

Investment Agreement

Innomission

Mission: II Green Fuels in Transport and Industry (Power-to-X, etc.)

MissionGreenFuels

The following parties:

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(hereinafter referred to as “IFD”)

and

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and

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and

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and

Dansk Brand- og sikringsteknisk Institut
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and

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and

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and

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and

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and

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and

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and

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and

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and

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and

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and

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and

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and

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and

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(hereinafter referred to as "NB")

have with effect of 15.06.2022 concluded this Investment Agreement relating to research, development and/or commercialisation based on an investment by IFD in the Partnership *MissionGreenFuels*.

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1. Exhibits

- Exhibit 1: Revised roadmap
- Exhibit 2: Partnership plan
- Exhibit 3: Organisation and management
- Exhibit 4: Rules of Procedure for the Partnership Board of Directors
- Exhibit 5: Partnership Budget

Furthermore, a Collaboration Agreement is a condition for, but not an integral part of the Investment Agreement

2. Definitions

The following definitions shall apply:

- 2.1.1. *“Administrator”*: has the meaning given to it in Clause 5.2.
- 2.1.2. *“Agreement”*: the entire agreement comprising this Investment Agreement and its Exhibits, and subsequent amendments to such documents.
- 2.1.3. *“Annual Report”*: has the meaning given to it in Clause 6.3.1.
- 2.1.4. *“Partnership Budget”*: the aggregate Partnership Budget and the Parties’ respective contributions thereto, annexed to the Investment Agreement as Exhibit 5.
- 2.1.5. *“Collaboration Agreement”*: the agreement concluded between the Partnership Participants governing their collaboration.
- 2.1.6. *“Final Report”*: has the meaning given to it in Clause 6.4.1.
- 2.1.7. *“IFD”*: the Innovation Fund Denmark, as established by the Minister for Higher Education and Science pursuant to Act no. 306 of 29th of March 2014 and consolidated Act no.1660 of 12th of August 2021.
- 2.1.8. *“Investment Agreement”*: this investment agreement with subsequent amendments, but exclusive of its Exhibits. See also the definition of *“Agreement”*.
- 2.1.9. *“Investment Criteria”*: the terms and conditions and criteria, including assessment criteria, and prerequisites on which IFD has based its decision to invest in the Partnership. These criteria can be found, inter alia, in IFD’s *“Guidelines for Grand Solutions and Innomission Partnerships”*, published August 20th 2021.

- 2.1.10. *“Investment Officer”*: the representative(s) of IFD appointed by IFD under Clause 8.1.13 who keep(s) an ongoing dialogue with the Partnership Leader during the Partnership and participate(s) in the Partnership Board of Directors meetings.
- 2.1.11. *“Investment Period”*: the period defined in the Partnership Plan during which IFD invests in the Partnership.
- 2.1.12. *“Investment Review”*: the annual review of the Partnership, including scientific, Partnership Budget-related and administrative aspects, as detailed in Clause 6.2.
- 2.1.13. *“Milestones”*: the milestones described in the Partnership Plan.
- 2.1.14. *“Party”*: each of the Partnership Participants and IFD.
- 2.1.15. *“Partnership”*: the Partnership described in the Partnership Plan .
- 2.1.16. *“Partnership Contributor”*: each of the legal entities and/or persons besides the Partnership Partners who participate in the performance of the Partnership, see the Partnership Plan and signs or subsequently accedes to the Agreement as a “Partnership Contributor”, see Clause 3.3.
- 2.1.17. *“Partnership Leader”*: the Partnership leader appointed by the Partnership Board of Directors and approved by IFD, see Clause 8.2.1.
- 2.1.18. *“Partnership Participant”*: each of the Partnership Partners and Partnership Contributors.
- 2.1.19. *“Partnership Partner”*: the legal entities and/or persons who sign or subsequently accede to the Agreement as “Partnership Partners”, individually, see Clause 3.3.
- 2.1.20. *“Partnership Plan”*: plan with information on IFD’s investment and Partnership Participants as well as description of the content of the Partnership, including Milestones and success criteria, annexed to the Investment Agreement as Exhibit 2, with subsequent amendments, see Clause 6.2 and Clause 7.3.
- 2.1.21. *“Partnership Board of Directors”*: the Partnership Board of Directors appointed by the Partnership Partners and approved by IFD, see Clause 8.1.

Unless otherwise specifically stated, references to clauses in this document shall be understood as references to clauses in the Investment Agreement. Unless otherwise specifically stated, references to exhibits are references to exhibits to the Investment Agreement. References to acts and rules shall be understood as references to acts and rules in force with subsequent amendments.

3. Background, purpose and accession of additional Partnership Participants

- 3.1. The purpose of the Agreement is to describe the Partnership Participants’ collaboration regarding the Partnership, see the Partnership Plan, and to describe the conditions governing IFD’s investment and the Partnership Participants’ receipt and use of IFD’s investment. As stated in Clause 13.2, the Investment Agreement is conditional upon the Partnership being commenced within a given deadline.

- 3.2. The Partnership Participants have entered into a Collaboration Agreement, governing their collaboration, including in relation to exploitation and distribution of any results and derived intellectual property rights arising in connection with the Partnership. See also Clause 11 below.
- 3.3. It is a condition for a Partnership Participant's entitlement to a share of IFD's invested funds, and for the Partnership Participant's acquisition of rights under this Investment Agreement, that the Partnership Participant signs this Investment Agreement in connection with its conclusion or subsequently accedes to the Investment Agreement as a Party by signing an accession agreement. When a Partnership Participant has signed such an accession agreement, and when the accession agreement has also been signed by IFD, the chairman of the Partnership Board of Directors and the Partnership Leader, the Partnership Participant in question is a Party to the Agreement. The decision to include new Partnership Participants as Parties to the Agreement shall be made by the Partnership Board of Directors in accordance with Clause 8.1.5. Inclusion of any new Partnership Participants shall, however, be valid only with the prior consent of IFD, confirmed by the signature of IFD on the accession agreement. IFD requires that new Partnership Participants meet the conditions on which IFD based its assessment of the Partnership and the existing Partnership Participants, i.e. the Investment Criteria, and hence IFD may refuse to approve a new Partnership Participant if the latter does not, in the assessment of IFD, meet the criteria. See also Clause 11.

4. Investment and Partnership funding

- 4.1. IFD invests DKK 201.625.000 in the Partnership in the Investment Period, however, see Clause 6.2 regarding adjustment of IFD's investment. The total Partnership costs and the distribution of the investment between the various Partnership Participants appears from the Partnership Budget. See also Clause 5 and Clause 6.2.
- 4.2. If the Partnership Participants obtain full or partial funding of their contributions to the Partnership from other public- or private-sector councils, foundations, entities, etc., IFD shall be notified thereof in writing. IFD shall have the right, but no obligation to offset such other funding against its investment. However, IFD has an obligation to perform set-off in its investment if a Partnership Participant that is an entity obtains aggregate public-sector co-funding that exceeds the permitted maximum according to the EU rules on state aid. A Partnership Participant's entitlement to receive funds from IFD is conditional upon the prior signing and submission by the Partnership Participant to IFD of any such statements and such information as IFD may require in relation to ensuring compliance with the EU rules on state aid.
- 4.3. No Party shall be ordered to contribute further resources to the Partnership or otherwise to bear costs beyond what is the responsibility of that Party in accordance with the Partnership Budget in force at any time. Hence, without the prior written consent of the Partnership Participant in question, amendments to the Partnership Budget, see e.g. Clause 6.2, shall not result in such Partnership Participant being ordered to contribute further resources to the Partnership or otherwise bearing costs beyond what is the responsibility of the Party as per the Partnership Budget applying at the time, or in any change of the size of the Partnership Participant's sub-payments or the time of their payment/contribution to the disadvantage of the Partnership Participant. Each Partnership Participant shall ultimately bear any costs incurred by such Partnership Participant in excess of the Partnership Budget. Throughout the Partnership, Partnership Participants shall avoid unnecessary consumption of resources and shall specifically justify extraordinary acquisitions, etc. during the last six (6) months of the

Investment Period. The Partnership Budget shall not be amended without the prior approval of IFD.

- 4.4. Investments under pool 2 budget shall follow the process described in exhibit 3 to this agreement.

5. Disbursement and use of the investment

- 5.1. The investment by IFD may be used for direct Partnership-related costs, i.e. costs that are directly attributable to the Partnership, see IFD's "Guidelines for Grand Solutions and Innomission Partnerships", published August 20th 2021.
- 5.2. Disbursement of IFD's investment shall take place by transfer to one of the Partnership Partners appointed by the Partnership Board of Directors and approved by IFD as administrator in terms of receiving and distributing the funds invested by IFD (the "Administrator"). The Administrator shall be responsible for ensuring that the sums disbursed by IFD are paid out to the Partnership Participants in accordance with the Partnership Budget and Partnership Plan.
- 5.3. IFD may lay down a number of requirements in connection with the appointment of the Administrator as conditions for approving the Administrator, including that the Administrator's financial solvency is acceptable to IFD, that one or more relevant third parties guarantee the Administrator's compliance with its obligations under the Agreement, or that the Administrator is organised in a manner that is reassuring to IFD in terms of the Administrator's obligations under the Agreement. IFD may at any time demand that a new Administrator is appointed if the existing Administrator does not, in the opinion of IFD, meet its obligations under the Agreement or if, in the assessment of IFD, there is a risk that the existing Administrator will be unable to meet its obligations under the Agreement.
- 5.4. Disbursements from IFD shall take place in accordance with IFD's "General Terms and Conditions for Grand Solutions" in force at any time, which can be found at IFD's website, www.innovationsfonden.dk. Disbursements shall take place on the basis of the most recently approved Partnership Budget; however, disbursements shall be reduced by the amount of funds previously disbursed by IFD but not used, see the "General Terms and Conditions for Grand Solutions". See also Clause 5.8 regarding IFD's option to demand repayment of funds disbursed but not used. No Partnership Participant shall be entitled to a share of the funds invested by IFD unless such entitlement is stated in the Partnership Budget.
- 5.5. As described in Clause 13.4 and Clause 14, IFD shall be entitled permanently to discontinue all disbursement of funds if IFD on the basis of an Investment Review under Clause 6.2 or another review under Clause 6.5 finds that the Partnership is not making sufficient progress, or minutes of Partnership Board of Directors meetings or Annual Reports have not been received on time, or if the said minutes or reports have not been prepared in accordance with the applicable rules and guidelines, see Clause 6.3.1. IFD may choose to, but need not, temporarily discontinue disbursement of funds, in full or in part, until such matters have been rectified.
- 5.6. Furthermore, IFD shall be entitled permanently to discontinue all disbursements of funds to a Partnership Participant if the latter becomes subject to insolvency proceedings as detailed in Clause 13.4, 2nd paragraph. IFD may choose to, but need not, temporarily discontinue disbursement of funds, in full or in part, if IFD receives information, see this Clause 5.6, giving IFD reason to assume that the Partnership Participant will become subject to such insolvency

proceedings. If a Partnership Participant becomes aware that a petition has been filed for financial restructuring or insolvency proceedings in relation to the Partnership Participant, or the Partnership Participant becomes aware that one or more of the situations referred to in section 18 of the Danish Insolvency Act applies in relation to the Partnership Participant, the relevant Partnership Participant shall immediately inform IFD, the Partnership Leader and the Administrator thereof, and the Administrator shall not subsequently disburse any funds to that Partnership Participant without the prior written approval of IFD.

- 5.7. Disbursement of the Final Instalment, see IFD's "General Terms and Conditions for Grand Solutions" in force at any time, shall be conditional upon IFD having received the Final Report on time, on such Final Report having been prepared in accordance with all applicable rules and guidelines, and on IFD having approved the Final Report. Furthermore, disbursement of the Final Instalment shall be conditional upon IFD having received and approved the final Annual Report for the Partnership.
- 5.8. IFD reserves the right during the course of the Partnership to demand repayment of unused funds, and all unused funds shall always be repaid to IFD after the expiry of the Investment Period. If IFD demands repayment of funds during the course of the Partnership, this shall be done by contacting the Partnership Leader and the Administrator. The relevant Partnership Participants shall, without undue delay, transfer funds to the Administrator so that repayment to IFD can take place. See also the "General Terms and Conditions for Grand Solutions" regarding repayment of funds disbursed.
- 5.9. The Partnership Participants shall, without undue delay, provide the Administrator with all necessary information for disbursement and transfer of IFD's investment. If such materials and information are not provided on time, IFD's investment cannot be disbursed.

6. Reporting to IFD and review of the Partnership

6.1. Partnership Board of Directors meeting documents and minutes

- 6.1.1. IFD shall monitor the progress of the Partnership throughout the Investment Period via an ongoing dialogue with the Partnership Leader and the Partnership Participants and via participation in Partnership Board of Directors meetings, including by receiving minutes of Partnership Board of Directors meetings.
- 6.1.2. IFD shall receive documents for Partnership Board of Directors meetings at least one (1) week before each meeting and shall receive the minutes of Partnership Board of Directors meetings within fourteen (14) days after the meeting was held.
- 6.1.3. IFD may at any time request, via the Partnership Leader, that the Partnership Partners report in detail on the progress of the Partnership. The deadline for such reporting which does not take place in connection with a Partnership Board of Directors meeting shall be ten (10) weekdays from the request.

6.2. Investment Review

- 6.2.1. Once a year, IFD shall perform an Investment Review together with the Partnership Board of Directors and any experts that IFD wishes to involve. The Partnership Leader and the Administrator shall assist IFD and the Partnership Board of Directors in connection with the

Investment Review(s). An Investment Review shall comprise a review and assessment of the Partnership status and expected development from a scientific perspective, including in relation to results, and from a financial/Partnership Budget-related, time-related and administrative/organisational perspective as specified by IFD. An Investment Review shall be based on input from the Partnership Board of Directors, the Partnership Leader and the Administrator as well as any further information requested by IFD or the Partnership Board of Directors from the Partnership Participants in connection with the review. The Partnership Participants shall provide all required information and assistance in connection with the performance of the review.

- 6.2.2. Unless IFD finds that there is no basis for continuing the Partnership, see Clause 13.4 and Clause 14, IFD and the Partnership Board of Directors shall, based on the annual Investment Review, jointly decide whether there is a need to amend the Partnership Plan and/or the Partnership Budget, including whether there is a basis for reducing IFD's investment, or whether it is relevant for the Partnership Participants to apply for further investments by IFD, and whether it is relevant to extend or shorten the Investment Period. The Partnership Plan and/or the Partnership Budget shall be updated to reflect such decisions, and the amendments made shall be binding on all Partnership Participants, however, see Clause 4.3 and Clause 7.3.

6.3. **Annual Report**

- 6.3.1. IFD shall annually receive a report (the "Annual Report") containing:
- (i) financial reporting in the form of accounts for the Partnership. The financial year shall be the calendar year. The accounts shall be prepared and presented in accordance with IFD's "General Terms and Conditions for Grand Solutions" in force at any time, see Clause 5.4, which, inter alia, state whether the accounts and the sub-accounts of the respective Partnership Participants shall be audited prior to submission, and
 - (ii) scientific reporting in relation to Partnership status and progress, including descriptions and documentation of results achieved and status relative to observance of Partnership Milestones and Partnership status relative to the success criteria laid down, see the Partnership Plan. The scientific reporting shall be based on the Investment Review described in Clause 6.2.
- 6.3.2. The Annual Report for a given financial year shall be received by IFD within the deadline stated in IFD's "General Terms and Conditions for Grand Solutions" in force at any time, and shall be approved by the Partnership Board of Directors prior to submission to IFD.
- 6.3.3. The Partnership Participants shall ultimately be responsible for the Annual Report and its preparation. Partnership Participants shall, without undue delay, supply the Partnership Leader with all necessary materials for use in connection with the preparation of the Annual Report. The Partnership Leader shall be responsible for ensuring that the Partnership Board of Directors receives a draft Annual Report for approval and that IFD subsequently receives the approved Annual Report by the deadline stated, see Clause 6.3.2. The Administrator shall assist the Partnership Leader in the preparation of the draft Annual Report.

6.4. *Final Report and follow-up*

- 6.4.1. Immediately after the completion of the Partnership and not later than three (3) months after the expiry of the Investment Period, the Partnership Leader shall submit a written final report in respect of the Partnership (the "Final Report"). The Partnership Participants shall contribute to the preparation of the Final Report, and the principles stated in Clause 6.3.3 shall apply relative to the preparation of the Final Report. The Final Report shall be prepared in accordance with IFD's "General Terms and Conditions for Grand Solutions" in force at any time, see Clause 5.4. As part of the evaluation of the Partnership and the preparation of the Final Report, the Partnership Participants undertake to be at the disposal of IFD.
- 6.4.2. For up to three (3) years after the completion of the Partnership, the Partnership Participants undertake to participate in IFD's annual Partnership follow-ups.
- 6.5. *IFD's current reviews of the Partnership*
 - 6.5.1. In addition to the annual Investment Reviews, see Clause 6.2, IFD may at any given time during the Investment Period decide to perform a review of the Partnership in relation to scientific aspects, including in relation to results, and in relation to financial/Partnership Budget-related, time-related and administrative/organisational aspects. In connection with such reviews, IFD may involve one or more independent external assessors. The independent external assessors may e.g. be involved in assessing whether one or more of IFD's Investment Criteria and/or Milestones and/or tasks laid down in the Partnership Plan have been fulfilled by the Partnership Participants, see Clause 7.1. The Partnership Participants, the Partnership Leader and the Administrator shall provide all required information and assistance in connection with the performance of the review. See Clause 13.4 regarding IFD's right to terminate the Investment Agreement and Clause 14 regarding IFD's right to terminate the Investment Agreement for breach.

7. Implementation of the Partnership

- 7.1. The Partnership Participants shall observe the Milestones and perform the tasks described in the Partnership Plan.
- 7.2. The Partnership Participants shall perform their respective Partnership tasks with a view to the Partnership contributing to promoting the objectives on the basis of which IFD has made the investment, see the Act referred to in Clause 2.1.7, and which are reflected in the Investment Criteria.
- 7.3. If IFD and the Partnership Partners, either in connection with Investment Review(s), see Clause 6.2, or otherwise, agree that it is appropriate to amend the Milestones, Investment Period, Partnership Budget or the tasks described in the Partnership Plan, the Partnership Partners shall, via the Partnership Board of Directors, prepare an amended Partnership Budget and/or a revised Partnership Plan describing the new Investment Period or the new Milestones and tasks. The revised Partnership Plan and/or amended Partnership Budget shall be subject to approval by IFD. The Partnership Participants shall observe the Milestones and perform the tasks described in the Partnership Plan applying at any time.
- 7.4. The Partnership Participants shall contribute the required materials, staff, facilities, equipment, etc. to the Partnership as described in the Partnership Plan, however, see Clause 4.3. The Partnership Participants shall drive forward the Partnership, making the best possible use of the resources allocated to the Partnership.

- 7.5. The Partnership shall be carried out and financial contributions made in accordance with the guidelines stated in the Partnership Plan, the Partnership Budget and IFD's "General Terms and Conditions for Grand Solutions" in force at any time, see Clause 5.4.
- 7.6. IFD attaches importance to Responsible Research and Innovation (RRI), which aims to strengthen the links between research and innovation processes and results and societal values and needs. IFD advances RRI in its overall strategies and in connection with its Partnerships. The European Commission's definition and implementation of RRI and IFD's encouragement to Partnership Participants to abide by RRI can be found [here](#).
- 7.7. IFD also supports the principles outlined in the [Danish Code of Conduct for Research Integrity](#). The Partnership Participants shall observe the Code of Conduct and hence accept and subscribe to these principles.
- 7.8. IFD has adopted the rules laid down in "[Open Access policy for public-sector research councils and foundations](#)". This means that published scientific articles which are the result of full funding or co-funding by IFD are to be made freely available to the public domain via Open Access if the publisher consents. The Partnership Participants accept and subscribe to these principles. The wording of these policies can be found via links from IFD's website, www.innovationsfonden.dk.
- 7.9. The Parties accept that although the Partnership is completed satisfactorily, this does not necessarily mean that the results stated in the Partnership Plan, expected or desired are achieved or realised. Hence, the Parties assume no responsibility for such achievement or realisation of results vis-à-vis one or more of the other Parties or any other responsibility in relation to the other Parties' expectations in terms of Partnership results. See Clause 13.4 regarding IFD's right to terminate the Investment Agreement with reference to the Investment Criteria.

8. Partnership management

8.1. *Partnership Board of Directors*

- 8.1.1. The Partnership Partners shall appoint a Partnership Board of Directors comprising representatives from each of the participating Partnership Partners. The Partnership Board of Directors shall appoint a chairman and a vice-chairman, who together with the Partnership Leader represent the Partnership vis-à-vis the outside world. The IFD shall approve the members of The Partnership Board of Directors and the Partnership Leader. The Partnership Board of Directors shall operate on the basis of the Rules of Procedure annexed to the Investment Agreement as Exhibit 4.
- 8.1.2. The Partnership Board of Directors is the supreme decision-making body in relation to the Partnership and responsible for its completion. The Partnership Board of Directors shall serve the overall interests of the Partnership and the Partnership Participants. Within the framework of the Investment Agreement, the Partnership Plan and the Partnership Budget, the Partnership Board of Directors shall lay down the strategy for the Partnership and its implementation.

- 8.1.3. Decisions of the Partnership Board of Directors shall have binding effect, not only on the Partnership Partners but also on the Partnership Contributors, however, see Clause 4.3 and Clause 7.3.
- 8.1.4. The Partnership Board of Directors shall monitor the development and progress of the Partnership and make decisions to ensure that interaction between the Partnership Participants as well as the organisation, management and resource allocation of the Partnership facilitate realisation of the Milestones and tasks described in the Partnership Plan, and to ensure that the Partnership is making sufficient progress. Among other things, the Partnership Board of Directors shall ensure that Partnership Participants collaborate in relation to common targets throughout the Investment Period and, if necessary, initiate adjustments to the Partnership Plan and Partnership organisation, see Clause 6.2 and Clause 7.3.
- 8.1.5. The Partnership Board of Directors shall make decisions regarding the inclusion of new Partnership Participants, including whether they shall accede to the Agreement as “Partnership Partners” or as “Partnership Contributors”. The Partnership Board of Directors shall observe the provisions of the Partnership Plan regarding the inclusion of new Partnership Participants. Pursuant to the Investment Agreement, the existing Partnership Participants authorise the chairman of the Partnership Board of Directors and the Partnership Leader jointly to sign accession agreements with binding effect on all Partnership Participants, however, see Clause 3.3. Inclusion of new Partnership Participants shall be subject to observance of the provisions of Clause 4.3 and Clause 7.3. The Partnership Plan shall be updated to reflect the accession of new Partnership Participants.
- 8.1.6. The Partnership Board of Directors shall ensure that both Partnership management and administration are taken into account throughout the Investment Period.
- 8.1.7. The Partnership Board of Directors shall supervise the work of the Partnership Leader and may lay down guidelines for and instruct the Partnership Leader in his/her work. The Partnership Board of Directors may at any time require that the Partnership Leader report to the Partnership Board of Directors, either in writing or at a meeting, on issues of relevance to the Partnership.
- 8.1.8. The Partnership Board of Directors shall supervise the Administrator and – if so requested by IFD – may at any time require that the Administrator provides information about disbursements by IFD and about the Administrator’s distribution of the funds to Partnership Participants.
- 8.1.9. The Partnership Board of Directors may decide to replace the Partnership Leader and/or the Administrator. Appointment of a new Partnership Leader or Administrator shall require the prior approval of IFD. The Partnership Board of Directors shall replace the Partnership Leader and/or the Administrator if IFD requires this, see Clause 8.2.1 and Clause 5.3.
- 8.1.10. The Partnership Board of Directors shall ensure the financial and scientific management of the Partnership and approve minutes of Partnership Board of Directors meetings and Annual Reports in connection with Partnership Board of Directors meetings. The Partnership Board of Directors must also approve the Final Report.
- 8.1.11. The Partnership Board of Directors shall meet at least twice a year, once in each half of the year.

- 8.1.12. IFD shall monitor the progress of the Partnership and supervise use of the funds invested in the Partnership; however, this shall not limit the liability of the Partnership Board of Directors and the Partnership Participants in relation to use of the funds invested.
- 8.1.13. IFD shall appoint one or two (1-2) Investment Officers to monitor the work of the Partnership Board of Directors. The Investment Officers appointed by IFD shall not be members of the Partnership Board of Directors but purely observers, and hence such Investment Officers shall not be entitled to vote at Partnership Board of Directors meetings. The Investment Officers appointed shall, however, have the right to attend and speak at all Partnership Board of Directors meetings, and IFD or any Investment Officer may convene a Partnership Board of Directors meeting and put separate items on the agenda of a Partnership Board of Directors meeting.
- 8.1.14. IFD and any Investment Officer(s) appointed may require that not only Partnership Board of Directors members and Investment Officers but also relevant specialists attend Partnership Board of Directors meetings and that these specialists are given the right to speak at the meetings.
- 8.1.15. IFD and/or the Investment Officer(s) appointed by IFD can in no way be held liable for the work of the Partnership Board of Directors, including for decisions made by the Partnership Board of Directors at its meetings, irrespective of whether any Investment Officers have participated in the Partnership Board of Directors meetings or have otherwise participated in the work of the Partnership Board of Directors. This shall also apply to any non-observance by the Partnership Board of Directors of its obligations under the Agreement.

8.2. *Partnership Leader*

- 8.2.1. The Partnership Board of Directors shall appoint a Partnership Leader, who must be approved by IFD. In this context, IFD may lay down a number of requirements as conditions for approving the Partnership Leader, including that the Partnership Leader has relevant professional experience and relevant Partnership management experience. IFD may at any time require that a new Partnership Leader be appointed if the existing Partnership Leader does not, in the assessment of IFD, meet his/her obligations under the Agreement or if, in the assessment of IFD, there is a risk that the existing Partnership Leader will be unable to meet his/her obligations under the Agreement.
- 8.2.2. The Partnership Leader is supervised by and receives instructions from the Partnership Board of Directors. The Partnership Leader participates in the meetings of the Partnership Board of Directors with the right to speak but not to vote.
- 8.2.3. The Partnership Leader shall have the day-to-day responsibility for the Partnership and its implementation, including coordination of activities between Partnership Participants.
- 8.2.4. Dispositions which are of an unusual nature relative to the Partnership content or have a major impact on the Partnership shall be made only by special authority from the Partnership Board of Directors.
- 8.2.5. In relation to IFD, the Partnership Leader shall always represent and act on behalf of the overall Partnership.

- 8.2.6. In current communication with the Partnership Leader regarding the Partnership and its implementation, all notices and information given by IFD to the Partnership Leader shall be deemed to have been given to all Partnership Participants at the same time. However, see Clause 15.3 on notices to Partnership Participants in relation to the Investment Agreement.
- 8.2.7. In addition to the responsibilities arising out of the Investment Agreement and the Partnership Board of Directors's instructions, the Partnership Leader shall be responsible for ensuring:
- that an initial Partnership Board of Directors meeting is held with the participation of the Investment Manager(s) and all Partnership Partners within one (1) month from the commencement of the Partnership,
 - that the Partnership Board of Directors is kept informed of Partnership progress,
 - that an ongoing dialogue is maintained with IFD; in this connection the Partnership Leader shall, without undue delay, inform IFD of any material circumstances of significance to the Partnership and/or IFD's investment,
 - that optimum use is made of Partnership resources,
 - that information from IFD is passed on to all other Partnership Participants,
 - that the minutes of Partnership Board of Directors meetings described in Clause 6.1 are prepared and submitted to IFD in a timely manner,
 - that he/she assists the Administrator in connection with disbursements from and repayments to IFD, and
 - that drafts are prepared for the Annual Reports and the Final Report and that the Annual Reports and the Final Report approved by the Partnership Board of Directors are submitted to IFD in a timely manner. The Partnership Leader shall collaborate with the Administrator in connection with the preparation of the Annual Reports and in connection with other reporting on financial aspects of the Partnership.

9. Dissemination

- 9.1. Partnership Participants shall ensure that references to Partnership activities in various media clearly indicate that this is a Partnership that has received IFD funding.
- 9.2. Any publication, report or other material published by Partnership Participants and containing references to the Partnership and/or results achieved in connection with the Partnership shall state that the Partnership has received funding from IFD, and the IFD logo shall be included in the material. However, the IFD logo may be omitted in scientific publications, etc. to the extent that it is not customary to use logos.
- 9.3. The Partnership Participants shall once a year during the Investment Period and in the calendar year after the completion of the Partnership provide assistance for the preparation of a short description of the Partnership and the Partnership status and make illustrations available for IFD's publication of the annual report, for IFD's website, etc. The material shall be produced in Danish and English. The deadline for submission of such material shall be determined by IFD, and the Partnership Board of Directors and the Partnership Leader shall, on behalf of the Partnership Participants, be responsible for ensuring that IFD receives the material on time.

- 9.4. Any publication, report or other material published by Partnership Participants in connection with the Partnership as described in Clause 9.2 shall be submitted to IFD electronically before its publication. Unless otherwise stated in the Investment Agreement, no party may use the logos, trademarks or other features of the other Parties in press releases or for marketing purposes without the prior written approval of the relevant Party.
- 9.5. IFD may lay down more detailed guidelines for the rights and obligations stated in this Clause 9. Furthermore, IFD may require that Partnership Participants set up and maintain a website providing information about the Partnership. The Partnership Board of Directors and the Partnership Leader shall be responsible for the set-up and maintenance of such website on behalf of the Partnership Participants.

10. IFD's communication about the Partnership

- 10.1. In accordance with IFD's "Guidelines for Grand Solutions and Innovation Partnerships", published August 20th 2021, IFD will publish an overview of the applications receiving investment commitments, and the Partnership Participants agree that, irrespective of this Clause 10, IFD may, in connection with the publication described in the guidelines, use the text from the application form with the short popular description. Furthermore, the Partnership Participants consent to IFD disclosing the names of the Partnership Participants, the Partnership title and duration, and key figures regarding the investment, including its size, in the Danish Research Database (<http://www.forskningsdatabasen.dk>), on IFD's website (www.innovationsfonden.dk) and in its publications.
- 10.2. Should IFD otherwise wish to communicate about the Partnership and/or results achieved in connection with the Partnership to the public, IFD shall inform the Partnership Leader thereof in writing, stating the information that IFD plans to communicate.
- 10.3. Communication to the public by IFD, see Clause 10.2, of the Partnership and/or results achieved in connection with the Partnership shall require the approval of all Partnership Participants. If no Partnership Participant has within thirty (30) days from receipt of written notice from IFD, see Clause 10.2, approved or rejected IFD's request to communicate information, IFD may in writing give the Partnership Participants fourteen (14) days to approve IFD's request or to reject it in writing, in which connection the grounds for such rejection shall be stated. If IFD's request has still not been replied to, this shall be deemed to be acceptance of IFD's planned communication to the public.
- 10.4. The scope or content of IFD's communication of information about the Partnership and/or results achieved in connection with the Partnership to the public shall never prevent or impede protection, including protection of intellectual property rights, of results achieved in connection with the Partnership.
- 10.5. In accordance with the "Guidelines for the Public on the Private Financing of Research at State Institutions" of 13 January 2000, state research institutions must disclose certain details relating to private co-funding of their research. In addition to the contents of Clause 10.1, the Partnership Participants accept that the Partnership title, the names of the Partnership Participants and size of the investment/funding is disclosed in accordance with the said guidelines.

11. Collaboration Agreement

- 11.1. It is a condition for obtaining investment from IFD that the Partnership Participants have entered into and signed a Collaboration Agreement on ownership and exploitation of the results and derived intellectual property rights arising in connection with the Partnership.
- 11.2. Furthermore, it is a condition that the Collaboration Agreement includes provisions ensuring that a Partnership Participant's accession to the Investment Agreement, see Clause 3.3, entails that the Partnership Participant accedes to the Collaboration Agreement at the same time, so that the Partnership Participant becomes a Party to the entire Agreement. A Partnership Participant cannot accede to the Collaboration Agreement without acceding to the Investment Agreement at the same time.
- 11.3. In the Collaboration Agreement, the Partnership Partners shall ensure that any Partnership Contributors undertake obligations vis-à-vis the Partnership Partners that will allow the Partnership Partners to observe the special obligations imposed on the Partnership Partners under the Investment Agreement and its other Exhibits.
- 11.4. IFD is not a party to and assumes no liability in relation to the Collaboration Agreement, see Clause 12.2. However, the Collaboration Agreement may only be amended with the prior written consent of IFD.

12. Liability and indemnification

- 12.1. Each Partnership Participant warrants to IFD:
 - 12.1.1. that the Partnership Participant in question is not aware of and to the best of its knowledge does not in connection with its performance of and participation in the Partnership in any way violate or contribute to infringement of any third party's rights, including in relation to consultancy, information or other contributions made by that Partnership Participant, its employees or students in connection with the Partnership,
 - 12.1.2. that the Partnership Participant in question has, to the best of its knowledge, acquired all necessary authorisations, licences, approvals and consents required in order to enter into this Agreement and participate in the Partnership,
 - 12.1.3. that the Partnership Participant in question will at all times observe the basic legal, regulatory and ethical principles applying to the specific Partnership area and execution, including, but not limited to, the principles listed in Clauses 7.6 and 7.7, and
 - 12.1.4. that the Partnership Participant in question will comply with the legislation in force at any time in connection with the Agreement and the execution of the Partnership, including, but not limited to, legislation and regulation concerning state aid, competition law, legislation on and regulation of corruption and money laundering, any national, foreign and international export control legislation, regulation, convention and sanction and any instructions from IFD aimed at ensuring such compliance.
- 12.2. The Partnership Participants shall never and cannot hold IFD responsible for circumstances unrelated to IFD's obligations as specifically stated in the Investment Agreement. For example,

Partnership Participants cannot hold IFD responsible for circumstances relating to the Exhibits to the Investment Agreement and/or the Partnership Participants' rights and obligations under these Exhibits, irrespective whether the IFD logo is printed on the Exhibits and irrespective of whether IFD was aware of, had reviewed, assessed, approved, accepted, signed or otherwise contributed to the drawing-up of the Exhibits.

13. Commencement, duration, expiry and termination

- 13.1. The Investment Agreement and Investment Period shall commence on 15.6.2022. The Investment Period is 5 year(s), unless amended in accordance with Clause 6.2 or Clause 7.3. Unless terminated earlier, see this Clause 13 and Clause 14, the Investment Agreement shall continue in force until the expiry of the Investment Period, when it shall cease immediately and without notice. Termination of the Investment Agreement, irrespective of the cause, shall entail immediate expiry of the Investment Period.
- 13.2. Irrespective of Clause 13.1, the Investment Agreement shall automatically be terminated if the Partnership has not been commenced within three (3) months from the date when the Investment Agreement enters into force, see Clause 13.1. If IFD prior to the expiry of the said period of three (3) months has received from the Partnership Leader an account approved by the Partnership Board of Directors stating the reasons for the delay, and IFD on the basis of this account finds that the grounds for the delay are reasonable and that the Partnership is still relevant, IFD may decide that the Investment Agreement shall not be terminated, despite the delay. However, if the Investment Agreement is terminated in accordance with this Clause 13.2, IFD will require that any funds disbursed are repaid by the Partnership Participants, and the Partnership Leader and the Administrator shall assist IFD in connection with such repayment.
- 13.3. Partnership Participants may terminate the Investment Agreement and depart from it giving three (3) months' notice to the end of a month. A Partnership Participant who terminates and departs from the Investment Agreement in accordance with this provision shall provide written reasons for such termination, but the right of termination shall not be conditional thereupon.
- 13.4. IFD may terminate the Investment Agreement in writing (for one or more Partnership Participants) giving three (3) months' notice to the end of a month if IFD – based on its free assessment, including a scientific assessment – finds

- (i): on the basis of a review under Clause 6.2 or Clause 6.5, (A) that the Partnership does not meet one or more of IFD's Investment Criteria or (B) that the Partnership is not making sufficient progress; this shall include, but not be limited to, situations where the Partnership in general is not making progress as assumed in the Partnership Plan timeline, or situations where it turns out that the basic assumptions on which the Partnership is based no longer exist, or
- (ii) that one or more of the Partnership Participant(s) do(es) not observe the Milestones and/or perform the tasks described in the Partnership Plan and/or the Partnership Budget, or
- (iii) a change in the Partnership Participant's/Participants' circumstances, including e.g. professional, scientific, financial and/or organisational circumstances entails that the Partnership Participant(s) no longer meet(s) IFD's Investment Criteria.

IFD may terminate the Investment Agreement in writing with immediate effect vis-à-vis a Partnership Participant which is subject to insolvent liquidation or to financial restructuring proceedings.

After the expiry of the period of notice, final accounts shall be prepared for the Partnership or the Partnership Participant(s) departing. On the basis of these accounts, the funds due/owing shall be disbursed or charged by IFD, and the terminated Partnership Participant(s) shall not receive any further share of the funds invested by IFD. The Partnership Leader and the Administrator shall jointly prepare the final accounts and present them for approval by IFD and the Partnership Board of Directors by a deadline set by IFD.

IFD may also terminate the Investment Agreement in the event of breach as described in Clause 14.

- 13.5. In connection with termination of the Investment Agreement, IFD shall to an appropriate extent take into account any obligations the Partnership Participants may have to finance PhD students.
- 13.6. If the Investment Agreement is terminated under Clause 13.3 or Clause 13.4, all Parties shall, unless otherwise agreed, continue to work loyally on the Partnership until the period of notice expires.

14. Breach and termination

- 14.1. If one or more Partnership Participants commit material breach of the Investment Agreement, IFD may terminate the Investment Agreement in writing with immediate effect for the Partnership Participant(s) in question, however, see Clause 14.3. In the event of material breach of the Investment Agreement by one or more Partnership Participant(s), Partnership Participants not in breach may request IFD to terminate the Investment Agreement in relation to the Partnership Participant(s) in breach. If IFD, in a situation where termination is possible, does not, within one (1) month from the request, comply with the request to terminate the Investment Agreement in relation to one or more Partnership Participants which are in material breach, the requesting Partnership Participants not in breach may terminate their own participation in the Investment Agreement giving a short notice of five (5) days. If IFD commits material breach of the Investment Agreement, the Partnership Participants may terminate the Investment Agreement in writing with immediate effect, however, see Clause 14.3.

- 14.2. The situations that constitute material breach shall be determined in accordance with the general provisions of Danish law, but the following shall always be deemed to be material breach: Partnership Participants' non-payment of financial contributions in accordance with the Partnership Plan or the Partnership Budget, non-timely submission of an Annual Report, see Clause 6.3, non-timely submission of other reports to be submitted by the Partnership Participants to IFD or submission of reports that are not in compliance with the rules and guidelines laid down by IFD, infringement by Partnership Participants of third-party rights, non-fulfilment by Partnership Participants of the indemnities stated in Clause 12.1, and misuse of Confidential Information.
- 14.3. However, if the breach can be rectified, the Investment Agreement shall be terminated only if the Party in breach has received a registered letter demanding it to do so, stating the nature of the breach, and has not rectified the matter within fourteen (14) days from the date when the demand was sent.
- 14.4. In the event of material breach on the part of a Partnership Participant, IFD may demand that all funding received by the Partnership Participant in breach from IFD be repaid within a deadline set by IFD. The Partnership Leader and the Administrator shall assist IFD in connection with such repayment.

15. Precedence, amendments, notices and assignment

- 15.1. The Investment Agreement shall be mandatory and shall in all respects take precedence over other documents and agreements, including the Collaboration Agreement.
- 15.2. No amendments to the Investment Agreement shall be valid unless they have been approved in writing by all Parties.
- 15.3. Notices and amendments to the Investment Agreement shall be in writing and addressed to the respective representatives of IFD and the Partnership Participants as stated in the Partnership Plan.

Notices exchanged between the Parties shall be sent by email to the email addresses of the representatives of the respective Parties as stated in the Partnership Plan. It is the responsibility of each Party to inform IFD and the Partnership Leader on an ongoing basis of any changes to the email address provided. Notices of termination, see Clause 13, including for breach, see Clause 14, shall, however, be sent by registered letter on the same day as the email regarding the issue in question was sent.

- 15.4. The rights and obligations of the Partnership Participants under the Investment Agreement cannot be assigned to a third party. Mergers of public-sector institutions shall not constitute assignment under this provision.
- 15.5. Irrespective of the provisions of this Clause 15, Clause 15 shall not limit the powers arising from Clause 8.1.3 (regarding the Partnership Board of Directors's decision-making powers), Clause 3.3 and Clause 8.1.5 (regarding inclusion of new Partnership Participants) and Clause 6.2 and Clause 7.3 (regarding amendments to the Partnership Plan and/or the Partnership Budget).

16. Governing law and legal venue

- 16.1. The Agreement shall be governed by Danish law, with the exception of Danish conflict of laws rules where such rules would lead to application of the law of another country.
- 16.2. Any dispute arising between the parties concerning this Agreement, including its interpretation and application, and which cannot be amicably settled must, in so far as is possible under the Administration of Justice Act, section 225 and section 227 be brought before the Maritime and Commercial High Court as court of first instance.

17. Signatures

Each Partnership Participant receives one (1) electronic copy of the Investment Agreement and its Exhibits.

For Innovation Fund
Denmark:

Date: 03/08 2022



Partnership Partners:

For Aalborg Universitet:

Date: / 2022

Per Michael Johansen
Rektor

For Aarhus Universitet:

Date: / 2022

Brian Bech Nielsen
Rektor

For Danmarks Tekniske
Universitet:

Date: / 2022

Anders O. Bjarklev
Rektor

For Syddansk Universitet:

Date: / 2022

Jens Ringsmose
Rektor

For Københavns
Universitet:

Date: / 2022

Henrik C. Wegener
Rektor

For Copenhagen Business
School:

Date: / 2022

Hanne Harmsen
Vice dean

For FORCE Technology:

Date: / 2022

Hanne Christensen
CEO

For Alexandra Instituttet:

Date: / 2022

Martin Møller
Chief Scientific Officer

For Teknologisk Institut:

Date: / 2022

David Tveit
Vice President

For Dansk Brand- og
sikringsteknisk Institut:

Date: / 2022

Carsten Damgaard
Forskningsdirektør

For Haldor Topsøe A/S:

Date: / 2022

Kim Grøn Knudsen
*Chief Innovation &
Strategy Officer*

For Danfoss A/S:

Date: / 2022

Atli Benonysson
Senior Director

Danfoss Drives A/S:

Date: / 2022

Vesa Laisi
President

For Grundfos Holding A/S:

Date: / 2022

Carsten Østergård
Pedersen, *Director*

For Vestas Wind Systems
A/S:

Date: / 2022

Bo Svoldgaard
Senior Vice President

For Siemes Gamesa
Renewable Energy A/S:

Date: / 2022

Finn Daugaard Madsen
Innovation Manager

For Ørsted A/S:

Date: / 2022

Anders Christian
Nordstrøm
Vice President COO P2X

For Energinet:

Date: / 2022

André Bryde Alnor
Senior Manager

For Energinet Systemansvar
A/S:

Date: / 2022

Bjarne Brendstrup
Senior Director

For Mærsk A/S:

Date: / 2022

Jacob Sterling
Senior Director

For Fonden Mærsk Mc-
Kinney Møller Center for
Zero Carbon Shipping:

Date: / 2022

Torben Nørgaard
Commercial Manager

For Green Hydrogen
Systems A/S:

Date: / 2022

Sebastian K. Andreassen
CEO

For DFDS A/S:

Date: / 2022

Jesper Aagesen
*Director of sustainable fleet
projects*

For Fredericia Kommune:

Date: / 2022

Anja Schaumburg
Sekretariatschef

For Energy Modelling Lab
ApS:

Date: / 2022

Kenneth Karlsson
Direktør

For DynElectro ApS:

Date: / 2022

Karsten Klemens Hansen
CEO

For Copenhagen Airports
International A/S:

Date: / 2022

Name
Title

For Rønne Havn:

Date: / 2022

Lars Nordahl Lemvig
CEO

For PlanEnergi:

Date: / 2022

Per Alex Sørensen
Teamkoordinator

For Hydrogen Valley:

Date: / 2022

Søren Bjerregaard
Pedersen
CEO

For Aalborg Kommune:

Date: / 2022

Name
Title

For Aabenraa Havn:

Date: / 2022

Henrik Thykjær
CEO

For EMD International A/S:

Date: / 2022

Anders N. Andersen
Head of R&D

For Center Denmark Fonden:

Date: / 2022

For EA Energianalyse

A/S:

Date: / 2022

For Copenhagen

Infrastructure Partners:

Date: / 2022

Søren Skov Bording
CEO

Lars Bregnbæk
Partner

Uffe Winther
Direktør

For Copenhagen
Infrastructure Project:

Date: / 2022

For European Energy

A/S:

Date: / 2022

For ENFOR A/S:

Date: / 2022

David Dupont-Mouritzen
Projektdirektør

Knud Erik Andersen
CEO

Mikkel Westenholz
CEO

For 2-control ApS:

Date: / 2022

For Energicenter Nord
ApS:

Date: / 2022

For Skovgaard Energy
ApS:

Date: / 2022

S. Jørgensen
CFO

Mads Skaarup Willadsen
CEO

Niels Erik Madsen
Managing Director

For EWII Fibernet A/S:

Date: / 2022

For NISA (Nordic
Initiative for Sustainable
Aviation):

Date: / 2022

For Everfuel A/S:

Date: / 2022

Lars Bonderup Bjørn
Adm. Direktør

Martin Porsgaard
Dir. Sustainable Aviation

Jacob Krogsgaard
CEO

For Nordisk Folkecenter for
Vedvarende Energi:

Date: / 2022

Jane Kruse
Forstander

For Nel Hydrogen A/S:

Date: / 2022

Jon Andre Løkke
CEO

For SAS Danmark A/S:

Date: / 2022

Name
Title

For Energy Cluster Denmark:

Date: / 2022

Glenda Napier
CEO

For DaCES:

Date: / 2022

Anne Marie Damgaard
Sekretariatschef

For: Fonden Dansk
Standard

Date: / 2022

Jens Heide
Administrerende Direktør

For SkyNRG BV:

Date: / 2022

Maarten van Dijk
Chief Development Officer

For Neste Oyj:

Date: / 2022

Outi Ervasti
VP Renewable Hydrogen

For Advanced Surface
Plating ApS:

Date: / 2022

Lars Pleth Nielsen
CEO

17. Signatures

Each Partnership Participant receives one (1) electronic copy of the Investment Agreement and its Exhibits.

For Innovation Fund
Denmark:

Date: / 2022

Partnership Partners:

For Aalborg Universitet:

Date: 9/16 2022



Per Michael Johansen
Rektor

For Aarhus Universitet:

Date: / 2022

Brian Bech Nielsen
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For Danmarks Tekniske
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Date: / 2022

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For Aalborg Universitet:

Date: / 2022

For Aarhus Universitet:

Date: 09/06 2022

For Danmarks Tekniske
Universitet:

Date: / 2022

Per Michael Johansen
Rektor


Brian Bech Nielsen
Rektor

Anders O. Bjarklev
Rektor

For Syddansk Universitet:

Date: / 2022

For Københavns
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Per Michael Johansen
Rektor

For Aarhus Universitet:

Date: / 2022

Brian Bech Nielsen
Rektor

For Danmarks Tekniske
Universitet:

Date: 9 / 6 2022


Anders O. Bjarklev
Rektor

For Syddansk Universitet:

Date: / 2022

Jens Ringsmose
Rektor

For Københavns
Universitet:

Date: / 2022

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Date: / 2022

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Date: / 2022

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Date: / 2022

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Chief Scientific Officer

For Teknologisk Institut:

Date: / 2022

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Vice President

17. Signatures

Each Partnership Participant receives one (1) electronic copy of the Investment Agreement and its Exhibits.

For Innovation Fund
Denmark:

Date: / 2022

Partnership Partners:

For Aalborg Universitet:

Date: / 2022

Per Michael Johansen
Rektor

For Aarhus Universitet:

Date: / 2022

Brian Bech Nielsen
Rektor

For Danmarks Tekniske
Universitet:

Date: / 2022

Anders O. Bjarklev
Rektor

For Syddansk Universitet:

Date: 07/06 2022



Jens Ringsmose
Rektor

For Københavns
Universitet:

Date: / 2022

Henrik C. Wegener
Rektor

For Copenhagen Business
School:

Date: / 2022

Hanne Harmsen
Vice dean

For FORCE Technology:

Date: / 2022

Hanne Christensen
CEO

For Alexandra Instituttet:

Date: / 2022

Martin Møller
Chief Scientific Officer

For Teknologisk Institut:

Date: / 2022

David Tveit
Vice President

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For Aarhus Universitet:

Date: / 2022

Brian Bech Nielsen
Rektor

For Danmarks Tekniske
Universitet:

Date: / 2022

Anders O. Bjarklev
Rektor

For Syddansk Universitet:

Date: / 2022

Jens Ringsmose
Rektor

For Københavns
Universitet:

Date: 23/6 2022

Henrik C. Wegener
Rektor



For Copenhagen Business
School:

Date: / 2022

Hanne Harmsen
Vice dean

For FORCE Technology:

Date: / 2022

Hanne Christensen
CEO

For Alexandra Instituttet:

Date: / 2022

Martin Møller
Chief Scientific Officer

For Teknologisk Institut:

Date: / 2022

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For Syddansk Universitet:

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Jens Ringsmose
Rektor

For FORCE Technology:

Date: / 2022

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CEO

For Aarhus Universitet:

Date: / 2022

Brian Bech Nielsen
Rektor

For Københavns
Universitet:

Date: / 2022

Henrik C. Wegener
Rektor

For Alexandra Instituttet:

Date: / 2022

Martin Møller
Chief Scientific Officer


For Danmarks Tekniske
Universitet:

Date: / 2022

Anders O. Bjarklev
Rektor

For Copenhagen Business
School:

Date: 14 / 6 2022


Søren Hvidkjær
Dean of Research

For Teknologisk Institut:

Date: / 2022

David Tveit
Vice President

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Date: / 2022

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For Syddansk Universitet:

Date: / 2022

Jens Ringsmose
Rektor

For Københavns
Universitet:

Date: / 2022

Henrik C. Wegener
Rektor

For Copenhagen Business
School:

Date: / 2022

Hanne Harmsen
Vice dean

For FORCE Technology:

Date: 10/16 2022



Hanne Christensen
CEO

For Alexandra Instituttet:

Date: / 2022

Martin Møller
Chief Scientific Officer

For Teknologisk Institut:

Date: / 2022

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Rektor

Brian Bech Nielsen
Rektor

Anders O. Bjarklev
Rektor

For Syddansk Universitet:

Date: / 2022

For Københavns
Universitet:

Date: / 2022

For Copenhagen Business
School:

Date: / 2022

Jens Ringsmose
Rektor

Henrik C. Wegener
Rektor

Hanne Harmsen
Vice dean

For FORCE Technology:

Date: / 2022

For Alexandra Instituttet:

Date: 7 / 6 / 2022

For Teknologisk Institut:

Date: / 2022

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CEO


Martin Møller
Chief Scientific Officer

David Tveit
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Vice dean

For FORCE Technology:

Date: / 2022

Hanne Christensen
CEO


For Alexandra Instituttet:

Date: / 2022

Martin Møller
Chief Scientific Officer

For Teknologisk Institut:

Date: 10 / 6 2022


David Tveit
Vice President

For Dansk Brand- og
sikringsteknisk Institut:

Date: / 2022

Hvidovre June 10th, 2022

Carsten Damgaard
Forskningsdirektør

For Haldor Topsøe A/S:

Date: / 2022

Kim Grøn Knudsen
Chief Innovation &
Strategy Officer

For Danfoss A/S:

Date: / 2022

Atli Benonysson
Senior Director

Danfoss Drives A/S:

Date: / 2022

Vesa Laisi
President

For Grundfos Holding A/S:

Date: / 2022

Carsten Østergård
Pedersen, Director

For Vestas Wind Systems
A/S:

Date: / 2022

Bo Svoldgaard
Senior Vice President

For Siemes Gamesa
Renewable Energy A/S:

Date: / 2022

Finn Daugaard Madsen
Innovation Manager

For Ørsted A/S:

Date: / 2022

Anders Christian
Nordstrøm
Vice President COO P2X

For Energinet:

Date: / 2022

André Bryde Alnor
Senior Manager

For Energinet Systemansvar
A/S:

Date: / 2022

Bjarne Brendstrup
Senior Director

For Mærsk A/S:

Date: / 2022

Jacob Sterling
Senior Director

For Fonden Mærsk Mc-
Kinney Møller Center for
Zero Carbon Shipping:

Date: / 2022

Torben Nørgaard
Commercial Manager

For Dansk Brand- og sikringsteknisk Institut:

Date: / 2022

Carsten Damgaard
Forskningsdirektør

For Haldor Topsøe A/S:

Date: 9/6 2022

Kim Grøn Knudsen
Kim Grøn Knudsen
Chief Innovation & Strategy Officer

For Danfoss A/S:

Date: / 2022

Atli Benonysson
Senior Director

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President

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Forskningsdirektør


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Date: / 2022

Kim Grøn Knudsen
Chief Innovation & Strategy Officer

For Danfoss A/S:

Date: 8/6 2022



Atli Benonysson
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Danfoss Drives A/S:

Date: / 2022

Vesa Laisi
President

For Grundfos Holding A/S:

Date: / 2022

Carsten Østergård Pedersen, *Director*

For Vestas Wind Systems A/S:

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*Chief Innovation &
Strategy Officer*

For Danfoss A/S:

Date: / 2022

Atli Benonysson
Senior Director

Danfoss Drives A/S:

Date: 8/16 2022



Vesa Laisi
President

For Grundfos Holding A/S:

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Carsten Østergård
Pedersen, *Director*

For Vestas Wind Systems
A/S:

Date: / 2022

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Renewable Energy A/S:

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Date: / 2022

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Date: / 2022

Vesa Laisi
President

For Grundfos Holding A/S:

Date: 10/6 2022



Carsten Østergård
Pedersen, *Director*

For Vestas Wind Systems A/S:

Date: / 2022

Bo Svoldgaard
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For Siemes Gamesa Renewable Energy A/S:

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Date: / 2022

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Date: / 2022

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Date: / 2022

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Senior Director

Danfoss Drives A/S:

Date: / 2022

Vesa Laisi
President

For Grundfos Holding A/S:

Date: / 2022

Carsten Østergård
Pedersen, *Director*

For Vestas Wind Systems A/S:

Date: 15/6 2022

Bo Svoldgaard

Bo Svoldgaard
Senior Vice President

For Siemes Gamesa Renewable Energy A/S:

Date: / 2022

Finn Daugaard Madsen
Innovation Manager

For Ørsted A/S:

Date: / 2022

Anders Christian
Nordstrøm
Vice President COO P2X

For Energinet:

Date: / 2022

André Bryde Alnor
Senior Manager

For Energinet Systemansvar A/S:

Date: / 2022

Bjarne Brendstrup
Senior Director

For Mærsk A/S:

Date: / 2022

Jacob Sterling
Senior Director

For Fonden Mærsk McKinney Møller Center for Zero Carbon Shipping:

Date: / 2022

Torben Nørgaard
Commercial Manager

For Dansk Brand- og
sikringsteknisk Institut:

Date: / 2022

Carsten Damgaard
Forskningsdirektør

For Haldor Topsøe A/S:

Date: / 2022

Kim Grøn Knudsen
*Chief Innovation &
Strategy Officer*

For Danfoss A/S:

Date: / 2022

Atli Benonysson
Senior Director

Danfoss Drives A/S:

Date: / 2022

For Grundfos Holding A/S:

Date: / 2022

Carsten Østergård
Pedersen, *Director*

For Vestas Wind Systems
A/S:

Date: / 2022

Bo Svoldgaard
Senior Vice President

Vesa Laisi
President

For Siemes Gamesa
Renewable Energy A/S:

Date: / 2022

Finn Daugaard Madsen
Digitalt signeret af Finn Daugaard Madsen
DN: cn=Finn Daugaard Madsen, o=DK,
o=Siemens Gamesa Renewable Energy
A/S // CN:78486212,
email=Finn.Madsen@siemensgamesa.com
Date: 2022.06.07 10:35:50 +0200

Finn Daugaard Madsen
Innovation Manager

For Ørsted A/S:

Date: / 2022

Anders Christian
Nordstrøm
Vice President COO P2X

For Energinet:

Date: / 2022

André Bryde Alnor
Senior Manager

For Energinet Systemansvar
A/S:

Date: / 2022

For Mærsk A/S:

Date: / 2022

Jacob Sterling
Senior Director

For Fonden Mærsk Mc-
Kinney Møller Center for
Zero Carbon Shipping:

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Torben Nørgaard
Commercial Manager

Bjarne Brendstrup
Senior Director

For Dansk Brand- og sikringsteknisk Institut:

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Forskningsdirektør

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Danfoss Drives A/S:

Date: / 2022

For Grundfos Holding A/S:

Date: / 2022

Carsten Østergård
Pedersen, Director

For Vestas Wind Systems A/S:

Date: / 2022

Bo Svoldgaard
Senior Vice President

Vesa Laisi
President

For Siemens Gamesa Renewable Energy A/S:

Date: / 2022

Finn Daugaard Madsen
Innovation Manager

For Ørsted A/S:

Ørsted Hydrogen Green Fuels DK A/S

Date: 8/6 2022

Anders Christian
Nordstrøm
Vice President COO P2X

For Energinet:

Date: / 2022

André Bryde Alnor
Senior Manager

For Energinet Systemansvar A/S:

Date: / 2022

Bjarne Brendstrup
Senior Director

For Mærsk A/S:

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Senior Director

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Forskningsdirektør

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Pedersen, *Director*

For Vestas Wind Systems A/S:

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Senior Vice President

For Siemes Gamesa Renewable Energy A/S:

Date: / 2022

Finn Daugaard Madsen
Innovation Manager

For Ørsted A/S:

Date: / 2022

Anders Christian Nordstrøm
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For Energinet:

Date: 13/06 2022


Andre Bryde Alnor
Senior Manager

For Energinet Systemansvar A/S:

Date: / 2022

Bjarne Brendstrup
Senior Director

For Mærsk A/S:

Date: / 2022

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Senior Director

For Fonden Mærsk McKinney Møller Center for Zero Carbon Shipping:

Date: / 2022

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For Dansk Brand- og
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Date: / 2022

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Forskningsdirektør

For Haldor Topsøe A/S:

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*Chief Innovation &
Strategy Officer*

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Date: / 2022

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Pedersen, *Director*

For Vestas Wind Systems
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Senior Vice President

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Renewable Energy A/S:

Date: / 2022

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Anders Christian
Nordstrøm
Vice President COO P2X

For Energinet:

Date: / 2022

André Bryde Alnor
Senior Manager

For Energinet Systemansvar
A/S:

Date: 9/6 2022


Bjarne Brendstrup
Senior Director

For Mærsk A/S:

Date: / 2022

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Senior Director

For Fonden Mærsk Mc-
Kinney Møller Center for
Zero Carbon Shipping:
Date: / 2022

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Forskningsdirektør

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Date: / 2022

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For Vestas Wind Systems A/S:

Date: / 2022

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Innovation Manager

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Date: / 2022

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Date: 7/6 2022

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Forskningsdirektør

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A/S:

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Renewable Energy A/S:

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For Energinet:

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Bjarne Brendstrup
Senior Director

For Mærsk A/S:

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Jacob Sterling
Senior Director

For Fonden Mærsk Mc-
Kinney Møller Center for
Zero Carbon Shipping:

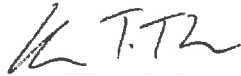
Date: 8/5 2022

Torben Nørgaard
Commercial Manager

HEAD OF ENERGY DIVISION

For Green Hydrogen
Systems A/S:

Date: 10/06 2022



Sebastian K. Andreassen
CEO

For DynElectro ApS:

Date: / 2022

Karsten Klemens Hansen
CEO

For Hydrogen Valley:

Date: / 2022

Søren Bjerregaard
Pedersen
CEO

For DFDS A/S:

Date: / 2022

Jesper Aagesen
*Director of sustainable fleet
projects*

For Fredericia Kommune:

Date: / 2022

For Copenhagen Airports
International A/S:

Date: / 2022

Name
Title

For Rønne Havn:

Date: / 2022

Lars Nordahl Lemvig
CEO

For Aalborg Kommune:

Date: / 2022

Name
Title

For Aabenraa Havn:

Date: / 2022

Henrik Thykjær
CEO

For Energy Modelling Lab
ApS:

Date: / 2022

Kenneth Karlsson
Direktør

For PlanEnergi:

Date: / 2022

Per Alex Sørensen
Teamkoordinator

For EMD International A/S:

Date: / 2022

Anders N. Andersen
Head of R&D

For Green Hydrogen
Systems A/S:

Date: / 2022

Sebastian K. Andreassen
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For DynElectro ApS:

Date: 8 /6- 2022

KKH

Karsten Klemens Hansen
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For Fredericia Kommune:

Date: / 2022

For Rønne Havn:

Date: / 2022

For Aabenraa Havn:

Date: / 2022

Anja Schaumburg
Sekretariatschef

Lars Nordahl Lemvig
CEO

Henrik Thykjær
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For Energy Modelling Lab
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For PlanEnergi:

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Hobro
Date: 9/16 2022

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Date: / 2022

Henrik Thykjær
CEO

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ApS:

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Date: / 2022

Per Alex Sørensen
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Date: / 2022

Anders N. Andersen
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Systems A/S:

Date: / 2022

Sebastian K. Andreassen
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Karsten Klemens Hansen
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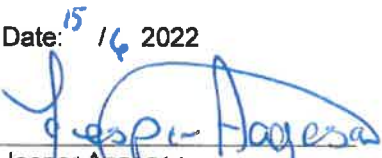
For Hydrogen Valley:

Date: / 2022

Søren Bjerregaard
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Date: ¹⁵ / ₁₆ 2022



Jesper Aagesen
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Name
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Date: / 2022

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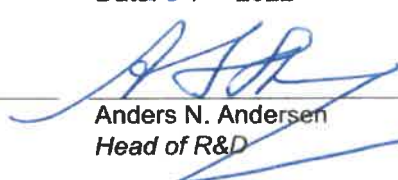
For PlanEnergi:

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Date: 10/7 2022


Anders N. Andersen
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MIKAEL
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Date: / / 2022

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Date: / 2022

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Infrastructure Partners:
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Partner

~~Uffe Winther
Direktør~~

For CI ETF I Hoes P/S
Date: 13/6 2022

For European Energy
A/S:
Date: / 2022

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David Dupont-Mouritzen
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Uffe Winther
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Infrastructure Project:

Date: / 2022

David Dupont-Mouritzen
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Date: 8/6 2022

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For ENFOR A/S:

Date: / 2022

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ApS:

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Date: 07/06 2022

David Dupont-Mouritzen
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For 2-control ApS:

Date: / 2022

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ApS:

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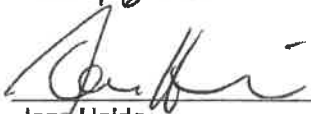
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Exhibit 1

Revised Roadmap

MissionGreenFuels

File number: 1150-00001A

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1 The common goal and vision for the Partnership

1.1 Background

Green fuels are essential for the green transition, as they form an essential piece in the puzzle that is the sustainable carbon cycle of the future and link different energy vectors to each other providing a holistic platform upon which to ensure flexibility, optimal use of resources and socioeconomic transparency.

Historically, green fuels have been biofuels of different sorts, but as we have become wiser and have had experiences with these fuels, we have learned that not all biofuels are green fuels, nor do they necessarily have to derive directly from biomass or even contain carbon. We have also learned, that once new fuels are introduced into the value chain, they are very difficult to get rid off again even though they in some cases are more GHG intensive than the classic fossil fuels.

In order not to repeat history, the MissionGreenFuels partnership addresses the challenges of green fuels in a focused and coordinated way, using the roadmap to align and guide research and innovation activities, and ensuring knowledge sharing that identifies and builds on synergies whilst avoiding lock-ins.

1.2 Vision

The vision for the MissionGreenFuels partnership is to contribute substantially to the Danish, European and global climate goals, specifically 70 % reduction by 2030 and net zero by 2050, and to support Danish research, innovation, growth, jobs and export potential within the field of green fuels. The partnership will accomplish this by

- Industrialisation and upscaling of flagship projects to support further acceleration of green fuels in order to sooner create independency of fossil fuels
- Carrying out research, innovation and demonstration activities within the prioritized areas of the roadmap
- Monitoring national and international developments and update roadmap objectives accordingly
- Building an agile, dynamic and inclusive mission-driven partnership committed to deliver together over the next five years and beyond
- Facilitating knowledge sharing and carrying out partnership strengthening activities
- Securing a portfolio of projects where cross-fertilisation across the individual projects is a priority to secure learning and development
- Establishing cross-cutting initiatives in the partnership ecosystems as well as outside the partnership i.e. to the other Innomissions to work towards green transition.
- Defining prioritized topics and areas for new research and innovation activities and work to secure additional funding for these
- Engaging with relevant national and international stakeholders across the full scope of pathways identified in the roadmap
- Reaching success depends delivering on cohesion: the partnerships ability to unite forces, minds, ideas and willpower, to work differently and to impact society rapidly.

In terms of the vision for the partnership itself it clearly goes beyond this initial funding period. In order to deliver on the GHG reduction targets, the partnership will look beyond 2026 and build the foundations for value creation for current and new partners in the longer perspective.

The Partnership is engaging into an agenda which is influenced by a lot of external (political) factors, enormous investments and with a lot of uncertainties, with needs for adjustments, and which calls for an explorative innovation process. The impacts may not necessarily be achieved within the duration of the projects, but through subsequent scaling of the solutions e.g., through export and full-scale implementation beyond the Partnership.

1.3 Objectives and value creation

As a first priority, the MissionGreenFuels secretariat will support the partnership in establishing a platform where partners (typically universities and research institutions) can set up knowledge-building activities in the form of MSc and PhD programs and lifelong learning, as well as mobilize institutional resources on commercialization of research and innovation activities. This will be based on already existing frameworks at the secretariat partners ECD, DaCES and AAU, allowing for an effective roll-out and engagement within the scope of the partnership.

Furthermore, the MissionGreenFuels partnership will work towards the following specific objectives:

1.3.1 CO₂ reduction impact

Climate projections from the Danish Energy Agency show that under a frozen policy scenario, total net emissions are expected to fall to 35 mt CO₂e in 2030, corresponding to a reduction of 55% compared to the 1990 level. The projections thus show that at present there is an estimated reduction shortfall of 15 percentage points, corresponding to 11.8 Mt of CO₂e in relation to the Danish Climate Act's 70% target (ref 5). Assuming full implementation of the proposed roadmap, initial estimations show that the roadmap has a potential to reduce CO₂e by a further 4.9 Mt in 2030. Thus, the roadmap covers 41% of the reduction shortfall to reach the Danish climate goal.

The main part of the CO₂e reductions are expected from the transport sector. Despite an increase in conducted transportation, CO₂e emissions from the transport sector are expected to fall by 2 mt from 2019 to 2030 in a frozen policy scenario, which means that the sector is expected to emit 11.5 mt of CO₂e in 2030. This is roughly at par with emissions in 1990. More than half of this reduction is from the transition to electric passenger cars (ref 12). By implementing the roadmap, emissions in 2030 are estimated to be further reduced by 3.3 Mt CO₂e so that the sector emits 7.9 Mt CO₂e. These estimations only include national transportation, in line with the Danish Climate Act's 70% target. Although the original roadmap does not propose full-scale Danish production of ammonia for shipping, the pace over the last year and the need for exploring further development of ammonia for this purpose underpins to address this element in the first full revision of the roadmap by the partnership. Expected reductions from shipping included in these estimates also include the effect of introducing ammonia as a fuel. Given the right framework conditions, and opportunity for full-scale demonstration of the technology, shipping is expected to convert to green fuels, irrespective of the origin.

In sum, the roadmap presents an estimated 33% reduction of the emissions in the transport sector compared with 1990 levels. This should be held up against a sharp increase in transportation conducted. It also exceeds expectations according to the Climate Partnership for Energy and Utilities Sector (ref 13), which estimated the CO₂e reduction potential from PtX in the transport sector to be 1.9 Mt. Moreover, it is in the high end of government estimations in the Climate Programme for 2020 (ref 12).

In a frozen policy scenario, emissions from the industry (manufacturing and construction) are expected to fall by 1.5 Mt CO₂e in 2030. The emissions from manufacturing and construction come from both the sector's energy consumption and process emissions (ref 5). The reduction is mainly due to a reduction in the manufacturing industry's energy-related emissions, while the decrease in process

emissions is significantly smaller. By implementing the roadmap, emissions are estimated to be reduced by a further 1.6 Mt CO₂e compared to the frozen policy scenario. This constitutes a 76% reduction in CO₂e emissions from the sector. Finally, we expect a 1.1 Mt CO₂e reduction from 2020 to 2030 from the Danish share of international shipping and aviation.

These reductions do not contribute towards the 70% reduction target as they are achieved in the international arena. The reduction will occur despite a considerable increase in transportation conducted by these modes. The estimations are uncertain, due to different methods of calculating the Danish share of international aviation and shipping. Nevertheless, the estimations are in line with the long-term reduction potential estimated in the government's Climate Programme for 2020 (ref 12).

The above calculations focus solely on transportation and industry, and not on national or international effects in other sectors. For instance, surplus heat from PtX can support the Danish district heating supply. Also, Danish power from sun and wind would arguably have a greater climate effect if it is exported in the European electricity system, where it would displace fossil-based electricity production. Finally, the calculations do not consider any possible rebound effects due to tighter regulation.

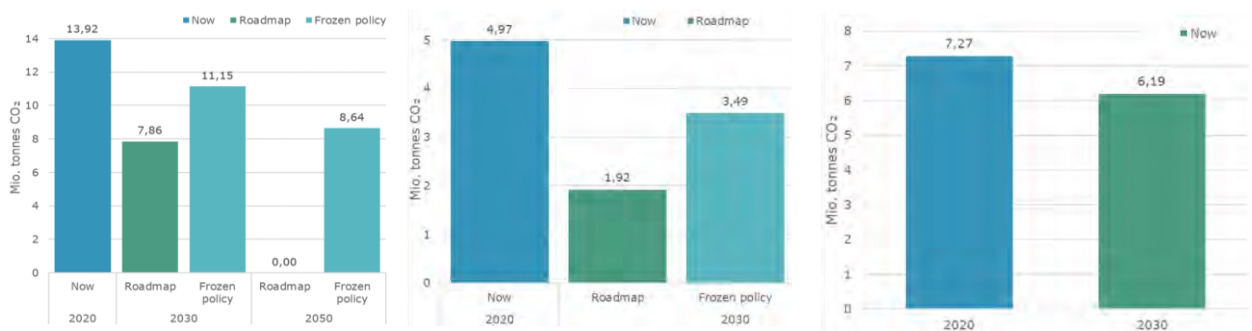


Figure 1 Roadmap contributions to CO₂ reductions from domestic transport (left), industry (center) and international maritime and aviation transport (right)

1.3.2 Export potential

Denmark has a long tradition of exporting energy raw materials, primarily based on oil and natural gas. From the end of the 1990s onwards, exports increased markedly and peaked in 2008 at approx. 76 billion DKK in export earnings (ref 5).

For the proposed roadmap, it seems realistic that there will be a considerable export potential for green hydrogen. The existing hydrogen consumption in industry and refineries is approx. 1440 PJ in Europe, which is today largely produced from fossil fuels, i.e. natural gas and coal. Some of this could potentially be replaced by electrolysis-based hydrogen from Denmark. The increasing green hydrogen demand from Germany, and ongoing discussions of an EU hydrogen backbone, are good indications of a growing demand from Denmark's neighbouring countries.

Medium term export of methanol also seems realistic, although to a less extent than hydrogen. Due to imports of biomass, Denmark has considerable access to carbon, which is used in methanol production. Conversely, the industry does not seem convinced that production and export of ammonia is a viable option for Danish producers, as this may be produced with less cost in other countries and imported to Denmark. For this reason, the roadmap does not include a large-scale ammonia production facility placed in Denmark, although smaller scale facilities may be set up in order to test the technology.

Danish production of PtX fuels still plays an important role in building technologies and know-how, which may be exported on a large scale, as is the case with wind energy. In continuation of this, the

70% target in 2030 can be leveraged for Danish consumers and companies to use energy-efficient solutions, which at the same time will lead to increased demand for energy technology. This supports the energy technology innovation in Denmark, which contributes to Danish companies having good conditions for continuing to develop and export competitive energy technology solutions. In fact, according to actors in the industry, this is where the main export potential is expected, and thus should not be underestimated.

This PtX road map suggests actions to among others support the realization of 3.7 GW already planned PtX projects for 2030. These already planned projects are likely to become the first fast steppingstone for Denmark to grow a global export of technologies and solutions in PtX. This export will come on top of the increased export of wind turbines from Denmark as a consequence of PtX requiring more renewable power on a global scale in the coming decades.

1.3.3 Job creation

The estimated demand from CAPEX projections includes both the direct and the indirect employment effects, and thus both the labor demand that investment creates in connection with the actual implementation of the investment and acquisition of the components/plants that are not standard solutions (the direct effect) and the labor demand generated by investment in suppliers of goods and other services (indirect effect).

Based on expectations for CAPEX projections for green hydrogen and methanol, combined with the suggested development of consumption of biofuels in industry transport, it is expected that PtX CAPEX investments of 35 billion DKK is required between 2021 and 2030, and a further 22 billion DKK towards 2050 to make transport and industry independent of fossil fuels by 2050.



Figure 2 Expected job creation resulting from implementation of the roadmap

While construction of production facilities mainly requires unskilled or lower-education labour, it could be expected that the significant labor demand created due to export of PtX technologies would be directed more towards higher education employment. In order to meet employment demands with a national workforce, it is crucial to ensure the right education of potential employees. This process must be initiated now, so that new graduates are ready by before 2030

2 Overall goals for the partnership

The overall goals for the partnership can be summarized into two overarching targets:

1. To establish a strong partnership platform that creates value for participating partners by
 - a. Involvement: partners are directly engaged in developing the focus and priorities of the partnership, and share knowledge in the individual work streams
 - b. Transparency: activities must be based on trust between the individual partners as well as on the objectivity of the decision-making processes within the partnership.
 - c. Agility: the partnership monitors developments within the green fuel area and responds quickly to these through roadmap updates and/or specific activities

2. To establish a strong partnership platform that creates value for society by
 - a. Contributing significantly to the Danish climate targets in 2030 and 2050 through the 9 projects defined across the work streams as well as the pool 2 implementation
 - b. Creating a long-term capacity building within green fuels by ensuring that next-generation professionals are equipped to meet the demands of the new technology areas, and that current-generation professionals can be updated to the same level
 - c. Stimulating and facilitating a strong Danish research and industrial presence within green fuels, benefitting both sectors as well as society

Portfolio for pool 1

The MissionGreenFuels project portfolio for pool 1 is divided in three strategic research and innovation areas, referred to as workstreams where green fuels are essential for the green transition. The combined contribution from the project portfolio defined in pool 1, and the projects to be defined in pool 2, are selected to secure the most significant contribution to the goals defined in the MissionGreenFuels roadmap. The three workstreams are:

- 1) Technologies
- 2) Infrastructure/P2X plants/sector coupling
- 3) Business and market development and acceptance

The projects in pool 1 are selected for their expected contribution to achieve the best possible development, acceleration of industrialization, production and volume and utilization of green fuels. This applies to potential, safety, most suitable technologies, implementation and development of a market. At the same time, pool 1 contains essential projects concerning infrastructure and acceptance of GreenFuels -solutions, i.e. increase the SRL, as there is a need to prepare for the development of green fuels on a large scale in order to sooner create independency of fossil fuels.

Overall goals for MissionGreenFuels

The overall goals and KPI's are complex to define for one single project, since the whole value chain of the GreenFuels are depending on a range of conditions, scalability and industrialization and still unsettled laws and regulations at both national and EU level that have to be in place before the full impact of the technological solutions can be measured.

The goals for each workstream are defined below. Though it is difficult to provide precise numbers for how much CO₂ reduction, its partners and the projects will generate, an estimated target for CO₂ reduction is indicated in Table 2. By performing an overall estimate based on the initial investment size into MissionGreen fuels as well as the expected additional funding to the mission versus the expected

total investments into green hydrogen by 2030 (total PtX infrastructure) and 2050 (electrolysis capacity) as listed in the proposal, the following overall KPIs can be estimated:

Table 1 MissionGreenFuel overall investments and target GHG reductions

	2030	2050 ¹
Expected installed electrolysis capacity (DK)	6-7 GW	25 GW
Total investment	25-35 bill DKK (from Table 2)	150 bill DKK (electrolysis only)
MissionGreenFuel	201 mio DKK (IFD 2023) + 1.500 mio DKK ²	+5-6 bill DKK ²
MissionGreenFuel Share of investments	5-7 %	~5 %
GHG reductions by full roadmap implementation	6.15 %-points (4.9 MT CO _{2eq} /a)	- no estimate; (+23.6 MT CO _{2eq} /a)
MissionGreenFuels share of DK GHG reductions	5 %-points (80 % of roadmap)	+15 %-points

If the ratio between total PtX investments and electrolysis only are carried forward to 2050, total investments will be around 300-400 bill DKK, and the investment share into MissionGreenFuel will drop accordingly.

Table 2 Total investments expected into Danish PtX infrastructure up to 2030³

Investeringer i relevante PtX-indsatsområder frem mod 2030	
Indsatsområde	Investeringer frem mod 2030 (mia. kr.)
Produktionsanlæg (værdikædeprojekter: 0,5 GW elektrolyse)	5-7
Produktionsanlæg (produktionsstøtte: 2,5 GW elektrolyse)	17-23
Forbrugsomstilling	2-3
Infrastruktur	1-2
Total	25-35

The MissionGreenFuels partnership is ambitious and wants to take an active role in advancing the green transition contributing to reaching the national reduction targets.

Specific and measurable goals for the individual work streams are given below. Furthermore, the specific contributions of the selected pool 1 projects to the targets are indicated for each workstream.

The complete set of KPI's for MissionGreenFuels is shown in Figure 3.

¹ Scaled according to expected investments at EU level

² Using expected success rate in table 1 in Partnership Plan

³ Dansk Industri: Anbefalinger til en dansk strategi for Power-to-X. 2021

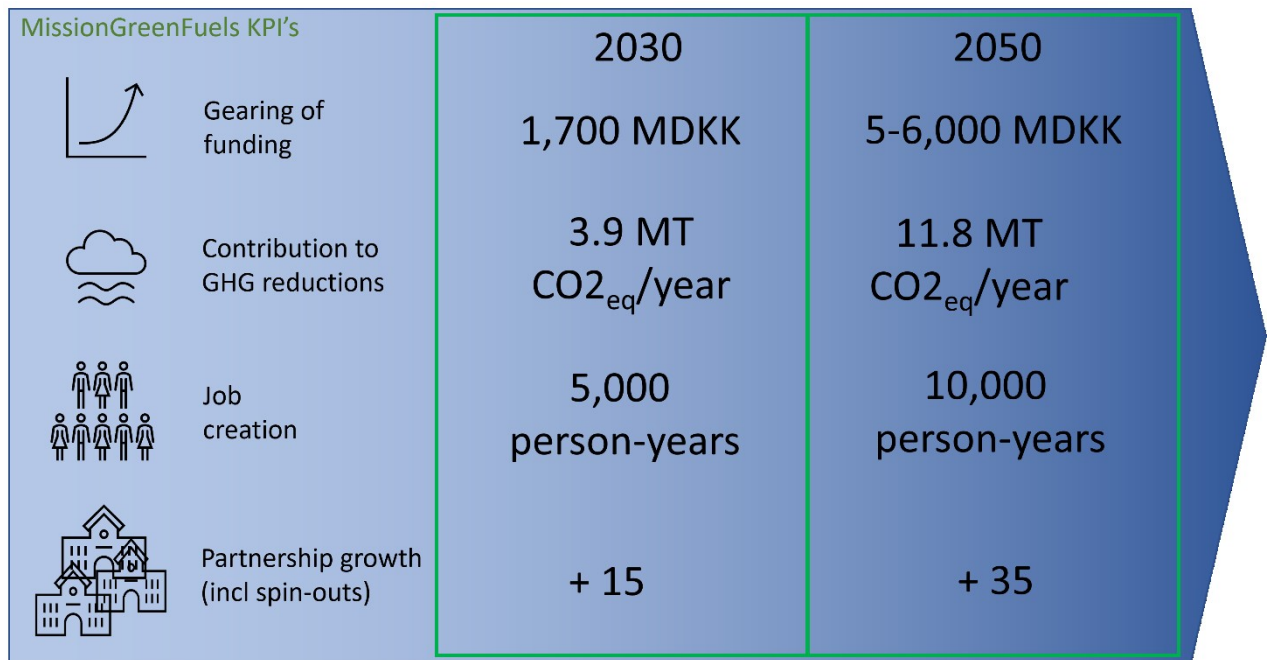


Figure 3 Overall KPI's for MissionGreenFuels

2.1.1 Workstream 1: Technologies

Indicator/goal	Target 2025/2030
CO2 Reduction	
ComEiCo	Large potential
GREMEOH	GREMEOH will have a potential of delivering +5% of the 4.9Mt reduction target by 2030 based on combined impact
COMPAS	25 % higher efficiency with SOEC => less production of renewable energy plants (wind), i.e. ~2.1 mio ton CO2 less - if 6.3 GW planned electrolysis in Denmark is SOEC. + 1.5 mio ton CO2 yearly (HØST)
MEOH to Jet	By 2027 the project Green Fuels for Denmark (GFDK) plans to use this technology to scale up to commercial production and by 2030 increase production capacity to 259kt/year of fuel per year, equivalent to ~1/3 of total yearly aviation fuel consumption in Copenhagen Airport in Kastrup and equivalent to displacing 810kt CO2/year.
Job potential	
ComEiCo	+200
GREMEOH	+175
COMPAS	+280
MEOH to Jet	Not specified

Project	Topic	TRL Base-line	TRL 2025	TRL 2030	TRL 2050
ComEiCo	Efficient power electronics for electrolysis	3	5		
GREMEOH	Electrolysis manufacturing systems	4	7		
Compas	Improving electrolysis technology for ammonia	2	4/5		
MEOH to Jet	Methanol-to-jet fuel process development	2	5/6		

2.1.2 Workstream 2: Infrastructure/PtX plants/Sector coupling

Indicator/goal	Target 2025/2030
CO2 Reduction	
Safe Ptx	Ensuring implementation of safety standards, regulations and approvals for Ptx technologies and upscaling of plants will contribute to achieving a total reduction of 2.5 million tons carbon emissions already by 2030.
DYNFlex	Ensuring a flexible dynamic operation of PtX plants is vital to obtain a higher degree of renewable energy utilization to succeed a reduction of CO2.
HYFueling	The specific project is to function as a first catalyst and living-lab demonstration for heavy duty station development and build-out in Denmark, hereto facilitating critical HD fueling validation and actual operator trials of first HD fuel cell vehicles. Transitioning a traditional heavy duty 40t truck driving ~100.000km/year to a comparable fuel cell truck is estimated to result in a ~100t CO2 reduction per truck/year.
Ptx-LCA	Ensuring efficient sector coupling may be determining for the feasibility of PtX projects. This project aims to ensure that a cost-efficient build out of energy infrastructures takes place to facilitate PtX projects, and hereby achieving CO2 reduction faster.
Job potential	
Safe Ptx	Developing safety standards for PtX scaled demonstration facilities will provide Danish companies with a competitive edge internationally and will result in job creation
DYNFlex	Large export potential and job creation in terms of Danish companies supplying PtX components and systems.
HYFuelling	Act as a stepping stone to create export and jobs of globally approved hydrogen fueling stations and infrastructure solutions for heavy duty and heavy use transportation, developed, produced and demonstrated in Denmark.
Ptx-LCA	Sector coupling and optimizing PtX products will generate a large number of jobs.

Project	Topic	TRL Base-line	TRL 2025	TRL 2030	TRL 2050
Safe Ptx	Safe and faster PtX implementation pathways	6	7		
DYNFlex	DYNFLEX - Digitalization and Test for Dynamic and Flexible Operation of PtX Components and Systems	2/3	7		
HYFuelling	Testing heavy-duty fuel in real-life	3	6		
Ptx-LCA	PtX sector coupling and LCA	4	8		

2.1.3 Workstream 3: Business and market development and acceptance

Indicator/goal	Target
Communities in the Green Fuels Transition	Reducing public resistance through development of models for public and civil engagement in the development of green fuel infrastructures
CO2 Reduction	<p>2025/2030:</p> <p>The foundation for a significant part of the green transition depends on the ability to build large-scale PtX facilities. By increasing social acceptance via early involvement processes and communication design, this project enables solutions by speeding up the process to allocate and build the needed facilities.</p>
Job potential	<p>2025/2030:</p> <p>Green fuels technologies have big potentials for job creation, but the realization depends on social acceptance of the implementation of the technologies. This project offers ways of tackling these barriers via communication design and models for citizen involvement.</p>
TRL / SRL	Baseline: 2 2025: 3/4a

3 Pool 2 priorities

Pool 2 priorities will be determined through a partnership process in the second half of 2022. In a manner similar to the evolution of the MissionGreenFuels proposal itself, a series of workshops will be arranged to establish the specific priorities and themes of the pool 2 call.

The workshops will be structured around the three workstreams and the updated roadmap, but will be scoped to reflect the top priorities within the area of green fuels. Thus, gaps in the implementation of the roadmap will be identified and considered for pool 2 topics. Budget allocations to specific call topics will be established during these workshops.

CHANGES TO THE ROADMAP (max 2400 characters)

Two elements constitute the main changes following the initial roadmap 1112-00008A. The alignment and inclusion of the proposed roadmap "Leveraging Danish strengths to mature and scale up e-fuels for transport" (1112-00012A) and the collected scope of the activities selected by Innomission Partnership for PtX and Green Fuels.

- > 1. Developing the Innomission partnership application has resulted in joining the scope of the two roadmaps. In general, there are no conflicts between the two roadmaps – one just being more comprehensive than the other. Similarities apply on the technological pathways for PtX, sector coupling, in the application of green fuels in off-take and in highlighting the urgency of deploying large scale plants, thus as fast as possible bringing down the cost of hydrogen production. Both roadmaps also focus on the role of flagship projects as key enablers of the development of the strongholds of Denmark within in the field. The two roadmaps have in concrete terms been aligned by including the pivotal flagship project: Green Fuels for Denmark, as one of three main project pillars which all proposed activities address in on one or the other way. In addition, a specific activity addressing a core enabler of the underlying business model of Green Fuels for Denmark, the development of a methanol to jet-fuel process has been selected.
- > 2. The initial roadmap has spurred a significant number of proposals for activities to be funded by the Innomission. The financial constraints have resulted in only a part of the projects being put forward to receive financing from this call – hence the roadmap in its totality cannot be accommodated. This among other includes aspects related to cavern storage, gasification, pyrolysis, biooils and HVO – which is not narrowly aligned with the process of bringing down the price of hydrogen and e-fuel production. The topics from the roadmap which have not been given focus in terms of the Innomission financing, continues to be part of the roadmap. Financing might be sought elsewhere, and the activities may remain on the Innomission longlist of development activities.



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Roadmap for Green Fuels in Transport and Industry

Innominmission 2 (2021)

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1 Abbreviation

AEC	Alkane electrolysis cell	Gasoline	Light hydrocarbons (C ₄ -C ₁₂ , typically C ₇ -C ₁₁). Same as petrol.
Biofuel	Biofuel is fuels produced from biooils (see definition of biooil below)	GHG	Greenhouse gas
Biogas	60% methane and 40% CO ₂ based on production from biomasses via anaerobic digestion	H ₂	Hydrogen
Biooil	Biooil is oil produced from pyrolysis, liquefaction or the HVO process. Biooil also include oil from pyrolysis of plastic and tires as it is assumed that these with time will become 100 % biogenic.	HFO	Heavy fuel oil (typically C ₂₀ -C ₅₀)
BNG	Biogas upgraded to natural gas quality by removing CO ₂ and other impurities, leaving primarily CH ₄	HVO	Hydrotreated vegetable oil (typically C ₁₅ -C ₁₈)
CC	Carbon capture	Jet-fuel	Highly branched hydrocarbon, C ₁₀ -C ₁₃ , mostly kerosene
CCU	Carbon capture and utilization	LCA	Life-cycle assessment analysis
CCS	Carbon capture and storage	LH ₂	Liquefied hydrogen
CH ₂	Compressed hydrogen	LNG	Liquefied natural gas (primary CH ₄)
CHP	Combined heat and power plant	LOHC	Liquid organic hydrogen carriers (H ₂ carrier with the goal of making H ₂ transport cheaper)
CO ₂	Carbon dioxide	LPG	Liquefied petroleum gas (primary C ₃ -C ₄)
CO ₂ e	Carbon dioxide equivalents	M85	Methanol gasoline blend with 85 wt% MeOH
DK	Denmark	MeOH	Methanol (CH ₃ OH)
DME	Dimethylether (C ₂ H ₆ O)	MGO	Marine gasoil (typically <C ₃₅)
ENDK	Energinet Denmark	Mt	Megatonne (1.000.000.000 kg)
EtOH	Ethanol (C ₂ H ₅ OH)	NG	Fossil natural gas (primarily CH ₄).
EU	European Union	NH ₃	Ammonia
EC	Electrolysis cell	RE	Renewable energy
FAME	Fatty acid methyl ether (=biodiesel) (C ₁₆ -C ₈₁ esters)	SMR	Steam methane reforming (eSMR=electric heated steam methane reforming)
FCEV	Fuel cell electric vehicle	SOEC	Solid oxide electrolysis cell (high temperature with high efficiency)
		WtE	Waste to Energy plants

2 Executive Summary

This road map provides a consolidated call for action through three periods leading to 2023/24, 2030 and 2030-2050 respectively, on the approach to green fuels in transport and industry in Denmark, building on multiple workshops and interviews involving a large number of the most significant Danish stakeholders across research organisations, innovation and knowledge sharing institutions, trade organisations and companies including technology and energy providers and future off-takers of green fuels. The roadmap is to be seen in conjunction with Innomission 1: Capture and storage or use of CO₂.

A call for action. Key activities and workstreams build on identified goals, challenges and inflection points and provides guidance for stakeholders, that all are part of a green transition. One action remains the most immediate and prominent across the value chain – the need to act urgently and coordinated and to support more demonstration and up-scaling activities. Further delay or hints of indecisiveness, in the support of enabling a transformation, will have pronounced consequences to the ability of further curbing Danish greenhouse gas emissions according to both national and international goals, as well as the harnessing of the significant Danish socio-economic potential. A large number of Danish industry stakeholders are already planning a total of 3.7 GW (~53 PJ/y hydrogen production) significantly exceeding the expectations of the Danish Energy Agency during the period from 2024 to 2030 of 132 MW (~1.9 PJ/y hydrogen production). These plans provide an immediate and obvious launch pad for a strong Danish ambition within PtX as supported by this roadmap.

Reducing uncertainty. Key in the utilisation of hydrogen-based fuels and scarce renewable carbon resources in specific parts of the transport system and industry requires a scale of investment beyond the traditional willingness of the public sector. To succeed, a reduction in uncertainty and achievement of cost parity between alternative green and fossil fuels, is needed. This involves:

- A clear and stable path as to which fuels besides direct electrification to target, which preferably is already global commodity e.g. Hydrogen, Ammonia, Methanol and biooil.
- Drastically increasing the availability of green hydrogen as well as increasing its utilisation both directly and as a basis for production of green fuels. And in consequence increase availability of renewable power accordingly.
- Pooling the off-taking demand side and creating new value chains across energy and transport.

-
- Ensuring focus of public resources available for building large scale demonstration and test sites. Changes in regulatory framework conditions (i.e. CO₂ taxes, subsidies, CO₂-displacement requirements in a cap-and-trade system) and research into innovative business models.
 - End-to-end large demonstrators and cost-out innovation activities with a strong focus on enhancing the efficiency in PtX and PtX-activities coupled with wind energy sources and technologies.

Technology leads the path to efficiency. In the subsequent steps technological development is equally vital in the bringing forth of a transition, in relation to the gradual cost-out of the production of fuels. In tandem with the development of the markets for green fuels, research and innovation will allow for more optimal combinations and scaling of existing technologies. On a longer term it could allow for the breaking of entirely new ground within the technologies by researching in optimization of electrolysis and catalytic processes. Research and innovation would entail:

- Optimal use of feedstocks across off-take sectors based on Life Cycle and substitution analyses, combined with studies into security of supply for feedstocks.
- Efficiency for new or retrofitted engines, new methods for modelling, forecasting, controlling and optimizing engines running on green fuel and safety in relation to operation.
- Pathways into a stronger integration of PtX plants with the broader energy systems by looking at modelling, control systems, new market design principles and monetization models to secure plant efficiency and a robust and balanced energy system enabled by a number of distributed PtX plants.
- New possibilities for utilisation of surplus heat and the use of biproducts from processing.
- Sector coupling of flexibility in both production and offtake of green fuels through among other digitalization, Artificial Intelligence, dynamic tariffs and through social science disciplines studying accept and behavioural adaptation in relation to PtX plants and new energy infrastructure facilities.
- Development and discovery of new catalysts and processes that are not limited by poor efficiency, low product selectivity, high cost, and rarity are needed.
- Fundamental research in CO₂ functionalization to generate platform chemicals, key building blocks in pharmaceutical industries and polymer chemistry, providing sustainable alternatives for petroleum-based chemicals.

Stay ahead. Denmark is already a world leader within shipping and maritime equipment as well as catalytic processing – combining large industry with a strong undergrowth of innovative SMEs. Furthermore, the Danish strongholds mirror the wind energy production capabilities and knowhow, which is second to none and offers cheap green power throughout the globe. In addition, the openness and trustfulness in the Danish research and innovation environment and in the related industry constitute the basis for unique collaborations across the entire value chain. By choosing timely to adhere to the necessity of making green fuels a key element at certain stages and in certain areas within transport and industry, Denmark's position in the lead of the global transition towards a sustainable future can be sustained. It will ensure that green fuel technologies in combination with carbon storage solutions will also be a substantial and increasing part of the economic activity of Denmark going towards 2030 and beyond.

2.1 PROCESS AND PARTICIPATING ORGANIZATIONS

Danish Center for Energy Storage (DaCES), six universities AAU, AU, SDU, KU, CBS, DTU, Energy Cluster Denmark (ECD) and Maritime & Logistics Innovation Denmark (MARLOG) have instigated the initiative to establish the partnership behind the Roadmap. With Professor Anker Degn Jensen, DTU Chemical Engineering as chair, the partnership has orchestrated this roadmap. Key partners and co-sponsors, the Danish Technological Institute, FORCE Technology, DBI and the Alexandra Institute, (RTO's), Vestas and Haldor Topsøe, have joined the initiative and are equally sponsors of the roadmap.

Three workshops, each hosting approx. 100 participants, has involved representatives of universities, industry, interest and business associations in identifying the challenges and possibilities. The workshops were involving and with a broad representation. The output was synthesized to decipher common denominators, gaps in the value chains and potential conflict of interests btw. stakeholders. Moreover, the synthesis includes insights from a

number of key industry interviews, as well as input from the DACES Joint Working Group, the boards of both ECD and MARLOG on the subjects.

Table 2-1. Organizations participating with inputs to the roadmap

1st Mile	DNV	North Denmark EU Office
A.P. Møller Mærsk		Nordic Folkcenter for Renewable Energy
Dansk Shell	DTU	NORDPHOS
ADP AS	DynElectro	Ocean Team Scandinavia
Danish Academy of Technical Sciences (ATV)	En2save	Oiltanking Copenhagen
Alexandra Institute	Energinet	PFA Pension
Andel	Energy Cluster Denmark	Port of Hanstholm
AquaGreen	EnergySolution	Port of Rønne
Athco-Engineering	Everfuel	Port of Aalborg
Ballard Power Systems Europe	FORCE Technology	R&D Engineering
Bech-Bruun	Futurelab AS	Rambøll Management Consulting
Blue World Technologies	Goth Engineering	REEL
BP Transport	Green Hub Denmark	ReFlow
CBS	Green Hydrogen Systems	Region Midtjylland
Copenhagen Airport	GreenLab Skive	ReIntegrate
Copenhagen Capacity	Hafnium Labs	Semco Maritime
COWI	Haldor Topsøe	ShippingLab
DaCES	Port of Hanstholm	Simac
Danfoss	Hybrid Greentech	Siemens Gamesa
Danish Shipping	Hydrogen Valley	Stena Bulk
Danish Ship Finance	IFD	Stiesdal Fuel Technologies
DBI - The Danish Institute of Fire and Security Technology	Implement Consulting Group	SubC Partner
Danish Energy	Iveco Denmark	SulfLogger
Dansk Energirådgivning	JG Maritime Engineering Ltd	University of Southern Denmark, SDU
Danish Gas Technology Centre	Kalundborg Municipality	Danish Technological Institute
Danish Industry	Kvasir Technologies	Tårntank Rederi
Danish Transport and Logistics (DTL)	University of Copenhagen	Total
Danish Harbours	LINDØ port of ODENSE	Tuco Marine ApS
The Danish Maritime Industry	Lloyd's Register	Vestas
Danish Transport and Logistics Association	Lundgrens	Wood Mackenzie
DB	MAN Energy Solutions	Wärtsilä
DFDS	Marlog	Ørsted
DHI	Maskinmesterskolen København	Aalborg CSP
DHRTC	Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping	Aalborg Portland
Disruptive Biotrading	Nature Energy	Aalborg University
		Aarhus University

3 State of the art

3.1 GOAL

To satisfy the 70%- CO₂e-equivalent (CO₂e) reduction goal in 2030, the CO₂e emission must be reduced by an additional 11.8 Mton/y compared to the current frozen policy projection as shown in Figure 3-1. Both industry and transportation are sectors where a significant CO₂e emission reduction can be achieved and contributed to reaching the 70%- CO₂e reduction goal in 2030.

A key source for the CO₂e emission in industry and the transport sector is fossil fuels. The available energy sources to replace fossil are electricity from renewable sources (wind and solar power) and residue biomass and waste. This is shown in Figure 3-2, which provides an overview of the technology pathways for production of renewable fuels.

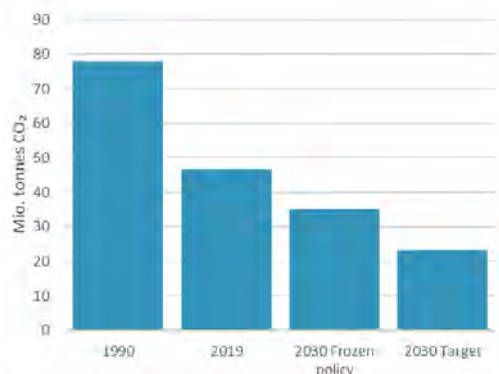


Figure 3-1: CO₂ emissions in Denmark from 1990 to 2030

3.2 ALTERNATIVE FUELS AND POSSIBLE PRODUCTION PATHS

Electricity produced from wind and solar power can be used directly by light-duty road transport or for heavy-duty road transport as a hybrid solution with other fuels. Alternatively, power can be converted to green hydrogen via electrolysis and be used directly in heavy-duty land transport or light-duty marine maritime transport. For heavy duty maritime and aviation, liquid fuel is optimal due to the need for high energy density.

Liquid fuels can be produced via either of the following routes:

1. **Methanol, DME:** Syngas is formed by combining green hydrogen with either:

- CO₂ from carbon capture
- Gasified biomass
- Steam reformed biogas

This Syngas can be converted to Methanol, DME or to a "crude alike oil" in a Fischer-Tropsch synthesis. These liquid fuels can be used to cover a variety of end users in the transportation sector. Additionally, they can be further converted into jet-fuel.

1. **Biogas:** Biogas is produced via anaerobic digestion. It can be used directly in combustion-based applications, upgraded to biogenic natural gas (BNG), or converted to Syngas (see point above)
2. **Ethanol:** Fermentation of biomass result in ethanol that can be blended into gasoline
3. **Biooil:** Biooil is oil produced from biomass through pyrolysis, liquefaction or the HVO process. Biooil also include oil from pyrolysis of plastic and tires as it is assumed that these with time will become 100 % biogenic. Biooil can be refined to liquid fuels for trucks, maritime and aviation
4. **Ammonia:** Nitrogen captured from air is mixed with hydrogen from electrolysis and sent to ammonia synthesis loop resulting in liquid ammonia

It is important to note that hydrogen is required for all the technology pathways mentioned. This makes the production of cheap and competitive green hydrogen via electrolysis crucial for the transition from fossil-based fuels to renewable alternatives.

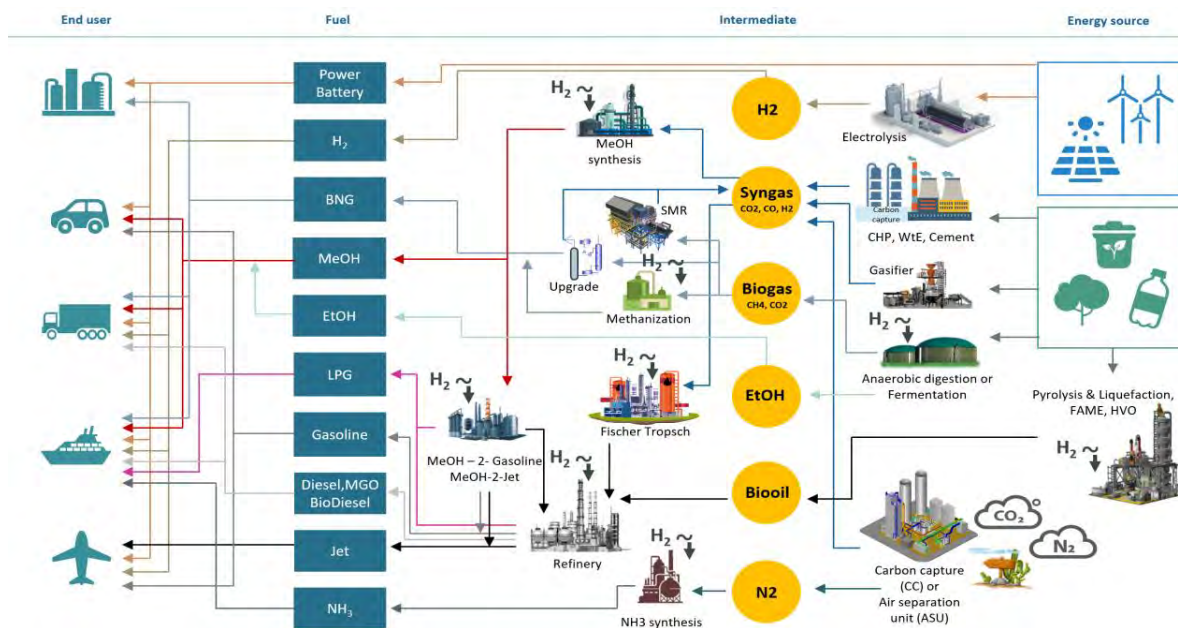


Figure 3-2: Overview of different pathways for production of renewable fuels (the black H₂ show the processes which need green hydrogen)

3.3 PTX PROJECTS AND ACTIVITIES

There is an ongoing massive global upscaling of hydrogen production. More than 30 countries have hydrogen roadmaps and 228 large-scale hydrogen projects have been announced (ref 1). There are already invested more than 80 billion USD globally in mature projects, meaning they have passed the final investment decision, with additionally 220 billion USD pledged in investments. Authorities worldwide have already pledged more than 70 billion USD in public funding.

In Europe, there is a target of 40 GW blue and green hydrogen production by 2030, with additional import of 40 GW. The eight largest announced European projects are set to commission more than 80 GW of electrolyser capacity by 2030 (Table 3-1). Denmark is missing an official target for hydrogen production but the power-production capacity goals for the energy islands are 2-3 GW at Bornholm and 3-10 GW in the North Sea.

It is important that the Danish projects in Table 3-1 receive the proper support, so that they will be realized by 2030, by setting up a national strategy and removing barriers. Development and demonstration of hydrogen, ammonia, methanol/DME, biooil refinery and jet-fuel projects are crucial to a successful roadmap for alternative fuels in transport and industry.

In addition to the PtX project listed in Table 3-1, DK have several companies that work with pyrolysis and liquefaction, producing a sustainable oil that can replace fossil. It is important quickly to ensure that our refineries become capable to take and refine these oils.

Table 3-1. Largest PtX projects of the world and Denmark (ref 2 and 3). Projects in DK are marked with light blue.

World's 20 largest green hydrogen projects	Cap. (GW)	Power Source	Products	Location	Year
HyDeal Ambition	67	Solar	H ₂	Spain, France, Germany	2030
Asian Renewable Energy Hub	14	Solar and onshore wind	H ₂ and NH ₃	Australia	2027-2028
NorthH2	10	Offshore wind	H ₂	Netherlands	2030-2040
AquaVentus	10	Offshore wind	H ₂	Germany	2035
HyEnergy Zero Carbon Hydrogen	8	Wind and solar	H ₂ and NH ₃	Australia	2030
Murchison Renewable Hydrogen Project	5	Onshore wind and solar	H ₂ , green fuels	Australia	2028
Beijing Jingneng Inner Mongolia	5	Onshore wind and solar	Unknown	China	2021
Helios Green Fuels Project	4	Onshore wind and solar	H ₂ (transported as NH ₃)	Saudi Arabia	2025
Pacific Solar Hydrogen	3.6	Solar	H ₂	Australia	-
Base One	3.4	Wind and solar	H ₂	Brazil	2025
H2-Hub Gladstone	3	Renewable Energy	NH ₃	Australia	-
Yellow Sea	2	Floating wind	Unknown	China	-
HyEx	1.6	Solar	NH ₃	Chile	2024
Geraldton	1.5	Onshore wind and solar	NH ₃	Australia	-
HNH	1.4	Onshore wind	NH ₃	Chile	2026
Green Fuels for Denmark, Ørsted, CPH Lufthavne, Mærsk, DSV, SAS	1.3	Offshore wind	H ₂ and e-fuels	Denmark	2023-2030
SeaH2Land	1	Offshore wind	NH ₃ , ethylene and transport fuel	Belgium and Netherlands	2030
Esbjerg, Maersk, DFDS, Arla, Danish Crown, DLG and Copenhagen Infrastructure Partners	1	Offshore wind	NH ₃	Denmark	2025-2027
H2 Sines	1	Onshore wind and solar	H ₂	Portugal	2030
Rostock	1	Offshore wind and other renewable energy	Undecided	Germany	-
Additional projects in Denmark	MW				
Siemens Gamesa, Green Hydrogen Systems	0.450	Onshore wind	H ₂	Brande	2021
HySynergy – Shell, Everfuel	1000	Wind and solar	H ₂	Fredericia	2022- 2030
Skovgaard Invest, Haldor Topsøe, Vestas	10	Wind and solar	NH ₃	Ramme	2022
GreenLab, EuroWind, Everfuel, Eniig, E.ON, Energinet, GHS, DGC	12	Wind and solar	H ₂ and e-fuels	Skive	2022
H2RES, Ørsted	2.1	Offshore wind	H ₂	Avedøre	2022
DIOGENES: Danfoss, Green hydrogen, DTU	0.5	Grid + PV	H ₂	Nordborg	2022
Green Hydrogen Hub, EuroWind, Corre Energy, Energinet	350	Wind and solar	H ₂	Hobro/Viborg	2028

Regarding international efforts, it is important that Denmark align our efforts to what happening in Europe and globally, when it comes to:

- Global push for CO₂-taxes
- Alignment of sustainable aviation fuels (SAF) approval and certificated requirements
- The European Hydrogen Strategy
- Plans by multiple European transmission system operators to develop and operate hydrogen grids
- Renewable Energy Directive II (RED II) entering into effect on June 30th 2021 and the coming revision
- The Sustainable and Smart Mobility Strategy from the European Commission
- Funding opportunities in Horizon Europe and European year of rail

3.4 DENMARK'S RELEVANT ASSETS AND CAPABILITIES

Denmark has a strong energy system with diversified grids and world-class security of supply. Our strongest comparative advantages are:

1. Energy source:

- **Wind power:** DK have world class offshore wind opportunities. The potential in the North Sea is estimated to be ~250 GW where 40-50 GW is with the Danish territorial. Denmark is also the leading wind-power producer per capita of the world.
- **Biogas:** Denmark has a leading position in biogas.

2. *Offtake sector:*

- **Maritime nation:** DK is today one of the world largest maritime nations and the home of many globally leading shipping and equipment companies
- **Aviation:** Copenhagen airport has received multiple awards for being the best airport of northern Europe, while also being the largest in the Nordics
- **Land transport:** DK has key players within the heavy land transport and freight forwarding

3. *Infrastructure, storage, and integration:*

- **Electricity grid:** The Danish electricity system consists today only of 14% fossil fuels. It is one of the most sustainable power systems in the world, with competitive electricity prices, and high security of supply
- **Gas grid:** The natural gas grid extends to most of the country and has the largest share of biomethane (20 % in 2020) in the world.
- **District heating system:** The district heating system enables Denmark to increase the overall energy efficiency of chemical plants considerable (to an overall efficiency of 90-95%). This include PtX-units which could deliver heat to 1.8 million households through district heating (ref 4).
- **Energy Storage:** The Danish underground is well suited for storing of gases, including hydrogen. We currently have one of the largest gas storage capacities of the world, measured per capita.
- **Digitalization** - DataHub and transparency in data related to energy markets, for supporting of new, green business models
- **Sector coupling:** Based on our assets and capabilities, we have a great foundation for achieving an efficient sector coupling among our different energy systems

4. *Ambitions and knowhow:*

- **Industry and technology:** Denmark has world leading companies, industry organizations, universities, energy and maritime clusters, willing to work together within the PtX value chain
- **PtX:** Leading in several PtX technologies (Figure 3-3)
- **Environmental governance and management:** Denmark has a well-functioning environmental governance and management system characterized by high levels of co-operation and consensus.

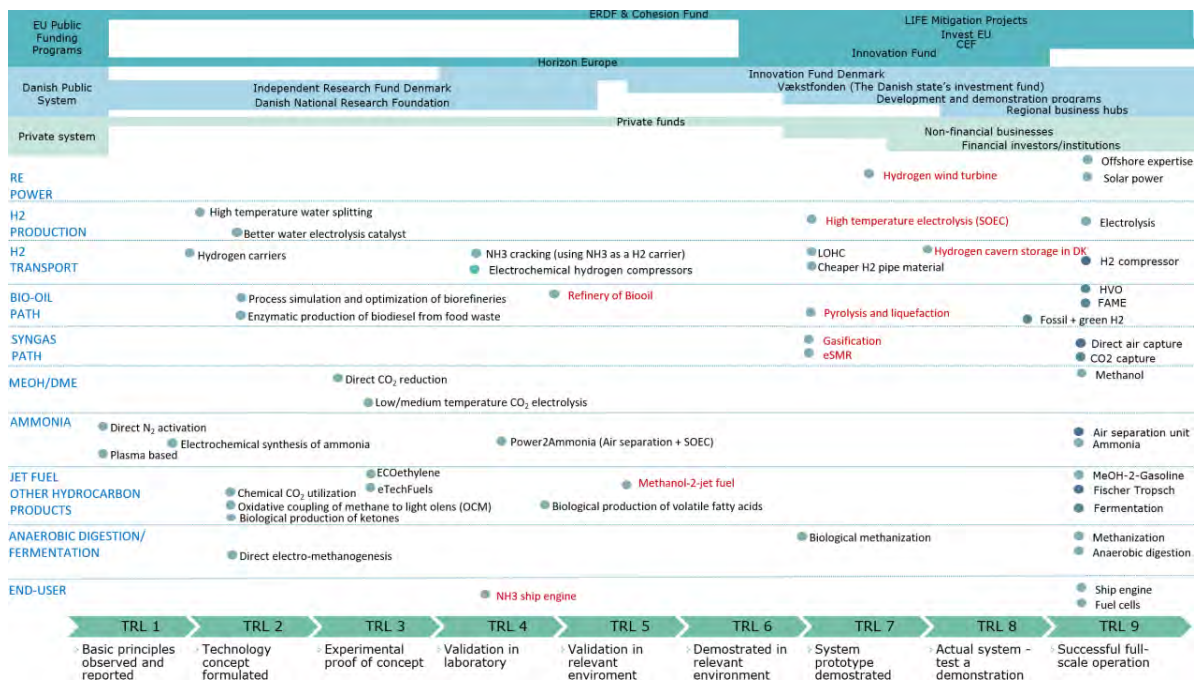


Figure 3-3: Various PtX technologies vs TRL and funding. Read text are considered very important to focus on in the near future.

There are several world-leading Danish companies involved in coming Danish PtX-projects, who drives the Danish stronghold in the area. First of all, these include the off-takers and world-class logistics companies such as **Maersk, SAS, DSV Panalpina, DFDS and MAN Energy Solutions**, which are highly specialized in international

transportation of freight and passengers and equipment. **Ørsted and Vattenfall** are among global leaders in managing large renewable energy projects and infrastructures. **Copenhagen Infrastructure Partners** are among the leading investors in renewable energy. **Vestas** and **Siemens Gamesa Renewable Energy** are among the leading wind turbine manufacturers. **Everfuel** is the leading operator of hydrogen refueling stations. **Haldor Topsøe** is leading in SOEC electrolyzers and chemical processing related to PtX. **Siemens Energy** and **Danfoss** are among the leading providers of technologies for PtX-plants. **Green Hydrogen Systems** designs and manufactures modular electrolyzers. **Energinet** is a world-class Danish transmission system operator in power, gas and hydrogen. **Ballard** is a leading provider and manufacturer of fuel-cell solutions. **Shell** owns and operates the largest refinery in Denmark. In addition to these companies, Denmark also has several leading universities with expertise in PtX, LCA and business modelling, including **DTU, AAU, CBS, AU, KU and SDU**. Finally, the Danish stronghold also consists of a strong open, trusting and collaborative culture across the value chains and an ability and experience of reducing costs in the renewable energy sector.

4 Technology paths – basis for roadmap

4.1 AVAILABILITY OF RENEWABLE ENERGY FOR FUEL PRODUCTION

4.1.1 Availability of wind and solar power

The Danish electricity system is strongly integrated into the northern European electricity market, and historically the balance between domestic electricity production and electricity imports has fluctuated depending on market conditions (such as precipitation, solar irradiation, temperature and wind) (ref 5). In a frozen policy scenario, the Danish Energy Agency expects that there will be years of net electricity exports and years of net electricity imports towards 2030, as shown in Figure 4-1. Any large-scale production of PtX before 2030 will increase Danish imports of electricity. Thus, the carbon footprint of the fuels will depend on the carbon footprint of the imported electricity blend. However, according to Danish Energy, 86% of imported electricity is renewable (ref 6).

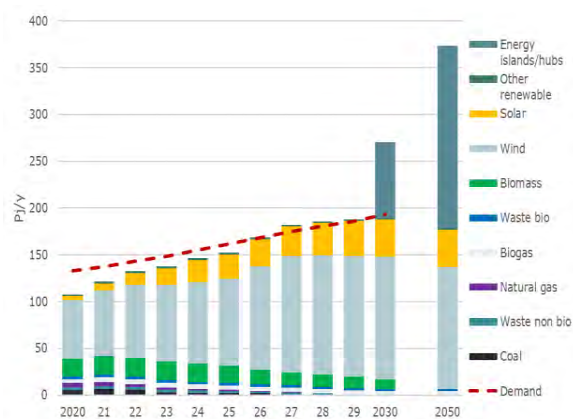


Figure 4-1: Available power and power usage towards 2030

The realization of the energy islands/hub in 2030 is expected to significantly affect Denmark's electricity balance, and provide a 74/y PJ surplus of green electricity, which can be used for electrification of other sectors (e.g. via PtX) or exported to Denmark's neighboring countries (ref 7 and 8).¹ Assuming that electricity consumption in other sectors is kept constant towards 2050 (or excess consumption is met by solar/wind projects not yet in pipeline), increased capacity from the energy island/hub in the North Sea will give a surplus of 195 PJ/y.

4.1.2 Availability of hydrogen

In a frozen policy scenario the Danish Energy Agency expects an expansion of electrolysis capacity to 132 MW (~1.9 PJ/y hydrogen production) during the period from 2024 to 2030 (ref 5). However, according to the actors in the industry, 3.3 GW (~48 PJ/y hydrogen production) is currently being planned (summary of Danish projects in Table 3-1).

4.1.3 Availability of biomass

In 2010, the Climate Commission calculated the total energy potential from Danish land-based biomass resources to 174 PJ/y towards 2050, provided that no additional area is included to produce energy crops (ref 9)². We assume that other sectors (mainly construction) will use 24 PJ/y biomass in 2050. This leaves 150 PJ/y available for fuel production.

¹ Political decisions have not yet been adopted on measures that can contribute to a significant increase in electricity consumption in the context of the energy islands, nor have specific foreign connections and capacities been agreed by those who import electricity abroad.

² Own calculations for 2050 based on a linear projection,

4.1.4 Availability of biogenic point source CO₂

Biogenic CO₂ from carbon capture from point source (mainly CHP, WtE and industrial boilers) can be a carbon source for green fuels production. According to Dansk Energi (ref 10), we have almost 16 Mt. biogenic CO₂ available today. A big amount of this CO₂ comes from imported biomass, which is expected to be reduced towards 2050.

Table 4-1. Point source biogenic CO₂ availability (COWI calculations)

2020	2030	2050
15.6	12.7	6.0

4.2 PATHWAY FROM END USER PERSPECTIVE

In the following sub-chapters, key propellants and their associated production paths is given for the following end-users:

1. Industry
2. Light road transport
3. Heavy-duty road transport
4. Maritime
5. Aviation

Based on these parts, we will identify key fuels and outline an optimal roadmap for the green transition.

4.2.1 Industry

The current and future expected energy sources and consumption levels are shown in Table 4-2 and Figure 4-2.

Units are in PJ/y	2020	2025	2030
Internal transport	1.4	1.3	0.7
Electric motors and ventilation/cooling	21.4	22.5	23.1
Light and electronics	3.0	3.3	3.3
Heating	12.9	10.5	9.1
Process heat - high temperature	19.8	21.2	21.9
Process heat - medium temperature	34.2	30.7	28.6
Electricity- and district heating production	2.6	2.6	2.6
Total	95.3	92.1	89.4

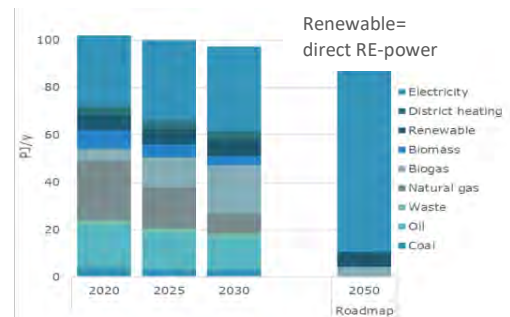


Figure 4-2: Energy source and consumption within industry (ref 5)

Table 4-2: Energy used in industry divided into areas

According to the Climate Partnership for Industry (ref 11), industry will aim for increased efficiency, carbon capture and electrification with the exception for high temperature applications, where considerable reduction in power price is required for electrification to be economic attractive. Until then, industry would like to solve their 70%-CO₂ reduction goal by using gas from the natural gas grid, which is expected to become fossil free by 2050 (Figure 4-3).

Most of the industry requiring high processing-temperatures, is connected to the existing natural gas grid, especially when the new natural gas pipeline to Lolland/Falster is constructed. Thus, converting high temperature applications to biogenic natural gas is considered a cost-effective way to reduce the CO₂ emission within industry.

As biomass likely will become a limited resource and as direct electrification is the most energy efficient pathway, it's desirable that industry focus on electrifying their processes, especially when commissioning new units. As biomass likely will become a limited resource and as direct electrification is the most energy efficient pathway, it is desirable that industry focus on electrifying their processes, especially when commissioning new units. Legislation should ensure that electrification is economically favorable in most cases.

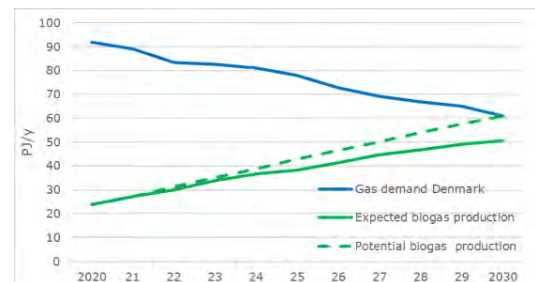


Figure 4-3: Expected NG consumption and % biogenic

The technology pathway for industry is depicted in where key focus is to increase the electrification and replace fossil with natural gas that over the years will become 100% biogenic. Green hydrogen (or any other green fuels) is not foreseen, as direct electrification is considered a more economically attractive path than green hydrogen/fuel.

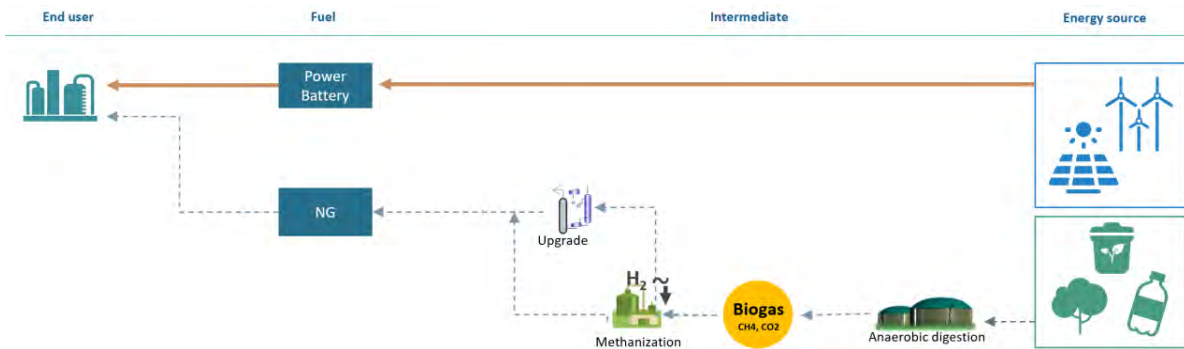


Figure 4-4: Dashed lines indicate an intermediate stage going towards 2030 while the full line is the major situation in 2050.

4.2.2 Light-duty road transport

In a frozen scenario, current and future expected energy sources and consumption levels are provided in Figure 4-5.

The highest obtainable energy efficiency in the entire chain from "electric production" to "wheel" is via direct electrification (see Figure 4-6). Thus, the optimal propellant for light and short distance transportation is electricity.

As most cars sold today are still gasoline/diesel-based, it will take several years before the majority of cars are electrified (see Figure 4-5). Thus, to satisfy the 2030-70% CO₂ emission goal, a green fuel that can be used within existing vehicles must be found. Fuels that can be used within existing vehicles are:

1. Gasoline engine: Gasoline, MeOH³, EtOH
2. Diesel engine: Diesel, DME, FAME (=biodiesel), HVO/BioFuel

MeOH/DME is cheaper and less complex to produce than synthetic Gasoline and synthetic Diesel. The carbon source can be CO₂ capture from point sources (thus, there is a synergy with the need for capture CO₂ from point sources). **FAME** and **EtOH** is today primarily based on first generation biomass which is not considered as an option for large scale production as it competes with food productions. There are considerable developments within **HVO/BioFuel**, which is expected to become competitive.

This gives the technology pathway for light-duty transportation shown in Figure 4-7.

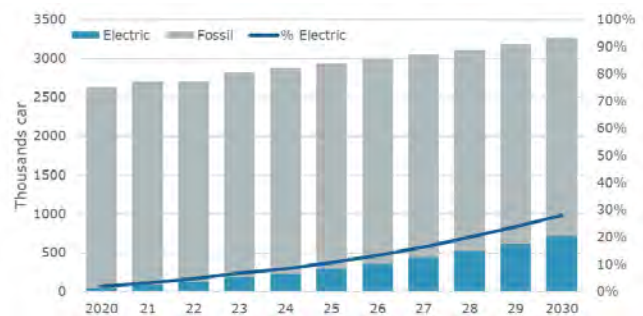


Figure 4-5: Energy source and consumption by cars

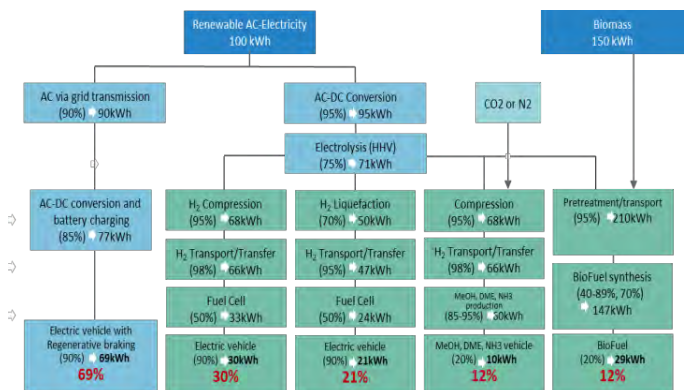


Figure 4-6: Indicative overall energy efficiency – from source to wheel. The electrolyze efficiency might increase from 75% (2021) to 90% (2030) which will improve the overall efficiency of green fuel. Additionally, the loss in electrolysis can be used for district heating which is not incorporated in the overall given efficiency figures.

³ Installation of a FFV (fuel flex vehicle) device on the motor to electronic adjust the combustion cycle time so it drives optimally on MeOH.

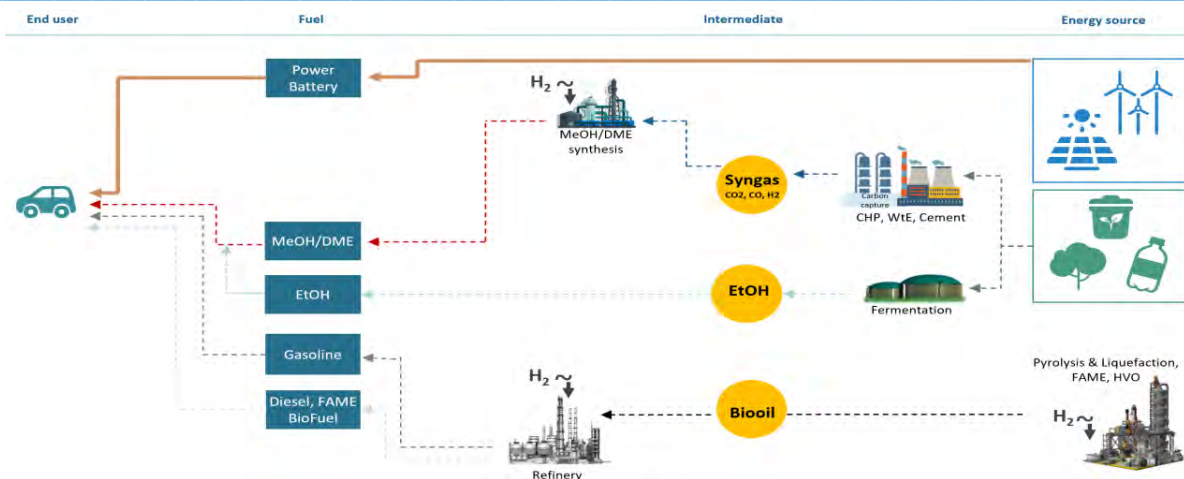


Figure 4-7: Dashed lines indicate an intermediate stage going towards 2030 while the full line is the major situation in 2050.

Additional advantage with both the MeOH/DME path and the HVO/BioFuel path are:

- easy to transport and can be transported and distributed by the existing infrastructure
- can be further synthesized/refined into aviation fuel when the existing vehicle package become electrified

4.2.3 Heavy duty land transport

Current and future expected energy sources and consumption levels are provided in Figure 4-8.

Despite the higher efficiency of electric engine, the following factors makes electrification of heavy long-distance transport less attractive:

1. Weight of today's batteries: Batteries will take up a major part of what is available for freight (see Table 4-3).
2. Charging time of today's batteries: Is several hours. This could be solved by battery swapping, but the batteries will be big and heavy, i.e. special swapping-machinery will be required.

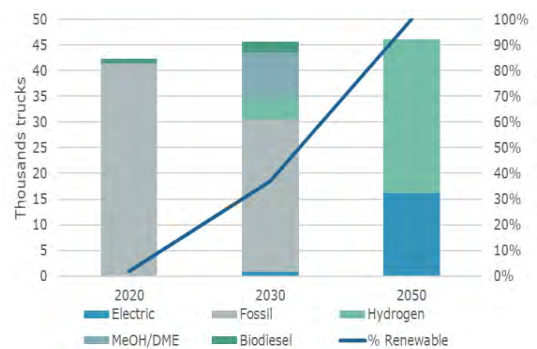


Figure 4-8: Energy source and consumption by heavy land

The most efficient propellant after electricity is hydrogen in FCEVs (see Figure 4-6).

It is believed that heavy-duty transport will be a combination of hydrogen and electricity. The weight of the batteries strongly depends on the distance and power use between refueling. Electric road system (ERS) with continuous electricity supply, which is considered in Sweden and Germany, as well as battery improvements will decrease the required size batteries.

As with light-duty road transportation, there will be a transition period where trucks are changed to new hydrogen-based fuel-cell-electric-vehicles (FCEV) driven trucks. Within this transition period the same intermediate fuel as used for diesel engine light-duty transportation can be applied.

Table 4-3: Gasoline/diesel tank sizes vs battery sizes required (used: battery energy density = 0.612 MJ/kg, Electric efficiency of electric engine=90%, energy density of CH₂=4.8 MJ/l (700 bar), energy density of LH₂=9.6 MJ/l, Efficiency of H₂-FCEV=50%)

Column1	Tank size [l]	Eff. Combustion	Fuel density [kg/l]	Max Fleet weight [ton]	Max cargo weight [ton]	Fuel weight [ton]	Battery weight [ton]	Hydrogen weight [ton]	Actual Hydrogen volume (CH ₂) [m ³]
Car	45	35%	0.85			0.038	1.1	0.01	0.14
	70	35%	0.85			0.060	1.7	0.01	0.22
Truck	475	35%	0.85	24		0.404	11.7	0.09	1.49
	1 000	35%	0.85	40	36	0.850	24.6	0.19	3.14
Big tanker ship	5 000 000	49%	1.01		150 000	5 050	204 861	1 590	26 120
	17 000 000	49%	1.01		500 000	17 170	696 526	5 408	88 807
Plane 1h flight	15 000	35%	0.85	70		12.8	369	2.9	47
	150 000	35%	0.85	350		127	3 694	28.7	471

This gives the technology pathway for heavy-duty road transportation shown in Figure 4-10.

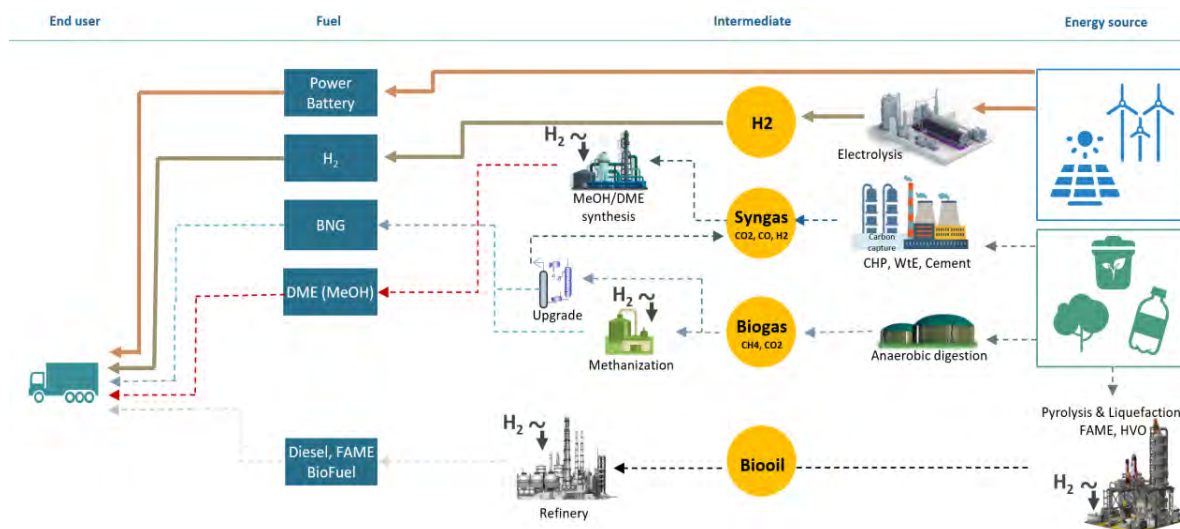


Figure 4-10: Dashed lines indicate an intermediate stage going towards 2030 while the full line is the major situation in 2050.

4.2.4 Ships

Current and future expected energy source and consumption are given in Figure 4-10

Long distance transport requires huge amounts of energy (see tank sizes in Table 4-3). Thus, **power** and **hydrogen** are only an option for short distance light ship transport.

Ammonia seems to be an optimal marine fuel as:

1. Ammonia can be produced where there is RE source but no carbon source, i.e. in the solar-rich-desert and on wind-rich-ocean
2. A major part of sustainable available biomass must be assigned to production of aviation fuel (see discussion in next chapter)

The disadvantages of NH_3 is that it has a low energy density, burn slowly and is toxic. That it burns slowly makes NH_3 not feasible on medium and high-speed engines (4-stroke engine) while suitable on slow large big container vessels (2-stroke engine). Cracking NH_3 to H_2 for use in an auxiliary engine is considered to facilitate speed when needed.

LNG: Today it seems to be larger focus on LNG as marine propellant. However, there is not enough biogenic NG for ensuring both zero emission industry and zero emission maritime sector. Fossil LNG emits ~28% less CO_2 than bunker fuel/HFO/MGO, so using fossil/biogenic-based NG is a CO_2 reducing solution in a transition period. However, boil-off gas from LNG carriers and emission of un-combusted methane gas in the exhaust from LNG vessel is large which may vanish the above saving as methane is a much stronger GHG than CO_2 . The problem can be decreased by flaring the vented gas. Due to the boil-off and the methane slip and since NG is a limited resource, LNG is not considered as an optimal fuel.

Cracking and associate hydrogenation of bunker fuel/HFO/MGO: In an initial transition period, hydrocracking of heavy marine fuel with green hydrogen is a low-cost solution that can assist in creating a hydrogen marked and making the maritime fuel partly green. As none of the Danish refineries have a FCC-unit (Fluid catalyst cracking), this option will not be considered in this roadmap.

LPG: A byproduct in the production of synthetic aviation fuel may be LPG. Thus, when larger amount of aviation fuel will be produced, large amount of LPG might be produced. Competition will determine whether it is optimal to convert LPG into aviation fuel or use it as marine fuel.

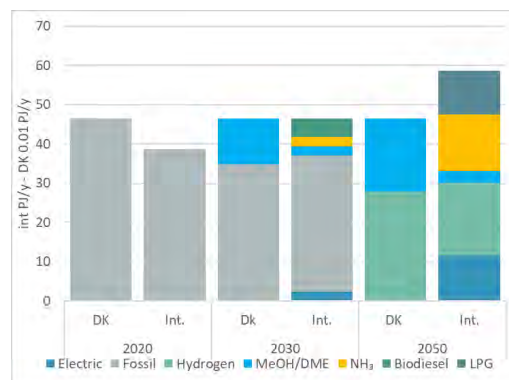


Figure 4-9: Energy source and consumption by marine transport.

MeOH/DME: DME can be used in today's diesel engines and it is cheap/simple to convert MeOH to DME. MeOH require minor engine development.

BioFuel: Oil produced from biomass/waste/plastic/tire is expected to be applicable after minor refinery processing in today's ship engine (required R&D). As ship engine normally is quite robust and as they often are equipped with downstream DeNO_x, the requirement to the fuel quality is often less meaning that it is optimal to use BioFuels in ship engine in the transition period where refineries convert from fossil fuel as feedstock to Biooils as feedstocks.

Hydrogen and electricity: If alternative to hydrocarbon-based aviation fuel is not found/approved, maritime will compete with the aviation getting the limited hydrocarbon-based fuel. This will most likely favor use of electricity and hydrogen as propellant on small and medium size ships where NH₃ is not appropriate.

This gives the technology pathway for near-shore and international marine transportation shown in Figure 4-11.

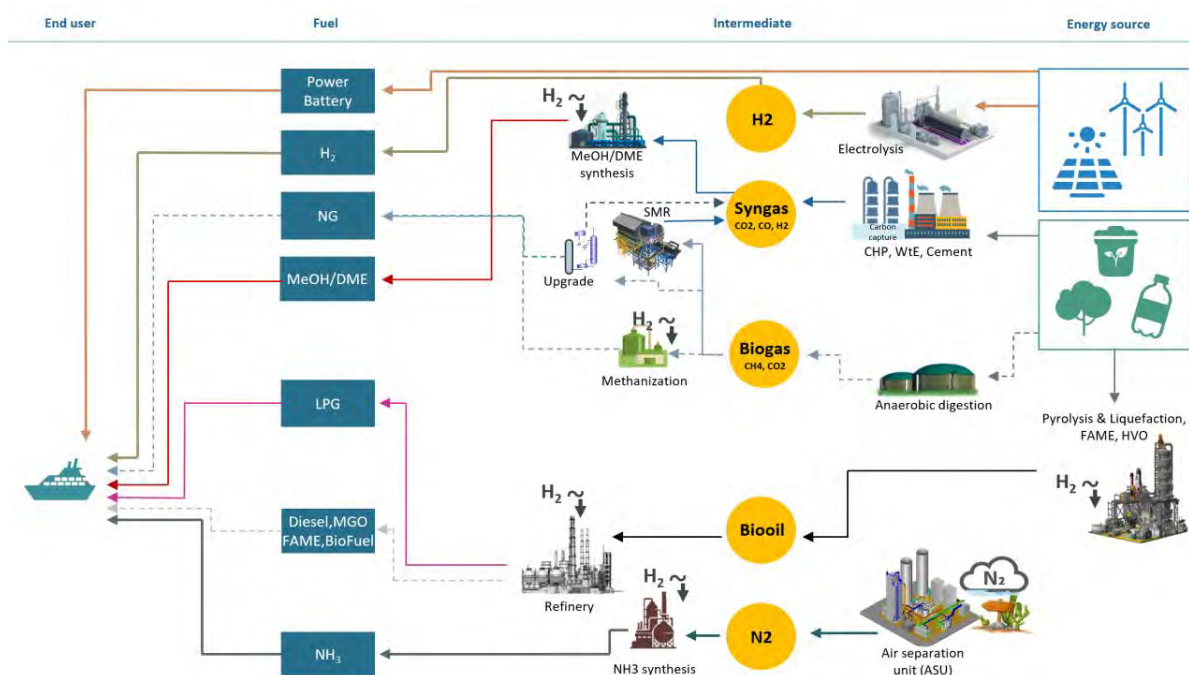


Figure 4-11: Dashed lines indicate an intermediate stage going towards 2030 while the full line is the major situation in 2050

4.2.5 Aviation

Current and future expected energy sources and consumption levels are given in Figure 4-12.

Electrification of small planes (7 passengers today, 28-30 passengers by 2030) is possible. However, due to the weight of batteries, it is unlikely that very large planes will become electrified within the near future. But hybrid planes may become important.

Synthetic aviation fuel (SAF): Fuels for aviation is subject to very strict regulation, including:

1. High energy density (ensure less fuel weight and thereby less fuel consumption)
2. Low cold fluid properties as very cold in 10 km altitude
3. Explosion limits (safety)

These requirements restrict aviation fuel to highly branched C₁₀-C₁₃ hydrocarbons. For cargo and military flight, the requirement to point 3 is less strict, allowing a blend with 70% gasoline (Jet-B).

Syngas to SAF: Synthetic production of aviation fuel can either follow the Fischer-Tropsch route or a MeOH/alcohol route (see Figure 4-13). The MeOH/alcohol route seems more optimal as the product distribution is limited by the catalyst pore size making the recovery within a specific range much higher than for the Fischer-Tropsch route.

Additionally, the MeOH route make synergy with using MeOH as intermediate fuel for light transportation (i.e. building the MeOH plants in a first step and then later adding the jet-fuel-synthesis step). Conversion of MeOH-to-Jet have a TRL of 5, i.e. R&D is required. Alternative, it should be investigated whether it is possible to approve Jet-B as passenger fuel as MeOH-2-gasoline is expected to have a higher recovery than MeOH-2-Jet and has a TRL=9. However, improvement of Jet-B will require international acknowledgment and approval.

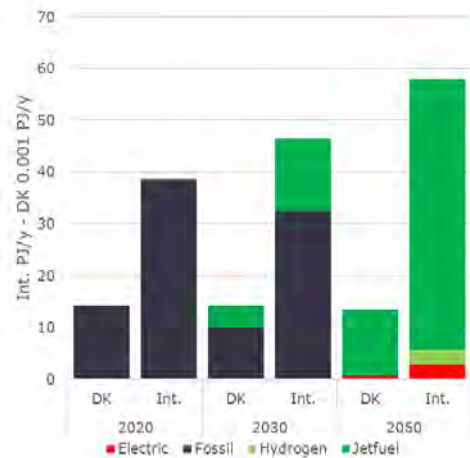


Figure 4-12: Energy source for Danish and international aviation

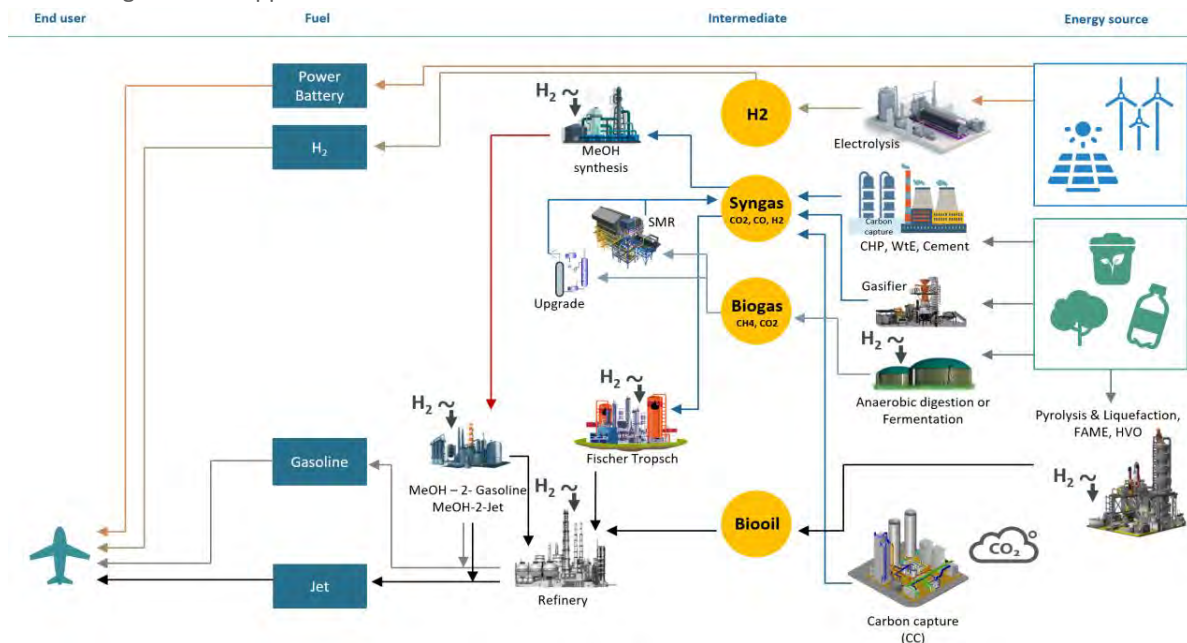


Figure 4-13: Technology pathways for aviation

Biooil to SAF: As huge amount of aviation fuel is needed, both the syngas route and the biooils route to produce aviation fuel must be matured. Thus, development and approval of refining of biooil to SAF is very important.

Hydrogen: The big aviation producers are looking into hydrogen planes. Liquefied hydrogen seems feasible and do to it very light weight, smaller wings are required. However, it has a very low volumetric energy density, is very explosive, and need extremely cryogenic storage facilities. Thus, hydrogen planes will include huge development, new infrastructure, approval, and tests before approved as passenger transport.

This gives the technology pathway for aviation shown in Figure 4-13.

4.2.6 Life cycle analysis (LCA)

To evaluate whether an alternative fuel can support the reduction of Danish emissions, we need to assess not only the end-use of alternative fuels, but the entire value chain. Using other feedstocks and fuels will only lead to real climate gains, if there are no alternative forms of utilization that can contribute to greater climate gains.

When assessing the environmental and climate footprint of transportation, all relevant emissions and resource consumption must be included. Both the direct and indirect environmental and climate impacts of using other fuels must be measured.

Research and innovation are thus required into the optimal use of feedstocks for green fuels in transportation, compared to other downstream sectors, based on LCAs and substitution analyses. The supply of feedstocks is critical, and it is therefore important to ensure that each feedstock is used where it has the greatest effect. The environment and climate impacts associated with feedstocks are typically associated with the production phase, but distribution and storage can also lead to significant emissions. In particular, land use associated with feedstocks is of environmental and climate significance. If feedstock, such as biomass, is already being used for other purposes, then the production of green fuels from the same biomass will cause indirect climate impacts.

4.3 SUGGESTED PATH FOR THE GREEN FUELS ROADMAP

Based on the expected dominant paths, we have evaluated the %-distribution of fuels for each end-user (see Table 4-4). The calculations are based on the following assumptions:

1. There will be no consumption of fossil fuels in 2050
2. From a CO₂/environmental perspective, a vehicle/fleet should not be replaced before its end-of-life. It takes time (10-30 years) to change our assets and fleets, thus intermediate green fuel alternatives must be used in our existing assets/fleet
3. Hydrogen and electric planes are limited before 2050, which means that aviation fuel must be carbon based
4. Max biomass consumption in 2050 is ~150 PJ/y (this is what we have of residual/waste – see subsection 4.1.3)
5. DAC (direct air capture) is not a competitive technology in 2050
6. NG will in 2020 be partly fossil based but will be 100% biogenic in 2050

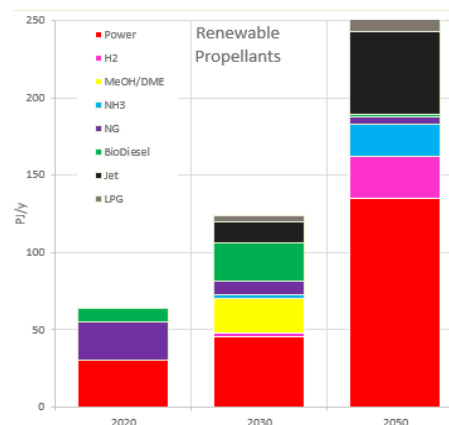


Figure 4-14 Expected total consumption of renewable fuels 2020, 2030 and 2050

Table 4-4: Expected % distribution of fuels in 2020, 2030 and 2050

Fuel distribution, %	CAR			VANS		TRUCKS		BUS		TRAIN		FERRIES		Kattegat		Spare time Boats		Fishing boats		Jetmotor		Turbopropelly		Int. Marine		Int Aviation		Industry					
	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050	2020	2030	2050			
Power	22	100		16	80		2	35		27	52		68	68	0	25		0	0		5		5		5	20		5	30	37	88		
H2				10	20		10	65		10	48		32	45		60		60	60				5		37		5						
MeOH/DME	15	0		5	0		20	0		5	0		10	0		25		60	60														
NH3																																	
NG																																	
Bio NG (Industry)																																	
BioDiesel	2	15	0	2	0	0	2	5	0																								
Jet																																	
LPG																																	
Biomass and waste																																	
Fossil	98	48	0	98	69	0	98	63	0	100	58	0	100	22	0	100	90	0	100	75	0	100	75	0	100	70	5	100	70	5	100	75	0

The total consumption of each of the expected fuels is plotted in Figure 4-15. Based on the consumption, we have calculated the required:

1. Renewable energy
2. Residue and waste
3. Hydrogen
4. CO₂ from point source (the intermediate consumption is not subtracted from residue/waste as a major part will be imported biomass)

To ensure that Denmark is sustainable we have compared the required values with what is available in Figure 4-15. The figure shows that we expect an intermediate scarcity in sustainable biomass/residue in the future, in particular carbon, which is supported by a recent publication by Danish Energy (ref 10).

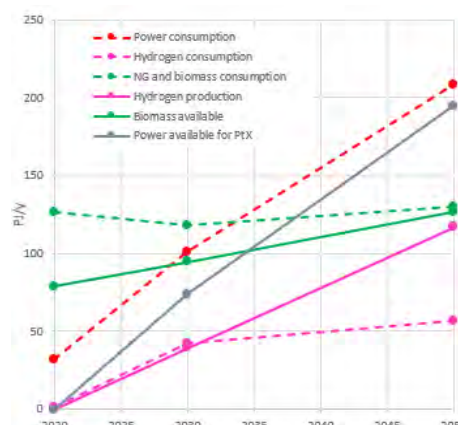


Figure 4-15: Expected availability and consumption of renewable energy, hydrogen and carbon in 2020, 2030 and 2050

This leads us to the following conclusion: If we are to be fossil free in 2050, and the major part of the aviation is still hydrocarbon-based fuel, then a big part of the available biomass/residue must be used for producing aviation fuel in 2050, thus, all other must to the extent possible use other than C-based fuel.

Provided the above assumptions, an optimal path that aims at using most of the available biomass/residue for production of aviation fuel in 2050 should be developed. Thus, a suggested path is a path where biomass/residue/CO₂ based carbon source is first converted to intermediate fuels that can be used in our existing vehicle/truck/marine package and then later converted to aviation fuels.

MeOH/DME and biooil/biodiesel are intermediate fuels that can be used in our existing fleet and then from 2030-2050 can be further converted to aviation fuel while our fleet is getting more electrified or converted to H₂ and NH₃. For marine, some LPG might optimally be available as this is a byproduct from the production of aviation fuel. However, it can be discussed whether this LPG optimally should be refined to aviation fuel to leaving some MeOH/DME for maritime use.

Methane/biogas/NG should be reserved for high temperature industries and while this is becoming more electrified, biogas should also be converted to aviation fuel.

In conclusion, this leads us to the following three main tracks in the roadmap:

1. Green hydrogen (for heavy duty land transport)
2. Intermediary fuels (MeOH/DME and Biooil)
3. Green fuels for shipping and aviation

5 Roadmaps

5.1 TECHNOLOGICAL ROADMAP

Within this subsection the technological implementation of the following three tracks in the roadmap is given:

1. Green hydrogen (for heavy duty land transport)
2. Intermediary fuels (MeOH/DME and Biooil)
3. Green fuels for shipping and aviation

The description of each track includes:

1. A table based on the implementation workshop where suggested action points are given. The action points contain specific goals, critical gaps/challenges and actions needed
2. Key actions are extracted from the table and plotted in a timeframe

5.1.1 Green Hydrogen (for heavy duty land transport)

Table 5-1 includes suggested action points for the technological implementation of the roadmap. The key action points are described below and shown in Figure 5-1.

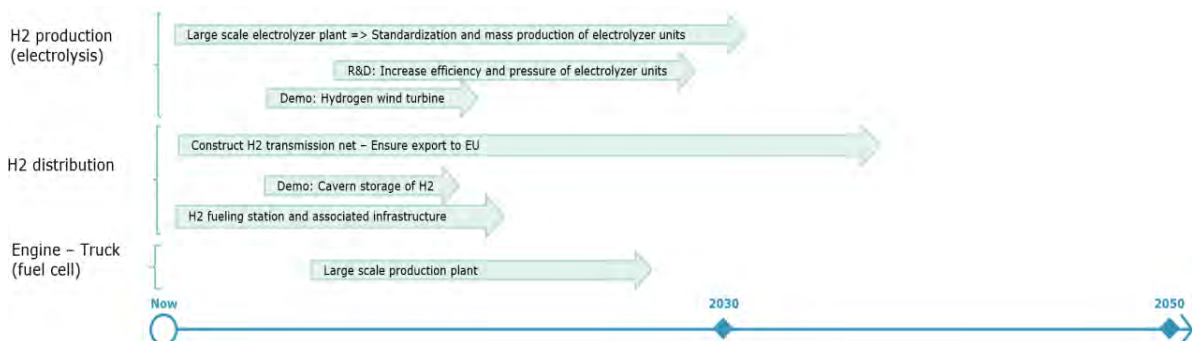


Figure 5-1: Key actions within the implementation roadmap for green hydrogen

To "kick-start" the green hydrogen marked, the following actions should be taken:

1. Large-scale electrolysis plants (see list of Danish projects in Table 3-1) that will push development both with respect to mass production, scale, standardization as well as R&D that will increase the efficiency and pressure in the electrolysis unit as well as reducing the plant cost
2. Hydrogen fueling station and associated infrastructure
3. Construction of hydrogen transmission net (both on and offshore) and associated cavern storage
4. Demonstration of offshore hydrogen wind turbine

Table 5-1: Technological implementation of green hydrogen

TECHNOLOGY	TODAY	GOAL/POSSIBLE*	KEY CHALLENGE/GAPS/SOLUTIONS	ACTION/IMPLEMENTATIONS	
Marked	Heavy-duty road	None	Larger fraction of truck in DK drive on H ₂	Hydrogen is still too expensive Distribution network, Safety	Legislation that make it beneficial until price get down H ₂ infrastructure and vehicles
	Export to EU	None	Export of hydrogen to EU	Need to compete with hydrogen from north-Africa and blue hydrogen	Construct a hydrogen transmission line to Germany
H ₂ production	Efficiency of electrolysis ⁴	75-88 % (HHV basis)	90-95 % (HHV basis)	Resistance in cell, material degradation, sluggish electrode kinetics	R&D
	Increase pressure in electrolysis	1-50 bar	80-100 bar	High pressure industrial scale components Mechanical stability of SOEC at high pressure	R&D Expand marked and increase robustness for high hydrogen pressure components
	Production of electrolysis units	Few MW	Up to 5 GW 2030 Up to 13 GW 2050	Fast increase in production facility	Production should focus on taking outdated unit back to reuse materials
	Decrease cost of electrolysis unit (€/kgH ₂)	4-8 (depend strongly on operation hours)	2 (2030) 1.5 (2050)	Decrease cost of RE-power Increase operation hours	Legislation (decrease taxes) Increased sector coupling Increase storage
	Hydrogen wind turbines	10-12 % AC-DC conversion and distribution loss	1-2%	Offshore maintenance of electrolysis	Scale production
	High temperature water splitting	TRL 2-5	TRL 9	Short lifetime, High CAPEX	Demonstration plant R&D
Hydrogen distribution	Compression		Decrease compression loss	More efficient compressors are under development	R&D: Development of electro-chemical hydrogen compressor
	Pipe	None	Pipe from offshore wind farm to Germany as fast as possible	Expensive Local resistance	Use part of existing net R&D – cheaper piping material
	Offshore integration - Island/hub	None			R&D - System integration
	Storage-Cavern	None	Large-scale cost-efficient storage	Local resistance	Demonstration plant
Fuel cells	Refueling stations	Few	Several distributed in DK	Trust that hydrogen is the way to go and safety	
	Increase efficiency Decrease production cost			Sluggish kinetic at electrodes, high cost Mass production & Standardization	R&D

5.1.2 Intermediary fuels (MeOH/DME and biooil)

In Table 5-2, suggested action points for the technological implementation roadmap are listed. The key action points are described below and shown in Figure 5-2.

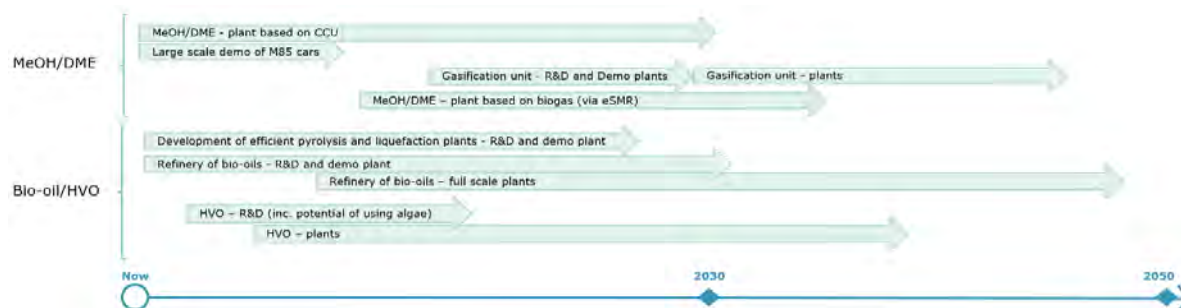


Figure 5-2: Key actions within the implementation roadmap for intermediate fuels

⁴ The efficiency is given on HHV basis to clearly indicate how much energy that is left for district heating.

Natural gas:

High temperature applications in industries will, until the power price is considerably lower and efficient electrification of high temperature process have been developed, use natural gas. Applications that uses coal or naphtha will convert to natural gas in a transition period. This conversion is already taking place and is not covered here.

NG for transportation: In 2050 most of the available biogenic natural gas should be used for production of aviation fuel. Thus, use of natural gas in the transport sector should be an intermediate solution. As natural gas cannot be used in existing vehicles it is questionable whether it is optimal to invest in infrastructure that support natural gas for land transport.

MeOH/DME and Biooil:

The transition to electrical cars will not be fast enough. Thus, a green alternative is needed in the transition period. As per subsection 4.2, MeOH/DME and Biofuels are optimal intermediate fuel as:

1. Only minor changes of existing infrastructure and vehicle engines are required
2. They can be further synthesized/refined into aviation fuel when the existing vehicle package become electrified
3. There is a synergy between the need for intermediate CO₂ capture from point sources (heat and powerplants that may be outdated when not able to compete with RE-production)

Key actions in the implementation roadmap are:

1. MeOH/DME - plants based on CCU (e.g. Green Fuels for Denmark project – see Table 3-1)
2. Large scale demonstration of M85 cars
3. Refinery of pyrolysis/liquefaction oil – R&D and demo plants
4. HVO – R&D (include potential of using algae)

Table 5-2: Technology implementation of intermediate green fuels

TECHNOLOGY	TODAY	GOAL/POSSIBLE*	KEY CHALLENGE/GAPS/SOLUTIONS	ACTION/IMPLEMENTATIONS	
MeOH/DME	Gasoline engine: Convert to M85	Have been used previous in CA in 80'	Install FFV (Flex fuel vehicles)	1. Enough green MeOH 2. Insurance (new fuel type is not covered by car insurance)	1. Ensure that green MeOH can compete (CO ₂ tax, cheap H ₂) 2. Large scale demo
	Diesel engine: Can run on DME	None	No/little modification is required	1. None	No action required (if MeOH marked, DME marked will automatically follow as conversion from MeOH to DME is cheap)
	CO ₂ infrastructure	Covered under mission 1 – Capture and storage of CO ₂			
	Production – based on captured CO ₂	TRL=9	Cheap	1. Hydrogen is expensive 2. Only biogenic CO ₂ must be applied	Cost comparison of CCS vs CCU – evaluate calculation procedure
	Production – based on biomass - gasification	TRL=8	TRL=9	1. Gas cleaning is expensive	1. R&D to develop cheap high temperature gas cleaning 2. Demo of the technology on large scale
Production – based on biogas - SMR			1. Anaerobic digestion is an inefficient process 2. Seems like an optimal route to make biogas to MeOH instead of methane (better business case)	Demo	
Bio-oil	HVO	TRL=9	Cheap	1. Hydrogen is expensive 2. Limit source of oil. Could be extended with algae	Cheap hydrogen (see chapter 5.1.1)
	FAME			1. Use first generation biomass	
	Pyrolysis/ solvent liquefaction	TRL 5-7	TRL=9 Cheap oil	1. Gap between produced oil and what refinery can take today 2. Removal of oxygen use large amount of expensive hydrogen 3. Optimize process 4. Scale production	1. Cheap H ₂ (see chapter 5.1.1) 2. R&D 3. Demo plants 4. Legislation that make it beneficial to use biooil instead of fossil in a transition period
	Fermentation (DME/OME)		TRL=9	Low TRL	R&D

Natural gas (NG)	Industry	Fossil	Replace with NG/power	Power price need to be much lower for high temperature applications in industry	Convert fossil consumption in industry to NG consumption that over time will be converted to biogenic
	Biological methanization	Demo plant	Full scale plant	Hydrogen is expensive Do not need gas-cleaning (advantage)	

5.1.3 Green fuels for aviation and shipping

In Table 5-2, suggested action points for the technological implementation roadmap are listed. The key action points are described below and shown in Figure 5-3.

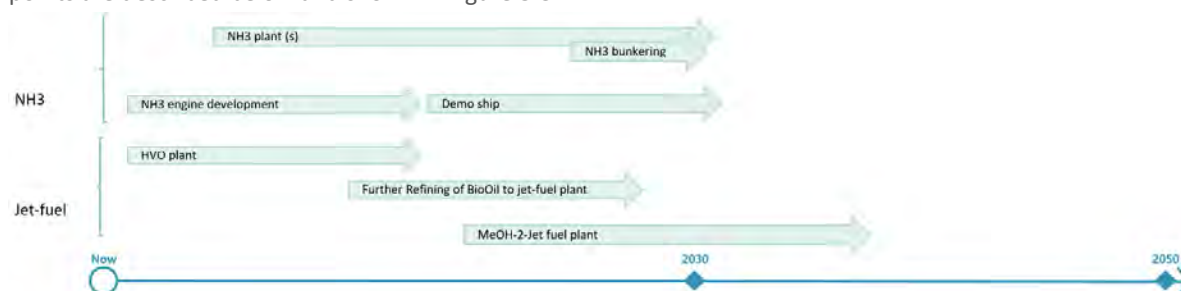


Figure 5-3: Key actions within the implementation roadmap for green fuel aviation and shipping

Key actions in the implementation roadmap are:

1. NH₃ engine – get it to work and approve NH₃ as a marine fuel
2. NH₃ large scale demonstration plant in harbor in DK (e.g. Esbjerg and Skovgaard Invest project – see Table 3-1) i.e. and associate bunkering facility
3. R&D on MeOH-2-jet process or get gasoline approved as jet fuel. MeOH-2-gasoline has TRL=9 and is believed to have higher efficiency than both Fischer-Tropsch and MeOH-2-jet.
4. MeOH-2-jet fuel demonstration plant

Table 5-3: Technology implementation of green fuel for aviation and shipping

TECHNOLOGY	TODAY	GOAL/POSSIBLE*	KEY CHALLENGE/ GAPS/SOLUTIONS	ACTION/IMPLEMENTATIONS	
NH ₃	Production	None	Plant in 2030 Demonstration of technology for export	Expensive to produce in DK compared with middle east/north Africa	Large scale demo plant
	Engine – ICE-2-stroke	None	One in 2025	NH ₃ is toxic/low flammability/safety Many different fuels	Focus on safety especially on first demo ship 1. An engine should be able to operate at several fuels 2. Try to limit the number of different types of fuels – will impose cheaper infrastructure and refueling logistic
	Direct NH ₃ fuel cell	Eff=50%	Eff>65%	Retrofitting existing ships	
	Demo ship	None	Bornholm ferry	Low TRL	R&D
	Production	See Table 5-2			
MeOH/ DME	Engine	Is developed		Retrofitting of existing engines	Duel fuel operation
	Demo ship		2023 (Mærsk)		
BioFuel	Production	See Table 5-2			
	Engine	Most BioFuels can with minor refinery enter existing engine (pilots with lignin from biomass is currently ongoing)			
	Demo ship				
Jet fuel	Approved as jet	Only HVO	All biomass/residue type should have a route to jet-fuel	Low TRL	R&D
	General			Can danish production become competitive	
	Fischer-Tropsch	None in DK		Low recovery	
	MeOH-2-gasoline	Some plants but none in DK	Approve Jet-B as jet fuel as this path is believed to be optimal	Jet-B is not approved for passenger transportation	Investigate whether it can be approved
	MeOH-2-jet	TRL=5	TRL=9, Approve	Lower expected recovery than MeOH-2-Gasoline. Higher expected recovery than Fischer-Tropsch	R&D

Other	Production		Export danish technologies		1. Needs for green certificates 2. Need for support/subsidies until technologies are more mature and competitive
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5.2 IMPLEMENTATION ROADMAP

A successful market implementation of green fuels contains several generic elements, irrespective of which fuel is sought implemented, as described in sections 5.2.1 and 5.2.2 below. Thereafter, we will consider specific challenges related to the market implementation of green hydrogen for trucks, methanol for passenger cars, and green fuels for shipping and aviation.

5.2.1 End-to-end demonstration projects

A crucial element for implementation is to convince all actors in the ecosystem that the product can both reach the market and be used effortlessly by consumers. As a considerable behavioral challenge, consumers - especially private consumers - are generally skeptical towards alternative fuels and must be convinced that these are both functional and safe. We therefore need in-depth case studies of what caused early mass public acceptance of alternative fuels (such as ethanol in Brazil or electric cars in China and California). This requires interdisciplinary research bringing together the social sciences and humanities. Moreover, there is a pressing need for end-to-end demonstration projects that represent the full value chain, from energy provider, over fuel production to distribution and consumption (see Table 3-1 for Danish flagship projects which also include end-to-end demonstration). It is advised to showcase the technology through demonstration projects with specific public sector institutions (e.g. deliveries to all hospitals in a region) by the use of public procurement agreements. Also, certain private companies have set very ambitious sustainability targets (e.g. Novo Nordisk) meaning that they accept paying a premium for low/no emission transports. Such private companies should also become partners in these demonstration projects. From experience, positive news of such successful applications spreads quickly, and helps convince consumers. Moreover, demonstration projects are a good opportunity to showcase Danish technological know-how and illustrate the commercial viability at industrial scale, thus supporting future export potentials.

5.2.2 Framework conditions

5.2.2.1 Strategic direction, including a clear infrastructure plan

Actors are awaiting a clear strategy from the Danish state, which displays an understanding of the industry and a commitment to the effort of introducing green fuels. This is seen as a challenge for the industry to proceed, and considered a key goal within the first year of the roadmap. The strategy should include a plan for green fuels infrastructure expansion as an integrated part of strategies for renewable energy. Currently, one of the main challenges of the sector is easy distribution of commodities in the ecosystem. This is exacerbated by the fact that infrastructure projects have a long duration – both in terms of planning and implementation. One infrastructure element, which is regarded specifically crucial for the market, is a hydrogen grid, either as a new pipeline or by retrofitting the current gas pipeline. Extent and location of this grid must be thoroughly analyzed benchmarking it against solutions where hydrogen is converted to methane to re-use existing infrastructure and where green hydrogen is upgraded locally to value added products like methanol/ammonia to benefit from co-location of electrolysis units and fuel-synthesis plants. A thorough analysis of this involving key stakeholders is important at national level. When planning the hydrogen grid, it is crucial to ensure both 3rd party access, and transparent usage regulation. The precise analysis of the various regulatory options entails an international political economy analysis that looks at winners, losers, side packages and incentives using both qualitative and quantitative methods. Until the hydrogen grid is at least partly functional, actors expect most projects to be on a demonstration level. Having the grid in place is regarded as a crucial inflection point to unlock scale in the green fuels market. Moreover, it is thought to give Danish companies a competitive edge in attracting international investments and help secure Denmark's position as a net exporter of hydrogen and hydrogen-related technology. Finally, as we have seen with data centers in relation to the well-functioning electricity grid in Denmark, a hydrogen grid might also open up for investments in other industries.

5.2.2.2 *Financial incentives for the market*

The government needs to ensure financial incentives for the end-user to use sustainable alternatives to fossil fuels, either by implementing a cap-and-trade system, tradable blending requirements or in terms of subsidies and taxation. A system which is transparent, technology neutral and ensures price comparability between green and fossil fuels within all areas of transportation and industry is regarded as an inflection point for market implementation. Such a system would require a certification mechanism for all sustainable fuels linked to life cycle assessments, to ensure traceability of inputs, and to allow the market to reward CO₂-reductions, and possibly other characteristics which are of benefit to society. Discussions with the industry have shown that most actors are in favor of a CO₂ tax as one of the most efficient tools to support green fuels. Thus, a key workstream within the first 1-2 years is to undertake a full comprehensive analysis of the broader strategic impacts of the various options (using e.g. multi-criteria decision analysis).

Consumers will presumably be willing to pay a premium for green fuels. The size of this premium will most likely differ from one end-user group to another. Some end-user groups are also more affected by global prices than others. International shipping and aviation will for instance have the opportunity of bunkering elsewhere, if prices for green fuels are comparatively high in Denmark. Thus, studies are needed into consumer willingness to pay to maximize the premium potential for each end-user group, and thereby minimize market distortions by subsidies and taxation.

Finally, on the input side, PtX producers are seeking a redesign of distribution tariffs. Dynamic electricity tariffs could be introduced to increase the potential for green hydrogen production to balance the electricity grid. Further, electricity distribution tariffs are charged on the cables, which connect electrolysis plants with renewable energy plants within the same project. This constitutes a large economic burden for PtX producers. The distribution tariffs could be redesigned so it is possible to opt-out of electricity consumption from the public grid and utilize its own sustainable power production plant for free.

5.2.2.3 *Social acceptance of green fuel technologies*

The diffusion, effect and final content of technological change depends on how it interacts with the organization of the social fabric, and the way in which measures contribute to solving major societal challenges depends on how they reflect the dynamics of change at the micro levels of the economic system. In this context, the micro level includes both the end-user and citizens. Considerable challenges to end user and citizens' acceptance of green fuel technologies is posed by concerns about the safety and functionality of the fuels as well as Not-In-My Backyard (NIMBY) attitudes. These must be tackled in a joint effort by the government and relevant companies. Innovative ways of channeling the general agreement on the need for climate-tackling activities into incitement for local green fuel projects should be explored. For instance, involvement of citizens and stakeholders in processes of energy transition may improve legitimacy and efficacy of green energy solutions. The involvement can take place at different scales, such as in the national public sphere or in local arenas, or in specific thematic contexts. Moreover, it can unfold in different media and communication formats such as public hearings, surveys, or future workshops. Other options, such as local co-ownership of production facilities, could also be considered to ensure legitimacy and social acceptance. A comprehensive strategy for affecting end-user behavior and citizens' concerns should be developed within the first years of the roadmap, based on existing knowledge within the social sciences and humanities (SSH) field.

5.2.3 *Green hydrogen for trucks*

A crucial aspect of market implementation of green hydrogen for trucks is to develop and enforce industry standardization of green hydrogen producing equipment and output quality, for which there are currently no national guidelines. If, for instance, the hydrogen is to be used in fuel cells, there are high demands for quality, and standards for allowed levels of water in pure hydrogen must be determined. Denmark should seek to align these standards with the EU so that a European regulatory system for hydrogen may come into place.

The composition of the industry for land transport of goods is complex, and actors sometimes have opposing interests. While companies buying transportation of goods push for greener options, distributors have a hard time finding haulers willing to risk investment in trucks run on green fuels, especially given the low margins in the

industry. Trucks are expensive, so haulers, which will most often be smaller companies with 5-10 vehicles, will not replace them until necessary, and when doing so will think mainly in economic terms. With a fairly long lifespan (7-8 years), replacement of old trucks is a slow process. Moreover, producers are not expected to have models ready for large-scale distribution until 2028. Since there are no major truck producers in Denmark, implementation is dependent upon international demand. Technological advances, which increased energy efficiency of trucks, and thus the number of kilometers traveled per charge, might help to increase demand so that commercially available trucks are available on a large scale at an earlier date.

Filling stations with pressurized tanks will need to be established along the main road network, both in Denmark and in the rest of the EU. Furthermore, given the explosive nature of hydrogen, a specific effort is needed to smooth citizens' and consumer concerns during the market introduction. In sum, the societal readiness level of green hydrogen for trucks is currently deemed at a medium to low level (3-4).

5.2.4 Intermediary fuels for road vehicles

Methanol use in private vehicles has a high technological readiness level and could be distributed from the producer to the end-user through the established network of pipelines and filling stations. Nevertheless, promoting intermediary fuels such as methanol in the market for private vehicles, has both a technical, behavioral and financial challenge. As a technical challenge, for the gasoline engine to run smoothly on high levels of methanol, it must either be equipped with an additional device (Flex Fuel Kit) or undergo changes to the engine map. Demonstration projects by Danish Technological Institute have shown that a blend of 85% methanol can be used in existing gasoline engines with only minor adjustments. The device/modification must be available on a large scale in a standardized version, and mechanics across the country must be instructed in the application. This is regarded as a first goal for market implementation. The behavioral and financial challenges relate to concerns that the vehicle will be damaged, and whether this will entail additional cost for the consumer. To handle this, the government could engage in dialogue with car producers, to expand engine guarantees to cover installation of the engine device and use of methanol. If this is not possible, other market actors, i.e. insurance companies, could be incentivized to cover any damages to the engine caused by installation or use. When both the technical, behavioral and financial challenges are overcome, a critical mass of consumers would be expected, which could be seen as an inflection point for the market. The market for private vehicles is estimated to have a high societal readiness level (7-9), although further studies into behavioural modeling of individual consumers are needed.

5.2.5 Green fuels for aviation and shipping

The shipping industry has a high readiness level to adapt green fuels. The large amounts of fuels which ships offtake means that a few ships will be able to kick-start a large demand. Moreover, ship owners have a desire to go green, vessel engines have a high acceptance for fuels, and there is ongoing research into engines that are tailored for, e.g. ammonia, to improve energy efficiency. The shipping industry is even ready to put a price tag on their engagement. According to actors in the industry, a specific goal for the market would be that fuels are available in 2025, with a 20 % price premium difference between black and green fuels. Perhaps a transition can be achieved by requiring a certain blend-in of green fuels to the current fuels or e.g. grey ammonia.⁵ The use of ammonia in shipping is deemed to have a medium to high SRL level (6-7).

Nevertheless, there are challenges to overcome. As a test before market introduction, end-to-end demonstration projects of the use of green fuels are crucial to improve consumer acceptance. Further, fuels need to be ready in large quantities to ensure sufficient bunkering opportunities. Vessels, especially ocean-going vessels, offtake large quantities of fuel when bunkering, and some fuels need to be stored in pressurized tanks. Thus, a considerable obstacle to market implementation of green fuels for shipping in Denmark is infrastructure readiness to operate and store large quantities of fuels. Related to this challenge are issues of determining operating standards and safety procedures, as well as securing port authorities' acceptance of bunker infrastructure.

Further, given the international nature of shipping, there is considerable skepticism from the industry on whether Danish production of green fuels for shipping will be sufficiently cheap to compete with international products. In

⁵ Fossil ammonia where CO₂ is captured and stored

any case, the industry expects no export potential of production. However, the industry further agrees that there is a considerable export potential of fuel-related know-how and technologies, both regarding fuel production and engine technology.

Another considerable challenge to overcome regarding implementation of green fuels for aviation and shipping concerns the regulatory barriers related to fuel requirements, which are particularly strict for aviation. These requirements are agreed upon on an international basis through the International Maritime Organisation (IMO) and the International Air Transport Association (IATA). Thus, for successful market implementation, the Danish government should consider active engagement in IMO and IATA to purposely transform these requirements.

5.3 FINANCIAL ROADMAP

The investments needed to convey a green transition through utilization of green fuels are significant. Following EU's Investment agenda €320-458bn is to be invested in hydrogen until 2030 and expected addressable market of €2 trillion until 2050. A significant part of the investment is related to the build out of renewable energy sources.

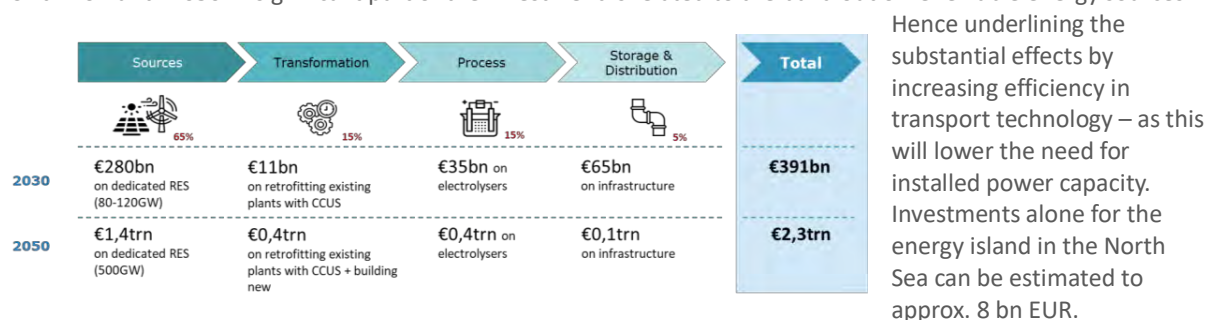


Figure 5-4: EU's investment agenda for hydrogen

5.3.1 Investments in demonstration and infrastructure

Creating a market for hydrogen is among the immediate actions of the proposed roadmap. This requires investments in large scale demonstration plants (as listed in Table 3-1), transmission abilities and storage, and will include the deployment of both large industry and SMEs. Private investments are envisioned having a significant role here. De-risking these massive private investments is of crucial importance sparking the development in this area, therefore also public financial support is envisioned to have an initial role.

Several aspects play a significant role in lowering the risk to the investor. Initial public co-financing of large demonstration plants is a strong contribution in this respect. Focusing available public funding for large demonstration plants, transmission and storage infrastructure is important. Another aspect is ensuring a stable off-take. Creating a significant market for f. ex methanol for light transport through legislative measures is thus important. Bundling investments across the value chain – including both the production, distribution and use of the green fuel – could also prove as efficient means to ensure off-take. Additional initiatives could be applying public procurement as a catalyst for the use of the green fuels by f.ex. offtake for public transportation.

Lowering the complexity in fuel solutions would also support the ability for investors to navigate – a scenario focusing on Hydrogen, Ammonia and Methanol would therefore have positive effect for the investor outlook. Similar if it would be possible to pool the demand by off-takers – to get more certainty on market sizes.

Even though there is a willingness in some markets to pay a premium on green solutions, a very significant contribution to the de-risking of investments, is to narrow the price gap between grey, blue and green hydrogen. This will in the longer run be obtained through scale-up production and research, and in the shorter run through economic incentives either increasing the cost of fossil-based fuels through a CO₂ tax or provide subsidies or alleviating other taxes applied to green fuels. In this respect it must be taken into account that electricity makes up 50% of the cost of green hydrogen production and tariffs another 20% – the price of electricity thus has a large impact on the price of hydrogen. Focusing on developing innovative business models that cater for a market for green fuels is therefore important.

User acceptance and behavior is also important to consider. Engagement and focus on benefits for end users/citizens is important in aiding the transition for both construction and operation of facilities and in the end positively affect demand. Utilizing existing assets by retrofitting fossil-based infrastructure (refineries, gas transmission, storage etc.) could also prove a faster way to reduce the investment requirements and the price of green fuels.

During the later years there have been an increasing focus towards sustainable investments (e.g. ESG) currently also driven by the introduction of the EU taxonomy. Green fuels are to benefit from this focus. But it will also call for transparency in the declaration of fuels. Introducing digital solutions like block-chain which is currently applied in development tools for reporting, would add to the transparency of the markets.

Projects that would require investments following the road map include:

1. Planned PtX demonstration projects with a 2030 horizon
2. Hydrogen (heavy vehicles) and M85 (light vehicles) fueling stations and associated infrastructure
3. Hydrogen transmission net – pipe to Germany for export
4. HVO: Medium scale plant
5. Hydrotreating of bio-oils: Medium scale plant on refinery
6. MeOH/DME: Large scale plant based on CCU
7. NH₃: Large scale NH₃ plant (at harbor) and associated NH₃ bunkering and maritime off-take
8. Offshore hydrogen wind turbines
9. Gasification with downstream MeOH and MeOH-2-jet: Medium scale plant

Demonstration projects often require public funding to support the business case for the involved actors. An example of this is the recent political agreement to set up a pool of DKK 200 million, earmarked for the green transformation of municipal ferry operation in Denmark.⁶

5.3.2 Public financing of Innovation and R&D

Besides initial co-financing, public funding also has a significant role in relation to technology development which is assumed to be ongoing towards 2050. The current road map identifies following key technologies which ought to be addressed:

1. NH₃ engine and retrofitting diesel engines for dual fuels
2. Refinery of Biooil (from pyrolysis and liquefaction)
3. Improve electrolysis – catalysts, efficiency, material degradation, and increase pressure
4. Improve fuel synthesis processes – better catalysts and more efficient processes
5. Methanol-2-jet (or approve jet-B as jet fuel for passenger aviation)
6. Improve pyrolysis and liquefaction process
7. Hydrogen wind turbine
8. Hydrogen storage in caverns in Denmark
9. Improve gasifier incl hot cleaning of syngas

According to the level of maturity of the identified technologies (Figure 3-3), specific relevance of national funding applies to the Innovation Fund: Grand solutions and Innobooster, EUDP and ELFORSK and in some cases even a facility like the Export Credit Foundation. But compared to the investment sizes needed, additional funding is highly relevant to consider. Several European funding possibilities apply during 2021-27. Most relevant is Horizon Europe with a budget of 15 bn EUR for climate, energy and mobility (i.e. InnovFin EDP Facility, which provides loans to commercial-scale industrial demonstration projects (TRL 7-8) for renewable energy, fuel cells and hydrogen. The EU Innovation Fund awards grants of 10 bn for demonstration or scaling up innovative technologies including PtX technologies. Other European options include Connecting Europe Facility with 5 bn EUR for grant and risk mitigation instruments for energy transmission infrastructures of European importance. Invest EU with a budget of 9 bn for guarantees for bankable investments in sustainable infrastructure, and LIFE with 1 bn EUR for demonstration projects in clean energy transition ready to be implemented close to market

⁶ <https://www.trm.dk/nyheder/2021/aftale-om-200-millioner-kroner-til-groenne-faerger-i-danmark/>

condition at industrial scale. In addition is to be consider EU funded programs implemented at the member state level (ERDF, Cohesion Fund and the Recovery and Resilience Facility). Of specific interest is also the dedicated instrument Important Project of Common European Interest (IPCEI) which is currently being applied on hydrogen throughout Europe, endowing selected projects with unique exceptions from state aid rules.

6 Integration of PtX with the broader energy system

The energy system stands before a transformation as it adapts to the introduction of the hydrogen value-chain of PtX, which embraces all energy consuming sectors. It is important to utilize the strengths of the individual system for optimal implementation of PtX fuels, while also ensuring efficient interfaces between different energy sources into the energy systems.

Despite the highly developed Danish energy system, it faces several challenges and opportunities with the introduction of the PtX value-chain. The challenges and opportunities are of technical, market, systemic and regulatory character and include:

- Availability and allocation of resources
- Development of energy system models to include PtX and co-optimization of energy grid infrastructures
- Balancing of electricity grid with increasing share of wind and solar power with PtX-plant flexibility and the associated energy storage capacity (e.g. Hydrogen storage)
- Development of hydrogen infrastructure, including offshore grids and energy islands
- System services and integration of PtX-plants in low-inertia, converter-based power systems
- Hybrid plants combining PtX with Energy storage, Wind Turbines, and Solar Panels
- Integration of electricity, electric infrastructure, reuse of heat surplus, district heating, hydrogen, gas, biomass and carbon markets.

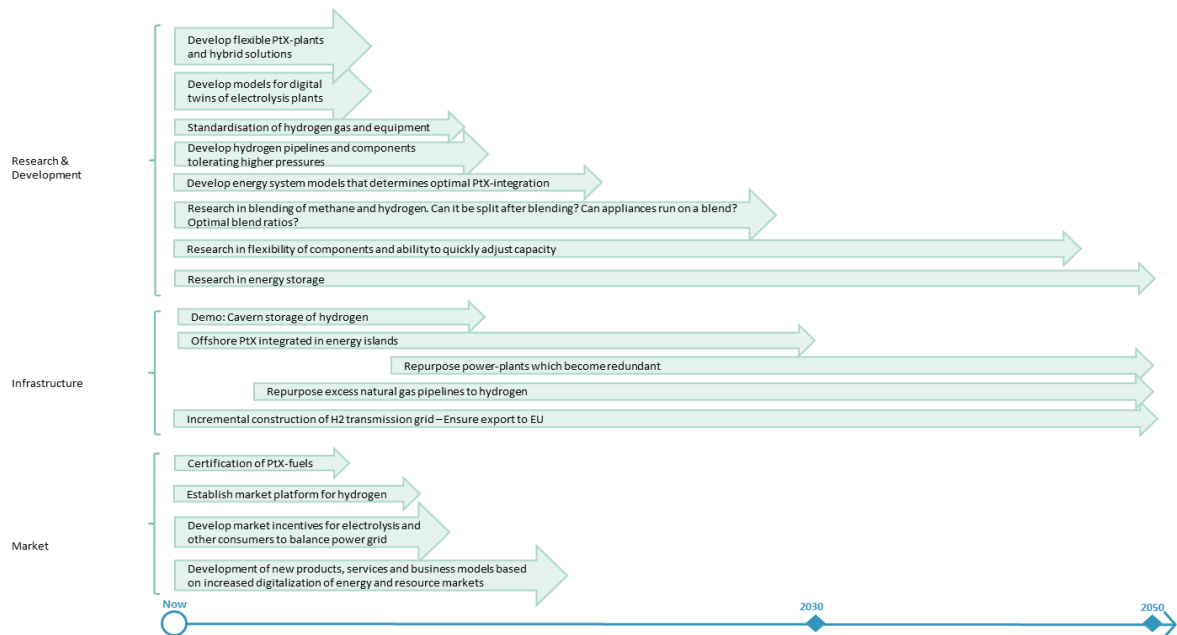


Figure 6-1. Key activities and workstreams for integration of PtX with the broader energy systems

There are several gaps in the current energy systems which leads to suboptimal integration of alternative fuel production, distribution, and consumption. A number of key activities and work streams have been identified to close the gaps. The goal is to do so optimally, by implementation of existing technologies and smarter regulatory frameworks, while other gaps require further research and development.

6.1 TECHNOLOGICAL IMPLEMENTATION

Balancing of the electricity system is a key focus area for technological market implementation. This can be achieved by development of hydrogen infrastructure with storage of hydrogen in underground caverns. The technology for hydrogen storage is mature but scaling and proof-of-concept is needed on a large scale. A big demonstration plant for hydrogen storage would allow shifting excess power production from wind power to periods with low production and high consumption of energy, increasing the agility of our energy system and put Denmark in a leading international position in renewable-based energy systems with PtX. Digital twins will enable optimal design and operation, and optimization of PtX-plants for various use cases. It is also essential that the development of the energy islands in the North Sea and Baltic Sea includes support for PtX-production.

Research and innovation are required to provide the pathways for stronger integration of PtX with the broader energy systems. It also opens for further development of flexibility in both production and offtake of green fuels through e.g. digitisation, market solutions and behavioural adaptation. By increasing the flexibility, efficiency in turn will increase adding to further lowering of cost and the overall uncertainty related to green fuels and provide better possibilities for balancing and ensuring stability of the electricity system with an increasing share of intermittent power. Research and innovation in flexibility should focus on the ability of components in the PtX energy system to be able to deliver system services for the electricity grid, by being able to quickly adapt to the price signals of the electricity market. Research and innovation should also focus on developing energy storage technologies, so they can become viable options for the energy system and for hydrogen production for both short- and long-term storage. Another aspect could be evaluating and handling the potential long-term risk for the Danish power and energy system, when there is large-scale deployment of PtX and increased level of cross-border fuel trading and transportation activities.

The industry opportunities by combining PtX-plants with wind turbines should be prioritized. This involves new control concepts, hybridization, simplified equipment, ancillary components, combined power and hydrogen transmission etc. Research and innovation about PtX and related technologies (incl. energy system models) for offshore applications shall also be prioritized to achieve optimal design, planning, implementation and operation of GW-scale offshore plants, e.g. via offshore energy islands. This will create a sustainable market for Danish technologies and stakeholders.

Key research and innovation activities are also needed in blending of hydrogen and methane. Research and innovation could provide options for splitting of these blended gases or for conversion of existing appliances connected to the grid to run on a hydrogen and methane mix. Research and innovation are also needed to increase the pressure of hydrogen in pipelines to excess of 30 bar. The higher pressure that can be achieved, the more energy can be transported in the hydrogen grid, increasing the flexibility of the energy systems.

Key innovation workstreams in repurposing natural gas pipelines for hydrogen must be carried out, as well as key activities in repurposing and reintegration of obsolete power plants into the PtX energy system, for example as hydrogen power plants. Also, the costs of repurposing the gas pipeline system for hydrogen and hydrogen cavern storage must be benchmarked with respect to overall economy versus a process, where hydrogen is converted to methane enabling re-use of existing infrastructure. Detailed analyses of the cost of the various routes must be benchmarked involving all key stakeholders.

Energy system models should be further developed and integrate the PtX value chain in both short- and long timescales. They should allow actors and regulators to determine optimal locations of new plants based on grid capabilities, market forecasts, biomass and carbon availability and include sector coupling and co-optimisation of gas, electricity, hydrogen and district heating. Energy system models should also incorporate digital twins of electrolysis plants for optimisation of energy systems. Furthermore, the advances in artificial intelligence and machine learning must be adopted in the energy system models, to provide valuable data analysis, insights and forecasting of energy markets. The models should provide socio-economic analyses assisting in prioritising e.g. biogenic CO₂ for CCS or fuel production, biogas for industry or methanol, offshore wind power for export of electricity, hydrogen or liquid fuels, taking into account the national resources and environmental goals.

6.2 MARKET IMPLEMENTATION

There is a need to establish a hydrogen grid as soon as possible, as this will drive the market implementation for the hydrogen economy and establish cost-efficient transport of hydrogen to where it is needed. The hydrogen grid will be a magnet for PtX-projects which will gain access to cheap hydrogen for further processing into PtX-fuels and will allow actors to focus on key expertise areas.

However, some technologies are best co-located such as high temperature electrolysis and down-stream synthesis to e.g. ammonia or methanol, as very high overall efficiencies can be achieved with correspondingly low cost. Thus, distribution will be most beneficial for export and distribution for transportation uses (trucks and short distance maritime transport).

To implement PtX-fuels in the energy markets further digitalisation is needed. Market actors are currently acting bilaterally due to a lack of centralised market platforms for particularly PtX-fuels, hydrogen, biomass, and carbon. A goal for market implementation of PtX-fuels in the broader energy system is to further digitalise energy markets. Key work streams should identify the possibility of implementation of blockchain technology in market designs as a tool to facilitate efficient and transparent market design and tracking of certificates providing guarantees of origin for hydrogen and PtX-fuels. Digitalisation should also integrate the trading of certificates with physical products. Digitalisation must also provide possibilities for utilisation of surplus heat and the use of biproducts from PtX processing plants. The market design should allow for consumers to be responsive regarding grid balancing and act dynamically on both production and distribution capabilities of the electricity grid. The PtX value chain must utilise the potential for balancing the electricity grid, which will allow Denmark to use cheap wind-power instead of exporting it to neighbouring countries. It is crucial that we reclaim the value of cheap wind-power.

Digitalisation must be seen as a new type of infrastructure similar to transmission grids. It is going to be one of the key pillars of the market development and will bind together the PtX-markets and make Denmark leading in green energy to sectors which are difficult to electrify. Thus, a goal is to test, develop and implement new digital and cyber-secure infrastructure and market solutions that can support the future PtX market, by securing the value of renewables in the entire value chain, across sectors and borders. It will allow actors increased access to market and utility data in a transparent and cyber-secure manner, which will reduce entry barriers for new and existing actors. Digitalisation will secure an efficient utilisation of existing and new energy infrastructure, which will minimise costs and issues related to the transition to sustainability. It will release the potential for sector coupling and introduce the necessary flexibility for balancing the electricity system.

7 Contribution towards the Vision

7.1 CO₂-REDUCTIONS

Climate projections from the Danish Energy Agency show that under a frozen policy scenario, total net emissions are expected to fall to 35 mt CO₂e in 2030, corresponding to a reduction of 55% compared to the 1990 level. The projections thus show that at present there is an estimated reduction shortfall of 15 percentage points, corresponding to 11.8 Mt of CO₂e in relation to the Danish Climate Act's 70% target (ref 5). Assuming full implementation of the proposed roadmap, initial estimations show that the roadmap has a potential to reduce CO₂e by a further 4.9 Mt in 2030. Thus, the roadmap covers 41% of the reduction shortfall to reach the Danish climate goal.

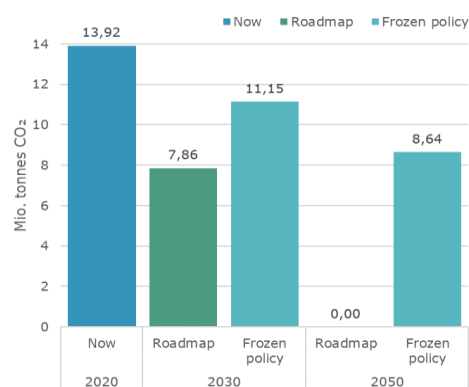


Figure 7-1: National emissions from transport (Mt CO₂) in 2020, 2030 and 2050 as frozen policy and roadmap scenarios

The main part of the CO₂e reductions are expected from the transport sector. Despite an increase in conducted transportation, CO₂e emissions from the transport sector are expected to fall by 2 mt from 2019 to 2030 in a frozen policy scenario, which means that the sector is expected to emit 11.5 mt of CO₂e in 2030. This is roughly at par with emissions in 1990. More than half of this reduction is from the transition to electric passenger cars (ref 12). By implementing the roadmap, emissions in 2030 are estimated to be further reduced by 3.3 Mt CO₂e so that the sector emits 7.9 Mt CO₂e. These estimations only include national transportation, in line with the Danish Climate Act's 70% target. Although the roadmap does not propose full-scale Danish production of ammonia for shipping, expected reductions from shipping are included. Given the right framework conditions, and opportunity for full-scale demonstration of the technology, shipping is expected to convert to green fuels, irrespective of the origin.

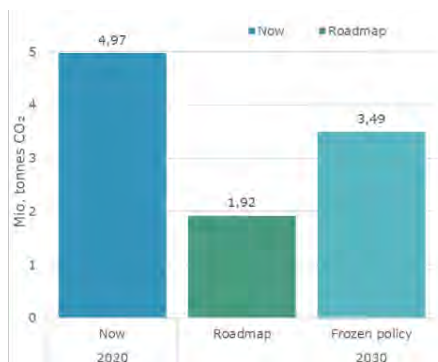


Figure 7-2: Emissions from industry (Mt CO₂) in 2020, 2030 and 2050 as frozen policy and roadmap

In sum, the roadmap presents an estimated 33% reduction of the emissions in the transport sector compared with 1990 levels. This should be held up against a sharp increase in transportation conducted. It also exceeds expectations according to the Climate Partnership for Energy and Utilities Sector (ref 13), which estimated the CO₂e reduction potential from PtX in the transport sector to be 1.9 Mt. Moreover, it is in the high end of government estimations in the Climate Programme for 2020 (ref 12).

In a frozen policy scenario, emissions from the industry (manufacturing and construction) are expected to fall by 1.5 Mt CO₂e in 2030. The emissions from manufacturing and construction come from both the sector's energy consumption and process emissions (ref 5). The reduction is mainly due to a reduction in the

manufacturing industry's energy-related emissions, while the decrease in process emissions is significantly smaller. By implementing the roadmap, emissions are estimated to be reduced by a further 1.6 Mt CO₂e compared to the frozen policy scenario. This constitutes a 76% reduction in CO₂e emissions from the sector.

Finally, we expect a 1.1 Mt CO₂e reduction from 2020 to 2030 from the Danish share of international shipping and aviation. These reductions do not contribute towards the 70% reduction target. The reduction will occur despite a considerable increase in transportation conducted by these modes. The estimations are uncertain, due to different methods of calculating the Danish share of international aviation and shipping. Nevertheless, the estimations are in line with the long-term reduction potential estimated in the government's Climate Programme for 2020 (ref 12).

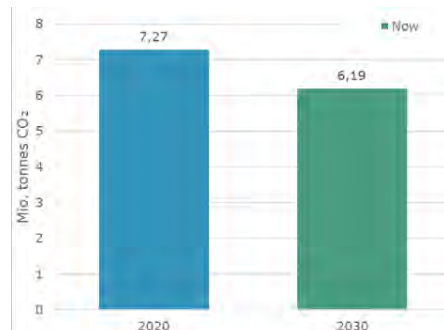


Figure 7-3: Emissions from international maritime and aviation transport (Mt CO₂) in 2020 and 2030 roadmap

The above calculations focus solely on transportation and industry, and not on national or international effects in other sectors. For instance, surplus heat from PtX can support the Danish district heating supply. Also, Danish power from sun and wind would arguably have a greater climate effect if it is exported in the European electricity system, where it would displace fossil-based electricity production. Finally, the calculations do not consider any possible rebound effects due to tighter regulation.

7.2 EXPORT

Denmark has a long tradition of exporting energy raw materials, primarily based on oil and natural gas. From the end of the 1990s onwards, exports increased markedly and peaked in 2008 at approx. 76 billion DKK in export earnings (ref 5).

The export potential of PtX products is dependent upon the composition and characteristics of the product. PtX products that are difficult to transport over long distances, or consist of raw material that is geographically

constrained, will have a better potential for exportation to other European countries than other products. For easily transportable PtX products, the market is expected to be saturated by cheaper products from areas with lower electricity costs (i.e. Australia or Saudi Arabia). Thus, the export potential of PtX commodities is focused mainly on Denmark's neighboring countries and the EU. The export of new PtX technologies and services has a huge potential for boosting the already existing export-intensive businesses within energy and transport given that commercial viable technologies are demonstrated.

For the proposed roadmap, it seems realistic that there will be a considerable export potential for green hydrogen. The existing hydrogen consumption in industry and refineries is approx. 1440 PJ in Europe, which is today largely produced from fossil fuels, i.e. natural gas and coal. Some of this could potentially be replaced by electrolysis-based hydrogen from Denmark. The increasing green hydrogen demand from Germany, and ongoing discussions of an EU hydrogen backbone, are good indications of a growing demand from Denmark's neighboring countries.

Medium term export of methanol also seems realistic, although to a less extent than hydrogen. Due to imports of biomass, Denmark has considerable access to carbon, which is used in methanol production.

Conversely, the industry does not seem convinced that production and export of ammonia is a viable option for Danish producers, as this may be produced with less cost in other countries and imported to Denmark. For this reason, the roadmap does not include a large-scale ammonia production facility placed in Denmark, although smaller scale facilities may be set up in order to test the technology.

An additional effect of the roadmap is the lost opportunity to transport electricity from the energy islands to the European electricity system. Indeed, Denmark will be a net importer of electricity, even when the North Sea energy island is operating at full capacity.

Nevertheless, besides satisfying a local market, Danish production of PtX fuels still plays an important role in building technologies and know-how, which may be exported on a large scale, as is the case with wind energy. Many years of active Danish energy and climate policy has ensured a good business starting point for the development of green technology in Denmark (ref 13). Today, more than 32.000 people work in the wind energy industry, and wind technology and services make up approx. 5% of Denmark's total exports, corresponding to more than DKK 66 billion (ref 14). At the same time the maritime industry employs 60,880 people directly and exports goods and services for just over DKK 287 billion accounting for 26.5% of the total Danish exports. On top of that more than 25.000 are employed within land transport in Denmark. In continuation of this, the 70% target in 2030 can be leveraged for Danish consumers and companies to use energy-efficient solutions, which at the same time will lead to increased demand for energy technology. This supports the energy technology innovation in Denmark, which contributes to Danish companies having good conditions for continuing to develop and export competitive energy technology solutions. In fact, according to actors in the industry, this is where the main export potential is expected, and thus should not be underestimated.

This PtX road map suggests actions to among others support the realization of 3.7 GW already planned PtX projects for 2030. These already planned projects are likely to become the first fast steppingstone for Denmark to grow a global export of technologies and solutions in PtX. This export will come on top of the increased export of wind turbines from Denmark as a consequence of PtX requiring more renewable power on a global scale in the coming decades.

7.3 EMPLOYMENT

The calculations of employment effects by the investments in the roadmap, is based on a breakdown of the investments in:

- expected labor purchase
- purchase of non-standard components/plant
- purchase of goods and services in general
- information on the timing of the individual investments

Table 7-1. CAPEX investments (bill. DKK) needed for fuel production in 2020-2030 and 2030-2050 (COWI calculations)

	2020-2030	2030-2050
H ₂	1	7
MeOH/DME	19	0
Jet	15	14
Total	35	22

This information has been obtained by experts from COWI's and external experts. Based on this information and COWI's calculation model, COWI has calculated the demand for labor measured in number of man-years and divided into years and occupational groups.

The demand calculations are based on expectations for CAPEX projections for green hydrogen, methanol/DME and jetfuel shown in Table 7-1. CAPEX estimations only cover production facilities, and further investments will be required for the distribution and bunkering of the fuels. Moreover, we assume that the cars, vans and trucks on Danish roads will be imported from abroad, regardless of which fuel they run on. This relatively large investment is therefore expected to have limited direct employment effects.

This also implies that the calculations do not additionally include demand due to technological export. This is important, as expectations for technological export are high, as mentioned in section 7.2. In fact, actors in the industry expect technological export to be the main driver behind job creation.

The estimated demand from CAPEX projections includes both the direct and the indirect employment effects, and thus both the labor demand that investment creates in connection with the actual implementation of the investment and acquisition of the components/plants that are not standard solutions (the direct effect) and the labor demand generated by investment in suppliers of goods and other services (indirect effect).

Based on expectations for CAPEX projections for green hydrogen and methanol, combined with the suggested development of consumption of biofuels in industry transport, it is expected that PtX CAPEX investments of 35

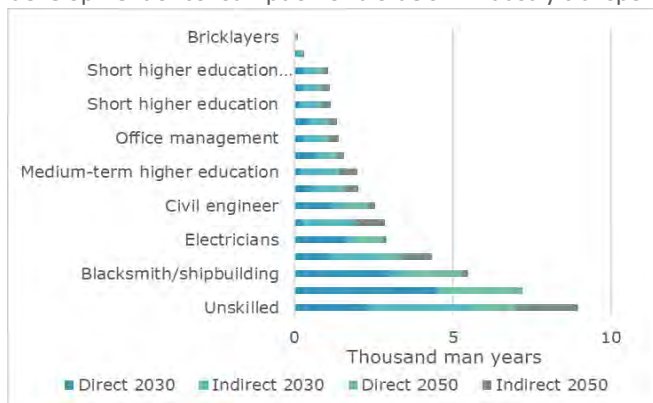


Figure 7-4: Total employment effect (thousand man-years) for 2020-2030 and 2030-2035

billion DKK is required between 2021 and 2030 , and a further 22 billion DKK towards 2050 to make transport and industry independent of fossil fuels by 2050.

The total employment effects for the periods 2020-2030 and 2020-2050 are shown in Figure 7-4. As the table shows, COWI foresees a high demand for unskilled labor, blacksmiths and shipbuilders and plumbing and gas-technicians.

While construction of production facilities mainly requires unskilled or lower-education labor, it could be expected that the significant labor demand created due to export of PtX

technologies would be directed more towards higher education employment.

In order to meet employment demands with a national workforce, it is crucial to ensure the right education of potential employees. This process must be initiated now, so that new graduates are ready by before 2030.

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Exhibit 2

Partnership Plan

MissionGreenFuels

File number: 1150-00001A

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1 Master plan for the whole Partnership

1.1 Establishing MissionGreenFuels partnership and secretariat

Within the first year of the partnership, the following initiating activities will take place:

- Employment of a head of secretariat for the mission
- Arranging a kick-off meeting with election of BoD members to replace interim BoD
- Definition of activity plan leading up to pool 2 commencement
- Start-up meetings in each workstream
- Devising a strategy forming the partnership and its cohesion ensuring the partnerships ability to unite forces, minds, ideas and willpower, to work differently and to impact society rapidly.
- To discuss and agree this strategy with the BoD.

Specific activities are given below.

Objective	Description	Due month
Activity plan for pool 1 period	Partnership activities in first year targeted on establishment, implementation and operation of the partnership with focus on research and innovation support activities	3
Work stream startup meetings	Meetings with responsible secretariat member and individual work streams	3
Plan for implementing pool 2	Partnership process and plan to define content, priority areas and budget allocations for pool 2 proposals	2
Plan for quarterly and annual knowledge dissemination events	Quarterly meetings in work streams to facilitate knowledge sharing and support roadmap updates; annual meeting in entire partnership as well as national/international stakeholders, other IM's	3
Communication plan	Internal and external information flow	2
Advisory boards established	Roles and purpose of advisory boards (industrial and research) established, potential members identified	3
Capacity building plan	Framework for education and capacity building at MSc, PhD, lifelong learning level as well as commercialization support activities	9
Stakeholder analysis & Funding acceleration plan/strategy?	A detailed plan for a funding plan/ and strategy will be developed and adjusted as the partnership develops.	6

1.2 Gearing of funding

The success of the IM2 mission activities will depend various factors, amongst others its ability to fundraise at a significantly higher level than the initial DKK 195+ million grant from IFD. This leverage effect will be built closely into the workflows of the MissionGreenFuels partnership and the management and secretariat. The goal is to build broad partnerships with foundations and private companies at sector level to ensure the necessary massive and broad societal leverage of the mission's activities.

The Secretariat will support the gearing of funding in relation to the IM2 scope in minimum four ways:

1. Keeping the Roadmap updated and communicating it to relevant stakeholders including public and private funding bodies, thus ensuring that the Roadmap lays an essential ground for any further research and innovation activities ahead in the area of IM2 mission activities. It is necessary to communicate broadly the mission's objectives and activities to ecosystems in both the energy sector as well as the transport sector and across value chains including private sector representatives, knowledge institutions, public authorities and consumers etc.
2. Offering the IM2 partnership relevant fundraising support to further develop the initiated projects within IM2 and ensuring commercialization of the projects within IM2.
3. Offering the companies and research institutions outside the IM2 partnership relevant fundraising support in order to develop projects within the IM2 scope.
4. Initiating dialogue with the private pension funds as to strengthen their involvement in the IM2 scope and mission activities focusing on opting pools of private funding for the commercialization of IM2 mission activities.

Furthermore, the MissionGreenFuels partnership will establish two advisory boards that will play a sounding role in working towards advancing the framework for further funding sources. One advisory board consisting of Danish relevant industry associations such as Green Power Denmark, Biogas Danmark, Dansk Industri, Dansk Erhverv, Dansk Fjernvarme, Brintbranchen, Danish Shipping, Danish Maritime and DTL that will concentrate on promoting favorable policies and framework conditions to support the objectives of the partnership. Secondly, an international advisory board will be established with relevant partners from the EU and 3rd countries to ensure relevant international knowledge transfer and collaboration in to the Innomission 2. Both advisory boards will provide useful input to the BoD and further IM2 partnership on relevant topics including funding opportunities.

Leverage of extra funding is a joint responsibility and a role to which the broad partnership is expected to contribute actively - both at consortium and portfolio level. BoD will play a vital role in fundraising and attracting further funds to the partnership. The MissionGreenFuels partnership regards the IFD funding as a starting point for the partnership and the future development of solutions. Further funding is needed to expand the envisioned tasks of the partnership. Below is a list of potential funding sources and estimated success rates.

Table 1 Funding opportunities and expected success rates

Funding source	Total sum	Estimated success rate	Time frame	Theme
IFD	-	N/a	n/a	Pool 2+n, n=1,2,3...
EUDP	1-200 mio DDK annually	50-100 mio DDK annually	2023-forward	Full value chain / individual process design & optimization
DFE thematic call on green research/transition	Approx. 100 mio DDK annually	25 mio DDK annually		Low TRL "curiosity" driven research
IPCEI		100 mio EUR	2024-forward	e-jet fuel production and certification
EU Innovation Fund	25 billion EUR towards 2050	100 mio EUR	2024- forward	Hydrogen & CO2 infrastructure project
Horizon Europe	15 billion EUR	100 mio Euro	2023-forward	PtX, sustainable fuels, RIA, IA, climate partnerships
Just Transition Fund	?	50 mio DDK annually	2023-forward	Erhvervsfyrtårne og regionalfondsprojekter
Private foundations / public-private foundations co-fund (eg Pioneer centers)	10 billion DDK annually	500-1000 mio DK (1-3 centres)	2024-2030	Sustainable carbon utilization; e-fuel infrastructure; public acceptance
Private investors/ venture capital		5 billion DDK	2024-forward	Commercial GW scale projects

A specific taskforce will be set up dedicated to devise a plan for the development of a funding strategy with national and international perspectives during the first acting period of the partnership. A good starting point is the overview provided by COWI¹:

¹ Dansk Industri – Anbefalinger til strategi for PTX og CCU. 2021

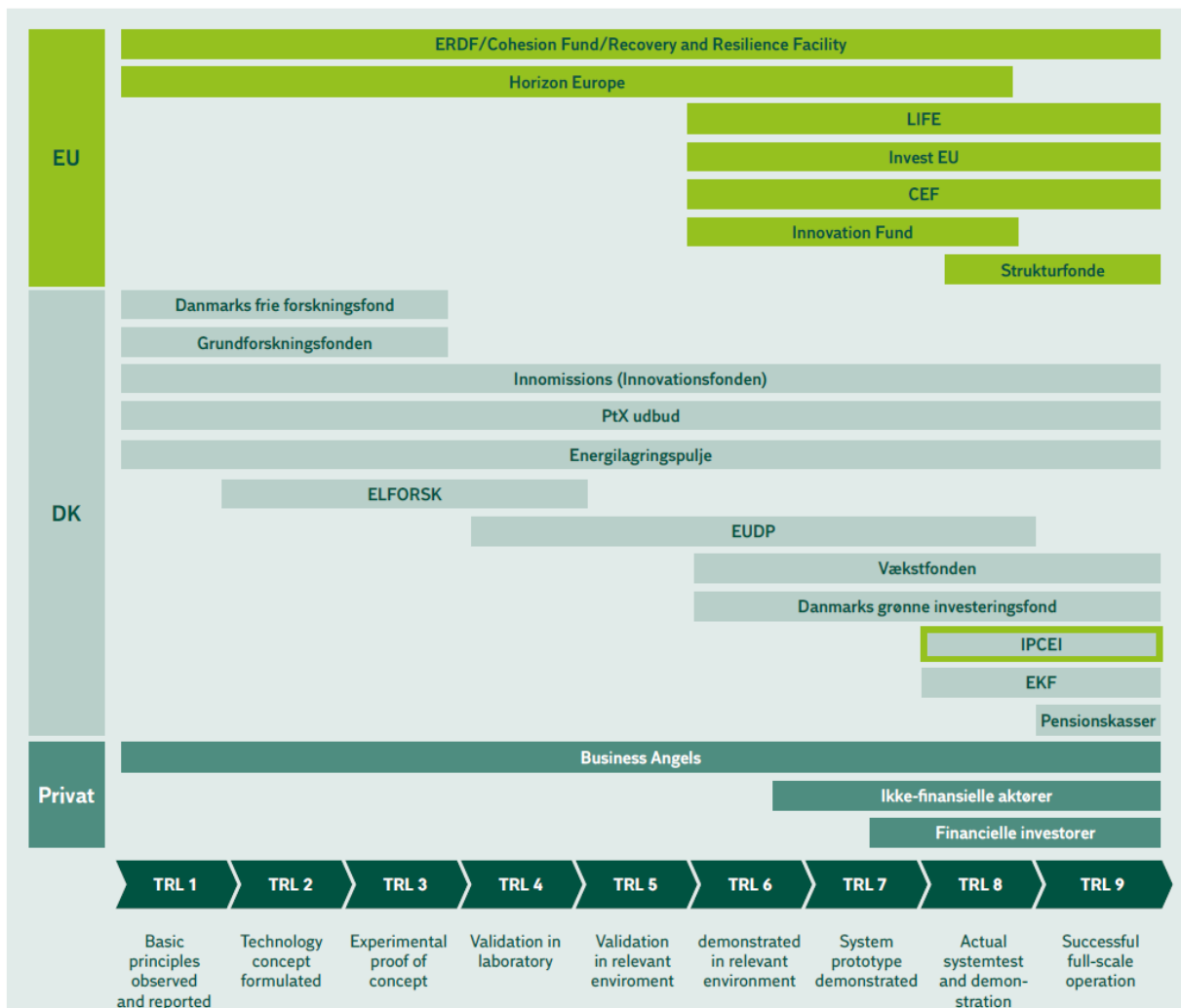


Figure 1 Overview of funding possibilities and corresponding TRL. COWI in Dansk Industri – Anbefalinger til strategi for PtX og CCU, 2021.

1.3 Partnership activities

The MissionGreenFuels partnership will be organized as the total group of involved companies, knowledge institutions and other organizations in the Innomission 2. It represents a free-of-charge, non-institutionalized partnership (as any Grand Solution project).

The IM2 partnership is served by a unique and strong secretarial partnership model by drawing on existing relevant supportive organizations and structures allowing the development of the IM2 partnership reaping the benefits from their extensive platforms, networks and activities.

This IM2 partnership is initially launched with an interim Board of Directors (BoD) representing industry, academia and research. The Chairman of the BoD has the overall responsibility for the execution of the Roadmap, portfolio management and project initiation in close collaboration with the other members of BoD. Once in operation, the BoD will be formalized.

The BoD has formed a secretariat with a secretariat leader based at AAU, with distributed assignments to Energy Cluster Denmark (ECD) and the Danish Center for Energy Storage (DaCES). A head of the Mission Secretariat will be recruited to lead and implement the MissionGreenFuels partnership placed at AAU. ECD and DaCES will refer to this secretariat lead.

The secretariat taps into the existing structure and strong partnership basis of the national cluster organization Energy Cluster Denmark representing the energy sector with more than 4000 affiliated companies and in particular involving its 400 members among large companies, SME's and knowledge institutions in the energy sector, and DaCES, representing actors working in the field of energy-storage from academia, knowledge institutions and industry.

The MissionGreenFuels BoD has negotiated and deliberately chosen this partnership model together with Aalborg university in order to capitalize on existing strengths, capacities, national and regional outreach and network of ECD and DaCES to relevant actors in the field. ECD with a strong focus on companies, SME's, innovation and commercialization and DaCES focusing on research and research related activities targeted at academia and industry. Furthermore, by building IM2 on this partnership model the start-up and running costs of the IM2 Secretariat are expected to be lower compared to building a new structure from ground zero.

The MissionGreenFuels partnership will operate with a portfolio approach centered around three main work streams distributed in 9 projects in pool 1. The three work streams are:

- Technologies
- Infrastructure and PtX plants, sector coupling
- Business models, market development and acceptance

A fundamental governance principle in mission-oriented innovation is the system-wide focus on a portfolio of activities across knowledge domains, actors, sectors, and value chains. This means that although the mission is realised through a bottom-up process and through activities, the governance model will ensure that the portfolio composition aligns with the mission, and enables new learning, insights and innovations to emerge. Portfolio management will therefore ensure systematic and aligned data collection, and active adjustment of the project portfolio – making new connections between activities, searching for missing elements to add, and discarding activities that no longer contribute to the mission.

The MissionGreenFuels partnership will ensure a broad portfolio of projects addressing the whole green fuel value chain and engage the broader ecosystem. It is a core aim for the governance model to be both agile and flexible in its structure, while also involving and engaging a very wide range of stakeholders.

A detailed plan for forming and supporting the partnership ensuring this outcome will be developed. This also includes a detailed set-up of how to ensure that all partner activities feed into making the MissionGreenFuels partnership a success.

The Secretariat and the head of the Mission secretariat will address these main tasks (non exhaustive list:)

- 1) Dynamic portfolio management including facilitation, partner collaboration, milestones, data collection, assessment/ learning and mission alignment across the portfolio. Mission Management can make operational decisions under responsibility to the BoD.
- 2) Process and decision support to the BoD and other governance bodies
- 3) Initiation of cross-cutting initiatives in collaboration with partnership: e.g., value chain building activities, capacity building programmes, workshops and conferences, fundraising activities, collaboration with policy makers, interaction with consumer groups and coordination with the other Innomission partnerships
- 4) Management of communication and outreach focusing largely communicating the IM2 Roadmap as to enhance the communication of the mission objectives and activities.
- 5) Project administration including for instance accounting tasks where the Mission accountant will collect individual project budgets, report to the IFD and together with the Mission Director

follow up on the progress of the mission projects. The Mission accountant will together with the IFD ensure sufficient financial data is provided from the project portfolio managers. The IFD will provide the final revision of project budgets (Pool 1, Pool 2 etc.) and is responsible for the final approval.

- 6) Responsible for ongoing coordination with the IFD

1.4 Key inflection points

There are a number of key inflection points that govern the development and roll-out of green fuels. These are a combination of technical, social and socio-economic/regulatory inflection points, which in some cases transgress the delimitation of the green fuels mission as such, and in other cases are contained within the mission.

1.4.1 Socio-economic/regulatory inflection points

A major driver for the successful implementation of green fuels is the associated tax and/or incentive structure. Currently, some fossil fuels are taxed but green fuels are still not competitive on a strictly economic evaluation, even though it is clear that for the fossil fuels, climate effects (or the cost of mitigation) are externalized in the price whereas for green fuels, they are internalized. For those fossil fuels that are not taxed (eg jet fuel), the difference is even more pronounced. One means of levelling this out is by carbon taxation, which is challenged by the international nature of aviation and marine transport in particular as well as by a very moderate implementation pace.

- A regulatory inflection point is when carbon taxation makes it unsustainable financially to use fossil fuels

From the perspective of infrastructure and its use, there are several barriers in the current tariff system for the electric grid that make it difficult for PtX operators to operate profitably.

- An infrastructural inflection point is when the tariffs and pricing structure of the transmission and distribution grids for electricity are adapted to accommodate PtX plants

One of the major bottlenecks for the green transition is the slow pace of implementing solar and wind production capacity.

- A regulatory inflection point is when the approval procedures for siting of green electricity and green fuel production have been simplified

Specifically for aviation fuels, there is a lengthy, expensive and challenging certification procedure in order to bring a sustainable aviation fuel to the market. This means that producers have to scale up production before they are certain that their product can be certified, which creates a barrier to investors and also increases the time-to-market significantly. Originally designed to accommodate Fischer-Tropsch derived jet fuel from gasification of coal from South Africa during the apartheid embargo, it is designed for maximum safety and established fuel producers.

- A key inflection point for aviation is when the ASTM certification procedure is refocused to the new reality: early stage producers in a hurry to get investors on board in order to scale up. Without losing sight of safety, of course.

1.4.2 Social inflection points

A major challenge for the large scale implementation of green fuels is the lack of public acceptance (or low SRL – Societal Readiness Level) of large scale production facilities – not so much for the actual fuel production as these are most likely not larger than current industrial plants, but very much so for the production of the green electricity needed to produce these fuels. Solar plants and wind farms

generate significant resistance from the local communities where they are sited, as do large biogas plants, and this forms an important barrier to the green transition.

- A social inflection point is when the NIMBY² effect has been turned into an *IMBY* effect

1.4.3 Technical inflection points

Cost is identified as one of the largest challenges when producing green fuels in order to penetrate the market. As mentioned above, part of this is the low cost of fossil fuels and slow implementation of a carbon tax, but the other part is very much due to technical challenges with being efficient enough in the various unit operations involved in making the green fuels. Dominating this is electrolysis which stands for the single largest energy losses in the production path; being fundamental to all the identified green fuel pathways to larger or smaller extent, bringing down the cost of electrolysis is key.

- Reducing the cost of electrolysis to below 2 EUR/kg H₂ is a key technical inflection point

² NIMBY – Not In My Back Yard

2 Partnership structure (activities and work packages)

2.1 Partnership structure

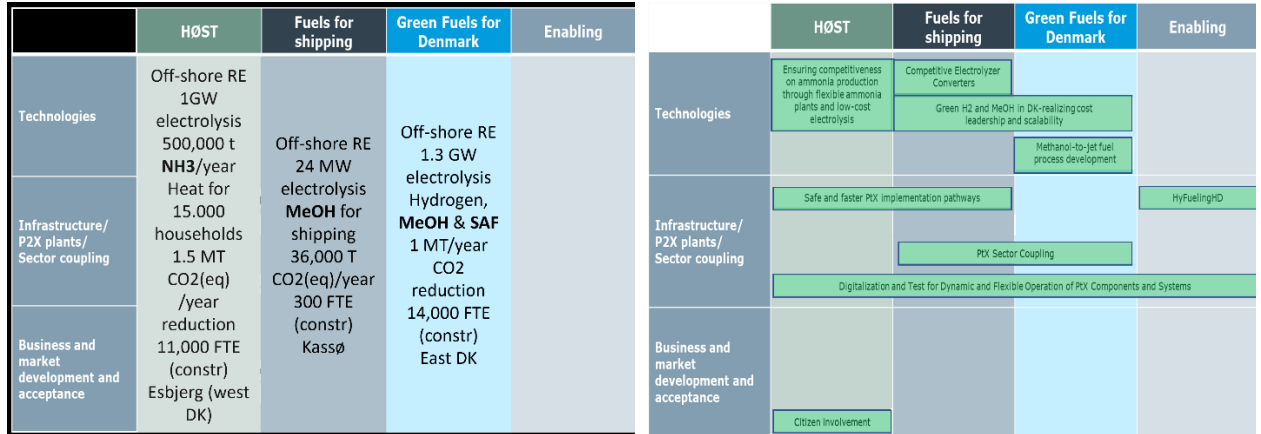


Figure 2 Overview of MissionGreenFuels: the three-plus-one vertical pillars (lighthouse projects) and three horizontal work streams. Pillar target scale and fuel type (left). The 9 pool 1 projects are shown in green, positioned according to work stream and pillar (right).

The MissionGreenFuels partnership is organized around three workstreams, supporting the three Danish lighthouse projects as well as a more fundamental research pillar. This is shown in the figure below. The 9 projects selected for pool 1 funding based on their relevance to the roadmap are indicated in the work stream and pillar to which they belong.

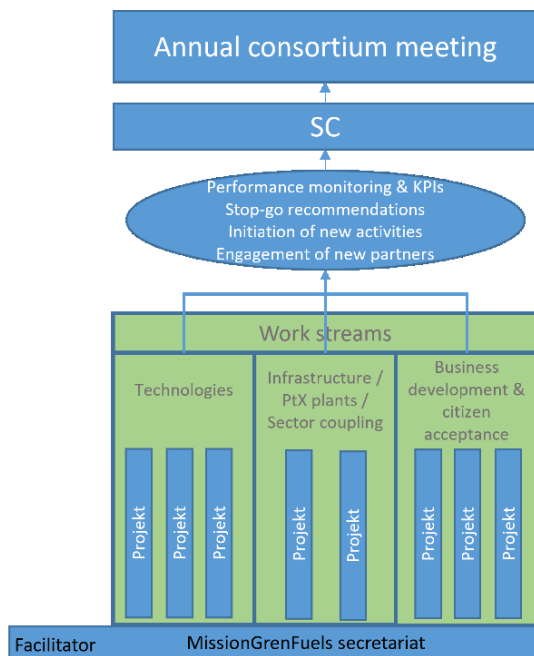


Figure 3 Administrative support for workstreams and information flow to BoD and annual consortium meeting

Full information including descriptions, milestones and KPI's for the individual projects are given in a separate document.

Within the partnership, the secretariat will support each of the workstreams and ensure the flow of information to the governing bodies of the mission partnership, the Board of Directors and the annual consortium meeting.

3 Partnership placement (leading the roadmap)

The IM2 partnership leading the IM2 Roadmap undoubtedly consist of the core companies and knowledge institutions in Denmark working with power-to-x research and technologies. The partnership covers the entire ptx-value chain from key research to major technology developers and end-users thus ensuring the inflow of critical knowledge and engagement in the process. The Danish ptx-landscape is largely driven by a handful of large development ptx-projects, and several smaller projects to be implemented within the next 3-5 years. Representatives from these projects are partners of the IM2 partnership as well as represented in the Board of Directors. On top of these projects, there is a need to develop research and new knowledge as to improve the ptx-technologies, but also to strengthen the knowledge around the different ptx business cases by investigating the link between ptx-projects and the energy system (e.g. access heat etc).

Through quarterly meetings in the partnership, the IM2 projects and progress are reviewed and discussed. This way the IM2 projects have not only been selected through the partnership, but also embedded and coordinated by the partnership. Moreover, as the partnership consist of the entire value chain that will be a mutual dependence on the results within the partnership. Companies will rely on the new research, end users will rely on the development and test of new technologies, and the market for green fuels will rely on the frontrunning market representatives to actually push the demand of these fuels in order to start demanding themselves. It is expected that this process will enhance the success in implementing the ideas and result to enhance the partnerships.

The IM2 roadmap is the one place in Denmark discussions related to both the technology development as well as research areas are taken. Through an annual consortium meeting the current as well as an update of roadmap is discussed. This annual meeting will not only include the IM2 partnership but will be an open invitation to the entire ecosystem to join. The roadmap will be discussed and updated annually. The roadmap process will lay the ground for further IM2 activities and be communicated to the entire ptx ecosystem, as to ensure that the roadmap lay the ground for new IM2 projects as well as inspire relevant organisations and companies outside IM2 partnership to engage in projects that are somehow outlined in the roadmap.

Through the advisory board (with industrial organisations) key barriers and obstacles for the ptx development will be identified and addressed in close dialogue with relevant national authorities. The second advisory board (with leading international research institutions) will help the IM2 partnership with pawing the way for enhancing further research paths towards 2030 and 2050, including grants and financing at EU-level as well as elsewhere.

Finally, the IM2 partnership will monitor the (critical) societal aspects of the ptx-development through coordinated dialogues with representatives from municipalities and KL.

4 Plan for communication

Communication and dissemination are essential for the partnership to achieve success. Thus, an important role of the secretariat is to support the partners in this and to facilitate multiple communication channels.

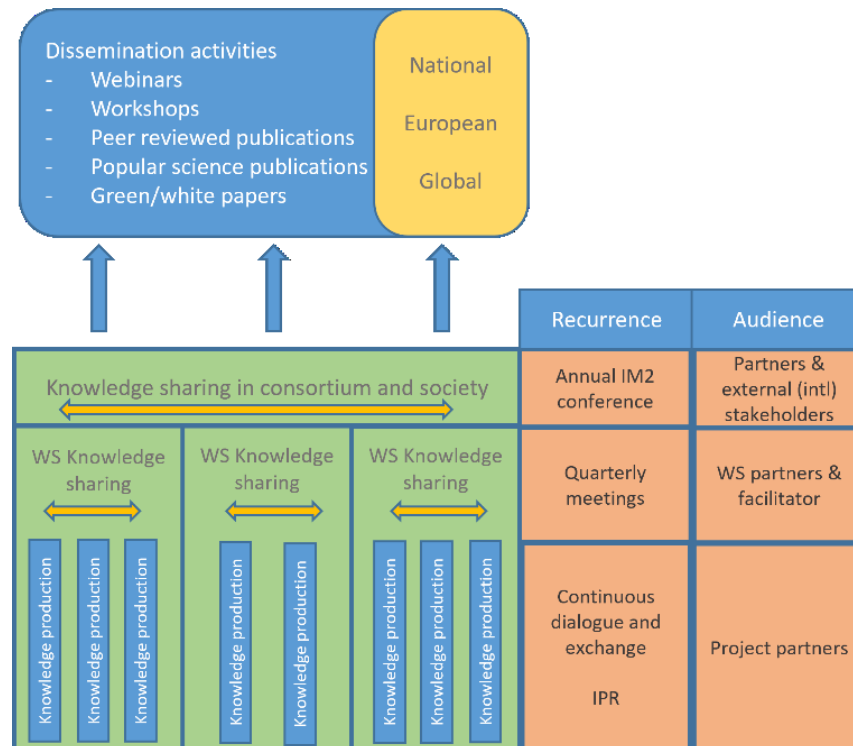


Figure 4 Overall structure for knowledge sharing and dissemination in MissionGreenFuels

4.1 Annual conference

The annual conference, co-located with a project and BoD meeting, is the main event for knowledge exchange within the partnership as well as with external stakeholders and will typically cover 2-3 days. Whereas detailed organization of this event will be handled by the secretariat and an organizing committee, it will consist of parallel/thematic tracks for “traditional” scientific exchange by presentations and posters, keynote presentations from within the partnership as well as from invited speakers, interactive workshops and elements directed towards policy/decisionmakers as well as the general public. It is important that the other InnoMissions are represented at the event, possibly to the extent that all four InnoMissions plan their events to be co-located in order to maximize visibility and impact.

4.2 Quarterly work stream meetings

Within each work stream, quarterly meetings will be arranged by the secretariat. The purpose of these is to ensure that the projects within each work stream indeed drive it forward, with respect to the overall goals and targets of the partnership. Furthermore, to identify relevant priorities and objectives for coming calls within the mission from each work stream, as well as specific topics that could serve as position or white/green papers from the partnership.

A short report of these meetings from each work stream will be drawn up by the secretariat and provided to the BoD where they will be discussed at the next BoD meeting.

4.3 Webinars, workshops and online presence

For the duration of the partnership, the secretariat will establish a series of workshops and webinars, interacting with the projects of the workstreams. These will be both physical and online, and available to partners and non-partners.

A website will be established to host partnership information and progress, as well as topical calls.

The partnership will establish principles for activities on SoMe.

4.4 Knowledge sharing principles

As mentioned, knowledge sharing is essential for the success of the partnership. Thus, communication will take place at many levels and to a multitude of audiences and target groups. In the partnership agreement, the principle that no information should be disseminated from within the partnership before all partners have been notified and approve such dissemination; this ensures that all partners are aware of information flows and no that no confidential or patentable information is shared.

Apart from scientific publications that will evolve from the individual projects, the partnership will endeavour to create joint publications such as white papers or editorials, in order to communicate at policy level.

Addendum – Exhibit 2: Pool 1 project descriptions

Workstream	Projects
1. Technologies	<ol style="list-style-type: none"> 1. ComElCo - Competitive Electrolyzer Converters 2. COMPAS – Ensuring competitiveness on ammonia production through flexible ammonia plants and low-cost electrolysis 3. GREMEOH - Green H₂ and MeOH in DK - realizing cost leadership and scalability 4. MeOH-to-Jet – methanol-to-jet fuel process development
2. Infrastructure/P2X plants/sector coupling	<ol style="list-style-type: none"> 1. Safe PtX - Safe and faster PtX implementation pathways 2. HyFueling HD 3. PtX sector coupling and LCA 4. DYNFLEX - Digitalization and Test for Dynamic and Flexible Operation of PtX Components and Systems
3. Business and market development and acceptance	<ol style="list-style-type: none"> 1. Engaging Communities in the Green Fuels Transition

ComElCo

Project title	Competitive Electrolyzer Converters (ComElCo)
Partners	Danfoss, Green Hydrogen Systems, AAU, SDU, DTU
Project manager	Niels Gade, Danfoss
Total budget	12Mkr
Investment from IFD	4.5Mkr
Project period	2.5Years: 2022-08-01 to 2025-01-31

Relation to workstream	Technologies
Relation to partnership KPIs/milestones	<p>The primary objective of ComElCo is to develop power electronics converters for electrolyzers with improved efficiency, low cost, and provisions for grid services. This aligns entirely with the IM2 partnership priorities of securing scale up of green hydrogen production, providing CO2 reduction and creating jobs and export.</p> <p>The LCoH2 2030 cost target of €2/kg, where H2 production would scale, hinges on future electrolyzer systems with a high OPEX share (maybe a 15%/85% CAPEX/OPEX split). This emphasizes the importance of developing power converters, which together with electrolyzer stacks can provide improved system efficiency (lower OPEX). Converters are currently around 30% of system CAPEX and improving converter costs are equally important. The development of competitive electrolyzer systems (with competitive converters) prepares Denmark for a future international business in PtX systems and creates hundreds of new jobs in DK</p>
Purpose of project	<p>The high efficiency low cost ComElCo power converters will enable and facilitate the growth in PtX plants needed to meet the 2030 and 2050 CO2 targets. The ComElCo converters enable PtX plants' to generate revenues from participation in demand/response schemes and grid services in general; this will help bring down the LCoH2.</p> <p>It is an embedded challenge, that the full value of ComElCo is only realized with the completion of the already anticipated follow up project, where solutions will reach TRL 7-8.</p>
Competences	<p>Required competences and key partners representing the competence:</p> <ul style="list-style-type: none"> • Hydrogen electrolyzer units, types, and technologies (GHS) • MW power electronics converters, present and future solutions (DDS, AAU, SDU) • Simulation based design and multi-domain modelling (SDU, AAU) • Grid services in a future power grid (DTU) • Converter commercialization and cost optimal power electronics design and manufacture (DDS)
Project plan	<p>ComElCo is structured in 4 content and 1 management WP:</p> <ol style="list-style-type: none"> 1. Project management and dissemination 2. System requirements 3. State of the art power converter we can realize today 4. State of the art power converter possible to realize tomorrow 5. Grid intelligence and interfacing

	<p>WP1. Project management and dissemination:</p> <p>WP1 takes care of the overall project management and coordination as well as administrative and dissemination roles. Primary tasks:</p> <ul style="list-style-type: none"> • T1.1: Build project team and create administrative basis • T1.2: Complete project administrative tasks including reporting and accounting • T1.3: Disseminate activities internally as well as externally <p>WP2. Define System Requirements:</p> <p>WP2 provides requirements and specifications for future electrolyzer converters and set targets for solution costs and performance. Primary tasks:</p> <ul style="list-style-type: none"> • T2.1: Converter specification for future large scale electrolyzers (GHS, DTU). GHS and DTU will work together on this task to clearly outline the anticipated requirements for converters in future electrolyzer systems. Analyses will include an assessment of (future) dominant electrolyzer types, important converter features and specification values (like voltage levels, voltage and current ripple, dynamic performance). Besides electrical requirements, the mechanical, installation and environmental requirements will be discussed. <i>Challenges/risks:</i> T2.1 sets the direction for the design and build activities in the project and should hence be carefully reviewed • T2.2: Converter cost targets and projections (DDS, GHS). DDS and GHS will work together on this task. We will approach cost requirements from two sides: 1) Starting from desired year 2030 cost/kg green H₂, assumptions on future energy costs, system efficiencies, Capex/Opex ratio and distribution of Capex among plant system elements, an estimate of required future converter costs can be made, contingent on applied business model and markup assumptions. 2) Likewise, starting from current converter market prices and anticipated future cost savings from scale and technology changes, realistic 2030 cost targets can be indicated based on the same business model assumptions. <i>Challenges/risks:</i> Quantitative cost projections for future solutions will be prone to uncertainties. • T2.3: Grid side requirements (SDU, AAU, DTU, DDS, GHS). Wide implementation of electrolyzers for grid services requires identification, evaluation, and validation of both technical and economic viability. In T2.3, both grid code requirements and electric grid services that can potentially be delivered by an electrolyzer system are identified. Relevant technical requirements and load profiles for these grid services are established to support design and development of electrolyzers' converter and control solutions. Diversity of grid service requirements in Danish and non-Danish power systems will also be considered when specifying the requirements. <i>Challenges/risks:</i> The monetary value in possible services is influenced by (future) legislative/political decisions.
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	<p>WP3. State of the Art converter, we can realize today:</p> <p>WP3 designs, builds, and tests the best possible converter to be made within the short time frame of the project. Special focus is to build the elements, we need to learn and extrapolate to future SoA systems. Primary tasks:</p> <ul style="list-style-type: none"> • T3.1: Design (AAU, DDS, SDU): With outset in outlined WP2 requirements, we will perform a Pugh Matrix comparison on converter concepts consisting of solution elements already available or easily achievable. The comparison will form the basis for deciding on the solution to realize physically within the 2½ year time frame of the project. Normal design iterations will follow (design specification, concept design, detailed design, ...). Note: The main objective of the design is to make a converter build that will enable appropriate learning on requirements and characteristics of converters for future scalable PtX systems: i.e we will make shortcuts, down scaling, emulations etc. whenever possible. <i>Challenges/risks:</i> Taking an outset in readily available solution elements may limit the possible learning • T3.2: Build (DDS, AAU, SDU, GHS): <ul style="list-style-type: none"> ○ <i>T3.2.1: Modify existing solution elements, where necessary (DDS, AAU, SDU, GHS).</i> DDS is supplying converter solutions for electrolyzers today and upcoming drive series to be released within the coming year will provide an upgraded platform to build electrolyzer converters from. This together with a general repository of converter solutions available at either DDS or the university partners will constitute the basis for the HW build. Circuit board revisions, performance upgrades through component swaps (active as well as passive), changes to controls, minor new developments etc. is foreseen. <i>Challenges/risks:</i> limited, if we avoid being too ambitious ○ <i>T3.2.2: Power and mech converter to electrolyzer interface, enclosure, coolant, start-up, ... (DDS, GHS).</i> This task addresses all the practical implementation questions related to putting together the converter (mockup) and the electrolyzer (emulator(?)). Anticipated steps: 1) Decide on building site 2) Determine efficient utilization of available infrastructure at building site to support the converter / electrolyzer integration / implementation 3) Execute the build. <i>Challenges/risks:</i> We need to avoid getting stuck on costly practicalities ○ <i>T3.2.3: Electrolyzer "emulation" (GHS).</i> The physical build will utilize electrolyzer parts/units from GHS. We will take short cuts and do HW emulation wherever this will save time and cost without jeopardizing the learning, we need from experiments. GHS has facilities, where the system will be built/installed and where tests will be executed. <i>Challenges/risks:</i> Timely availability of facilities and system elements • T3.3: Test: <ul style="list-style-type: none"> ○ <i>T3.3.1: Performance validation (AAU, SDU, DTU, DDS, GHS).</i> Input from T3.2 and T3.1: Hardware system is manufactured. In T3.3.1 a plan for performance validation is agreed between partners. Performance validations include 1) Hardware and software functionality validation 2) Assessment of compliance to system specifications 3) Report documenting the performance validation deliveries. <i>Challenges/risks:</i> limited
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- *T3.3.2: Scalability verification (SDU, AAU, GHS).* In T3.1 a state-of-the-art converter design will be established. Based on the targeted power ranges of the electrolyzer from 2 MW to 6 MW at 500 – 1500 V the best scalability scenario of the power converter related to lowest system costs and highest system efficiency will be identified and verified. Here especially the optimal use of the components like e.g. power modules and power capacitors are highly relevant and will be proved. *Challenges/risks:* Scalability has both a feasibility and a cost/complexity dimension. We will take care to address both to the degree possible given the build made
- *T3.3.3: Cost assessment and projection (DDS).* This task takes its outset in the HW built in task 2.2. 1) Organize a Bill of Materials from the build. 2) Extent/extrapolate to cover for short-cuts made. 3) Consider impacts of technology development, concept improvements and scale. 4) Seek to validate findings towards available benchmark figures and industry predictions. *Challenges/risks:* Insufficient incorporation of cost trends may result in pessimistic conclusions.

WP4. State of the Art converter possible to realize tomorrow:

WP4 develops and tests a digital representation of the future competitive power converter system. Primary tasks:

- **T4.1: System architecture:** The system architecture must be proposed before the results of T3.3.2 Scalability verification and T3.3.3 Cost assessments and projections are completed (M24-30). There is a risk that T4.1 choose a wrong topology. There are two main paths: 1) continue using today's infrastructure and take advantages of the benefits of new components that replaces today's technology giving increased A) power conversion efficiency, B) reduced material cost on a system level. Both arguments A and B need to be addresses in T4.1. Could say, this is an incremental approach based on the market experiences and thus with lower risks for being non-relevant solution 2) At high power, that could be above the 6MW, alternative infrastructure of converter and electrolyzers could offer a system level improvement of LCoH₂. Here one could keep an eye on what goes on in the wind turbine industry. Output to T4.2 System architecture(s) will be provided based on a Ping-Pong with T4.2 Digital twin M6-24. *Challenges/risks:* As discussed above: This is where we make our "bet" on a future "winning" solution. We will mitigate risks by thorough comparison on relevant alternatives
 - *T4.1.1: Topology (DDS, AAU, SDU)*
 - *T4.1.2: Control (DDS)*
 - *T4.1.3: Critical components (AAU)*
- **T4.2: Digital twin (SDU, AAU):** Based on the results of T4.1 Development of the system architecture of the future state of the art converter – digital twin simulation models of the components and the system level will be developed using PSpice, Matlab/Simulink tools and for the Finite element simulation Comsol Multiphysics and Ansys. Note: We need a FULL virtual system covering both grid, converter and electrolyzer. Will

	<p>make sense to select a few relevant “use” cases (e.g grid types). <i>Challenges/risks:</i> limited, but we do not have full transparency yet!</p> <ul style="list-style-type: none"> • T4.3: Virtual test (DDS, AAU, SDU, GHS): We want to formulate functional tests that traditionally are conducted in the laboratory or during the manufacturing process. In the design process a dialogue with component suppliers of: busbars, pcbs, active components, filters and control could be established to find out if digital data can be shared between partners internally and with external suppliers. Further, what virtual test data is relevant to customers of DDS and GHS. A datasheet is often provided but what about models on: system level and sub-system level. What are the critical risks barriers? We expect some barriers as some of the data is not commonly shared, but a dialogue and mapping of challenges could be a relevant activity. To the extent we have set up a data material for the system that is related to the physical world it will make sense to conduct tests based on different levels of details. The partners DDS,AAU,SDU,GHS have to agree on a set of tests that is an relevant delivery. <i>Challenges/risks:</i> We will ensure a high fidelity in our simulation models to enable trust in our virtual test results. <p>WP5. Grid intelligence & grid interfacing:</p> <p>WP5 assesses cost-revenue for feasible grid services and compares alternative means for grid support. Primary tasks:</p> <ul style="list-style-type: none"> • T5.1: Show value in grid services (DTU): Based on the results of T2.3 and T3.1, T5.1 will conduct a cost-revenue analysis for using the electrolyzer to provide the identified grid services, such as power balancing and voltage support, etc. The analysis will include life cycle cost analysis and Net Present Value calculation considering expected revenues for grid services and CAPEX/OPEX for the electrolyzer. <i>Challenges/risks:</i> Inadequate transparency to future legislative setups • T5.2: Consider alternative means to provide grid support (DTU, DDS, AAU): Today, technologies like battery, super capacitor and STATCOM are also used to fulfill various types of grid support needs. T5.2 will compare the designed grid-support electrolyzer with these alternative means from a technical-economic perspective and evaluate the trade-off between applying these alternative means and direct use of grid support converters in electrolyzers. <i>Challenges/risks:</i> limited, though MANY alternatives and configurations are possible
<p>Milestones</p>	<p>(check Gantt chart)</p> <p>M1: Competent team established, and administrative guidelines present.</p> <ul style="list-style-type: none"> • Success criteria: Productive project team with active participation, mutual trust and collaboration demonstrated <p>M2: First annual report. M3: Second annual report. M4: Final report</p> <p>M5: System requirements ready.</p> <ul style="list-style-type: none"> • Success criteria: M5 shall provide clarity of direction for all the project’s design, build and test activities. <p>M6: Design of physical converter (+ electrolyzer) ready.</p> <ul style="list-style-type: none"> • Success criteria: The design shall enable us to get adequate learning to build competitive converters in the future

	<p>M7: Physical converter/electrolyzer system built.</p> <ul style="list-style-type: none"> • Success criteria: The actual build shall facilitate the analyses and tests needed to build competitive converters in the future <p>M8: Physical converter/electrolyzer system tested.</p> <ul style="list-style-type: none"> • Success criteria: Coverage and detail shall provide answers to the key questions, we identify during the project execution <p>M9: System architecture of converter for the future ready.</p> <ul style="list-style-type: none"> • Success criteria: The outlined solution shall be able to withstand a thorough peer review <p>M10: Virtual representation / digital twin of future converter system ready:</p> <ul style="list-style-type: none"> • Success criteria: This is very much about the fidelity in the model. We need to be able to qualify plausibility of the digital twin <p>M11: Test on digital twin completed.</p> <ul style="list-style-type: none"> • Success criteria: as for milestone M8 <p>M12: Value of grid services in future PtX systems outlined.</p> <ul style="list-style-type: none"> • Success criteria: Clear link from assumptions and boundary conditions to value conclusions <p>M13: Grid support alternatives assessed.</p> <ul style="list-style-type: none"> • Success criteria: Adequate coverage of alternatives demonstrated
<p>End result</p>	<p>(1) Power converter lab model (and electrolyzer mockup) representing the best fit to future requirements we can realize with today's technology</p> <p>(2) Digital twin / virtual representation of tomorrow's power converter system and electrolyzer. The simulated converter system architecture will apply component and solution technologies becoming available tomorrow and attractive within the next 2-3 years.</p> <p>The conceptual solution outlined in (2) together with the combined learning from physical tests on (1) and virtual tests on (2) will together constitute the basis for the formulation of a phase 2 demonstrator project bringing solutions to TRL7-8. The phase 2 solution is the competitive scalable high-efficient electrolyzer converter critical for the future success of green H2.</p> <p>Note: Besides (1) and (2) the ComElCo project will provide insight in electrolyzer system trends and requirements and point to economic viability of grid services (in DK and internationally)</p> <p><i>Success criteria:</i> Besides the success criteria already outlined in the milestone section above, it is critical to the success of ComElCo that the project activities manage to provide the sound and sufficient basis for the initiation and execution of a) the follow on project and b) the commercial role out plans.</p> <p><i>Implementation plans:</i> Product development and commercialization plans can be formed on the results of ComElCo and implementation can begin. Full implementation will be pending on the results of the follow on project.</p>

COMPAS

Project title	Ensuring competitiveness on ammonia production through flexible ammonia plants and low-cost electrolysis (COMPAS)
Partners	Copenhagen Infrastructure Partners (CIP), Topsoe (HT), Aarhus University (AU), University of Copenhagen (UC), Technical University of Denmark, (DTU) – DTU Wind and DTU Energy
Project manager	Henrik Lund Frandsen
Total budget	34.57 mill. DKK
Investment from IFD	23.35 mill. DKK
Project period	1/7-2022 - 30/6-2024

Relation to workstream	Technologies
Relation to partnership KPIs/milestones	<p>COMPAS support the revised Innomission 2 roadmap by addressing green ammonia production and hereby support the HØST flagship project. It does so by investigating the technical and economical requirements for revamping the electrolysis plant of a future green ammonia plant, and hereby minimizing a technical risk for first movers.</p> <p>COMPAS also support the revised Innomission 2 roadmap on enhancing the energy efficiency. This is done through further maturing the highly energy efficient electrolysis technology, the solid oxide electrolysis technology. With a swift introduction of this technology more than 25 % electricity can be saved for ammonia production, with a corresponding impact on renewable electricity and infrastructure installations.</p>
Purpose of project	<p>In order to de-risk the long-term ownership of the first-generation green ammonia production plants, it is essential that they remain competitive during the whole lifetime. One key to this is to ensure that the plants are flexible towards technology advancements, in particular with respect to the electrolysis technology, as the main operating expense is associated with the electricity consumption of the electrolysis in the green ammonia plant. One potential advancement could be an upgrade to the emerging SOEC technology, which will result in an electrical efficiency increase of more than 25 % on plant level.</p> <p>Besides de-risking on the plant level, the current project also targets various improvements over the entire value chain all targeting lower cost and competitiveness. A particular focus is on increasing the SOEC technology robustness towards high current loads and dynamic operation. The technological improvements suggested are all at a low TRL (2-3) and the target is to be raised to TRL 4 within the project.</p> <p>It is also a target to demonstrate that the SOEC technology can operate dynamically. In the project the requirement the for the</p>

	<p>dynamic operation will also be investigated, given a renewable energy source and possible storage facilities at plant level (e.g. batteries).</p> <p>The overall vision is thus to bring the Danish value chain including both commercial actors on green ammonia production and knowledge strong-holds to the forefront and retain the position there. By a robust and highly efficient electrolysis technology, the Danish value chain behind this research and development project will have a strong asset in the international competition on commercial green ammonia projects. Because with a far more efficient electrolysis technology (>25 %), the overall lower installed capacity of renewable energy sources, infrastructure etc. can be exchanged to reduction in overall cost and thus in competitiveness and bigger revenues.</p> <p>The higher efficiency will also decrease the overall environmental impact both in terms of material and energy usage for production of electrolyzers and infrastructure, but also in terms of usage of area needed for the purpose.</p>
<p>Competences</p>	<p>The consortium behind the project covers a project developer, CIP, a technology provider, Topsoe, and university partners (AU, CU, DTU). CIP has already started developing their first green ammonia project in Denmark (HØST) and is expecting a roll out of the concept worldwide. They are thus well situated to scale the solutions achieved in the project.</p> <p>Topsoe is world leading in providing technology for ammonia production and is currently in the process of a rapid upscale of their complementary electrolysis technology, SOEC. The SOEC market is rather new, and the competition is currently subsidized through national and European projects. Topsoe has however announced a strong commitment towards the green transition and has recently changed the company strategy towards this.</p> <p>DTU Energy is amongst the world leading research groups on SOEC technology and has more than 15 years of research experience on the topic. The group is large, and competences are diverse from materials research, over component production and testing to characterization of stacks and into integration of the technology. They will thus lead the consortium.</p> <p>AU has together with HT established a system level test lab, where electrolysis is integrated with various feedstocks and down-stream processes. Their experience is thus towards high TRL testing and investigations of the technology.</p> <p>CU with Jan Rossmeisl has a strong background in theoretical materials research using density functional theory to elucidate chemical reactions and other interaction between materials. This</p>

	<p>knowledge will be brought into play in the further understanding of degradation mechanisms in the SOECs with the aim to extend their lifetime.</p> <p>DTU Wind is amongst the world leading on the topic of wind energy and has diversified to study hybrid solar/wind power plants and is currently researching the system integration with P2X. Their role will be to further develop these simulation tools to optimize the operation of ammonia plants towards renewable energy sources.</p>
<p>Project plan</p>	<p><u>Overall project description</u></p> <p>To meet the end objectives; 1) Estimating the cost of designing a flexible ammonia plant that allows for change of electrolyzer technology, 2) Optimizing the plant units for the lowest cost of ammonia, and 3) proving and improving the robustness of the SOEC technology towards dynamic operation – the project has been divided into three work packages addressing each of these.</p> <p>WP1 thus focuses on technological improvements on the cell and stack level, WP2 on the integration and WP3 on the techno-economic assessments of technology upgrades on the flexible ammonia plants.</p> <p>The achieved dynamic performances in WP1 will be used to guide the plant unit configurations in WP2, which again will play in on the techno-economic assessment of the flexible plants in WP3. The analysis tools will be constructed, such that they can be used to investigate the impact of the technical results achieved through the project.</p> <p><u>Risks and mitigating activities</u></p> <p>In the following the technical targets, their risks and success criteria in terms of milestones (MS) are described. The milestones are listed in the next rubric.</p> <p>The techno-economic analysis and evaluation is essential for the commercialization of the technology and an understanding of the capabilities. There is however a risk that this will have no impact as integrators are operating in a new field to them and thus aiming towards minimizing technical risks. In the project the integrators will play an active role in the techno-economic analysis in order to provide insight and perhaps become more open to technical risks (MS4).</p> <p>For a thorough techno-economic analysis, the overall engineering of green ammonia plants must be laid out, while detailed engineering is beyond the scope of this project. Whereas Topsoe is world leading in building steadily operating ammonia plants with hydrogen from SMR, then ammonia plants dynamically operating with hydrogen from electrolyzers are in their infancy. There is thus a risk that unforeseen technical challenges, which are not accounted for in the overall</p>

	<p>engineering can occur down the line. This will however be further studied in the current project and cost estimates will be based on the vast experience of Topsoe on the topic (MS3).</p> <p>This project will point towards a phase 2 in IM2, where amongst other higher TRL demonstration will be undertaken to demonstrate the capabilities and thus de-risk the investments. However already in current project the objective is to both demonstrate long-term operation and dynamic testing in lab on module level to mimic the conditions in real use (MS2).</p> <p>In terms of technology, the efficiency of the SOEC technology is second to none. The primary risk for the technology is related to the degradation of the cells and the mechanical integration of the ceramic components in an environment with spatial and temporal thermal gradients. To mitigate these risks material development is essential and a core of the project. While the current technology is competitive to other electrolysis technologies, then further material enhancements could make the technology far more attractive. In the project several material development tracks are undertaken in parallel, increasing the chance of success (MS1).</p> <p>The dynamic capabilities of the green ammonia plants are also key for the integration of the technology into a future grid. The dynamic operation of green ammonia plants is investigated in the REDDAP project and thus outside the scope of this project. The dynamic operation of the SOEC electrolyzer will be essential for the dynamic capabilities of the plant. While poor dynamic capabilities can be mitigated by intermittent storage solutions, such as batteries, to even out the peak loads and changes in load, then this will also increase the cost of the plants. The impact on the cost of dynamic capabilities of the electrolyzer will be investigated - with an objective to determine a techno-economic optimum. The risk is thus that poor dynamic capabilities will lead to a higher plant cost and loss of competitiveness. Various technical investigations and material development tracks are thus also undertaken in the project towards improving the dynamic performance.</p>
<p>Milestones</p>	<p>MS1 Develop a cell which degrades less than 15 mV/kh at 750°C and a max of 1.25 A/cm² over 3000 hours (DTU E)</p> <p>MS2 Demonstrate dynamic operation of a SOEC stack-module based on operation strategy defined via input from end-users (HT)</p> <p>MS3 Conceptual design of a flexible ammonia plant, allowing for revamp from alkaline to SOEC based on design from DTU (HT)</p> <p>MS4 Techno-economic analysis of revamp from AEC to SOEC in HØST (CIP)</p>
<p>End result</p>	<p>Providing a number of techno-economic analysis that can assist early mover investors in making right long-term decisions for their green</p>

	<p>ammonia plants will be central for the project. This will be achieved by combining the knowledge on fluctuating renewable energy sources, dynamic performance of an electrolyzer and ammonia plants, and plant dynamics through components such as batteries. The project will thus be successful if the investors and thus the entire value chain identifies significant potentials for savings. This will potentially result in more Danish jobs, but also a faster and more affordable green transition. Next steps will be to further analyze possible savings based on the technical insight achieved in the project.</p> <p>Demonstrating that the SOEC technology can be operated dynamically at module level (in lab, i.e. TRL 4) will be a great success. While many reports claim poor dynamic performance from both the AEC and SOEC technologies, this has never truly been investigated – only partially at lower TRL. Showing that dynamic operation is possible with SOEC module will thus greatly impact the view on the technology. The next steps beyond the project will be to demonstrate this at system level in a relevant environment (TRL 5), and thus a desired activity in phase 2 of the Innomission 2.</p> <p>Currently the best cells will degrade at 20-30 mV/kh at a current density of 1.25 A/cm² at 750°C. This will provide the cells an estimated lifetime of approximately 2.5-3 years. Thus, achieving a cell degradation at 15 mV/kh at same conditions will dramatically increase the lifetime of the cells at this high current density. While economic competitiveness towards other technologies is already believed to be at hand with the current lifetime and an upscaled production, then further enhancing the lifetime will further increase the competitiveness, but also minimize the resources needed for a green transition. For these reasons, material and cell technology research is foreseen to be a continuous activity for many years ahead. The next steps are to test the cell technology developed in COMPAS at stack scale, but also further research materials and cell technology.</p>
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GREMEOH

Project title	Green H ₂ and MeOH in DK - realizing cost leadership and scalability (GREMEOH)
Partners	Green Hydrogen Systems A/S (GHS) , European Energy (EE), University of Southern Denmark (SDU) [departments: MMMI + ITI]
Project manager	Søren Rosenkrantz Riber, GHS, srr@greenhydrogen.dk
Total budget	11,68 MDKK
Investment from IFD	7,5 MDKK
Project period	1/8-2022 – 1/8-2024 (24 months)

Relation to workstream	Technologies
Relation to partnership KPIs/milestones	<ul style="list-style-type: none"> Accelerate scaling of manufacturing/assembly of H₂O-electrolysis and H₂- and CO₂-based methanol processing units Serve a rapid increase in demand for green methanol to decarbonize the shipping industry Levelize the cost of green hydrogen and methanol to fossil parity Create jobs and competence development in Denmark.
Purpose of project	GREMEOH takes the existing collaborations between GHS and EE (Re::Integrate) to the next level, where electrolyzer and methanol production unit components are subject to automation and digitalization of manufacturing, aggregation and digitization with the assistance of core competences from SDU – and associated industry cluster with robotics and digitalisation. Guidelines for supply chain optimisation are developed to serve as a basis for deployment.
Competences	<p>GHS: Electrolyser stack design and composition, critical tolerances in assembly, electrolyzer manufacturing plant layout, supply chain boundaries, R&D project and innovation management.</p> <p>EE: Methanol reactor unit design and integration composition, supply chain dependencies and limitations, R&D project and innovation management.</p> <p>SDU: Automation and flexible robotic solution design, computer-based simulation and modelling of assembly flows, supply chain optimization, vision technology for challenging assembly components, factory assembly optimization, network to the robot cluster, R&D project management, education of new talent.</p>
Project plan	<p>WP1: Project Management Daily project management, administration and contact to InnoMission 2 secretariat.</p> <p>WP2: Manufacturing and Assembly Technology Design and selection of automated manufacturing and assembly procedures based on exploration of existing practices at GHS and EE. Build of digital model for optimized automation steps prior to build of mock-up robotic station at SDU with flexible grippers and tool shifts. Test of vision technology to improve and document quality. Feedback to optimized design of critical process components.</p> <p>WP3: Material Flow</p>

	<p>Review of PtX project documentation from existing/ongoing installations (including existing BoMs) at GHS and EE. Mapping of value chain and material flow incl. data capture on process times, costs, quality issues (eg. from Kassø and other PtX sites). Development of strategies for sourcing and designing the (global) supply chain, solutions for in- and outbound logistics and the layout of the manufacturing and assembly system.</p> <p>WP4: Industrial Design Twin / Asset Administration Shell (AAS) Develop a roadmap for digitalization of information and manufacturing flow, considering IoT for data capture and use of Digital Twin standards and tools. Integration of asset administration into ICT-solutions, definition of sub-models and design of information exchange.</p>
<p>Milestones</p>	<p>MS1: Work Team assembled MS2: Stack assembly process video recorded and mapped with quality / time study included (<i>de-risking of data capture</i>) MS3: Task specified in detail including tolerances etc. MS4: Robot cell incl. grippers and cameras designed (<i>prior to mock-up build</i>) MS5: Kinematic simulation, digital twin and robot program ready MS6: Robot system ready (<i>mock-up to derisk physical production</i>) MS7: Conclusions on first tests, second version input (<i>report</i>) MS8: Updated robot system ready MS9: Conclusion on second tests MS10: Material flow simulation model ready for designed automated assembly line MS11: Mapped value chain and material flow MS12: Conceptualized global sourcing strategy based on company objectives MS13: Designed value chain model reflecting logistic and sourcing strategies MS14: Defined Roadmap for digitalization of the PtX production MS15: Defined model for structure and hierarchy of the AAS system for the value chain MS16: Demonstrated exchange of information and services via the AAS system.</p>
<p>End result</p>	<ol style="list-style-type: none"> 1. Functional prototype robot for automated assembly of electrolyzer stacks 2. ICT-based concept for supply chain automation and configuration 3. Roadmaps for optimal manufacturing and assembling of electrolyzer and methanol production units 4. Foundation for CAPEX decisions for GHS and EE as part of their scaling 5. Employment of master candidates at GHS and EE as part of the project activities 6. Additional R&D collaborations initiated between GHS, EE and SDU (including other potential partners).

	Both GHS and EE will engage relevant colleagues in GREMEOH to secure proper and timely contributions, anchoring, and ongoing exploitation of results and discoveries targeting implementation.
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MeoH-to-jet

Project title	Methanol-to-jet fuel process development
Partners	Ørsted Hydrogen Green Fuels DK A/S, Haldor Topsøe A/S, DTU Chemical Engineering, Aalborg University, Copenhagen Airports, SkyNRG, Neste Oy, NISA
Project manager	Michael Paludan-Müller Nylykke, Ørsted
Total budget	50.98mDKK
Investment from IFD	24.98mDKK
Project period	2022-2025

Relation to workstream	Workstream 1, task 5
Relation to partnership KPIs/milestones	<p>The revised roadmap submitted by the MissionGreenFuels partnership on October 19th, 2021, combines the two roadmaps, Green Fuels in Transport and Industry (1112-00008A) and Strengths to mature and scale up e-fuels for transport (1112-00012A), which had been selected by Innovation Fund Denmark.</p> <p>The roadmap identifies aviation as a key end-user sector to address with PtX in that direct electrification of most aircrafts will not be feasible towards 2050. Within its suggested paths the roadmap points to a need for sustainable carbon-based fuels with high energy density and good safety characteristics, which resemble the properties of the aviation fuels in use today, to decarbonize aviation. Furthermore, the decarbonization scenarios in the roadmap have avoided forced replacement of road vehicles for which reason fuels production pathways where intermediate products may be relevant in for road transport in a transition period are preferred. To this end the Methanol-to-Jet (MtJ) production pathway to aviation fuel is highlighted in the roadmap because the methanol (MeOH) input to the processes has transitory decarbonization uses in other end use sectors while the MtJ technology is developing. To that end the roadmap points to two key actions in the implementation of the areas specific to aviation intended to be conducted throughout the 2020s:</p> <ul style="list-style-type: none"> - R&D on the MtJ process - MtJ fuel plant demonstration <p>Furthermore, the roadmap highlights the importance of PtX flagship projects as the enabler of relevant PtX technologies and future technological and commercial strongholds for Denmark. Through the activities planned in the project the MtJ process development project addresses both the need for aviation fuel production technology development, supports towards flagship project realization and contributes towards Danish decarbonization targets.</p> <p>The timing of the project activities and results from analysis and R&D pilot plant activities is aligned with the roadmap's abovementioned implementation timeline, which ensures societal relevance so that the project feeds into the Danish aviation domestic decarbonization targets and the EU regulation on ReFuelEU Aviation towards sustainable fuels in air transport.</p>

	<p>Moreover, the timing of the expected results from the project are aligned with the Green Fuels for Denmark (GFDK) flagship project's timeline. If development and ASTM certification is successful within the MtJ process development project, first industrial deployment of an MtJ process is aimed for by 2025. By 2027 GFDK plans to use this technology to scale up to commercial production and by 2030 increase production capacity to 259kt/year of fuel per year, equivalent to ~1/3 of total yearly aviation fuel consumption in Copenhagen Airport in Kastrup and equivalent to displacing 810kt CO₂/year.</p> <p>In time the MtJ process may in principle be implemented to address all aviation fuel offtake in Kastrup and internationally. The estimated annual demand for synthetic aviation fuel in EU by 2050 is 20 million ton. To meet this demand, investments of around EUR 150 billion are needed within renewable power generation, carbon capture and PtX plants. With a competitive MtJ fuel technology, it is expected to capture a substantial share of both the European and the global market. It is expected that investments of this magnitude will lead to significant job creation.</p>
<p>Purpose of project</p>	<p>The objective of the methanol-to-jet fuel (MtJ) process development project is to develop the MtJ fuel pathway for production of aviation fuel to a level of maturity where the pathway is developed to TRL of 5-6. This will</p> <ol style="list-style-type: none"> a) Create a solid design base for subsequent design to industrially relevant scale b) Enable the project to create a strategy for and commence ASTM certification of the MtJ pathway for use of the fuel in commercial aviation c) Create sufficient certainty about the process to determine competitiveness against alternative sustainable aviation fuel (SAF) pathways d) Make it possible to plan and optimize the future integration of MtJ plants with the energy systems <p>This serves the purpose of decreasing the time-to-market of a certified MtJ process such that it can be available for SAF production at the earliest possible date to complement existing SAF pathways to contribute to a fast and economic transformation of aviation fuel consumption away from fossil fuels.</p> <p>Since its inception in October 2021 the purpose of the project has been further confirmed through an increasing political focus on developing new production methods for sustainable aviation fuels. Among others, the Danish Prime Minister's New Year's speech setting a target for a first carbon neutral domestic flight in 2025 and fully decarbonized domestic aviation in Denmark by 2030 is a testimony to that.</p>
<p>Competences</p>	<p>Ørsted Hydrogen Green Fuels DK A/S: Ørsted Hydrogen Green Fuels DK A/S is an entity fully owned by Ørsted A/S. Ørsted develops, constructs, and operates offshore and onshore wind farms, solar farms, energy storage facilities, renewable hydrogen and green fuels facilities, and bioenergy plants. Within green fuels Ørsted has established the PtX department with the intention of developing, constructing, operating and owning PtX facilities. The department numbers +40 employees with competencies spanning across electrolyser</p>

specialists, technical and commercial project developers, and business analysts. Ørsted is currently constructing its first electrolyser asset (H2RES.dk) and has an announced project development pipeline of >3GW electrolysis capacity including the ambitious Green Fuels for Denmark project, which aims to produce significant amounts of sustainable aviation fuel when fully built out in 2030. To that end Ørsted brings broad experience in developing and operating green energy assets including commercial introduction of novel green energy technologies.

Haldor Topsøe A/S: With a long history as technology provider for a wide range of chemical processing solutions, Topsoe has developed and fully commercialized the TIGAS™ (Topsoe Improved Gasoline Synthesis) solution that makes it possible to produce high-quality, high-value gasoline from methanol. Green methanol can be provided from CO₂ and green hydrogen by the eMethanol™ technology. Topsoe has further developed commercial solutions to provide renewable Diesel and jet fuel. We see this as an excellent base to develop a dedicated methanol-to-jet fuel technology pathway and to benchmark the MtJ process against alternative SAF pathways (incl. Fischer-Tropsch).

DTU Chemical Engineering: The CHEC research center at DTU-Chemical Engineering has over the last 15 years built up internationally recognized expertise in applied heterogeneous catalysis. The center has a large portfolio of equipment for studying reactions in flow reactors at elevated pressure (up to 100 bar) and temperature (up to >1000 K). Previously studied reactions of relevance for PtX include among other synthesis of methanol, higher alcohols, syngas conversion to light olefins and aromatics, ammonia synthesis, upgrading of biomass pyrolysis oil and more. Additionally, the group has experience in the synthesis of catalysts by various methods (impregnation, precipitation, flame spray synthesis etc) and in characterization of the synthesized materials. The group is thus well suited for the current project.

Aalborg University: Sustainable Energy Planning group (SEP AAU) has more than 25 years of experience working with interdisciplinary energy planning. SEP AAU researches the integration of renewable energy, energy scenarios for different national and international regions, and renewable energy solutions for transport. SEP AAU has developed the energy system modelling tool EnergyPLAN designed to model the large-scale integration of renewable energy and smart energy systems, focusing on integrating electricity, heating, cooling, industry, and transport. In addition, the group has worked for more than 10 years with PtX and electrofuel pathways to meet the transport sector transition to green energy and integrate these pathways into the energy system.

SkyNRG: SkyNRG is a pioneer and global leader in the field of SAF and has been involved in many sustainable aviation fuel projects across the supply chain. Having supplied over thirty airlines on all continents, it's SkyNRG's mission to make SAF the new global standard. SkyNRG works together with leading technology providers. Together with these companies, and other partners, we are involved in more than 15 innovation tracks where we aim to take the next step towards commercialization of new SAF technology pathways. Given our

	<p>ability to market SAF, our project development capabilities and knowledge and expertise of SAF quality, we can add unique value to these projects.</p> <p>In these innovation tracks SkyNRG’s extensive experience with SAF development tracks is utilized to guide new production pathways towards a high-quality SAF product. SkyNRG performs and evaluates Tier 1 and Tier 2 analyses of new SAF production pathways and could support with the development of the technical reports. In this specific project, we will assess together with other partners, the right approach to achieve ASTM certification in the future. Additionally, next steps for fuel producers aiming to seek ASTM approval of their pathway are recommended.</p> <p>Neste Oy: As a leading sustainable fuel producer, Neste will analyze the technological opportunity created by the MtJ technology in comparison to established alternatives in the power-to-liquid technology space. Neste has a wide expertise in renewable fuel plant investment, renewable feedstock sourcing and a dedicated team to PtX solutions and will bring the perspective of a plant owner in the project.</p> <p>Copenhagen Airports (CPH) and NISA: CPH and NISA have a global network in the aviation sector, also focusing on SAF, as well as access to network of individuals involved in the fuel approval process (ASTM) as a part of the Aflight project (DLR, IATA, ICAO). NISA is involved in activities related to development of MtJ process, other PtX projects, as well as in the discussions globally on MtJ within a global network called ‘PtX platform’ led by RSB (Round table for Sustainable Biomaterials).</p>
<p>Project plan</p>	<p>To realize the objectives outlined in the project purpose the MtJ process development project has been structured in six work packages with the following names, overall activities, challenges and risk which together constitute the project plan.</p> <ul style="list-style-type: none"> • WP1: R&D pilot plant process design and construction (Topsoe) <ul style="list-style-type: none"> ○ Development of a tailored MtJ production process ○ Design, build and operate pilot plant with aim of mechanical completion by beginning of 2024 ○ The pilot plant allows confirmation of process and catalyst reliability, performance, and characterization of key fuel parameters ○ Challenges & risks: Executing required R&D and design & construction work within a very compressed time frame • WP2: Optimisation of MtJ process fundamentals (DTU) <ul style="list-style-type: none"> ○ Experimental proof of concept and subsequent technology validation in lab ○ Enhanced experimental and analytical understanding of process possibilities and boundaries incl. process kinetics, yields, etc ○ Challenges & risks: Gaining sufficient process knowledge to understand, adjust and optimize process parameters once R&D pilot is built • WP3: Fuel specification and ASTM certification strategy (Topsoe, SkyNRG, Ørsted, NISA, CPH Airports) <ul style="list-style-type: none"> ○ Establish practical understanding of current and future ASTM process for SAF certification

	<ul style="list-style-type: none"> ○ Leverage R&D pilot design and first fuel production to create a certification strategy and initial feedback from the ASTM community on the path to obtain certification ○ Challenges & risks: Come up with a fast, ambitious yet realistic certification strategy which reduces time-to-market with the right fuel product ● WP4: Analysis of first industrial scale implementation (Ørsted, Topsoe, Neste) <ul style="list-style-type: none"> ○ Benchmarking of the MtJ process vs. alternative SAF pathways (incl. Fischer-Tropsch) ○ Analysis of and planning for a first deployment of the MtJ process in a commercial production plant ○ Challenges & risks: interfacing with other partners on data transfer (data relevance and timing). Ability to minimize need for demo plant between R&D pilot and first industrial scale plant ● WP5: Energy system integration (AAU, Ørsted) <ul style="list-style-type: none"> ○ Comprehensive energy system analysis of effects, synergies, infrastructure impacts, and costs, including waste heat and oxygen ○ Assessment of needed PtX capacity to supply the national/international demand for aviation fuels and the potential export of PtX fuels ○ Challenges & risks: Real-life ability to recreate the structures/setup recommended by the analysis ● WP6: Project management and project result dissemination (all) <ul style="list-style-type: none"> ○ Designing and operationalizing project governance, collaboration and InnoMission 2 reporting requirements ○ Coordination, planning and execution of dissemination efforts incl. scientific papers, conferences, site visits and promotion in press
Milestones	<p>Please see Gantt Chart for timing of milestones.</p> <p>WP1:</p> <p>M1.1: Pilot process design and material for vendor interaction completed</p> <ul style="list-style-type: none"> - The Pilot process design including PFD, MSD, PID drawings, mechanical specifications for reactors, plot plan for the pilot site and various descriptions are established as base for vendor interaction with respect to equipment and detailed engineering <p>M1.2: Detailed engineering completed</p> <ul style="list-style-type: none"> - A suitable vendor for equipment and detailed engineering is selected and the detailed engineering by the vendor is completed <p>M1.3: Construction including FAT completed</p> <ul style="list-style-type: none"> - The construction of the equipment at the vendor site, including the Factory Acceptance Test, is completed <p>M1.4: Pilot commissioned</p> <ul style="list-style-type: none"> - The MtJ pilot is installed at pilot site, Site Acceptance Test is passed and the MtJ pilot is commissioned and operational <p>WP2:</p> <p>M2.1: Literature survey completed</p> <p>M2.2: First round of activity measurements finished</p>

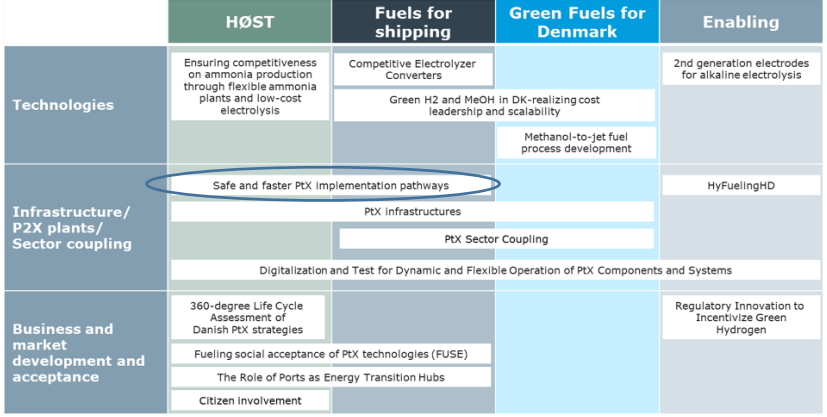
	<ul style="list-style-type: none"> - Experimental study the oligomerisation of lower olefins to jet-fuel range olefins over commercial reference catalysts (SPA and acidic resins) and selected zeolites over a range of operating conditions conducted <p>M2.3: Second round of activity measurements finished</p> <ul style="list-style-type: none"> - Catalyst characterization to provide understanding of the relation between physical properties and activity conducted <p>M2.4: Preliminary kinetic model of selected catalyst</p> <ul style="list-style-type: none"> - Preliminary kinetic model for the most relevant catalyst candidates developed <p>WP3:</p> <p>M3.1: ASTM certification strategy development completed</p> <ul style="list-style-type: none"> - Assessment of the approach to achieve ASTM certification finalized including consideration of fast-track vs. full initial certification <p>M3.2: Feedback from the ASTM community incorporated into the certification strategy</p> <ul style="list-style-type: none"> - Partners will support the work on ASTM certification and give their guidance on how to best proceed and obtain ASTM certification based on the initial fuel quality results and discussions with the ASTM community <p>WP4:</p> <p>M4.1: High level energy and mass balance and list of main equipment for methanol to jet process for the techno-economic assessment</p> <ul style="list-style-type: none"> - Aggregated techno-economic input data based on development work in WP1, incl. heat and mass balance as well as a list of main equipment for the MtJ process. This milestone therefore needs to be achieved before starting the work towards M4.2 <p>M4.2 Final benchmarking report on MtJ vs. Fischer-Tropsch</p> <ul style="list-style-type: none"> - Based on the data consolidated by milestone M4.1, this milestone marks the outcome and documentation of the techno-economic analyses of MtJ <p>M4.3 High-level design and deployment strategy for first industrial scale plant drafted</p> <ul style="list-style-type: none"> - Based on preliminary mass and energy balances, aviation fuel yield rates and capex/opex estimates a site-specific analysis of next stage plant construction and strategy towards commercialization will achieved with this milestone <p>WP5:</p> <p>M5.1: Energy system effects of PtX kerosene pathways</p> <ul style="list-style-type: none"> - MtJ pathway comparison to other means of producing kerosene and quantification of the supply chain effects on the energy system and the carbon balances conducted <p>M5.2: International market assessment conducted</p> <ul style="list-style-type: none"> - Assessment and understanding of international markets for kerosene and the relation to the local Danish energy system supply chain and carbon sources incl. assessment of current and future needs for market changes and regulatory frameworks finalized <p>WP6:</p> <p>M6.1 Bi-annual consortium meeting</p>
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	<ul style="list-style-type: none"> - Meetings conducted at regular intervals between the project consortium partner representatives to coordinate joint work and present preliminary findings. Will be conducted physically and virtually <p>M6.2 Consortium agreement signed</p> <ul style="list-style-type: none"> - A collaboration agreement between the partners will be drafted to further specify project governance incl. but not limited to roles, confidentiality and ownership of intellectual property <p>M6.3 Final project report published</p> <ul style="list-style-type: none"> - To conclude on the results and achievements of the project a report will be issued at the end of the project with findings from all main activities conducted <p>M6.4 R&D pilot inauguration</p> <ul style="list-style-type: none"> - Upon achieving first operation of the R&D pilot plant a promotion event will be scheduled to disseminate the findings and broader perspectives of the project to the general public
<p>End results</p>	<p>WP1: By the end of the project, the MtJ pilot plant will be installed and operational. The pilot plant will be suitable to confirm process and catalyst reliability, performance and characterization of key fuel parameters. Topsoe will provide the project partners with relevant background knowledge to support both the ASTM certification strategy and techno-economic results (explained in the further WP's) in the best possible way before results can be generated and confirmed based on the MtJ pilot plant.</p> <p>WP2: Identification of a catalyst and process conditions with >90% selectivity towards C8-C16 olefins and a preliminary kinetic model for process design. The results will be directly applicable to guide the plant design.</p> <p>WP3: An ASTM certification strategy and techno-economic considerations based on available knowledge base will be established with the partners. Based on the work done in the project, the project partners will support further work on ASTM certification. The analysis will get input from the analysis of first industrial implementation in WP4 to provide a plan for additional ASTM activities beyond the project's scope.</p> <p>WP4: Benchmarking MtJ versus Fischer-Tropsch route from a techno-economic point of view, end results will be production cost estimation of jet in different scenario with MtJ versus a benchmark technology (Fischer-Tropsch synthesis). The outcome will be reviewed to assess the potential for developing commercial MtJ facilities in the future. The benchmark will be complemented by a comprehensive assessment of the suitability of the MtJ process for application in commercial aviation fuels production seen from the point of a plant developer, owner and operator, incl. analysis into the need for further (demo) plants towards first industrial scale implementation. Analysis of potential first industrial deployment will take site-specific considerations into account using the Green</p>

	<p>Fuels for Denmark as a case study for potential first industrial implementation of the MtJ technology in a full-sized plant with input from WP3.</p> <p>WP5: The competitiveness of different electrofuels for aviation is strongly connected to low wind power costs, energy efficient in the supply chain and availability of carbon. This WP aims at identifying robust pathways incl. energy system and plant configuration, for producing aviation fuels based on wind power focusing on MtJ and the competitors. The analysis will draw on input from the analysis of first industrial implementation to qualify assumptions for the energy system analysis.</p> <p>WP6: The results include establishing and executing project governance, submitting content and progress reports as required by Innomission 2 and disseminating the project results to relevant forums, with the objective of efficient project management and creating a big impact from sharing the project results.</p>
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Safe PtX

Project title	Safe and faster PtX implementation pathways (“Safe PtX”)
Partners	HØST (CIP), Dansk Standard, Dansk Brand- og sikringsteknisk Institut (DBI), DFDS, European Energy, FORCE Technology, Green Hydrogen Systems, Everfuel, Rønne Havn, Siemens Gamesa Renewable Energy, Skovgaard Invest
Project manager	Carsten Møller (DBI) and Trine Nybo Lomholt (FORCE Technology)
Total budget	11,5 DKKm (Investment from IFD + Inkind)
Investment from IFD	6,5 DKKm
Project period	October 1st 2022 – August 31st 2024

<p>Relation to workstream</p>	<p>Safe PtX is an infrastructure project, that benefits equipment producers and plant owners by reducing safety and approval uncertainties and hereby enabling investment decisions and faster time to market for PtX production plants.</p> 
<p>Relation to partnership KPIs/milestones</p>	<p>If safety standards are not tested and in place once the industry speeds up, we estimate that the CO2 reductions planned from PtX will be postponed at least 3-5 years. The PtX roadmap from the IM2 application estimates a total reduction of 2.5 million tons carbon emissions already by 2030. This project will immensely contribute to reaching this number, alone by enabling safe and faster pathways for PtX implementation.</p>
<p>Purpose of project</p>	<p>The purpose of the project is to support the development of the necessary safety requirements for PtX implementation in Denmark. Safety requirements and standards are fundamental necessities for a fast pathway towards PtX-implementation and the realization of the huge potential for reducing GHG-emissions identified in the two IM2 roadmaps. Risk identification, quantification and mitigation by the development of transparent fast implementable safety standards are an important tool in paving the way for the required scaling and integration of technologies outlined in the roadmaps. Widely</p>

	<p>recognized safety standards on a national or even European level will similarly fertilize the commercialization between companies in the whole value chain and simulate efficient industrial implementation. Furtherly, on the opposite, lack of confidence in technology and related safety slow down and can with a lack of public acceptance even stop a wider implementation on an industrial scale in</p>
<p>Competences</p>	<p>The fulfilment of the purpose of the project is greatly embedded in the interaction and building of new competences between the partners on current and future barriers for establishing efficient and safe PtX value chains. Building new efficient safety standards and approaches will come from co-joining bottom up component level tests with top down strategic system design requirements witch the strongly value chain aligned consortium supports in best possible way</p>
<p>Project plan</p>	<p>Industrial stakeholders discuss production of e-fuels as a topic of priority. Today, smaller land-based production units exist, but to embrace the full opportunity that e-fuels represent, production scaling is paramount. This scaling process cannot happen if safety is not correctly built in the designs and documented for successful approvals. Today, stakeholders do not know what approvals should look like, and dread making investment decisions in a context of uncertainty. The proposed project addresses the pressing issue of safety documentation and uncertain approval processes, in an attempt to ease implementation of e-fuel production. Production is only one of the necessary links in the value chain. Produced e-fuels need to be transported and used. The last part of this project will explore possible action to bring safety further from production to transport and end-users.</p> <p>WP1 - Overcoming approval uncertainties to enable land-based production plant investment decisions and scaling</p> <p><i>WP1 - Description</i></p> <p>At the time of the investment decision, major uncertainties must be reduced. One such uncertainty is obtaining the approval to build and operate the plant. Approval procedures involve many different authorities and rules/regulations from different domains (environment, energy, oil/gas, work safety). The relation between approval and the general public is unclear; this could lead to barriers in the implementation of industrial projects. Moreover, in the competition between upcoming P2X technologies and existing energy solutions, predictable steps in an approval process can support company valuation and stimulate investment. Hence there is a need for transparency for both processes and requirements of approval procedures, sharing experiences and raising knowledge levels. This work package therefore aims at understanding these uncertainties and proposing a draft procedure to obtain approvals with appropriate and clear objectives to address the needs of compliance, industry, and the general public.</p>

	<p><i>WP1 - Tasks</i></p> <p>1.1 Fact finding from the first onshore PtX production projects and hydrogen infrastructure. Process/customer journey mapping and timeline. Identification of challenges and improvement opportunities - by review of approval processes from the first PtX projects: SGRE Brande Brint, Ørsted H2RES, Skovgaard Invest REDDAP 10 MW Ammonia, Crossbridge Energy HySynergy 20 MW Hydrogen, GreenLab Skive 12 MW.</p> <p>1.2 Involvement workshop to adjust and verify findings.</p> <p>1.3 GAP workshops for onshore PtX production approval processes. Bringing authorities, companies and local public stakeholders together to share experiences and discuss potential for improvements.</p> <p>1.4 Development of draft procedure for plant owners and authorities to assist faster approval processes - technical and administrative content. It builds on the interests of involved parties: Compliance (authorities), Investment uncertainty reduction (Industry) and the local community (society), and by a holistic, inclusive and transparent process.</p> <p>1.5 Demonstrate efficiency of the draft procedure on selected PtX projects.</p> <p>1.6 Wide dissemination in the PtX community including SME's.</p> <p><i>WP1 - Deliverables</i></p> <p>D1.1 Overview of past approvals from first PtX plants (M12)</p> <p>D1.2 First draft of recommended procedure for approving land based PtX production facilities (M18)</p> <p>D1.3 Verified recommended procedure for approving land-based PtX production (M24)</p> <p><i>WP1 - Challenges and risks</i></p> <p>The main risk is to produce a draft procedure that does not represent the needs and concerns of important stakeholders (e.g. the public or authorities). This risk is mitigated through Task 1.1 and 1.2, which will map needs and involve stakeholders to account for their opinions.</p> <p>WP2 - Design and documentation of acceptable safety levels for land based PtX production</p> <p><i>WP2 - Description</i></p> <p>PtX infrastructures are comprised of multiple overlapping domains and introduce new interfaces (e.g. between electricity generation, electrolysis, catalysis, storage, distribution, filling, usage etc.), new roles, new professions, new hazards, new authorities, new scales, new designs, new fuels. This calls for risk methodologies and frameworks that cover the complexity of PtX, and builds a bridge to the fragmented and siloed risk assessment of today.</p> <p>Risk assessments are carried out to produce documentation, in turn serving the approval procedure. The work in this WP2 is closely linked to the findings of WP1, so that the appropriate methodologies and documents are chosen in support of the objectives of the approval procedure.</p> <p>This WP2 aims at developing a guideline for designing and documenting acceptable safety levels for land-based PtX production.</p>
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	<p>This guideline is intended as a tool to fulfill the objectives and requirements of the approval procedure from WP1.</p> <p><i>WP2 – Tasks</i></p> <p>2.1 Establishing and running a PtX safety forum to exchange knowledge on plant/safety designs – focus will be on the interfaces between value chain elements (electricity generation, electrolysis, catalysis, storage, distribution, usage) as well as interfaces between safety disciplines (technical/functional safety, behavioral safety, accident scenario/spread, accident handling, firefighting & evacuation).</p> <p>2.2 Mapping / Identifying “safety risk and documentation methodology” for production plants inspired by existing practices from different industries (Seveso directive, ATEX, Machine directive, pressure directive, Formal Safety Assessment, Procedure for alternative design MSC 1455...) and identifying improvement potentials for more efficient documentation. This work will be guided by the findings from WP1 so that candidate methodologies support the overall approval procedure and its steps.</p> <p>2.3 Mapping / Identifying present “safety risk, documentation and test methodology” for equipment and systems and identifying improvement potentials for more efficient documentation. This work will also be guided by the findings of WP1.</p> <p>2.4 Stakeholder involvement to verify findings</p> <p>2.5 Identifying local innovation needs for standards to scale</p> <p>2.6 Development of the guideline on methodologies to follow in order to produce documentation for the approval procedure developed in WP1. This includes general documentation of safety and risks at the plant level, but also test and certification needs for equipment and systems.</p> <p>2.6 Demonstrate efficiency of the guideline and recommendations on selected IM2 PtX projects</p> <p>2.7 Wide dissemination in the PtX community including SME’s</p> <p><i>WP2 – Deliverables</i></p> <p>D2.1 Safety risk and documentation methodology for plants mapped (M12)</p> <p>D2.2 Safety risk and documentation methodology for equipment and systems mapped (M12)</p> <p>D2.3 Input from local needs implemented in D2.1 and D2.2 (M18)</p> <p>D2.4 Guideline of acceptable safety levels developed (M24)</p> <p><i>WP2 – Challenges and risks</i></p> <p>Many methods exist to perform risk-based assessments. The main risk of this WP2 is to select methods that do not address the outlined needs of the approval procedure, or are disconnected from the objectives of the approval procedure. This risk is mitigated by using the WP1 findings as a reference to develop and/or select methodologies.</p>
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	<p>WP3 - Develop further value chain opportunities The aim is to strengthen the partnership, exchange knowledge and create new projects for funding of “safe and faster PtX scaling”.</p> <p><i>WP3 – tasks</i> 3.1 Extract ideas and develop opportunities related to PtX safety and approvals for e-fuel distribution and usage. This covers land-based distribution and usage; maritime bunkering and storage; on-ship e-fuel safety design and operations. 3.2 Dialogue with partners in the consortia and external stakeholders relevant to continue further collaborations with. 3.3 Define new projects to develop further value chain opportunities</p> <p><i>WP3 – deliverables</i> D3.1 Further projects applied for (ongoing until M24)</p> <p>See attached Gantt chart for the project plan.</p>
<p>Milestones</p>	<p>M1 Input received from entire value chain on existing approval processes (M12) M2 Recommended practice for efficient approval process demonstrated (M24) M3 Safety risk and documentation methodology mapped (M12) M4 Guideline of acceptable safety levels developed (M24)</p> <p>See attached Gantt chart for the project plan.</p>
<p>End result</p>	<p>End result</p> <ul style="list-style-type: none"> • A draft procedure for approving land based PtX production facilities by a holistic, inclusive and transparent process, which builds on: <ul style="list-style-type: none"> ○ the interests of involved parties: Compliance (authorities), Investment uncertainty reduction (Industry) and the local community (society). ○ a shared understanding of approval process challenges between industry and authorities and removal of inconsistencies. • A Guideline on methodologies to follow in order to produce documentation for the approval procedure developed in WP1. This includes general documentation of safety and risks at the plant level, but also test and certification needs for equipment and systems. • Applications for further projects in the PtX value chain. IM Phase 2 and other programs. <p>Plan for implementing results</p> <ul style="list-style-type: none"> • Test of application in demonstration projects • Wide dissemination in the Danish PtX community including SMEs • Alignment with industry NGO’s (e.g. Brintbranchen, Dansk Energi, DI Energi, Danske Maritime)

	<ul style="list-style-type: none">• Participation as representatives for Danish industry in relevant technical ISO-committees / mirror committees and IMO working groups / correspondence groups.
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HyFuelling HD

Project title	HyFueling HD
Partners	Everfuel A/S (lead) Nel Hydrogen A/S Force Technology
Project manager	Nicolaj Bruun Rasmussen, nr@everfuel.com Brian Ramsgaard, bkra@force.dk
Total budget	10.689.181 DKK
Investment from IFD	4.550.462 DKK
Project period	01.04-2022 – 31.12-2023

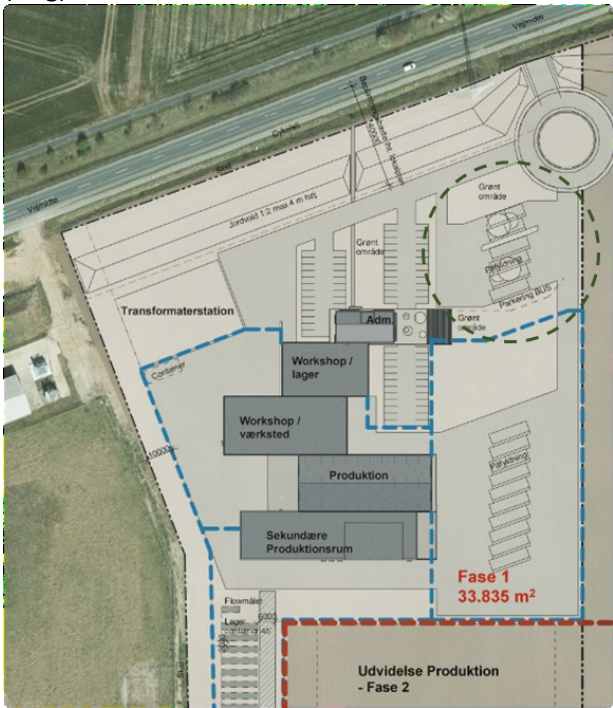
Relation to workstream	INNOMISSION 2
Relation to partnership KPIs/milestones	<p>The project is a core part of the roadmap, relative to its near-term effect as a demonstration site and deployment catalyst for new heavy duty fueling infrastructure and vehicles. Development and demonstration of high-capacity hydrogen refueling stations, further to be tested and validated in a real operational environment with first prototypes of key heavy duty FCEVs, plays a central role to "kick-start" the green hydrogen uptake for heavy duty zero emission road transport in Denmark, underpinning the roadmap's 2030 / 2050 ambitions.</p> <p>The focus area is Green Hydrogen for heavy duty land transport (section 5.1.1 in the roadmap in Appendix 3) and H2 distribution – H2 fueling station and associated infrastructure and Pathway "Storage, transport and distribution" (in the roadmap in Appendix 4).</p> <p>Synergies with adjacent projects are to be implemented as the IM2 projects progress, with an example being that Safety aspects in this project (phase 1 and potential consecutive phases) is already agreed to be two-way leveraged in direct coordination with the proposed project: "Safe and faster PtX implementation pathways".</p> <p>The project, the technological advancements and the operational experience has European-wide potential but is specifically focused on the objective of being a catalyst to development, testing and validation of new fueling equipment and heavy-duty fuel cell vehicles in a Danish and Scandinavian context. As specified by the Fit for 55 package and similar European ambitions and plans, the hydrogen station network build-out of high-capacity stations need to accelerate dramatically over the coming years, which is why the Danish station producer NEL Hydrogen will be able to leverage on the initial learnings of this first type of dual-pressure high capacity fueling station in real life testing, before applying these learnings in solutions provided in other European regions and scenarios.</p> <p>Simultaneously, Danish infrastructure developer and operator Everfuel is planning to address these targets of infrastructure build-out via a</p>

close customer collaboration being both strategic- and organic based on - among other things - vehicle operator's specific needs, which are often cross-country and therefore benefitting the members states in Scandinavia and countries along main road corridors in EU. Based on the learnings from existing fueling station types for cars and buses, as well as the significant capacity scale-up to be initially demonstrated in this project, these learnings will act as a catalyst to establishing a coherent refueling network essential for both initial deployment and later mass adoption of FCEVs in Denmark and across EU borders. In relation hereto Everfuel is lead partner in the STRING corridor project – a cross-border private/public partnership working to create a green megaregion in Northern Europe (see picture below), involving hydrogen fueling infrastructure for heavy duty road transport covering the entirety of the corridor.



Select examples of technology-oriented projects, in addition to the InnoMission2 work packages, to which this project and partners relate to and/or can leverage on previous works, are listed here for reference:

- EMPIR MetroHyVe – FORCE Technology has participated in the European R&D project 'Metrology for Hydrogen Vehicles', laying the foundation for metrological control of hydrogen refueling stations.
- EUDP HyScale – NEL Hydrogen and FORCE Technology participated in the HyScale project, which included type approval of a hydrogen fueling station for light duty hydrogen vehicles.
- FT02 – FORCE Technology is currently leading a strategic PtX effort: "FT02: Power-to-X som driver for grøn omstilling og vækst".
- HySynergy – In a multi-party project partnership, Everfuel is currently constructing Europe's largest electrolyser of its kind (by opening in 2022) in Fredericia, to which this project is set to leverage greatly upon in terms of site availability, fast deployment, H2 buffer integration, etc.

<p>Purpose of project</p>	<p>Leveraging on the flagship 20 MW electrolyser and established site infrastructure in the HySynergy project in central Denmark, which is currently under construction and set to open Europe’s largest facility of its kind 2nd half 2022, this project will develop and demonstrate a dual pressure high-capacity hydrogen fueling station directly at the allocated test site, interlinked with the hydrogen production and multi-ton buffer. Aiming at dramatically increasing hydrogen fueling flows to cater for heavy duty/heavy use road transportation at both 350bar and 700bar, the project is furthermore enabling a location in central Denmark for practical validation and demonstration of fueling capabilities, protocols and practical use cases of new heavy duty/heavy use fuel cell vehicles – vehicle types that are central to the Roadmap on green fuel transition towards 2030 and 2050 and which are currently being introduced on prototype level from a variety of vehicle OEM’s. The referred area made available for the test site is marked below (ring).</p>  <p>Link to video presenting the HySynergy project</p> <p>This phase 1 hydrogen for road transport demonstration project will provide critical real life operating experiences and technology demonstrations needed to further advance the high-capacity dual pressure fueling technology from concepts and lab environments towards the TRLs 6-7, as well as being a centrally located Danish site for live demonstration and validation of an variety of new heavy-duty fuel cell vehicles being introduced in the coming years, acting as a direct steppingstone for the established roadmap towards 2030 and 2050.</p> <p>The project enables the real-life technology demonstration of new HD fueling equipment currently limited to lab-conditions and simulations, targeting adherence to the under-development SAEJ2601-3 HD hydrogen fueling protocol with its groundbreaking ten-fold increases in</p>
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	<p>both flow and tank sizes. These critical learnings and validations will be applicable to other hydrogen projects across the country aiming at unlocking hydrogen for road transport, as well as addressing the regulatory and technical challenges of co-operating a fueling station together with a live PtX facility. Relative to the latter topic, the upstream value chain integration of the demonstration project is to be prepared for direct pipeline connection to the +5-ton hydrogen buffer storage situated between the electrolysis plant and the pipeline to the refinery operations – a facility and a set of engineering challenges that is in general a first of its kind in Europe at this size and type of equipment, at the time of opening (2nd half 2022) of the European flagship HySynergy project in Fredericia.</p>
<p>Competences</p>	<p>Nel Hydrogen has the competence to develop fueling equipment for hydrogen refueling for mobility purposes.</p> <p>Everfuel produces and distribute hydrogen and has special competences in optimization of the whole supply chain to reduce the cost of hydrogen and thereby make hydrogen a competitive alternative to fossil fuels.</p> <p>Force Technology possesses special knowledge regarding materials and flow design for pipelines and the safety regarding this.</p>
<p>Project plan</p>	<p>The project contains the development of a high-capacity dual pressure fueling station, design of a hydrogen pipeline from the HySynergy main hydrogen storage and application of both in a combined system that enables fueling of both 350 bar and 700 bar hydrogen for light and heavy-duty vehicles.</p> <p>Development of the station will be done by Nel hydrogen based on existing building blocks limiting the risk of completely new designs but still requiring significant development resources. Testing of the new station will be done in the Nel development lab before it is applied on site.</p> <p>Force will design a hydrogen pipeline that connects the main storage at Dyssynergy with the fueling storage. Developing methods for piping hydrogen at high pressure over long distances will reduce the distribution cost for hydrogen and thereby making it a more competitive fuel.</p> <p>Everfuel will develop the fueling site at the site of the largest electrolyser in Northern Europe and thereby achieve a synergy between hydrogen production and distribution. The development will include risk assessment of the piping, station, and other installations. Permitting of the site and the construction and installation on site.</p> <p>When the station is operational the performance of the station will be monitored and optimized.</p>
<p>Milestones</p>	<p>Major milestones are:</p> <ul style="list-style-type: none"> - Final design of the station - Lab test of the station - Final design of pipeline - Public approval of the station to allow construction to begin - Site Acceptance test to allow 3rd party fueling at the site.

<p>End result</p>	<p>The below action points are set to be achieved end of 2023 and onwards, relative to the focused phase 1 fueling technology scope and the hereby enabled live tests together with new fuel cell vehicle types:</p> <ul style="list-style-type: none"> • Establish the demonstrator site and phase 1 fueling equipment for dual pressure, high capacity fueling of heavy-duty vehicles in Denmark, directly linked/co-located with large-scale PtX facility • Planning of hydrogen distribution pipeline from PtX facility to the fueling station site, including interaction with stakeholders • Preparatory engineering works of direct pipeline connection to the PtX facility, to ensure safe and robust operation of the interfaces as well as the interlinked facilities • Enable the centrally located, national demonstration and validation site for new types of heavy-duty fuel cell vehicles in actual use, concurrent with fueling technology developments and used for e.g., PtX fuel distribution, infrastructure service and broader operator trials (enabled for consecutive phases) • Gain critical, real-life operating experiences from technology demonstration of both fueling and vehicles • Facilitate first validation and optimization of heavy-duty fueling with Danish developed technology, adhering to ongoing specification of the new HD fueling protocol SAE J2601-3 <p>Establish metrological infrastructure for type approval (OIML R 139) and related verifications with authorities</p>
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PtX sector coupling and LCA

Project title	PtX Sector Coupling and LCA
Partners	Academia/GTS: DTU MAN, DTU Compute, AAU PLAN , SDU, Alexandra SMEs: EA Energy Analysis, Energy Modelling Lab, PlanEnergi, EMD Industry: Energinet, Danfoss, Grundfos, Vestas, CIP
Project manager	Henrik Lund, AAU PLAN
Total budget	DKK 7.67 million
Investment from IFD	DKK 4.85 million
Project period	September 2022 to September 2024

Relation to workstream	Work Stream 2: Infrastructure/ PtX Plans/ Sector coupling
Relation to partnership KPIs/ milestones	The project aligns closely with the focus on the “integration of PtX with the broader energy system” (IM2, section 6). The “Development of energy system models that determines optimal PtX-integration” is outlined as a key workstream starting already today (Figure 6-1), which emphasizes the need for the comprehensive modelling tasks in this project. Furthermore, the state-of-the-art modelling tools that are brought together in this project will address the main highlighted challenges and opportunities (IM2, section 6, p.25) and will be further developed to allow assessments of “optimal locations of new plants based on grid capabilities, market forecasts, biomass and carbon availability, and to include sector coupling and co-optimisation of gas, electricity, hydrogen and district heating (as highlighted in IM2, section 6.1). Finally, the project enhances inputs to decision making through quantitative lifecycle assessment of PtX implementation strategies and potential trade-offs by connecting the system modelling tools to the LCA framework.
Purpose of project	<p>The purpose of the project is twofold:</p> <ol style="list-style-type: none"> 1. To further develop existing energy systems and LCA tools, methodologies and models to better determine optimal PtX-integration into the green transition 2. To use these models for assessments relevant to defining the optimal locations of new plants based on grid capabilities, market forecasts, biomass and carbon availability and including sector coupling and co-optimisation of gas, electricity, hydrogen and district heating <p>The optimal placement of PtX plants will depend on the availability of resources (wind and power, local biomass and CO₂ sources) as well as the vicinity to energy infrastructure (harbours, district heating grids, gas grids, power grids). Moreover, the integration with green fuels and the value chain of various biomass conversion technologies have an important role to play. An analysis will be made to illustrate the importance of resources and infrastructure in terms of placement, environmental performance, and profitability of plants taking into account the following themes:</p> <ul style="list-style-type: none"> - GIS data (e.g. from Energinet’s hub and AAU’s Heat Plan Denmark 2021) - potential tariff structures - alternative and supplementing district heating production - economy of scale and excess heat temperatures - dynamics and demand-response potential of the PtX - life cycle impacts related to system and technology choices - potential excess heat for district heating

	<p>The project will illustrate the use of data from Energinet's hub for analyses of optimal placement of PtX plants, depending on local resources and infrastructure.</p> <p>Furthermore, the data from the datahub will be supplemented with data on district heating potentials and available baseload heat demands within the existing district heating area from AAU's Heat Plan Denmark 2021. Combining both data sources gives a detailed view and possibility to analyse the optimal placement of PtX in various scenarios.</p> <p>The project encompasses some of the best existing modelling tools, which focus on different aspects of PtX, from analysis at project level with a strong representation of PtX plants, over district heating and long-term storages to international markets for power and hydrogen. Each model will be used to perform scenario analyses to assess the potential benefits and caveats of sector coupling and, in particular, the connection to district heating and the synergy and competition with other district heating technologies. Analyses will be conducted with similar parameter variations, such as CO2 prices, and subsequently visualized in an online tool, for investors to gain an understanding of the parameters affecting the feasibility of investment decisions.</p>
<p>Competences</p>	<p>AAU PLAN brings three important tools and competences into the project: The EnergyPLAN energy systems analysis tool, the EnergyMAPS GIS tool and LCA system analysis. Existing energy system scenarios from different Danish actors will be used to estimate the effect in previously developed energy system scenarios. The aim is to identify how energy infrastructures affect the energy system under different conditions, and these scenarios will be connected to LCA-based system modelling. This will be supplemented with GIS analysis with a focus on the benefits of exploiting excess heat from PtX in district heating.</p> <p>DTU MAN together with EA bring expertise in the use of the Balmorel tool. The aim is to have a good representation of the geographical aspects determining the optimal placement of PtX plants including the possibility to utilize excess heat. DTU MAN scenario analyses will illustrate robust investment opportunities. EA will use Balmorel to analyse the influence of potential tariff structures and impacts on the cost and viability of local PtX plants.</p> <p>DTU Compute brings the Frigg modelling framework, which is capable of capturing complex dynamics of technical systems and realistically evaluate their demand response potential. It can be linked with linear optimization energy planning tools such as Balmorel.</p> <p>Alexandra brings the expertise to develop a prototype of an IT-based decision support tool, which will be developed, demonstrated, and tested in close cooperation with research, industry partners and users. The tool will build on top of one (or both) of the open-source analysis models and will be made broadly available to industry.</p> <p>EML brings expertise on the ON-TIMES tool and model. Focusing on describing sector coupling and potential synergies from the modelled scenarios, scenario analysis will clarify the optimal placements of PtX plants in the Nordic countries in terms of cost effectiveness.</p> <p>PlanEnergi brings expertise on the availability of excess heat (amount and temperatures) of different PtX technologies. Analyses will be conducted of different types of heat storages and the utilisation of excess heat at different temperatures combined with heat pumps.</p> <p>EMD brings the tool EnergyPRO to the project and provides the direct dissemination of results of the optimal operation of PtX plants, taking into account different electricity markets and heat production and storages.</p>

	<p>Energinet provides data supply and integration into own tools and studies.</p> <p>Danfoss and Grundfos provide input on future district heating scenarios and the efficient utilization of excess heat in district heating grids.</p> <p>Vestas provides a strategy perspective in terms of future PtX plants being stand-alone versus grid connected.</p> <p>CIP is a central partner who brings important input on PtX technologies as well as connects directly to other parts of the overall IM2 project.</p> <p>SDU will be associated to the LCA modelling integration.</p>
<p>Project plan</p>	<p>This project will use inputs from the other parts of the IM2 consortium in terms of concrete descriptions of PtX and Green fuel technologies, which are essential to the analyses carried out in this project. On the other hand, we will be able to provide essential information back to the technology developers and demonstration projects reading how, when and where the new technologies would fit best into the overall sector-integrated design of the green transition, which is valuable information not only to the technology stakeholders but also to society. In this way, this project will assess “pathways into a stronger integration of PtX plants with the broader energy systems” (IM2, p.2) by using energy system modelling as the key tool.</p> <p>The project defines a number of relevant themes and analyses under the umbrella of the overall purpose and topic. These themes are dynamic for several reasons. First, communication with the other IM2 projects is essential and may lead to adjustment of the themes. Next, an element of the project is to inspire to new collaborations between models, tools and methodologies, which may also lead to adjustments. Finally, the development in both PtX technologies as well as in the context of the green transition is considered dynamic and may also lead to new focus areas, which again may lead to adjustments. The themes already mentioned above under competences are used as a starting point.</p> <p>To facilitate the best collaboration and development among the themes, the project is organized and divided into the following 4 WPs:</p> <p>WP1: State-of-the-art knowledge sharing: The purpose of this WP is to establish knowledge sharing among the partners on the state-of-art within existing analyses and results as well as existing models, tools and methodologies.</p> <p>WP2: Problem formulation and data: The purpose of this WP is to establish a dialogue with the rest of IM2 and to sharpen the problem formulation of the analyses attached to the themes and to organize for data collection and data sharing, if relevant.</p> <p>WP3: Modelling and analyses: To conduct a number of separate and coordinated analyses of each of the themes.</p> <p>WP4: Multi-approach synthesis: The purpose is twofold. First, to interpretate and put together the conclusions of the thematic analyses in the overall context of the IM2 project. Next, to identify areas of potential inspiration and collaboration between models, tools and methodologies based on the activities of the project.</p> <p>The project is coordinated via 4 plenary consortium meetings, as illustrated in the Gantt chart.</p>
<p>Milestones</p>	<p>The project will have the following 4 milestones:</p> <p>M1: State-of-the-art knowledge sharing among the partners</p> <p>M2: Adjustment and final definition of themes after dialogue with the rest of the IM2</p> <p>M3: Analysis and results of each of the themes</p>

M4: Synthesis conclusion in the context of the overall IM2 project		
Year	Year 1	Year 2
Month number	9 10 11 12 1 2 3 4 5 6 7 8	9 10 11 12 1 2 3 4 5 6 7 8
Calendar year	2022	2023
WP1 - Establishing status	X M1	
WP2 - Problem formulation and data		X M2
WP3 - Modelling and analyses		X M3
WP4 - Multi approach synthesis		X M4
M1: State-of-the-art knowledge sharing among the partners		
M2: Adjustment and final definition of themes after dialogue with rest of the IM2		
M3: Analysis and results of each of the themes		
M4: Synthesis conclusion the overall context of the overall IM2 project		
X = Project meetings		

End result	<p>Condensing the project into two years will facilitate timely results as well as contributions to subsequent projects, which could include more focus on market and regulation. This project will contribute with the following results outlining the potential future development of PtX and related sector coupling:</p> <ul style="list-style-type: none"> - An analysis will be made to illustrate the importance of resources and infrastructure in terms of placement and profitability of plants. - The project will illustrate the use of data from Energinet's hub for analyses of the optimal placement of PtX plants, depending on the local resources and infrastructure. - Furthermore, the data from the datahub will be supplemented with data on district heating potentials and available baseload heat demands within existing district heating area from AAU's Heat Plan Denmark 2021. - Further development of modelling tools and data sets of partners. <p>Scenario analyses will be conducted illustrating robust investment decisions and threshold values, e.g. for electricity prices and H2 market volume.</p> <p>Note: The results of the themes listed above are subject to adjustments based on a dialogue between the project partners and the rest of the IM2 projects, as mentioned above.</p>
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DYNFLEX

Project title	Digitalization and Test for Dynamic and Flexible Operation of PtX Components and Systems (DynFlex)
Partners	The project team consist of 9 SME, 5 large companies, 2 RTOs, 3 universities and 1 other organizations. <i>SME:</i> 2-Control, DynElectro, EMD, Energicenter Nord, ENFOR, Green Hydrogen Systems, Center Denmark, Hydrogen Valley, Skovgaard Invest. <i>Universities:</i> DTU, SDU, AAU <i>RTOs:</i> Danish Technological Institute (Lead) , Alexandra Institute <i>Large companies:</i> CIP, EWII, Haldor Topsøe, Port of Aabenraa, European Energy <i>Other:</i> Energinet
Project manager	Frank Elefsen, Danish Technological Institute
Total budget	33,3 Mill. DKK.
Investment from IFD	20 Mill. DKK
Project period	01-08-2022 to 01-08-2025

Relation to workstream	Infrastructure/PtX Plants/Sector coupling
Relation to partnership KPIs/milestones	The project was priorities as second best among the 15 selected projects in IM2 with a high SME participation. The project is aligned with the 3 large scale lighthouse projects, which all have stated the need for research and test of dynamic operation of PtX plants. In a broader scope, it paves the way to a stronger integration of PtX plants with the broader energy systems by looking at modelling, control systems, and overall dynamics of the plants.
Purpose of project	The project develops new methods for testing and operating individual PtX components and the total system (TRL 2-7). This supports the scale-up, business case and technology platform for production of green fuels. Digitalization for flexible, dynamic and efficient operation of grid-integrated PtX plants requires 1) simulation, forecasting, monitoring, control and optimization methods; 2) fault-detection, condition monitoring, and predictive maintenance methods for components; 3) real-time hardware-in-the loop emulation and test facilities for components and systems (lab and full scale). The holistic approach includes the electricity grid, solar and wind power production, power converters (AC to DC), electrolyzers, air separation, ammonia and methanol production, and their interfaces to the electricity-, heat- and gas-grids. We develop these forecasting- and optimization-based control systems and use test facilities of these components and systems to enable integrated PtX facilities to operate safely, flexibly, and efficiently. This facilitates reliability

	<p>of the power system and such that PtX plants have interfaces for sector coupling, e.g., district heating and the transport sector. The project develops new methods for testing and operating individual PtX components and the total system (TRL 2-7). This improves the business case for PtX plants.</p>
<p>Competences</p>	<p>Safe, flexible, and efficient operation of PtX facilities requires competences within simulation, forecasting, control, fault-detection, predictive maintenance, real-time hardware-in-the loop test facilities for components and systems. All these competences are represented at the 3 most important technical universities and the 2 RTOs included in the project. The project is aligned with several large full scale PtX facilities, that's going to be established soon. The project is open to include future upcoming PtX installation as well.</p> <p>The project will have activities nation wide represented by test facilities at knowledge institutions, demonstration plants and full scale PtX facilities widespread across Denmark. International knowledge sharing will be performed through the knowledge institutions and the partners with international activities.</p> <p>The project is also characterized by having a large number SME included. The participating SME cover the whole PtX-chain both components and systems.</p>
<p>Project plan</p>	<p>The project consists of 8 work packages covering controller development, test facilities, data collection, fault detection, forecasting, market integration and performance of dynamic tests all addressing PtX components and systems.</p> <p><i>Work Package descriptions</i></p> <p>WP1 Controller development for individual components (DTU Comp) Model-based optimizing control systems that can efficiently reject disturbances and track set point changes related to productions levels an economically optimizing manner as well as first-principles models for dynamic simulation will be established for electrolyzers, air separation units, ammonia reactors, and methanol reactors. The model-based controllers will be tested by dynamic simulation using first principles models and in demonstration facilities. The interface to these controllers will be constructed such that they can incorporate forecasts and enable a coordinating optimization layer to do plant-wide coordinated, flexible, and efficient operation of the PtX facility with the power-system, when the majority of the energy is generated by wind turbines and photo voltaic cells.</p> <p>WP2 Test facilities at AAU, DTI and DTU incl. e.g., RT-HIL reflecting international standards & accreditation schemes. (AAU Ener and DTI)</p>

	<p>In WP2 existing test facilities at DTI, DTU and AAU will be extended with PtX test equipment facilities. Especially focus will be on Real-Time Hardware in the Loop (RT-HIL) facilities. Further test and lab-facilities at Port of Aabenraa and other PtX demo sites will be integrated in the project.</p> <p>WP3 Real-time data collection and development of consolidated dynamic test procedures (CD and DTI) Real-time data monitoring is essential to make dynamic systems more robust and reliable and to have much better adaption to fluctuating wind and solar energy production. WP3 will collect real-time data from PtX components in operation in the field using the existing facilities at DTI and Center Denmark. We will use these data to develop lab-test procedures for PtX components and systems.</p> <p>WP4 Mapping of fault propagation, development of algorithms for fault detection (AAU ES) In WP4 we will develop methods for plant-wide fault detection, condition monitoring and risk assessment. The faults can occur in the equipment, sensors, actuators, or storage. One example of a failure could be leakage through cracks in the reactor walls, caused by vibration and corrosion. The development of preventive measures requires monitoring and early warning technologies. We aim to monitor system dynamics and chosen process variables to predict a failure before it takes place. Subsequently, its consequences are automatically computed to provide plant operators with information needed to take decisions about whether to stop production, replace parts, or conduct repairs. Activities: <ul style="list-style-type: none"> - Choosing and placing sensors for monitoring and diagnosis - Modeling and simulation of internal flows in the electrolyser units. - Mapping of fault propagation, safety/risk assessment and visualization for decision makers and plant operators - Development of Digital Twin-style models to ensure that dynamical behaviors can be captured correctly - Development of algorithms for fault detection and pinpointing of mishaps; here, both hardware and software faults will be considered - Development of algorithms and establishing scenarios for recovery from faults. </p> <p>WP5 Forecasting of wind and solar generation, electricity load, electricity prices (DTU Comp) State-of-the-art forecasting solutions for the partners in DynFlex will be established. In a joint effort between DTU, ENFOR and Center Denmark, solutions for real-time forecasting of electricity prices, electricity load, wind and solar generation will be established. The forecasting horizon will be adjusted to the actual need. For market participation, the forecast will be delivered in real-time on hourly or 5-15 minutes resolution up to 2-3 days ahead. Forecasts can be</p>
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	<p>delivered as point forecasts, probabilistic forecasts, or scenarios for direct use in optimization of business potentials and for minimizing risks.</p> <p>WP6 Electricity market optimization and integration (SDU CEI) This WP aims to investigate, identify, and evaluate PtX's integration with electricity markets by: 1) Mapping of PtX's different electricity market participation models; 2) Identification and assessment of PtX business potentials and barriers with the climate, social, economic, technical, and political perspectives; 3) Investigation of electricity market participation opportunities and strategies under the current and future market scenarios; 4) Evaluation of PtX plants' optimization algorithms and strategies.</p> <p>WP7 Perform dynamic test of selected PtX components. (DTU Electro and DTI) This WP will test the dynamic performance of selected PtX technologies from Green Hydrogen Systems and DynElectro as well as the controllers from WP1. The tests will be conducted according to both international standards and internally designed test protocols that represent future applications, such as wind power balancing. Simulation models will be developed and calibrated according to the test results for further studies related to scalability and replicability</p> <p>WP8 Coordination and Project Management (DTI) WP8 perform all project management and administration tasks. Further there will be held general assemblies for the whole project and coordinated with other projects in Innomission 2.</p> <p>The main challenges and risks are:</p> <ul style="list-style-type: none"> - Available data on the dynamic operation of PtX components and systems is very limited, especially large scale PtX components and systems - The upscaling effects on large scale PtX facilities are based on limited knowledge, especially in dynamic operation - The project results are needed within few years to obtain the 2030 goals and the new energy challenges caused by the conflict I Ukraine
<p>Milestones</p>	<p>M1: component level investigation and optimization M2: condition monitoring for components with fault-detection M3: emulation and test facilities for components</p>
<p>End result</p>	<p>The results after phase 1 are: 1) simulation, forecasting, monitoring, control, and optimization methods on component level; 2) fault-detection, condition monitoring for components; 3) real-time hardware-in-the loop emulation and test facilities for components. This improves the business case for PtX plants and supports further funding and investments PtX components and plants.</p>

Engaging citizens in the green transition

Project title	Engaging Communities in the Green Fuels Transition
Partners	University of Copenhagen, Dept. of Anthropology Aalborg University, Dept. of Communication & Psychology Naboskab (SME) Green Hydrogen Systems (SME) European Energy Copenhagen Infrastructure Partners Aalborg Municipality Fredericia Municipality Nordic Folkecenter for Renewable Energy
Project manager	Simon Lex (Co-PI) and Anders Horsbøl (Co-PI)
Total budget	2.120.000 DKK
Investment from IFD	1.500.000 DKK
Project period	1.9.2022 – 31.12.2023

Relation to workstream	Business and market development, social acceptance
Relation to partnership KPIs/milestones	The project aligns with the issue of social acceptance as described in the roadmap in 5.2.2.3., in particular “involvement of citizens and stakeholders in processes of energy transition” to “improve legitimacy and efficacy of green energy solutions”.
Purpose of project	<p>To avoid public resistance, which risk decelerating the development of the Danish green fuel market, the ambition of the project is to develop models for public and civil engagement in the development of green fuel infrastructures. The purpose is thus to support local collaborative environments, which are essential for realizing envisioned job creation and CO2 reductions.</p> <p>As a first step, it is pivotal to produce in-depth knowledge about 1) governance structures and organizational procedures in local municipalities and 2) behaviors and levels of acceptance among local actors in civil society. More specifically, the study will explore how public authorities and civil society relate to green fuels and large production sites and infrastructures, focusing especially on triggers of resistance, support and collaboration. The project will identify key barriers as well as best practices with citizen engagement in the development and implementation of green infrastructures as wind turbines, solar panels and PtX plants.</p> <p>On that basis, the project will develop scenarios for how to constructively model structures and practices for public and civil engagement. The scenarios will be shared with project partners and serve as a vehicle for the development of national models for public and civil engagement in the development of the green fuel market.</p>
Competences	By including social scientists from anthropology (UCPH) and Communication (AAU), the project ensures the development of in-depth qualitative knowledge about stakeholders as well as communication formats for public involvement and dissemination of results across organizational boundaries. The team of scholars has

	<p>extensive experience with conducting applied research <i>with</i> private and public organizations within the energy sector in Denmark. To ensure buy-in and implementation of insights across the value chain, the project continuously involves local municipalities, private businesses and civil society.</p>
Project plan	<p>Phase 1 (Desk research, data collection and analysis) Desk research including a) a state-of-the-art review of related concepts i.e. “social acceptance”, “citizen involvement”, “NIMBY” and b) qualitative mapping of existing “best-practice” examples of citizen involvement in RE technologies. Quantitative surveys with Danish municipalities and green fuel businesses to obtain an overview of experiences and challenges with the implementation of green fuels. Qualitative fieldwork with participatory observation in chosen field sites in Denmark and in-depth interviews with key stakeholders (municipalities, companies, and civil society) to map relevant experiences, challenges and opportunities of citizen involvement in the planning of infrastructures for green fuels. Data analysis and report.</p> <p>Phase 2 (concept and design) 5. Conceptualization and proof of concept with private, public and civil stakeholders (with partners and IM2 partnership). Dissemination of scenarios and design guidelines for citizen involvement to be tested in phase 3 (funded by pool 2).</p>
Milestones	<p>Phase 1 State-of-the-art review and map of best practices of social acceptance and citizen involvement in the development of “green” fuels infrastructures. Analysis of needs, motivations and conditions of relevant civil protest groups and movements. Analysis of barriers and opportunities for municipalities when engaging with civil society and private companies.</p> <p>Phase 2 4. Scenarios and guidelines for tackling barriers to green fuels via the establishment of collaboration across the value chain. The project is managed and evaluated in two decision gates of which the first is performed by partnership leads after phase1, while the second is performed by the IM2 steering committee after phase 2.</p> <p>Success criteria - Minimizing risk and time to market. - Increasing civil engagement. - Improving collaboration across the value chain.</p>
End result	<p>A comprehensive catalogue of best practices and promising venues for citizen involvement and social acceptance in the development of infrastructure for green fuels, including scenarios and design guidelines for tackling barriers to green fuels via the establishment of collaboration across the value chain.</p>

Exhibit 3

Organisation and Management

MissionGreenFuels

1 – Management and organization

MissionGreenFuels will be structured as a consortium, with the daily management answering to a Board of Directors and an annual consortium meeting as shown below.

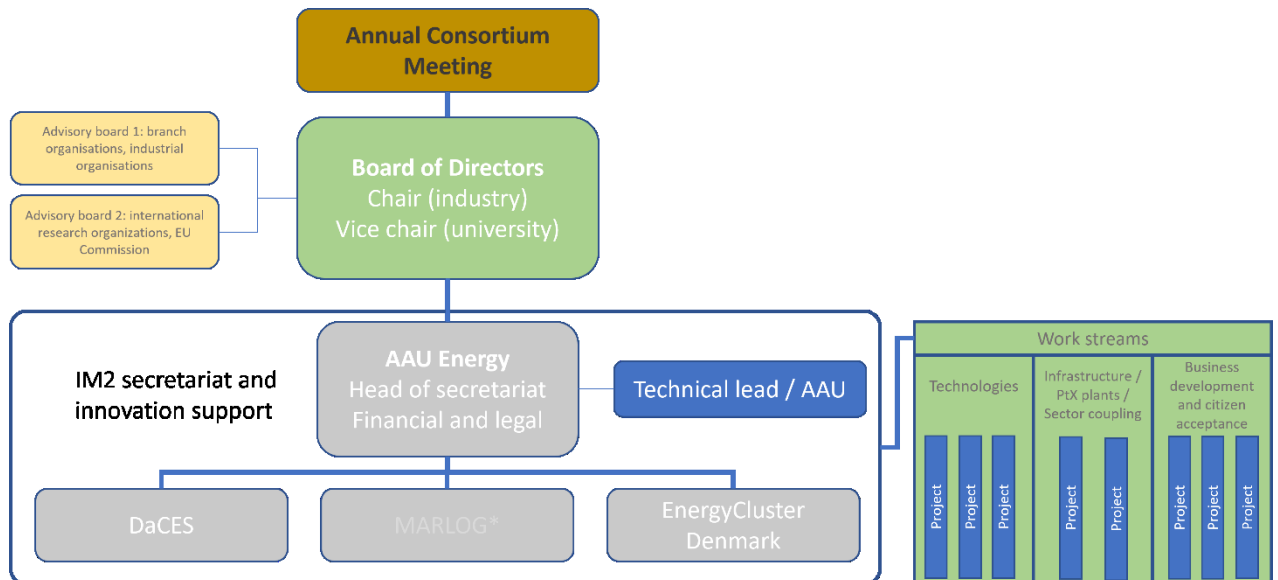


Figure 1 MissionGreenFuels organogram. *: MARLOG has been a part of the secretariat until bankruptcy in early April 2022. Until further notice, AAU, DaCES and ECD will handle the tasks but in the event that MARLOG is reconstructed, a place will be held.

Annual consortium meeting

The annual consortium meeting of the partnership MissionGreenFuels is the ultimate governing authority of the partnership. The mandate is to shape the overall mission and delegate to the Board of Directors (BoD). The consortium will consist of a wide group of business, industry, SME’s, academic and knowledge institutions, RTO’s, clusters and think tanks, municipalities, and NGO’s. The annual meeting of the partnership will be open to relevant new members to the partnership to deliver on the mission goals.

The mandate of the annual Consortium meeting is to work for an open, inclusive, and agile mission-driven partnership, which will be supported by rotation in the board members over time. The direction of the partnership is primarily set by BoD. However, a high member inclusion and involvement will not only be through concrete project mission activities, but also through regular members meetings, events/ conferences, and workshops. These activities will be organized by the Mission-GreenFuels Secretariat headed by AAU in close collaboration with Energy Cluster Denmark and DaCES and their respective ecosystems. Where members of the partnership and members of BoD will meet to shape the strategic frame and focus.

The annual consortium meeting can support the establishment of cross-cutting initiatives in the partnership ecosystems as well as outside the partnership i.e., to the other Innomission partnerships, to give dynamism to the MissionGreenFuels partnership.

Board of Directors

Decision-making power is delegated to Board of Directors (BoD) from the annual consortium meeting.

BoD executes its decisions through the MissionGreenFuels Secretariat.

An Interim Board of Directors has been established to manage the contract negotiation process, and will be replaced by an elected BoD at the kick-off meeting of the consortium in Q 2 to take up the full responsibility of the partnership.

The interim BoD has had the following members:

Role	Name	Function	Affiliation	e-mail
Chairman	Kim Grøn Knudsen	Chief Strategy & Innovation Officer	Topsøe	kik@topsoe.com
Member	Jakob Fredsted	Senior vice president	Danfoss	jakob@danfoss.com
Member	Steen Stoltze	Senior vice president	Ørsted	stso@orsted.com
Member	Per Hesselund Lauritzen	Offshore Research Manager	Siemens Gamesa	Per.lauritsen@siemensgamesa.com
Member	Bo Svolgaard	Senior vice president	Vestas	bosvo@vestas.com
Member	Jacob Sterling	Senior Director	Maersk Line	jacob.sterling@maersk.com
Member	Carsten Orth Gaarn-Larsen	Senior vice president	DTU	coglar@dtu.dk
Member	Mogens Rysholt Poulsen	Dean	AAU	Dekan-engineering@adm.aau.dk
Member	Lars Ottosen	Head of department	AU	ldmo@eng.au.dk
Member	Jens Ejbye Schmidt	Head of department	SDU	jesc@igt.sdu.dk
Member	Erik Bisgaard Madsen	Vice dean	KU	proem@science.ku.dk
Member	Hanne Harmsen	Vice dean	CBS	hh.slk@cbs.dk
Member	David Tveit	EVP	TI	dt@teknologisk.dk
Member	Torben Nørgaard	Commercial Manager	MMZCSC	Torben.norgaard@zerocarbon-shiping.dk

The BoD of MissionGreenFuels will be elected for a period of 2.5 years, ie half the duration of the funding period. Thus, a mid-term election will be held approximately half way taking place at the annual consortium meeting. The composition of the BoD will consist of 10 members, according to this principle:

- 5 industrial members (chair)
 - 3 large
 - 2 SME (at least)
 - 3 university members (vice chair)
 - 2 GTS/knowledge institutions
- 2 periods of 2.5 years each

- 4 meetings per year (at least)

Each partner will have 3 votes, one for each group (industrial, university and GTS/knowledge institution).

The responsibility of the BoD is to set and communicate clear and targeted direction for the mission with well-defined objectives and impacts, which can achieve broad buy-in across the ecosystem. BoD formulates mission statements with an objective to implement the MissionGreenFuels Roadmap and ensures common anchoring and alignment of the work.

BoD will together with the Secretariat align projects and activities to support the overall mission milestones and goals such as adapting the content of ongoing projects and activities and down-prioritising ongoing projects and activities.

BoD's role in prioritising new projects financed by the Innovation Fund Denmark will be described in [Ad Exhibit 3 Governance Model for Pool 2](#). The MissionGreenfuels Roadmap will be the foundation of the prioritization for further calls. BoD will together with the Head of the Secretariat play a vital role in fundraising and attracting further funds to the partnership. A specific taskforce will be established.

Activities and projects initiated from funding from i.e., private funds, donations and partner contributions will also be prioritized with an outset in the partnership plan.

The BoD must represent the mission and not an individual project, financing source or institution. BoD must maintain focus on the integrity of the mission project portfolio, and its alignment with the mission impact.

Innovation Fund Denmark

The Innovation Fund Denmark (IFD) is the overall governing body and the financial responsible for the **201.650.000**, - DKK allocated to support the mission in 2022 and five years ahead. The IFD is therefore a key partner in the partnership providing support on accounting, legal aspects, and other administration aspects. The IFD also plays a pivotal role in allocating funds to in particularly new projects, where the IFD will confirm the final decision based on recommendations from the partnership and BoD.

IFD will also provide their resources for the Pool 2 (and further) call i.e., the E-grant system, Eureka reviews and administrative resources related to the handling of applications.

As for projects in Pool 1 and ongoing projects in general, the Secretariat will regular attend meetings with IFD officers to report on the progress and discuss possible challenges, changes in priorities etc.

The IFD must have two (2) observer seats on the BoD and contribute with agenda items to the meetings.

MissionGreenFuels secretariat

The MissionGreenFuels secretariat will consist of AAU, DaCES and ECD. The Head of Secretariat will be employed by AAU Innovation. The Head of Secretariat will be employed by an open call during Q2 2022. A function as "Technical Project Lead" has been defined in order to ensure a technical liaison between the BoD and the activities in the workstreams. This function has no executive rights or

special responsibilities within the organisation of MissionGreenFuels, and is purely an advisory function. The Technical Project Lead will be Lasse Rosendahl, professor and head of AAU Energy. Until the Head of Secretariat is found, Lasse Rosendahl will be acting as such.

Role	Name	Function	Affiliation	e-mail
Technical Project Lead	Lasse Rosendahl	Professor, head of department	AAU	lar@energy.aau.dk
Head of Secretariat	NN		AAU	
Ensuring focus on innovation, value chain building, cross fertilization and commercialization activities	Glenda Napier	CEO	ECD	gna@energycluster.dk
Ensuring focus on research and partnership cross fertilisation	Anne Marie Damgaard	Head of Secretariat	DaCES	amd@atv.dk

The secretariat will support the three workstreams as shown below, and ensure that information flows vertically to and from projects to BoD and the annual consortium meeting as well as horizontally, through partnership supporting activities based on the already established structures and ecosystems of ECD and DaCES. Each partner of the secretariat will be responsible for a workstream.

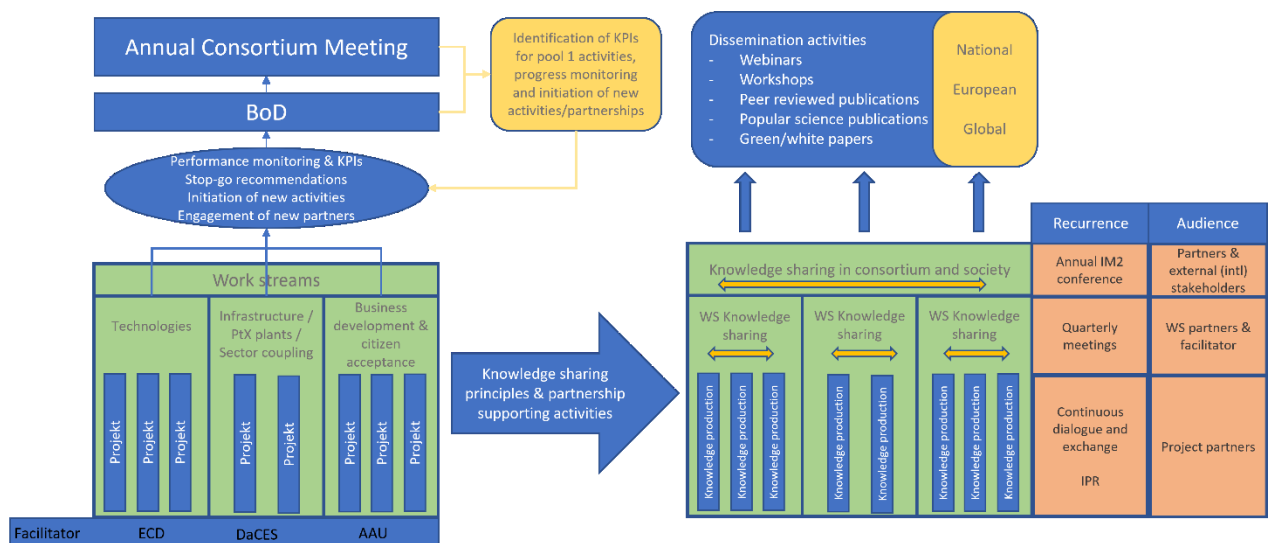


Figure 2 Overall organisation of the MissionGreenFuels secretariat and partnership. Left hand part is the information flow to the BoD and IFD, whereas the right hand side indicates knowledge sharing and partnership supporting activities.

The Head of Secretariat distinguishes clearly between administration and process functions versus portfolio management (innovation) functions (see further down under “Portfolio management”).

The Head of Secretariat reports to BoD and is held accountable for mission alignment. The Head of Secretariat and Technical Project Lead are not members of the Board of Directors, but will assist the BoD and participate in the meetings unless otherwise decided by the BoD, both have the right to speak but no voting rights in this forum.

The Head of Secretariat can recommend adding and discarding activities in coordination with the project portfolio managers. The Head of Secretariat must continuously be able to “translate” the mission strategy and serves as a key link between BoD and the individual research and innovation projects. This will make the mission an operational top-down process, while informing mission progress from a bottom-up approach.

The Head of Secretariat has a clear mandate across all ecosystem actors to maintain systematic, active portfolio management through robust processes of data collection, learning/assessment/evaluation, and subsequent adjustment.

Financial administration will be handled by AAU. Each project will submit a single financial and technical report to the secretariat for annual reporting, where a single overall reporting will be compiled and submitted to IFD.

Project facilitation to support cross fertilisation: DaCES and ECD will divide a role of project support facilitation among them. In practice, there will be a support project manager connected to each IM2 project as to ensure milestones, general progress as well as handling daily challenges in the groups in close collaboration with the project portfolio managers appointed by each project. This role is to support, progress and develop cross-fertilisation amongst the projects and their partners of being part of and belonging to a partnership working for common goals. The facilitation is a service offered to the individual project portfolio managers and teams.

Initiation of cross-cutting initiatives in collaboration with partnership: e.g., on capacity building programmes, collaboration with policy makers, interaction with consumer groups and coordination with the other Innomission partnerships (Secretariat).

Two advisory boards will be populated after the kick-off of the partnership. ECD is responsible for the industrial advisory board, whereas DaCES is responsible for establishing the international research advisory board.

Project funding: The secretariat will work to ensure further fundraising in relation to the IM2 projects and Roadmap. A specific taskgroup with representatives from the BoD and the partnership will be established when the GreenMissionfuels kicks-off supported by the secretariat. There will also be an explorative funding linkage to other large and relevant initiatives such as the “Erhvervsfyrtårne” in Denmark.

Communication and dissemination: The secretariat will work to disseminate the IM2 Roadmap to the ecosystem around PTX and green fuels. This will be organized through workshops and conferences. ECD and DaCES will also work to disseminate and communicate through their already established information channels to their members, network and ecosystems. An annual conference on project information, dissemination and progress organised in partnership with IFD will be undertaken.

2 – Portfolio management

A fundamental governance principle in mission-oriented innovation is the system-wide focus on a portfolio of activities across knowledge domains, actors, sectors, and value chains. This means that although the mission is realised through a bottom-up process and through activities, the governance model will ensure that the portfolio composition aligns with the mission, and enables new learning, insights and innovations to emerge.

Portfolio management will therefore ensure systematic and aligned data collection, and active adjustment of the project portfolio – making new connections between activities, searching for missing elements to add, and discarding activities that no longer contribute to the mission. The GreenMissionfuels partnership will ensure a broad portfolio of projects addressing the whole green fuels value chain and engage the broader ecosystem. It is a core aim for the governance model to be both agile and flexible in its structure, while also involving and engaging a very wide range of stakeholders.

The BoD will together with the secretariat regular review the mission project portfolio up against the IM2 Roadmap.

Ongoing calls for proposals are open and will be targeted broadly towards national and international ecosystem involving universities, clusters, companies and NGOs and public organisations to bid for and participate in proposals. The content and focus of new calls for proposals will be aligned with the content and direction of the GreenMissionfuels roadmap.

Counting almost 60 partners, the MissionGreenFuels partnership has a very wide and comprehensive representation of stakeholders within the field. This facilitates communication and awareness of international developments and opportunities that are important for the success of the partnership. For example, communication lines with other established and coming centres for PtX such as the Villum P2X accelerator at DTU are established. Within the InnoMissions, there is close communication with InnoCCUS and dialogue and collaboration is also being built with Innomission 3 (AgriFoodTure) and Innomission 4 (Circularity; plastics and textiles).

Portfolio management includes

- supporting the three workstreams, ensuring knowledge sharing¹ and cross fertilisation building a genuine partnership
- identifying new calls and opportunities
- coordinating the annual dissemination event
- joint communication activities, such as white papers, webinars, workshops
- updating and maintaining the MissionGreenFuels roadmap
- supporting advisory boards
- establishing a funding plan for the consortium

3 – Governance for investment in Pool 2

In budget for Mission-driven Green Partnerships a minimum of 40 % of the total investment is reserved for new investments within a defined field(s) of the roadmap(s) connected to the specific Mission, and within the partnership period. This part of the budget is referred to as pool 2.

¹ To the extent possible within the individual project agreements

In the Investment Agreement the purpose of pool 2 investment is described in detail. This description will be defining for the development of calls under pool 2. With the approval of the Investment Agreement by IFD board of directors the budget for pool 2 is allocated to the Mission-partnership.

The Mission-partnership is responsible for process of application, evaluation and decision-making regarding investment of pool 2 budget. IFD can provide assistance with the frame and develop basic templates for call text, application format, criteria, evaluation process and investment decision by the Mission-partnership.

IFD Board of Directors must approve process and investment decision.

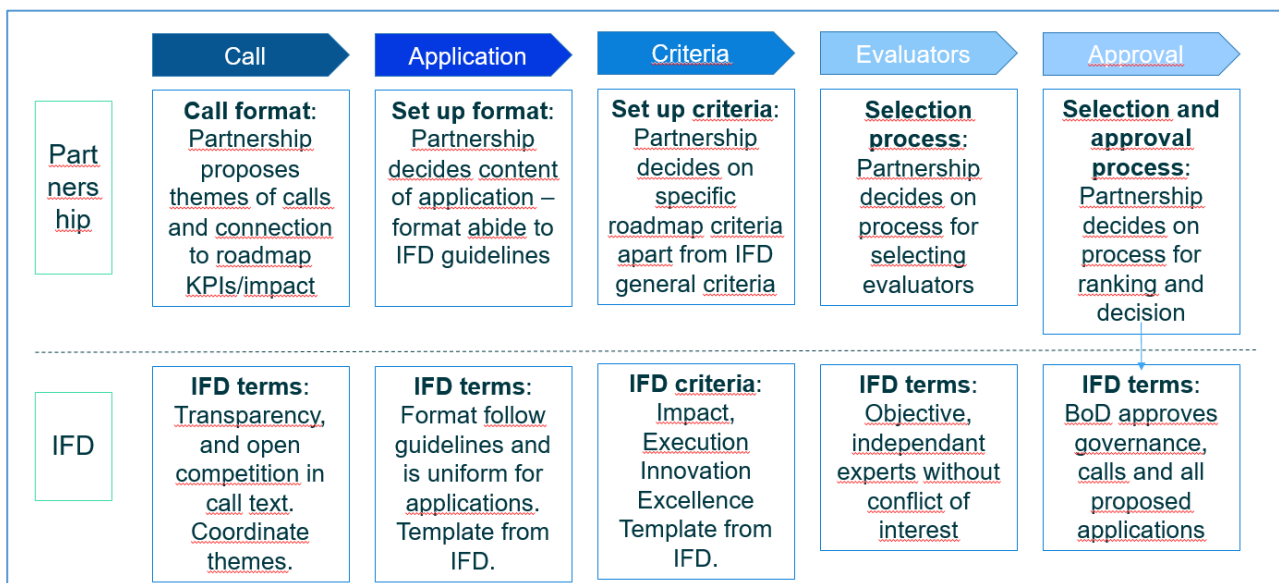
See also attached 'Ad Exhibit 3 - Governance Model for Pool 2'.

Ad Exhibit 3 - Governance Model for Pool 2

The following is a description of proposed governance model for pool 2 budget in relation to mission-driven green partnerships.

The model will secure that investment from Innovation Fund Denmark (IFD) is in accordance with IFD guidelines, public administration law and rules of state aid.

The basic idea is that IFD supplies basic framework and template for the investment process, and that the partnerships build upon this framework and adjusts in accordance with partnership and roadmap specific criteria/KPI's.



Call

To ensure transparency and openness in focusing pool 2 investments, and future top-up funding, in the missions IFD will supply a format for call text, and in cooperation with the leadership of the partnership coordinate the calls.

The format will take current guidelines into account to ensure that the call is conducted in open competition.

The call format will both be used for pool 2 investments and future top-up funding.

It is the obligation and responsibility of the partnership to ensure that the calls are within the frame of the roadmap, and supports impact.

Application

IFD shall supply an application format containing the necessary information to identify and evaluate the application.

The format will be a structure round basic information on applicants, and relevant element to be described such as, excellence, value creation, efficiency and implementation.

The partnership will supply elements in the application related to roadmap impact and partnership specific information.

Final template for application shall be approved by IFD.

Criteria

IFD shall supply and ensure that the evaluation criteria for the application are aligned with the IFD general evaluation criteria, and within the scope of guidelines.

The partnership shall add criteria that are related to roadmap impact and partnership specific aspects.

Final template for evaluation shall be approved by IFD.

Evaluators

It is the responsibility of IFD to ensure that evaluation process is conducted by evaluators without conflict of interest and that rules of hearing are abided. IFD can supply internal evaluators, external evaluators and/or international peers from Eureka's expert database.

The partnership must approve model for selection of evaluators.

Approval

It is the responsibility of IFD board of directors to approve process for investments in pool 2, and any new funding, and approve the final proposal of projects for investment.

The evaluation process will result in a ranking of the individual applications based on the collected score from the evaluators. The leadership of the partnership shall approve the ranking, and can add evaluation criteria that relate to roadmap impact and partnership specific aspects, that can be applied to the group of applications that have a high score (≥ 5) in the evaluation of basic criteria.

IFD recommends that the proposal of applications corresponds to an investment amount twice of what is available for investment.

It is paramount that the group of ranked applications that the leadership of the partnership must process and decide for the final ranking of the applications are found between applications that are eligible for investment, based on the basic IFD criteria.

Exhibit 4

Rules of procedure for the Board of Directors

Rules of procedure for the Board of Directors for MissionGreenFuels

1 - The Board of Directors's composition and competence

1.1 The Board of Directors consists of 10 members, representing different types of stakeholders as follows:

- Group 1:
 - 5 industrial members (chair)
 - 3 large
 - 2 SME (at least)
- Group 2:
 - 3 university members (vice chair)
- Group 3:
 - 2 GTS/knowledge institutions

Individual members are elected by the partnership, such that each partnership member casts one vote within each of the three electoral groups. Membership is assigned through simple majority of votes. During the current funding period, there will be two elections, one at the kick-off of the partnership and one half way through. Thus, there will be two electoral periods, each approximately 2.5 years. The IFD shall approve the composition of the Board of Directors.

1.2 At the Board of Directors's inaugural meeting a Chairman and a Vice-Chairman are appointed by the Board of Directors. The appointments shall be approved by the IFD. The Chairman and Vice-Chairman must be members of the Board of Directors. The appointments are made through simple majority of votes. In the absence of the Chairman the Vice-chairman acts on his/her behalf. If the Chairman or Vice-Chairman resigns the Board of Directors appoints a new Chairman or Vice-Chairman amongst the members of the Board of Directors

1.3 The Board of Directors members are appointed for 2 times 2.5 years, thus covering the entire duration of the Investment Period. Members from the first period can be re-elected. If a member resigns before time, the successor will be appointed by the Partnership Participant, whom the member represents in the Partnership.

1.4 A member is personally appointed and cannot be represented by another person by power of attorney. The member may, however, if prevented from being present vote by proxy through the Chairman.

1.5 The Board of Directors forms a quorum when at least half the members and the chairman, and in his/her absence the Vice-chairman, are present.

1.6 All decisions in the Board of Directors are made by simple majority of votes. In case of a tied vote the Chairman's vote, or in his/her absence the Vice-chairman's vote, will be decisive. Every member of the Board of Directors with a right to vote may veto any decision made by the Board of Directors. No member can, however, veto discussions or decisions about infringement of the Investment agreement and the Collaboration Agreement from the Partnership Partner, which the member represents.

Nor can any member oppose a decision that will not have consequences for, or relates to the member's own work and/or budget.

1.7 The Technical Project Lead has the right to attend and speak in the Board of Directors.

1.8 The Head of Secretariat is responsible for facilitating the meetings of the Board of Directors.

2 - Innovation Fund Denmark's participation in the Board of Directors

2.1 Innovation Fund Denmark appoints 1-2 Innovation Officers to follow the work of the Board of Directors. The Innovation Officers appointed by Innovation Fund Denmark are not members of the Board of Directors, but are solely observers and have no right to vote at the Board of Directors meetings. The appointed Innovation Officers do have the right to attend and speak at all Board of Directors meetings. Innovation Fund Denmark or any Innovation Officer may convene a Board of Directors meeting and put separate items on the agenda of a Board of Directors meeting.

3 - The tasks of the Board of Directors

3.1 The tasks and responsibilities of the Board of Directors are described in the Investment Agreement.

3.2 The Board of Directors has the overall responsibility for setting the direction for the Partnership and ensuring optimal impact on goals defined in mission-roadmap. With approval by Innovation Fund Denmark, the Board of Directors will appoint a Partnership Leader who will have the daily responsibility for the Partnership. Operations which are of unusual type in relation to the content of the Partnership, or which will be of great importance to the Partnership, may only be undertaken with special authorisation from the Board of Directors

3.3 The Board of Directors will monitor the development and progress of the Partnership and make decisions to ensure that the interaction between the Partnership Participants and the Partnership's organisation, management and resource allocation enables the achievement of the Milestones and in accordance with the mission-roadmap. The Board of Directors must amongst other things ensure that the Partnership Participants collaborate towards common goals defined in the mission-roadmap throughout the Investment Period, and if appropriate make the necessary adjustment of the Partnership Plan/Roadmap and/or the Partnership's organisation.

3.4 The Board of Directors will monitor impact of the Partnership on Roadmap. Governance model for pool 2 investments is described in exhibit 3, where the process for securing alignment between investments and roadmap is outlined, and how IFD ensures that all guidelines and regulations are kept. In the yearly review process it is the responsibility of the Board of Directors to monitor and support the Partnership leadership and engage in the review process, cf. 6.

3.5 The Board of Directors must ensure that account is taken of the Partnership's management and administration throughout the entire Investment period. The Board of Directors can decide to replace the Partnership Leader and/or the Administrator, cf. conditions in the Investment Agreement.

3.6 The Board of Directors must undertake the Partnership's financial management and at the Board of Directors meetings approve the Partnership Manager's annual scientific and financial reports (Annual Report), final report and other reports Innovation Fund Denmark may require.

3.7 Any member of the Board of Directors are entitled to raise matters concerning the Partnership's scientific content, results, business relevance, etc., for the Board of Directors to evaluate.

3.8 The Chairman and Vice-Chairman of the Board of Directors together with the Partnership Leader represent the Partnership vis-à-vis the outside world.

4 - The conduct of Board of Directors meetings

4.1 The Board of Directors must meet a least twice a year (once every six months), or whenever the Chairman, and in his/her absence the Vice-chairman, finds it necessary, or upon written request from at least one member of the Board of Directors. The Board of Directors must in that case at the request of the Chairman, and in his/her absence the Vice-chairman, convene within three weeks of receiving the request.

4.2 Meetings are called by the Chairman, and in his/her absence the Vice-chairman, with at least two weeks' notice if possible. An agenda for the meeting is sent out with the call for the meeting. Any supplementary documents must be sent out at least a week before the meeting if possible. Every member may request an item to be put on the agenda.

4.3 At the start of the meeting the proposed agenda is approved. The Chairman, and in his/her absence the Vice-chairman, chairs the meeting

5 - Minutes etc.

5.1 The Chairman, and in his/her absence the Vice-chairman, is responsible for minutes to be taken of the Board of Directors's negotiations and decisions. This task is seconded to the Head of Secretariat, cf clause 1.8. If a Partnership Participant does not agree with a Board of Directors decision they have the right to have their opinion reported in the minutes. The minutes must contain clear definitions of actions and clearly state who are responsible for the actions.

5.2 The draft minutes must be sent out no later than one week after the Board of Directors meeting with notice of a deadline for comments. The minutes must be approved by email no later than two weeks after the Board of Directors meeting by the Board of Directors members.

5.3 Unless objections have been raised to the minutes within the given notice, cf. 5.2, the Board of Directors's decisions may be executed after the expiry of the notice

6 - The conduct of Investment Reviews

6.1 The investment Review is to be held once a year.

6.2 Investment reviews are called by the Chairman of the Board of Directors, and in his/her absence the Vice-chairman. An agenda for the review is coordinated with IFD Investment Officer and sent out

with the call for the review. Supplementary documents must be sent out at least two weeks before the review if possible. Every member and IFD may request an item to be put on the agenda.

6.3 At the start of the Investment Review the proposed agenda is approved. IFD representative chairs the review.

6.4 Participants from IFD – Investment Officers, members of board of directors and members of Mission Advisory Board (MIAB).

6.4 Minutes follow the same process as for Board of Directors meeting, cf. 5.

7 - Other provisions

7.1 The present Rules of procedure have been agreed on by the Parties in the Partnership by signing the Investment Agreement between the Partnership Parties and Innovation Fund Denmark and are enclosed as an exhibit to this Agreement.

InnoMission 2 Partnership for Green Fuels in Transport and Industry - IM2

Instructions

Fill in basic information and work packages titles according to format description.

Support & links

[E-grant support](#)

[Innovation Fund Denmark](#)

Project - Master data

Project - Basic information

Project information			
Project title	InnoMission 2 Partnership for Green Fuels in Transport and Industry		
Acronym	IM2	Case no.	<input type="text"/>
Project - start date (on the form: dd-mm-yy)	01-April-2022		
Project - end date (on the form: dd-mm-yy)	31-December-2025		
Duration	3 years, 8 months, 30 days		
Administrator Administrator information must be filled in on sheet "P1"	P1 - Aalborg University		

WP1	Write work package name here	Competitive Electrolyzer Converters (ComEiCo)
WP2	Write work package name here	Ensuring competitiveness on ammonia production through flexible ammonia plants and low-cost electrolysis (COMPAS)
WP3	Write work package name here	Digitalization and Test for Dynamic and Flexible Operation of PtX Components and Systems (DynFlex)
WP4	Write work package name here	Green H2 and MeOH in DK - realizing cost leadership and scalability (GREMEOH)
WP5	Write work package name here	HyFueling HD (HyFuel)
WP6	Write work package name here	Engaging communities in the green fuels transition (LexHorsbol)
WP7	Write work package name here	Methanol-to-jet fuel process development (MJ fuel process development)
WP8	Write work package name here	PtX Sector Coupling and LCA (PtX-LCA)
WP9	Write work package name here	Safe and faster PtX implementation pathways (SafePtX)
WP10	Write work package name here	Administration

InnoMission 2 Partnership for Green Fuels in Transport and Industry - IM2

Support & Data
Innovation Fund and Denmark

Budget overview

Key Project figures		
Project title	InnoMission 2 Partnership for Green Fuels in Transport and Industry	
Project acronym	IM2	
Project - start date (on the form dd-mm-yyyy)	01-06-22	
Project - end date (on the form dd-mm-yyyy)	31-12-25	
Duration	3 years, 6 months, 30 days	
Total Project budget	kr.	179,388,000
Total IFD investment incl. overhead	kr.	103,914,737
IFD investment rates	Project	
	55%	Industrial uses
Total IFD investment excl. Overhead	kr.	84,201,200
	kr.	18,023,864
Administrator	DTU - Aarhus University	

IFD Investment Rates					
Partner no.	Partner name	Org type	IFD investment Rate	Industrial research	Experimental development
P1	Aarhus University	DK-UNI	50%	73%	27%
P2	Quintus A/S	DK-VEK	40%	0%	100%
P3	Green Hydrogen Systems	DK-VEK	37%	45%	55%
P4	Technical University of Denmark	DK-UNI	30%	41%	59%
P5	University of Southern Denmark	DK-UNI	30%	80%	50%
P6	Copenhagen Infrastructure Partners	DK-VEK	24%	98%	4%
P7	Hydrogen Systems A/S	DK-VEK	48%	100%	0%
P8	Aarhus University	DK-UNI	30%	0%	100%
P9	University of Copenhagen	DK-UNI	30%	0%	100%
P10	Denmark Technology and Innovation Institute	DK-GTS	30%	100%	0%
P11	Aalborg University	DK-GTS	33%	100%	0%
P12	Dynalisco A/S	DK-VEK - Industrielsk	42%	100%	0%
P13	European Energy A/S	DK-VEK	30%	73%	20%
P14	EMD	DK-VEK - Industrielsk	50%	100%	0%
P15	Casden Denmark	DK-VEK	50%	100%	0%
P16	ENERGI	DK-VEK	50%	100%	0%
P17	2-Carbon	DK-VEK	50%	100%	0%
P18	Fuel of Additive	DK-VEK	33%	100%	0%
P19	EnergyPartner Nord	DK-VEK	23%	100%	0%
P20	Stinguard Invest	DK-VEK	22%	100%	0%
P21	EMR	DK-VEK	22%	100%	0%
P22	Emergent	DK-GRV/CO2/FACIT	0%	100%	0%
P23	CEMTEC Jordan	DK-VEK	50%	100%	0%
P24	University of Southern Denmark - IT	DK-UNI	30%	100%	0%
P25	EnergyLab	DK-VEK	50%	13%	87%
P26	Nov Hydrogen A/S	DK-VEK	30%	0%	100%
P27	Fuelix Technology	DK-GTS	60%	83%	17%
P28	Aalborg Kommune	DK-GRV/CO2/FACIT	33%	0%	100%
P29	Frølands Kommune	DK-GRV/CO2/FACIT	33%	0%	100%
P30	Nordisk Fællescenter for Vedvarende Energi	DK-VEK	0%	0%	100%
P31	Nobonair	DK-VEK	0%	0%	100%
P32	Østfold Hydrogen Green Fuels DK A/S	DK-VEK	0%	0%	100%
P33	DTU Chemical Engineering	DK-UNI	30%	80%	50%
P34	Syngas	DEL-VEK	0%	0%	100%
P35	Neste Oy	DEL-VEK	0%	0%	100%
P36	NEA	DK-GRV/NO2/PCF	0%	0%	100%
P37	Copenhagen Alloys	DK-VEK	0%	0%	100%
P38	Aalborg University	DK-GTS	50%	0%	100%
P39	Energy Marketing Lab	DK-VEK - Industrielsk	50%	100%	0%
P40	ProEnergy	DK-VEK - Industrielsk	60%	100%	0%
P41	EMD International A/S	DK-VEK - Industrielsk	60%	100%	0%
P42	Exalogit Systemer A/S	DK-VEK - Industrielsk	0%	100%	0%
P43	Quintus A/S	DK-VEK - Industrielsk	0%	100%	0%
P44	Quintus Holding A/S	DK-VEK - Industrielsk	0%	100%	0%
P45	Vestas Wind Systems A/S	DK-VEK - Industrielsk	0%	100%	0%
P46	EA Energy Analytics	DK-VEK - Industrielsk	80%	100%	0%
P47	Copenhagen Infrastructure Project	DK-VEK - Industrielsk	0%	100%	0%
P48	DBI - Dansk Brand- og Sikkerhedsinstitut	DK-GTS	60%	100%	0%
P49	HeatPilot Energy	DK-VEK	50%	100%	0%
P50	Sensora Greenhouse Renewable Energy	DK-VEK	50%	100%	0%
P51	Recharge Invest	DK-VEK	50%	100%	0%
P52	EMTEC	DK-VEK	50%	100%	0%
P53					
P54	Denish Standard	DK-GRV/CO2/FACIT	75%	100%	0%
P55	Energy Cluster Denmark	DK-VEK	30%	100%	0%
P56	Denish Center for Energy Storage / Akademisk for og Teknisk Videnskabscenter	DK-GRV/NO2/PCF	30%	100%	0%
P57					
P58					
P59					
P60					

InnoMission 2 Partnership for Green Fuels in Transport and Industry - IM2

[Support & links](#)

[Innovation Fund Denmark](#)

Partner budget

Partner number and name	Type	Org. type	Total budget incl. OH	IFD investment incl. OH	Self-financing	IFD Investment Rate	
P1	Aalborg University	Project Partner	DK-UNI	kr. 14.130.775	kr. 12.667.697	kr. 1.463.078	90%
P2	Danfoss Drives A/S	Project Partner	DK-VIRK	kr. 5.000.000	kr. 1.999.999	kr. 3.000.001	40%
P3	Green Hydrogen Systems	Project Partner	DK-VIRK	kr. 6.550.002	kr. 2.449.998	kr. 4.100.004	37%
P4	Technical University of Denmark	Project Partner	DK-UNI	kr. 22.164.119	kr. 19.947.707	kr. 2.216.412	90%
P5	University of Southern Denmark	Project Partner	DK-UNI	kr. 6.655.551	kr. 5.989.995	kr. 665.556	90%
P6	Copenhagen Infrastructure Partners	Project Partner	DK-VIRK	kr. 1.250.000	kr. 300.000	kr. 950.000	24%
P7	Haldor Topsøe A/S	Project Partner	DK-VIRK	kr. 63.255.402	kr. 30.501.701	kr. 32.753.701	48%
P8	Aarhus University	Project Partner	DK-UNI	kr. 1.799.568	kr. 1.619.611	kr. 179.957	90%
P9	University of Copenhagen	Project Partner	DK-UNI	kr. 2.592.199	kr. 2.288.862	kr. 303.337	88%
P10	Danish Technological Institute	Project Partner	DK-GTS	kr. 5.166.670	kr. 3.100.003	kr. 2.066.667	60%
P11	Alexandra Institute	Project Partner	DK-GTS	kr. 900.000	kr. 296.999	kr. 603.001	33%
P12	DynElectro ApS	Project Partner	DK-VIRK - deminimis	kr. 1.200.000	kr. 504.000	kr. 696.000	42%
P13	European Energy A/S	Project Partner	DK-VIRK	kr. 4.030.000	kr. 1.449.000	kr. 2.581.000	36%
P14	EMD	Project Partner	DK-VIRK - deminimis	kr. 600.000	kr. 300.000	kr. 300.000	50%
P15	Center Denmark	Project Partner	DK-VIRK	kr. 600.000	kr. 300.000	kr. 300.000	50%
P16	ENFOR	Project Partner	DK-VIRK	kr. 600.000	kr. 300.000	kr. 300.000	50%
P17	2-Control	Project Partner	DK-VIRK	kr. 600.000	kr. 300.000	kr. 300.000	50%
P18	Port of Aabenraa	Project Partner	DK-VIRK	kr. 1.300.000	kr. 299.000	kr. 1.001.000	23%
P19	Energicenter Nord	Project Partner	DK-VIRK	kr. 1.300.000	kr. 299.000	kr. 1.001.000	23%
P20	Skovgaard Invest	Project Partner	DK-VIRK	kr. 1.350.000	kr. 299.000	kr. 1.051.000	22%
P21	EWII	Project Partner	DK-VIRK	kr. 1.300.000	kr. 299.000	kr. 1.001.000	23%
P22	Energinet	Project Partner	DK-ØVRIGOFFINST	kr. 300.000	kr. -	kr. 300.000	0%

P23	CEMTEC Fonden	Project Partner	DK-VIRK	kr.	600.000	kr.	300.000	kr.	300.000	50%
P24	University Southern Denmark - ITI	Project Partner	DK-UNI	kr.	2.808.559	kr.	2.499.997	kr.	308.562	89%
P25	Everfuel A/S	Project Partner	DK-VIRK	kr.	6.393.531	kr.	3.196.766	kr.	3.196.765	50%
P26	Nel Hydrogen A/S	Project Partner	DK-VIRK	kr.	4.345.650	kr.	1.303.696	kr.	3.041.954	30%
P27	Force Technology	Project Partner	DK-GTS	kr.	4.435.000	kr.	2.661.000	kr.	1.774.000	60%
P28	Aalborg Kommune	Project Partner	DK-ØVRIGOFFINST	kr.	75.759	kr.	25.000	kr.	50.759	33%
P29	Fredericia Kommune	Project Partner	DK-ØVRIGOFFINST	kr.	75.759	kr.	25.000	kr.	50.759	33%
P30	Nordisk Folkecenter for Vedvarende Energi	Project Partner	DK-VIRK	kr.	50.000	kr.	-	kr.	50.000	0%
P31	Naboskab	Project Partner	DK-VIRK	kr.	50.000	kr.	-	kr.	50.000	0%
P32	Ørsted Hydrogen Green Fuels DK A/S	Project Partner	DK-VIRK	kr.	1.500.000	kr.	-	kr.	1.500.000	0%
P33	DTU Chemical Engineering	Project Partner	DK-UNI	kr.	2.966.361	kr.	2.669.725	kr.	296.636	90%
P34	SkyNRG	Project Partner	UDL-VIRK	kr.	535.000	kr.	-	kr.	535.000	0%
P35	Neste Oy	Project Partner	UDL-VIRK	kr.	744.000	kr.	-	kr.	744.000	0%
P36	NISA	Project Partner	DK-PRIVNONPROF	kr.	300.000	kr.	-	kr.	300.000	0%
P37	Copenhagen Airports	Project Partner	DK-VIRK	kr.	200.000	kr.	-	kr.	200.000	0%
P38	Alexandra Institute	Project Partner	DK-GTS	kr.	600.001	kr.	360.001	kr.	240.000	60%
P39	Energy Modelling Lab	Project Partner	DK-VIRK - deminimis	kr.	300.000	kr.	180.000	kr.	120.000	60%
P40	PlanEnergi	Project Partner	DK-VIRK - deminimis	kr.	320.000	kr.	192.000	kr.	128.000	60%
P41	EMD International A/S	Project Partner	DK-VIRK - deminimis	kr.	300.000	kr.	180.000	kr.	120.000	60%
P42	Energinet Systemsvar A/S	Project Partner	DK-VIRK - deminimis	kr.	500.000	kr.	-	kr.	500.000	0%
P43	Danfoss A/S	Project Partner	DK-VIRK - deminimis	kr.	250.000	kr.	-	kr.	250.000	0%
P44	Grundfos Holding A/S	Project Partner	DK-VIRK - deminimis	kr.	250.000	kr.	-	kr.	250.000	0%
P45	Vestas Wind Systems A/S	Project Partner	DK-VIRK - deminimis	kr.	375.000	kr.	-	kr.	375.000	0%
P46	EA Energy Analyses	Project Partner	DK-VIRK - deminimis	kr.	300.000	kr.	180.000	kr.	120.000	60%
P47	Copenhagen Infrastructure Project	Project Contributor	DK-VIRK - deminimis	kr.	300.000	kr.	-	kr.	300.000	0%
P48	DBI - Dansk Brand- og Sikringsteknisk Institut	Project Partner	DK-GTS	kr.	3.200.000	kr.	1.920.000	kr.	1.280.000	60%
P49	Høst PIX Esbjerg	Project Partner	DK-VIRK	kr.	800.000	kr.	400.000	kr.	400.000	50%

P50	Siemens Gamesa Renewable Energy	Project Partner	DK-VIRK	kr.	800.000	kr.	400.000	kr.	400.000	50%
P51	Renne Havn	Project Partner	DK-VIRK	kr.	200.000	kr.	100.000	kr.	100.000	50%
P52	DFDS	Project Partner	DK-VIRK	kr.	200.000	kr.	100.000	kr.	100.000	50%
P53				kr.	-	kr.	-	kr.	-	0%
P54	Dansk Standard	Project Partner	DK-ØVRIGOFFINST	kr.	480.000	kr.	360.000	kr.	120.000	75%
P55	Energy Cluster Danmark	Project Partner	DK-VIRK	kr.	750.000	kr.	675.000	kr.	75.000	90%
P56	Danish Center for Energy Storage / Akademiet for de Tekniske Videnskaber	Project Partner	DK-PRIVNONPROF	kr.	750.000	kr.	675.000	kr.	75.000	90%
P57				kr.	-	kr.	-	kr.	-	0%
P58				kr.	-	kr.	-	kr.	-	0%
P59				kr.	-	kr.	-	kr.	-	0%
P60				kr.	-	kr.	-	kr.	-	0%

Partner and Work packages

Project title	InnoMission 2 Partnership for Green Fuels in Transport and Industry
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Total Project budget	kr.	178.398.905
Total IFD Investment incl. overhead	kr.	103.914.757
Total Project Self-financing	kr.	74.484.148

Partner number and name	Total budget incl. OH	IFD Investment incl. OH	Self-financing	IFD Investment Rate	Partner comment
Total	kr. 141.044.286	kr. 85.212.572	kr. 55.831.714	60%	
P1 Aalborg University	kr. 14.130.775	kr. 12.667.897	kr. 1.463.078	90%	
P2 Danfoss Drives A/S	kr. 5.000.000	kr. 1.999.999	kr. 3.000.001	40%	
P3 Green Hydrogen Systems	kr. 6.550.002	kr. 2.449.998	kr. 4.100.004	37%	
P4 Technical University of Denmark	kr. 22.164.119	kr. 19.947.707	kr. 2.216.412	90%	
P5 University of Southern Denmark	kr. 6.655.551	kr. 5.989.995	kr. 665.556	90%	
P6 Copenhagen Infrastructure Partners	kr. 1.250.000	kr. 300.000	kr. 950.000	24%	
P7 Haldor Topsoe A/S	kr. 63.255.402	kr. 30.501.701	kr. 32.753.701	48%	
P8 Aarhus University	kr. 1.799.568	kr. 1.619.611	kr. 179.957	90%	
P9 University of Copenhagen	kr. 2.592.199	kr. 2.288.862	kr. 303.337	88%	
P10 Danish Technological Institute	kr. 5.166.670	kr. 3.100.003	kr. 2.066.667	60%	
P11 Alexandra Institute	kr. 900.000	kr. 296.999	kr. 603.001	33%	
P12 DynElectro ApS	kr. 1.200.000	kr. 504.000	kr. 696.000	42%	
P13 European Energy A/S	kr. 4.030.000	kr. 1.449.000	kr. 2.581.000	36%	
P14 EMD	kr. 600.000	kr. 300.000	kr. 300.000	50%	
P15 Center Denmark	kr. 600.000	kr. 300.000	kr. 300.000	50%	
P16 ENFOR	kr. 600.000	kr. 300.000	kr. 300.000	50%	
P17 2-Control	kr. 600.000	kr. 300.000	kr. 300.000	50%	
P18 Port of Aabenraa	kr. 1.300.000	kr. 299.000	kr. 1.001.000	23%	
P19 EnergiCenter Nord	kr. 1.300.000	kr. 299.000	kr. 1.001.000	23%	
P20 Skovgaard Invest	kr. 1.350.000	kr. 299.000	kr. 1.051.000	22%	

Work packages												
Partner number and name	Total project	1	2	3	4	5	6	7	8	9	10	
Total Work packages	kr. 141.044.286	kr. 12.000.000	kr. 34.821.300	kr. 31.433.334	kr. 8.868.896	kr.	kr. 1.865.686	kr. 44.730.000	kr. 4.175.001	kr. 1.650.000	kr. 1.500.000	
P1 Aalborg University	kr. 14.130.775	kr. 2.999.999	kr. -	kr. 4.444.443	kr. -	kr. -	kr. 833.333	kr. 1.800.000	kr. 2.553.000	kr. -	kr. 1.500.000	
P2 Danfoss Drives A/S	kr. 5.000.000	kr. 5.000.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P3 Green Hydrogen Systems	kr. 6.550.002	kr. 2.000.000	kr. -	kr. 600.000	kr. 3.100.002	kr. -	kr. 50.000	kr. -	kr. -	kr. 800.000	kr. -	
P4 Technical University of Denmark	kr. 22.164.119	kr. 1.000.000	kr. 12.086.564	kr. 7.555.555	kr. -	kr. -	kr. -	kr. -	kr. 1.522.000	kr. -	kr. -	
P5 University of Southern Denmark	kr. 6.655.551	kr. 1.000.001	kr. -	kr. 1.666.666	kr. 3.888.884	kr. -	kr. -	kr. -	kr. 100.000	kr. -	kr. -	
P6 Copenhagen Infrastructure Partners	kr. 1.250.000	kr. -	kr. 200.000	kr. 1.000.000	kr. -	kr. -	kr. 50.000	kr. -	kr. -	kr. -	kr. -	
P7 Haldor Topsoe A/S	kr. 63.255.402	kr. -	kr. 19.025.402	kr. 1.300.000	kr. -	kr. -	kr. -	kr. 42.930.000	kr. -	kr. -	kr. -	
P8 Aarhus University	kr. 1.799.568	kr. -	kr. 1.799.568	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P9 University of Copenhagen	kr. 2.592.199	kr. -	kr. 1.709.846	kr. -	kr. -	kr. -	kr. 882.353	kr. -	kr. -	kr. -	kr. -	
P10 Danish Technological Institute	kr. 5.166.670	kr. -	kr. -	kr. 5.166.670	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P11 Alexandra Institute	kr. 900.000	kr. -	kr. -	kr. 900.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P12 DynElectro ApS	kr. 1.200.000	kr. -	kr. -	kr. 1.200.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P13 European Energy A/S	kr. 4.030.000	kr. -	kr. -	kr. 1.300.000	kr. 1.880.000	kr. -	kr. 50.000	kr. -	kr. -	kr. 800.000	kr. -	
P14 EMD	kr. 600.000	kr. -	kr. -	kr. 600.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P15 Center Denmark	kr. 600.000	kr. -	kr. -	kr. 600.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P16 ENFOR	kr. 600.000	kr. -	kr. -	kr. 600.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P17 2-Control	kr. 600.000	kr. -	kr. -	kr. 600.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P18 Port of Aabenraa	kr. 1.300.000	kr. -	kr. -	kr. 1.300.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P19 EnergiCenter Nord	kr. 1.300.000	kr. -	kr. -	kr. 1.300.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	kr. -	
P20 Skovgaard Invest	kr. 1.350.000	kr. -	kr. -	kr. 1.300.000	kr. -	kr. -	kr. -	kr. -	kr. -	kr. 50.000	kr. -	

Work package number and name		Total budget							
		Total	2022	2023	2024	2025	2026	2027	2028
1	Competitive Electrolyzer Converters (ComEiCo)	kr. 12.000.000	kr. 1.385.710	kr. 5.228.732	kr. 4.971.277	kr. 414.281	-	-	-
2	Ensuring competitiveness on ammonia production through flexible ammonia plants and low-cost electrolysis (COMPAS)	kr. 34.821.380	kr. 7.932.071	kr. 17.452.270	kr. 9.437.039	-	-	-	-
3	Digitalization and Test for Dynamic and Flexible Operation of PX Components and Systems (DynFlex)	kr. 33.633.334	kr. 5.507.336	kr. 12.097.331	kr. 10.300.333	kr. 5.728.334	-	-	-
4	Green H2 and MeOH in DK - realizing cost leadership and scalability (GREMEOH)	kr. 11.677.445	kr. 1.884.826	kr. 6.173.960	kr. 3.618.659	-	-	-	-
5	HyFueling HD (HyFuel)	kr. 10.689.181	kr. 5.536.194	kr. 5.152.987	-	-	-	-	-
6	Engaging communities in the green fuels transition (LexHorsbol)	kr. 2.117.204	kr. 520.212	kr. 1.596.992	-	-	-	-	-
7	Methanol-to-jet fuel process development (MJ fuel process development)	kr. 50.975.361	kr. 4.074.952	kr. 18.862.972	kr. 27.241.287	kr. 796.150	-	-	-
8	PX Sector Coupling and LCA (PX-LCA)	kr. 7.670.002	kr. 1.273.531	kr. 3.728.513	kr. 2.667.957	-	-	-	-
9	Safe and faster PX implementation pathways (SafePX)	kr. 11.815.000	kr. 1.495.876	kr. 5.919.500	kr. 4.399.624	-	-	-	-
10	Administration	kr. 3.000.000	kr. 2.560.000	kr. 440.000	-	-	-	-	-
Total		kr. 178.398.906	kr. 32.170.708	kr. 76.653.257	kr. 62.636.176	kr. 6.938.765	kr.	-	-

Work package number and name		Experimental development							
		Total	2022	2023	2024	2025	2026	2027	2028
1	Competitive Electrolyzer Converters (ComEiCo)	kr. 12.000.000	kr. 1.385.710	kr. 5.228.732	kr. 4.971.277	kr. 414.281	-	-	-
2	Ensuring competitiveness on ammonia production through flexible ammonia plants and low-cost electrolysis (COMPAS)	kr. 15.595.978	kr. 3.125.720	kr. 7.839.570	kr. 4.630.688	-	-	-	-
3	Digitalization and Test for Dynamic and Flexible Operation of PX Components and Systems (DynFlex)	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
4	Green H2 and MeOH in DK - realizing cost leadership and scalability (GREMEOH)	kr. 2.490.001	kr. 525.762	kr. 1.195.173	kr. 769.067	-	-	-	-
5	HyFueling HD (HyFuel)	kr. 10.689.181	kr. 5.536.194	kr. 5.152.987	-	-	-	-	-
6	Engaging communities in the green fuels transition (LexHorsbol)	kr. 2.117.204	kr. 520.212	kr. 1.596.992	-	-	-	-	-
7	Methanol-to-jet fuel process development (MJ fuel process development)	kr. 3.575.636	kr. 892.615	kr. 1.331.667	kr. 1.271.739	kr. 79.615	-	-	-
8	PX Sector Coupling and LCA (PX-LCA)	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
9	Safe and faster PX implementation pathways (SafePX)	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
10	Administration	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
Total		kr. 46.468.000	kr. 11.986.213	kr. 22.345.121	kr. 11.642.771	kr. 493.896	kr.	-	-

Work package number and name		Industrial research							
		Total	2022	2023	2024	2025	2026	2027	2028
1	Competitive Electrolyzer Converters (ComEiCo)	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
2	Ensuring competitiveness on ammonia production through flexible ammonia plants and low-cost electrolysis (COMPAS)	kr. 19.225.402	kr. 4.806.351	kr. 9.612.700	kr. 4.806.351	-	-	-	-
3	Digitalization and Test for Dynamic and Flexible Operation of PX Components and Systems (DynFlex)	kr. 33.633.334	kr. 5.507.336	kr. 12.097.331	kr. 10.300.333	kr. 5.728.334	-	-	-
4	Green H2 and MeOH in DK - realizing cost leadership and scalability (GREMEOH)	kr. 9.187.444	kr. 1.359.065	kr. 4.978.788	kr. 2.849.592	-	-	-	-
5	HyFueling HD (HyFuel)	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
6	Engaging communities in the green fuels transition (LexHorsbol)	kr. -	kr. -	kr. -	kr. -	kr. -	-	-	-
7	Methanol-to-jet fuel process development (MJ fuel process development)	kr. 47.399.725	kr. 3.182.337	kr. 17.531.305	kr. 25.969.548	kr. 716.535	-	-	-
8	PX Sector Coupling and LCA (PX-LCA)	kr. 7.670.002	kr. 1.273.531	kr. 3.728.513	kr. 2.667.957	-	-	-	-
9	Safe and faster PX implementation pathways (SafePX)	kr. 11.815.000	kr. 1.495.876	kr. 5.919.500	kr. 4.399.624	-	-	-	-
10	Administration	kr. 3.000.000	kr. 2.560.000	kr. 440.000	kr. -	kr. -	-	-	-
Total		kr. 131.930.906	kr. 20.184.495	kr. 54.308.136	kr. 50.993.406	kr. 6.444.869	kr.	-	-

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DynElectro

The company's CVR-number:
(or similar identification number if a foreign entity) 40036326

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: DynFlex

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

15-06-2022

Date



Signature

Name and position of the signatory: Karsten Klemens Hansen, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 - 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 - 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DynElectro

The company's CVR-number:
(or similar identification number if a
foreign entity) 40036326

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: DynFlex

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

15-06-2022

Date



Signature

Name and position of the signatory:

Karsten Klemens Hansen, CEO

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: xxxxxx

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DynElectro

The company's CVR-number:
(or similar identification number if a foreign entity) 40036326

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: DynFlex

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2021
Number of employees in the enterprise (full time employees on an annual basis)	6
Annual turnover (State DKK or Euro)	-2.300.000 DKK
Balance sum (State DKK or € - euro)	1.000.000 DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	NO

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

15-06-2022

Date



Signature

Name and position of the signatory:

Karsten Klemens Hansen, CEO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: xxxxxx

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Naboskab ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) 40814280

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

20.06.2022

Date



Signature

Name and position of the signatory:

Kristoffer Ravnbøl, director and partner

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **xxxxxx**

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Naboskab ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) 40814280

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

20.06.2022

Date



Signature

Name and position of the signatory: Kristoffer Ravnbøl, Director and partner

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Naboskab ApS

The company's CVR-number:
(or similar identification number if a foreign entity) 40814280

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	01.01.2021 – 31.12.2021
Number of employees in the enterprise (full time employees on an annual basis)	10
Annual turnover (State DKK or Euro)	3,8 mio DKK
Balance sum (State DKK or € - euro)	1,5 mio DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

20.06.2022

Date



Signature

Name and position of the signatory: Kristoffer Ravnboel, Director and partner

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: **XXXXXX**

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Everfuel A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) DK 38456695

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

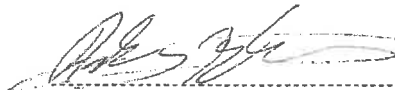
Project's acronym: 1150-00001A

IFD file number: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10/6-2022

Date



Signature

Name and position of the signatory: Anders Bertelsen, CFO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Everfuel A/S

The company's CVR-number:
(or similar identification number if a foreign entity) DK 38456695

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: 1150-00001A

IFD file number: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	Everfuel Annual Report 2021
Number of employees in the enterprise (full time employees on an annual basis)	36
Annual turnover (State DKK or Euro)	€ 193,000
Balance sum (State DKK or € - euro)	€ 83,792,000
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	YES
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

10/06-2022

Date



Signature

Name and position of the signatory:

Anders Bertelsen, CFO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: European Energy A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 18351331

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

09-Jun-2022

Date



Signature

Name and position of the signatory:

Knud Erik Andersen, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **xxxxxx**

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: European Energy A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 18351331

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

09-Jun-2022

Date



Signature

Name and position of the signatory:

Knud Erik Andersen, CEO

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Copenhagen Airports A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 14 70 72 04

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry – MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10/6-2022
Date


Signature

Name and position of the signatory: Jesper Jacobsen, Head of Sustainability Development

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: XXXXXX

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: EWII Energi A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 20810440

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry
- MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10.06.2022

Date

Signature



Name and position of the signatory:

Olaf Bjørn Spliid, Direktør

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **xxxxxx**

page 2 of 3

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

SAS AB

The company's CVR-number:
(or similar identification number if a
foreign entity)

55 66 06 - 8499

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

Methanol-to-Jet fuel process development

IFD file number:

1150 - 0000 7A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

8 June 2022

Date



Signature

Name and position of the signatory:

Ann-Sophie Hørlin

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

SAS AB

The company's CVR-number:
(or similar identification number if a
foreign entity)

55 66 06 - 8499

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

Methanol-to-Jet fuel process development

IFD file number:

1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

8 June 2022

Date



Signature

Name and position of the signatory:

Ann-Sophie Herlin

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: xxxxxx

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DBI – The Danish Institute of Fire and Security Technology

The company's CVR-number:
(or similar identification number if a foreign entity) 65 19 68 16

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

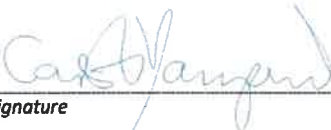
Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

June 8th, 2022

Date



Signature

Name and position of the signatory:

Carsten Damgaard, R&D director

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DBI – The Danish Institute of Fire and Security Technology

The company's CVR-number:
(or similar identification number if a foreign entity) 65 19 68 16

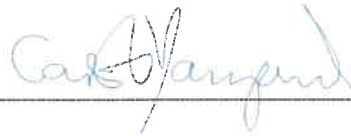
and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

June 8th, 2022
Date



Signature

Name and position of the signatory: Carsten Damgaard, R&D director

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: 1150-00001A

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DBI – The Danish Institute of Fire and Security Technology

The company's CVR-number:
(or similar identification number if a foreign entity) 65 19 68 16

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

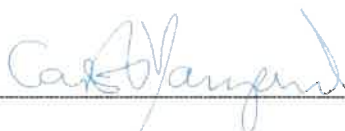
The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	1 June 2022 – 31 May 2027
Number of employees in the enterprise (full time employees on an annual basis)	250
Annual turnover (State DKK or Euro)	250.894.654 DKK
Balance sum (State DKK or € - euro)	211.715.808 DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	-

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

June 8th, 2022
Date


Signature

Name and position of the signatory: Carsten Damgaard, R&D director

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: 1150-00001A

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

SKOVGAARD ENERGY APS

The company's CVR-number:
(or similar identification number if a foreign entity)

24205371

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

MISSION GREEN FUELS

IFD file number:

1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

9/6-2022

Date


Signature

Name and position of the signatory:

MANAGING DIRECTOR

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

SKOVGAARD ENERGY APS

The company's CVR-number:
(or similar Identification number if a
foreign entity)

24205371

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

MISSION GREENFUELS


IFD file number:

1150 - 00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

9/6 - 2022

Date



Signature

Name and position of the signatory:

MANAGING DIRECTOR

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: xxxxxx

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Skovgaard Energy A/S

The company's CVR-number:
(or similar identification number if a foreign entity)

24205371

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

MISSION GREENFUELS

IFD file number:

1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)		1/1-2020 - 31/12-2020
Number of employees in the enterprise (full time employees on an annual basis)		9
Annual turnover (State DKK or Euro)	DKK	102.743.376
Balance sum (State DKK or € - euro)	DKK	1.246.121.499
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO		Yes
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO		Yes

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

9/6-2022

Date

[Signature]

Signature

Name and position of the signatory:

MANAGING DIRECTOR

References:

The European Commission's recommendation of 6 May 2003 (2003/361/EC)

Please see EUs User guide to the SME definition

Commission's Regulation (EC) No. 651/2014 of 17 June 2014

File number: xxxxxx

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Danish Standards Foundation/
Fonden Dansk Standard

The company's CVR-number:
(or similar identification number if a
foreign entity)

11733212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Innomission II: Green Fuels in Transport and Indus-
try (Power-to-X, etc.) MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

09 June 2022

Date



Signature

Name and position of the signatory:

Jens Heiede, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **XXXXXX**

page 2 of 5

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Danish Standards Foundation/
Fonden Dansk Standard

The company's CVR-number:
(or similar identification number if a foreign entity) 11733212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Innomission II: Green Fuels in Transport and Industry (Power-to-X, etc.) MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2021
Number of employees in the enterprise (full time employees on an annual basis)	150
Annual turnover (State DKK or Euro)	176,1 mio. Dkk
Balance sum (State DKK or € - euro)	168,1 mio. Dkk
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

09 June 2022

Date

Signature

Name and position of the signatory:

Jens Heiede, CEO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: xxxxxx

page 4 of 5

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: EMD International A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 27491529

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10-06-2022

Date


Signature

Name and position of the signatory: Anders N. Andersen, Head of R&D, EMD International A/S

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: EMD International A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 27491529

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

10-06-2022

Date



Signature

Name and position of the signatory: Anders N. Andersen, Head of R&D, EMD International A/S

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: EMD International A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 27491529

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	
Number of employees in the enterprise (full time employees on an annual basis)	39
Annual turnover (State DKK or Euro) 2021	47.419.070 DKK
Balance sum (State DKK or € - euro) 2021	41.308.029 DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	YES
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

10-06-2022

Date



Signature

Name and position of the signatory: Anders N. Andersen, Head of R&D, EMD International A/S

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: 1150-00001A

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: SkyNRG

The company's CVR-number:
(or similar identification number if a foreign entity) NL KVK number: 50242423

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry – MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

6/9/2022

Date

DocuSigned by:

Maarten van Dijk

7D5355C1387D421...

Signature

Maarten van Dijk

Chief Development Officer

Name and position of the signatory:

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: SkyNRG

The company's CVR-number:
(or similar identification number if a foreign entity) NL KVK number: 50242423

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry – MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	01-Jan-2021 to 31-Dec-2021
Number of employees in the enterprise (full time employees on an annual basis)	37
Annual turnover (State DKK or Euro)	€ 6.034.947
Balance sum (State DKK or € - euro)	€ 10.865.195
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

6/9/2022

Date

Name and position of the signatory:

DocuSigned by:

Maarten van Dijk

7D5355C1387D421

Signature

Maarten van Dijk

Chief Development Officer

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Green Hydrogen Systems A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 30548701

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

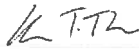
Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10/06/2022

Date



Signature

Name and position of the signatory:

Sebastian Koks Andreassen, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energy Cluster Denmark

The company's CVR-number:
(or similar identification number if a foreign entity) 41343788

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014



8. juni 2022

Date

Signature

Name and position of the signatory: Glenda Napier, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energy Cluster Denmark

The company's CVR-number:
(or similar identification number if a foreign entity) 41343788

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2021
Number of employees in the enterprise (full time employees on an annual basis)	35
Annual turnover (State DKK or Euro)	32,5 mio. DKK
Balance sum (State DKK or € - euro)	42,0 mio. DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)



8. juni 2022

Date

Signature

Name and position of the signatory: Glenda Napier, CEO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: xxxxxx

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Haldor Topsøe A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 41853816

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry – MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

09/06/2022

Date



Signature

Name and position of the signatory:

Eva Nymark, Senior Legal Counsel

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA Interest coverage ratio has been below 1,0.

File number: xxxxxx

page 1 of 1

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Topsoe

The company's CVR-number:
(or similar identification number if a
foreign entity) 41853816

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

8/6-22
Date

Klaus Knudsen
Signature

Name and position of the signatory: Chief Strategy & Innovation Officer

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA Interest coverage ratio has been below 1,0.

File number: **XXXXXX**

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Topsoe

The company's CVR-number:
(or similar identification number if a
foreign entity) 41853816

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

8/6-22
Date

Kenn Kunder
Signature

Name and position of the signatory: Chief Strategy & Innovation OfficerP

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Danfoss A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 20165715

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

9 JUNE 2022
Date



Signature

Name and position of the signatory:

THOMAS AUERBACH, HEAD OF DANFOSS FINANCE FUNCTIONS

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

Classified as Business

File number: xxxxxx

page 2 of 4

Innovation Fund Denmark

Europahuset, Europaplads 2, 4. sal
8000 Århus

Innovationsfonden.dk

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Danfoss Drives A/s

The company's CVR-number:
(or similar identification number if a foreign entity)

19883876

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IM2 - Mission Green Fuels

IFD file number:

1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

18.06.2022

Date



Signature

Name and position of the signatory:

VESA LAASI
SEGMENT PRESIDENT

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- In the case of an undertaking that is not an SME, where, for the past two years:
 - the undertaking's book debt to equity ratio has been greater than 7,5 and
 - the undertaking's EBITDA interest coverage ratio has been below 1,0.

Classified as Business

File number: xxxxxx

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Vestas Wind Systems A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 10403782

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2 Green Fuels in Transport and Industry (MissionGreenFuels)

IFD file number: _____

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

15/6-'22
Date

Kristian B. Grønbjerg
Signature

Name and position of the signatory:

Finance Director, Vestas

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: XXXXXX

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Nei Hydrogen A/S

The company's CVR-number:
(or similar identification number if a foreign entity) DK 26933048

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: 1150-00001A

IFD file number: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10/6-2022

Date



Signature

Name and position of the signatory: ROBERT BORIN SUP FUELING

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

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- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

FREDERICIA KOMMUNE

The company's CVR-number:
(or similar identification number if a
foreign entity)

69116418

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

INNOMISSION MISSION GREEN FUELS

IFD file number:

1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

14/6-2022

Date

Anja Schauburg

Signature

Name and position of the signatory:

ANJA SCHAUBURG, SEKRETARIATSCHEF

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

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- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Nordic Foliocenter for Renewable Energy

The company's CVR-number:
(or similar identification number if a foreign entity)

7229 1212

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10. juni 2022

Date

Jane Fromme

Signature

Name and position of the signatory:

director

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Nordic Folkecenter for Renewable Energy

The company's CVR-number:
(or similar identification number if a
foreign entity)

7229 1212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

10. juni 2022
Date

Signature

Jane Knudsen
Director

Name and position of the signatory:

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: xxxxxx

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Nordic Folkecenter for Renewable Energy

The company's CVR-number:
(or similar identification number if a foreign entity)

72291212

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	
Number of employees in the enterprise (full time employees on an annual basis)	
Annual turnover (State DKK or Euro)	
Balance sum (State DKK or € - euro)	
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

10. juni 2022

Date

Signature

Jane Romme
director

Name and position of the signatory:

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: xxxxxx

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energinet

The company's CVR-number:
(or similar identification number if a
foreign entity) 28980671

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

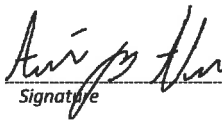
Project's acronym: MissionGreenFuels

IFD file number: 1150-0001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

13-06-2022

Date



Signature

Name and position of the signatory:

André Bryde Alnor, Senior Manager

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energinet

The company's CVR-number:
(or similar identification number if a
foreign entity) 28980671

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-0001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

13/06-2022
Date


Signature

Name and position of the signatory: André Bryde Alnor, Senior Manager

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Ea Energy Analyses A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 28 98 58 27

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

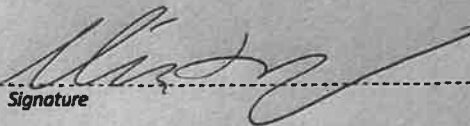
Project's acronym: MissionGreenFields

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

14.6.2022

Date



Signature

Name and position of
the signatory:

Mikael Togeby, Partner, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

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- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: ~~XXXXXX~~

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Ea Energy Analyses A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 28 98 58 27

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

14.6.2022

Date



Signature

Name and position of the signatory: Mikael Tøgeby, Partner, CEO 14.6.2022

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: ~~XXXXX~~

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: DFDS A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 14194711

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

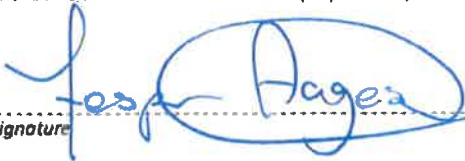
Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

14/06/2022

Date


Signature

Name and position of the signatory:

Jesper Aagesen – Director of Sustainable fleet projects

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

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- (e) In the case of an undertaking that is not an SME, where, for the past two years:
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 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: CI ETF I Hoest P/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 42533963

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

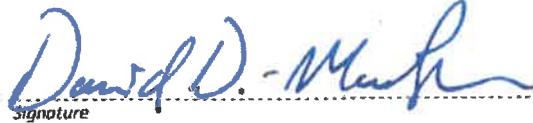
Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

10 June, 2022

Date


Signature

Name and position of the signatory:

David Dupont-Mouritzen, Project Director

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: 1150-00001A

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: CI ETF I Hoest P/S

The company's CVR-number:
(or similar identification number if a foreign entity) 42533963

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	1 Feb 2021 – 31 Dec 2022
Number of employees in the enterprise (full time employees on an annual basis)	0
Annual turnover (State DKK or Euro)	MEUR 25.9
Balance sum (State DKK or € - euro)	0
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	Yes
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	Yes

I, the undersigned, who is duly authorised by the above-mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

10 June, 2022

Date



Signature

Name and position of the signatory:

David Dupont-Mouritzen, Project Director

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: 1150-00001A

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Neste Oyj

The company's CVR-number:
(or similar identification number if a
foreign entity)

Business ID 1852302-9

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

Partnership for Green Fuels in Transport and
Industry – MissionGreenFuels

IFD file number:

1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

13.6.2022

Date

Name and position of the signatory:

DocuSigned by:

Outi Ervasti

Signature

Outi Ervasti,
VP Renewable H2
Neste

DocuSigned by:

Tuukka Kulha

Signature

Tuukka Kulha,
VP Innovation Excellence
Neste

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- In the case of an undertaking that is not an SME, where, for the past two years:
 - the undertaking's book debt to equity ratio has been greater than 7,5 and
 - the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Grundfos Holding A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 31858356

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Mission Green Fuels (IM2)

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10/6-2022
Date


Signature

Name and position of the signatory:

Carsten E. Pedersen
Director, District Energy

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Alexandra Institutttet A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 24 21 33 66

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

13.6.2022

Date



Signature

Name and position of the signatory: Martin Møller, CSO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **XXXXXX**

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: 2-control ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) 25293681

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuel (DYNFLEX)

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

13-06-2022
Date

S. Jørgensen
Signature

Name and position of the signatory: S. Jørgensen, CFO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: 2-control ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) 25293681

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuel (DYNFLEX)

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceeding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

13-06-2022

Date


Signature

Name and position of the signatory:

S. Jørgensen, CFO

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: 2-control ApS

The company's CVR-number:
(or similar identification number if a foreign entity) 25293681

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuel (DYNFLEX)

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2020-2021
Number of employees in the enterprise (full time employees on an annual basis)	4
Annual turnover (State DKK or Euro)	921.000 DKK
Balance sum (State DKK or € - euro)	1.293.000 DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	YES.
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

13-06-2022

Date


Signature

Name and position of the signatory:

S. Jørgensen, CFO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: xxxxxx

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: ENFOR A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 29421633

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry -
MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

08-06-2022

Date



Signature

Name and position of the signatory:

Mikkel Westenholz, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **xxxxxx**

page 1 of 3

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: ENFOR A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 29421633

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry -
MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

08-06-2022
Date


Signature

Name and position of the signatory: Mikkel Westenholz, CEO

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 2 of 3

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: ENFOR A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 29421633

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2021
Number of employees in the enterprise (full time employees on an annual basis)	12
Annual turnover (State DKK or Euro)	13 mio DKK
Balance sum (State DKK or € - euro)	7 mio DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	No
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

08-06-2022

Date


Signature

Name and position of the signatory:

Mikkel Westenholz, CEO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: **xxxxxx**

page 3 of 3

1-A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD)

The declaration concerns the company:

Name of the company:

NISA

The company's CVR number:
(or similar identification number if a
foreign entity)

35362789

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in "undertaking in difficulty" in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

10.06.2020

Date

Martin Porsgaard Nielsen

Signature

Name and position of the signatory:

Dir. Sustainable Aviation
Martin Porsgaard Nielsen

Instructions

Definition of "undertaking in difficulty" can be found in article 2, no. 18 | COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

"Undertaking in difficulty" means an undertaking in respect of which at least one of the following circumstances occur:

- (a) in the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediaries), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, "limited liability company" refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and "share capital" includes, where relevant, any share premium;
- (b) in the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediaries), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, "a company where at least some members have unlimited liability for the debt of the company" refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU;
- (c) where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors;
- (d) where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan;
- (e) in the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

1.C Declaration of SME status and declaration on state aid

(Fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grant Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD)

The declaration concerns the company:

Name of the company:

NISA

The company's CVR-number:
(or similar identification number if a foreign entity)

35362789

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	Calendar year 2021
Number of employees in the enterprise (full time employees on an annual basis)	3
Annual turnover (State DKK or Euro)	DKK 1.800.000
Balance sum (State DKK or Euro)	DKK 250.000
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	ASSOCIATED WITH FOREIGN MEMBERS
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	N.A.

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC)
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

10. 06. 2022
Date

Martin Porsgaard Nielsen
Signature

Name and position of the signatory:

Dir. Sustainable Aviation
Martin Porsgaard Nielsen

References:

The European Commission's recommendation of 6 May 2003 (2003/361/EC)

Please see EU's User guide to the SME definition

Commission's Regulation (EC) No. 651/2014 of 17 June 2014

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

Siemens Gamesa Renewable Energy A/S

The company's CVR-number:
(or similar identification number if a
foreign entity)

76486212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

Safe PtX

IFD file number:

1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

Brande, 8th of June 2022

Date

**Poul
Hansen**

Signature

Digital signatur af Poul Hansen
DN: cn=Poul Hansen, o=DK, ou=Siemens
Gamesa Renewable Energy A/S,
email=poul.hansen@siemensgamesa.com
SN: O=Poul Hansen, OU=Siemens Gamesa
Renewable Energy A/S,
E=poul.hansen@siemensgamesa.com, C=DK
Date: 2022.06.08 13:35:46 +0200

Name and position of the signatory:

Poul Hansen, Managing Director, Finance

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energinet Systemansvar A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 39314959

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

26-2022
Date

Bjarne Brendstrup
Name and position of the signatory:

SMR, DIRECTOR


Signature

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A
page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energinet Systemansvar A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 39314959

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry -
MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

9/6 - 2022
Date


Signature

Bjarne Brendstrup
Name and position of the signatory:
SMR. DIRIGATOR

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: 1150-00001A

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Maersk A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 32345794

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

8-6-2022
Date


Signature

Name and position of the signatory: Jacob Sterling, Senior Director

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **xxxxxx**

page 2 of 2

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Advanced Surface Plating ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) CVR-number 34589070


and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

7/6-2022
Date


Signature

Name and position of the signatory: CEO, Lars Pleth Nielsen

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Advanced Surface Plating ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) CVR-number 34589070

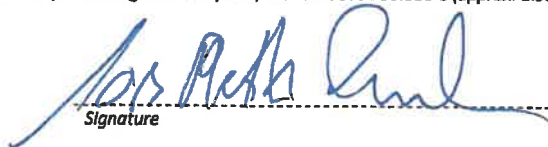
and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

7/6-2022
Date


Signature

Name and position of the signatory: CEO, Lars Pleth Nielsen

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?url=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Advanced Surface Plating ApS

The company's CVR-number:
(or similar identification number if a foreign entity) CVR-number 34589070

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

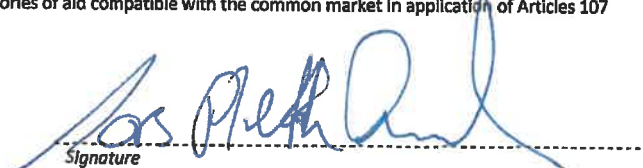
The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	3
Number of employees in the enterprise (full time employees on an annual basis)	3
Annual turnover (State DKK or Euro)	-534.853 Euro
Balance sum (State DKK or € - euro)	1.954.125 Euro
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	YES
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

7/6-2022
Date


Signature

Name and position of the signatory: CEO, Lars Pleth Nielsen

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: 1150-00001A

page 4 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Energy Modelling Lab ApS

The company's CVR-number:
(or similar identification number if a
foreign entity) 40941622

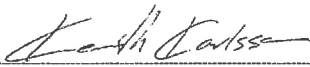
and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: PtX Sector Coupling and LCA

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceeding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

6/6-2022
Date


Signature

Name and position of the signatory: Kenneth Karlsson, Direktør

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **xxxxxx**

page 3 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Ørsted Hydrogen Green Fuels DK A/S

The company's CVR-number:
(or similar identification number if a
foreign entity) 41576863

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 I COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

8/6-2022
Date


Signature

Name and position of the signatory: Anders Christian Nordstrøm, Vice President COO P2X

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 I COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 1 of 1

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Aabenraa Havn

The company's CVR-number:
(or similar identification number if a
foreign entity) 24393968

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

8/6-2022

Date



Signature

Name and position of the signatory:

HenrikThykjær, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0

File number xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Aabenraa Havn

The company's CVR-number:
(or similar identification number if a
foreign entity) 24393968

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200 000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

8/6-2022

Date



Signature

Name and position of the signatory: HenrikThykjær, CEO

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/eli/reg/2013/1407/oj>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Aabenraa Havn

The company's CVR-number:
(or similar identification number if a foreign entity) 24393968

and concerns the signing of an investment agreement with Innovation Fund Denmark for the project:

Project's acronym: Partnership for Green Fuels in Transport and Industry - MissionGreenFuels

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated

Reference period (the accounts/the period, for which the information apply)	
Number of employees in the enterprise (full time employees on an annual basis)	
Annual turnover (State DKK or Euro)	
Balance sum (State DKK or € - euro)	
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

8/6-2022

Date

Signature

Name and position of the signatory:

HenrikThykjær, CEO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [link](#) page to the SME definition.

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: xxxxxx

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Rønne Havn A/S

The company's CVR-number:
(or similar identification number if a foreign entity) 27932150

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

28. juni 2022
Date

Max Hansen
Signature

Name and position of the signatory: Max Hansen, CEO
PORT OF ROENNE A/S
Fiskerivej 1
DK-3700 Rønne
Tlf. +45 5695 0678
www.portofroenne.com
SE-nr. 27932150

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- In the case of an undertaking that is not an SME, where, for the past two years:
 - the undertaking's book debt to equity ratio has been greater than 7,5 and
 - the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: **xxxxxx**

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

ENERGICENTER NORD

The company's CVR-number:
(or similar identification number if a
foreign entity)

2614 58 72

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

Date

Signature

Name and position of the signatory: _____

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 - 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 - 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: xxxxxx

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

ENERGICENTER NORD

The company's CVR-number:
(or similar identification number if a
foreign entity)

26145872

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

Date



Signature

Name and position of the signatory: _____

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

File number: **XXXXXX**

page 3 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

ENERGICWATER WORKS

The company's CVR-number:
(or similar identification number if a foreign entity)

26145872

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

IFD file number:

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	
Number of employees in the enterprise (full time employees on an annual basis)	
Annual turnover (State DKK or Euro)	
Balance sum (State DKK or € - euro)	
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

Date

Signature

Name and position of the signatory: _____

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: XXXXXX

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company:

ATV, Akademiet for de Tekniske Videnskaber, DALES

The company's CVR-number:
(or similar identification number if a
foreign entity)

16007870

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym:

MissionGreenFuels

IFD file number:

11500001B

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

June 30, 2022

Date

Anne Marie Dømgaard

Signature

Name and position of the signatory:

Anne Marie Dømgaard, sekretariatschef

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: XXXXXX

page 2 of 4

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: ATV, Akademiet for de Tekniske Videnskaber, **DACES**

The company's CVR-number:
(or similar identification number if a foreign entity) 16007870

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 115000001B

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	
Number of employees in the enterprise (full time employees on an annual basis)	
Annual turnover (State DKK or Euro)	
Balance sum (State DKK or € - euro)	
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

June 30, 2022

Date

Anne Marie Damgaard

Signature

Name and position of the signatory:

Anne Marie Damgaard, sekretariatschef

References:

The European Commission's recommendation of 6 May 2003 (2003/361/EC)

Please see EUs User guide to the SME definition

Commission's Regulation (EC) No. 651/2014 of 17 June 2014

File number: **XXXXXX**

page 4 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: Teknologisk Institut

The company's CVR-number:
(or similar identification number if a
foreign entity) 5697 6116


and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFields

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

13/7 2022
Date


Signature

Name and position of the signatory: Dorte Dalsgaard, Souschef økonomi

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: FORCE Technology

The company's CVR-number:
(or similar identification number if a
foreign entity) DK55117314

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: MissionGreenFuels

IFD file number: 1150-0001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

12.07.2022

Date

Signature



Name and position of the signatory:

Hanne Christensen, CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 1 of 1

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: CEMTEC / HYDROGEN VALLEY

The company's CVR-number:
(or similar identification number if a
foreign entity) 26263328

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2, MISSIONGREENFUELS

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

5/7-22

Date



Signature

Name and position of the signatory:

CEO

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

page 2 of 4

1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: CEMTEC / HYDROGEN VALLEY

The company's CVR-number:
(or similar identification number if a
foreign entity) 26263328

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2, MISSIONGREENFUELS

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

5/7-22

Date



Signature

Name and position of the signatory:

CEO

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: CEMTEC / HYDROGEN VALLEY

The company's CVR-number:
(or similar identification number if a foreign entity) 26263328

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2, MISSIONGREENFUELS

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2021
Number of employees in the enterprise (full time employees on an annual basis)	5
Annual turnover (State DKK or Euro)	6M DKK
Balance sum (State DKK or € - euro)	45M DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	NO
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	NO

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

5/7-22
Date


Signature

Name and position of the signatory:

CEO

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: 1150-00001A

page 4 of 4

Declarations

In addition to the agreement the company partners must fill in up to three of the following declarations:

1A) Declaration on status as 'not in difficulty', 1B) Declaration on De minimis rules of state funding, and 1C) Declaration on status as SME and state funding.

All companies must fill in 1A, companies that apply flat-rate in the budget fills in 1B, and all SME's fill in 1C.

1.A Declaration of status as an undertaking not in difficulty

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: PlanEnergi


The company's CVR-number:
(or similar identification number if a
foreign entity) 7403 8212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2MissionGreenFields

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the above company is not an "undertaking in difficulty" as defined in 'undertaking in difficulty' in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014

Date 2022.06.16 Signature 

Name and position of the signatory:
Per Alex Sørensen, Head of department

Instructions

Definition of 'undertaking in difficulty' can be found in article 2, no. 18 i COMMISSION REGULATION (EU) No. 651/2014 of 17 June 2014.

'Undertaking in difficulty' means an undertaking in respect of which at least one of the following circumstances occurs:

- (a) In the case of a limited liability company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its subscribed share capital has disappeared as a result of accumulated losses. This is the case when deduction of accumulated losses from reserves (and all other elements generally considered as part of the own funds of the company) leads to a negative cumulative amount that exceeds half of the subscribed share capital. For the purposes of this provision, 'limited liability company' refers in particular to the types of company mentioned in Annex I of Directive 2013/34/EU (1) and 'share capital' includes, where relevant, any share premium.
- (b) In the case of a company where at least some members have unlimited liability for the debt of the company (other than an SME that has been in existence for less than three years or, for the purposes of eligibility for risk finance aid, an SME within 7 years from its first commercial sale that qualifies for risk finance investments following due diligence by the selected financial intermediary), where more than half of its capital as shown in the company accounts has disappeared as a result of accumulated losses. For the purposes of this provision, 'a company where at least some members have unlimited liability for the debt of the company' refers in particular to the types of company mentioned in Annex II of Directive 2013/34/EU.
- (c) Where the undertaking is subject to collective insolvency proceedings or fulfils the criteria under its domestic law for being placed in collective insolvency proceedings at the request of its creditors.
- (d) Where the undertaking has received rescue aid and has not yet reimbursed the loan or terminated the guarantee, or has received restructuring aid and is still subject to a restructuring plan.
- (e) In the case of an undertaking that is not an SME, where, for the past two years:
 1. the undertaking's book debt to equity ratio has been greater than 7,5 and
 2. the undertaking's EBITDA interest coverage ratio has been below 1,0.

File number: 1150-00001A

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1.B Solemn declaration of the European Commission de minimis aid regulations

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: PlanEnergi


The company's CVR-number:
(or similar identification number if a
foreign entity) 7403 8212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2MissionGreenFields

IFD file number: 1150-00001A

I, the undersigned, who is duly authorised by the above mentioned company, declare that the company has not received other de minimis aid during the current financial year nor the two preceding financial years, that exceeds 200.000 € (approx. 1.500.000 Dkr.) including the grant that this declaration concerns.

Date 2022.06.16 Signature 

Name and position of the signatory:
Per Alex Sørensen, Head of department

Instructions

COMMISSION REGULATION (EU) No 1407/2013 of 18 December 2013 on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to *de minimis* aid as published in The Official Journal of the European Union: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32013R1407&from=EN>

This Regulation applies to aid granted to undertakings in all sectors, with the exception of undertakings active in the fishery and aquaculture sector, the primary production of agricultural products or undertakings that performs road freight transport for hire or reward. These shall apply actual salary costs as described in section 3.2 'Budgetary rules for enterprises in Denmark and abroad'

1.C Declaration of SME status and declaration on state aid

(fill in according to section 3.2 'Budgetary rules for enterprises in Denmark and abroad' in Grand Solutions Guidelines)

The completed form must be printed, dated and signed, then scanned and sent electronically to Innovation Fund Denmark (IFD).

The declaration concerns the company:

Name of the company: PlanEnergi

The company's CVR-number:
(or similar identification number if a foreign entity) 7403 8212

and concerns the signing of an Investment agreement with Innovation Fund Denmark for the project:

Project's acronym: IM2MissionGreenFields

IFD file number: 1150-00001A

The following information must relate to the last finished fiscal year and be calculated on a yearly basis. In case of a newly established company, with unfinished financial accounts, an accurate estimate based on the course of the present fiscal year must be calculated.

Reference period (the accounts/the period, for which the information apply)	2021
Number of employees in the enterprise (full time employees on an annual basis)	38
Annual turnover (State DKK or Euro)	28.224.373 DKK
Balance sum (State DKK or € - euro)	16.573.379 DKK
Is the enterprise jointly owned by or a linked or partner enterprise with other Danish or foreign companies (see EU rules below) – YES/NO	YES
If yes to the above question: Do the enterprises together fulfil the requirements of a maximum of 250 employees and a maximum of 50 million euros yearly annual turnover or a total yearly balance of no more than 43 million euros? – YES/NO	YES

I, the undersigned, who is duly authorised by the above mentioned company, declare

- that the above information is correct and that the company fulfils the conditions for being Small- and Medium-sized Enterprise as defined by the European Commission's recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises (2003/361/EC).
- that the company is aware of the regulations in the General block exemption Regulation (Commission's Regulation (EC) No. 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the common market in application of Articles 107 and 108 of the Treaty)

Date 2022.06.16

Signature 

Name and position of the signatory:
Per Alex Sørensen, Head of department

References:

[The European Commission's recommendation of 6 May 2003 \(2003/361/EC\)](#)

Please see EUs [User guide to the SME definition](#)

[Commission's Regulation \(EC\) No. 651/2014 of 17 June 2014](#)

File number: 1150-00001A

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Policies and terms for investment by IFD DK.

Grants from Danish public research councils and foundations are subject to the following policies and terms:

1) *“Project activities in the partnership must comply with the ‘Do no significant harm’-principle according to Technical Guidance (2021/C58/01, see: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218(01))), i.e. the activities should lead to no significant harm to environmental objectives within the meaning of Article 17 of the EU Taxonomy Regulation, and the activities must be in compliance with relevant EU and national environmental legislation.”*

2) Open Access policy for public research councils and foundations (attached)

3) Responsible research and innovation (attached)

4) Danish Code of Conduct for Research Integrity (attached)

Open Access policy for public research councils and foundations

In June 2012, the Danish Council for Independent Research, the Danish National Research Foundation, the Danish Council for Strategic Research, the Danish National Advanced Technology Foundation and the Danish Council for Technology and Innovation adopted their joint Open Access policy.

Research grants from The Danish Council for Independent Research (DFF), the Danish Council for Strategic Research, the Danish National Research Foundations, the Danish Advanced Technology Foundation, and the Danish Council for Technology and Innovation (in the following referred to as research councils and foundations) are essential for Danish and international research, innovation and economic growth.

Research furthers knowledge and drives the intellectual, social and economic development. Research councils and foundations find it important to strengthen the effect of research by ensuring free and cost-free digital access for everybody to state-financed research results. Open Access - i.e. access free of charge for everybody to read and use scientific information in digital form via the Internet - will improve the possibilities of a better utilisation of the most recent research results.

With this policy, research councils and foundations want to establish Open Access as the standard in scientific publishing. The aim is to ensure that all scientific articles, the quality of which has been assured by peer review and which have been published in a scientific magazine, can be read and distributed without any financial, technical or legal restrictions.

[Open Access Policy for Public Sector Research Council and Foundations of 21 June 2012](#)

[Contact letter to publisher](#)

[Addendum to Publication Agreement](#)

With this policy, research councils and foundations also want to make sure that the researchers will get a better foothold regarding copyright for their own articles in connection with scientific publication.

Furthermore, research councils and foundations have adopted the Berlin *Declaration on Open Access to Knowledge in the Sciences and Humanities*, which is a milestone in the definition of and work with Open Access.

Requirements for the grant holder

The grant holder is - if the magazine allows it - requested to parallel-publish a digital version of the final, peer-reviewed scientific article which has been accepted by a scientific magazine. The article which is a result of full or part financing by research councils and foundations must be parallel-published in an institutional or subject-specific repository, i.e. a digital archive.

The parallel publishing of the scientific article can - at the request of the magazine - take place after an embargo period, i.e. a period in which the article is only available in the scientific magazine, of up to six or twelve months after publication in the scientific magazine. The waiting periods for the specific research areas must be as follows:

- Health science - 6 months
- Natural science - 6 months
- Engineering science - 6 months
- Agricultural and veterinarian science - 6 months
- Social science - 12 months
- The humanities - 12 months

The final, peer-reviewed scientific article which is subject to parallel publication must include all graphic and other materials prepared for the article. Research data shall be excepted.

The grant holder is responsible for making sure that relevant publication or copyright agreements with publishers are in accordance with the conditions for grants laid down by research councils and foundations in connection with parallel publication.

Such conditions shall be observed according to current copyright rules.

Which types of publication are included?

through peer review.

This means that the request for parallel publication does *not* include:

monographs

anthologies

books

popular science articles, i.e. articles processed by journalists without quality assurance through peer review.

What does this mean for the grant holder?

For the grant holder, this policy means:

I. that the grant holder must in connection with acceptance of an article for publication in a scientific magazine try to maintain the rights to parallel-publish an edition of the peer-reviewed and accepted scientific article.

How?

This can be done by using the draft letter and appendix for publication agreement for publishers/magazines which are available on the websites of research councils and foundations in Danish and English.

If the publishers accept the request, the grant holder maintains a non-exclusive and non-commercial right to publish his/her own scientific articles.

The above request for publishing via Open Access can also be met by publication by the grant holder directly in an Open Access magazine (complete or hybrid).

Research councils and foundations find it important that the grant holder should not compromise on the quality of the magazine in which he/she wants to publish. They are therefore recommended only to publish in an Open Access magazine if the profession finds that such a magazine exists at a high, well-reputed quality level.

II. that the grant holder ensures in connection with publication - possibly after the waiting period - that the article is parallel-published in an institutional or subject-specific repository.

library at the relevant institution or the responsible operator of the subject-specific digital archive.

III. that in connection with reporting to research councils and foundations, the grant holder will in the reporting form state links to the scientific publications subject to parallel-publication in Open Access as a consequence of full or part financing.

How?

The electronic form for reporting, links to the scientific articles published in Open Access must be stated (possibly with indication of the embargo period, if the waiting period had not ended on reporting).

If articles are as a consequence of full or part financing by research councils and foundations published in Open Access after the final reporting, a revised form must be forwarded, stating such articles with links.

Evaluation of the policy

No later than two years after the publication of this policy, it will be evaluated with a view to a discussion of the need to revise the policy.

[Contact letter to publishers](#)

[Addendum to publication agreement](#)

Open Acces Policy for Public Sector Research Council and Foundations of 21 June2012Contact letter to publisherAddendum to Publication Agreement

last modified Jun 12, 2015

News from the Ministry

[@UFM_UDD](#)

[@UFM_FI](#)

This is the joint website for the Danish Ministry of Higher Education and Science.

The website includes the Ministry/the Department, Danish Agency for Science, Technology and Innovation and Danish Agency for Higher Education.

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Requirements for responsible research and innovation

Responsible Research and Innovation (RRI) within Innovation Fund Denmark.

R
R



Aims to strengthen the links between research & innovation processes and results and societal values and needs.

Innovation Fund Denmark strives to advance RRI in both its overall strategies and via its projects and the Fund adheres to the European Commission's definition and implementation of RRI.

We have designed our investment types and evaluation criteria in such a way as to encourage projects to focus on 'societal commitment' and 'research training'. To that end, projects are specifically encouraged to:

- Involve all relevant stakeholders and institutions in the research and innovation process
- Cultivate a keen focus on future users
- Engage in formal and informal cross-institutional research training

By involving all relevant stakeholders in the research and innovation process projects may potentially create more sustainable and long-term results. And by making formal and informal research training an integral part of the projects, they will not only generate research and innovation results, but also train the next generation of researchers.

Mere om RRI

Læs mere om RRI på følgende sider:

RRI Tools

RRI Tools formål er at opbygge et bedre forhold mellem videnskab og samfund.

HORIZON 2020

HORIZON 2020 er EU's rammeprogram for forskning og innovation.

ResAGorA

Res-agera består af 8 europæiske partnere fra universiteter og organisationer indenfor videnskab og teknologi.

Newsletter

Get the latest news from Innovation Fund Denmark

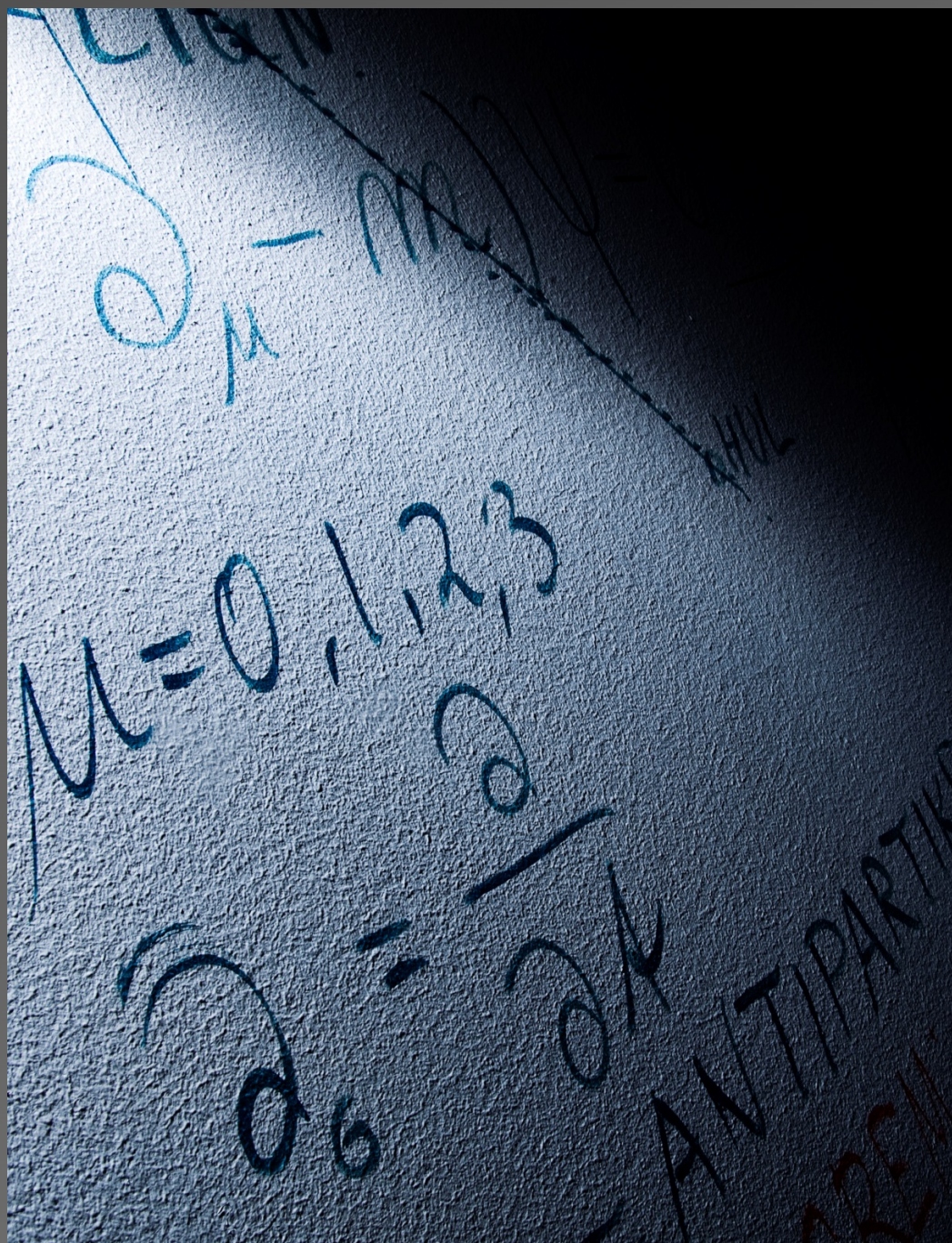
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Danish Code of Conduct for Research Integrity

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Foreword

Research and research-based education is of central and increasing importance in developing society's knowledge base, increasing welfare and providing informed answers to local and global challenges.

This is why we invest heavily in high-quality research and education. All this happens in a continually more complex and demanding interdisciplinary and internationalised research community.

To support high-quality research we must strive for trustworthiness and high integrity in research. At the same time we must respect the basic principle of freedom of research, which enables us to support a climate where new views and understandings (including those that are critical and possibly controversial) can be put forward. Freedom of research implies the right to freely define research questions, choose and develop theories, gather empirical material and employ appropriate methods.

Honesty, transparency, and accountability should pervade all phases of the research process, as failure to respect these basic principles jeopardises the integrity of research to an extent that may threaten the freedom of research. Researchers and institutions should be aware of their responsibilities to the research community, to the funders of research activities and to society at large.

Over the past few years international guidelines and recommendations aimed at promoting research integrity have been developed. Three widely acknowledged documents are of particular importance:

- The Singapore Statement on Research Integrity (developed at the 2nd World Conference on Research Integrity in 2010)
- The Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations (developed at the 3rd World Conference on Research Integrity in 2013)
- The European Code of Conduct for Research Integrity (developed by the European Science Foundation and All European Academies in 2011)

These international guidelines recommend that all research institutions continuously support high integrity in their research. We must do the same in Denmark by promoting research integrity at the national and institutional level in accordance with these international documents.

The Danish Code of Conduct for Research Integrity provides the research community with a framework to promote commonly agreed principles and standards. The Code of Conduct aims to support a common understanding and common culture of research integrity in Denmark.

Based on three basic principles of research integrity, i.e. honesty, transparency, and accountability, the Code presents a set of six commonly accepted standards on responsible conduct of research, a set of guidelines on teaching, training, and supervision, and, finally, a set of guidelines on how to respond to breaches of responsible conduct of research. Together, these elements are intended as guidance tools for researchers in their day-to-day work. Furthermore, the Code pro-

vides a common foundation upon which institutions are encouraged to further develop policies and procedures for promoting research integrity within all fields of research.

The Danish Code of Conduct for Research Integrity is not a legally binding document in itself. The Code will only gain full impact when researchers adhere to the document and when public and private research institutions integrate the document in their institutional framework.

The Code embraces all fields of research, while acknowledging the fact that the applicability of the standards for responsible conduct of research may differ between various fields of research. This implies that some recommendations may be more relevant for a specific field of research and at the same time be less applicable to others. The recommendations of the Code should always be understood in accordance with established practices predominant within the individual fields of research.

The Code was drafted by a working group established in 2013 by the Ministry of Higher Education and Science and the organisation Universities Denmark. The working group comprised representatives from all eight Danish universities, the Sector Research Institutes of Denmark, the Danish Council for Independent Research and the Danish Council for Strategic Research. As part of the development of the Code, it was sent to public consultation and discussed at a conference in May 2014.

I. Principles of Research Integrity

The Danish Code of Conduct for Research Integrity rests on three basic principles that should pervade all phases of research.

Honesty

To ensure the trustworthiness of research, researchers should be **honest** when reporting objectives, methods, data, analysis, results, conclusions, etc.

This requires accurate and balanced reporting when:

- presenting and interpreting research
- making claims based on findings
- acknowledging the work of other researchers
- applying for research funding
- reviewing and evaluating research

Transparency

To ensure the credibility of scientific reasoning and to ensure that academic reflection is consistent with practice in the relevant field of research, all phases of research should be **transparent**.

This requires openness when reporting:

- conflicts of interest
- planning of research
- research methods applied
- results and conclusions

Accountability

To ensure the reliability of research, all parties involved should be **accountable** for the research carried out.

This requires that researchers and institutions accept responsibility for the research they are conducting, in terms of:

- accuracy and reliability of research results
- adherence to all relevant regulations
- fostering and maintaining a culture of research integrity through teaching, training, and supervision
- taking appropriate measures when dealing with breaches of responsible conduct of research

II. Responsible Conduct of Research

Responsible conduct of research requires that everyone involved in the research process follows high standards for conducting research. Such standards cover a wide variety of subjects – from proper collection and management of data to the dissemination of research results.

The six standards for responsible conduct of research in the Code of Conduct are recommendations, i.e. they are not *per se* legally binding regulations.

The standards embrace all fields of research. Accordingly, some of the recommendations may not be equally relevant for all fields of research. Neither do they represent an exhaustive list of how to carry out research in every detail. Thus, the standards are meant to be further developed by institutions in accordance with specific practices predominant within the individual field of research.

The standards are based on already commonly agreed practices. They are intended to help researchers and institutions to promote integrity in their research. Widespread adoption of the standards will support a common ground for how responsible research is carried out in Denmark.

The Danish Code of Conduct for Research Integrity addresses six basic standards for conducting research:

1. Research planning and conduct
2. Data management
3. Publication and communication
4. Authorship
5. Collaborative research
6. Conflicts of interest

It is recommended that further specification, policies and procedures are developed at the institutional level. It is specifically recommended that institutions take responsibility for continually informing their research staff about policies and procedures that are in place at the institution.

Researchers and institutions should also be aware of co-existing and legally binding regulations that have an impact on research, e.g. regulation on processing of personal data, intellectual property rights, ethics reviews, etc.

1. Research planning and conduct

Conscientious planning and conduct of research are essential prerequisites for responsible conduct of research, and consequently fundamental to ensuring transparent and credible research. This applies to all fields of research, regardless of the fact that research methods are as varied as the fields of research.

Responsible conduct of research applies throughout the research process, from planning of research to reporting of results.

DEFINITIONS

Research strategies, plans and protocols are types of planning tools for how research could be carried out. The form, content and implementation of these tools are decided by the field of research in question and thus may vary across different disciplines.

1.1. Responsibilities

- i. The design, collection of data, and conduct of the intended research should be planned in a manner consistent with practices within the field of research in question. This could entail application of a research planning tool, e.g. a research strategy, plan, protocol or other tools.
- ii. Research should be documented in a manner consistent with practices in the field of research in question, e.g. by keeping records, logbooks, journals or similar practices – if possible with dates and entries by the person(s) responsible for the conduct of the research. To the extent possible, the documentation should allow the research to be examined and – when relevant – reproduced.

1.2. Division of responsibilities

- i. **Researchers** are responsible for planning and conducting their research.
- ii. Throughout the research, **researchers** should conduct assessments to determine if there are particular issues requiring permits, approvals, etc., e.g. approval from an ethics committee or an institutional review board.
- iii. **Researchers** should not enter into agreements (e.g. with funders or others) that limit their access to their own data and their ability to analyse and publish these data independently, unless such access limitations can be justified by the specific circumstances.

- iv. **Institutions** should maintain relevant policies for the proper management of research planning and conduct and for the procedures regarding necessary approvals and permits.

2. Data management

Responsible conduct of research includes proper management of primary materials and data. The key purpose of data management is to guarantee credible and transparent research.

DEFINITIONS

Primary material is any material (e.g. biological material, notes, interviews, texts and literature, digital raw data, recordings, etc.) that forms the basis of the research.

Data are detailed records of the primary materials that comprise the basis for the analysis that generates the results.

2.1. Responsibilities

- i. Primary materials and data should be retained, stored and managed in a clear and accurate form that allows the result to be assessed, the procedures to be retraced and – when relevant and applicable – the research to be reproduced. The extent to which primary materials and data are retained and the recommended retaining period should always be determined by the current practices applicable to the specific field of research. However, data should in general be kept for a period of at least five years from the date of publication.
- ii. The data records should enable identification of persons having conducted the research and persons or institutions with responsibility for the primary materials, data, and research results. The data records should contain a precise and traceable reference to the source. Any changes to the primary materials or data stored should be clearly accounted for in a way that allows clear identification of the changes made.

2.2. Division of responsibilities

- i. **Researchers** are responsible for storing their primary materials and data.
- ii. **Researchers** are – unless otherwise regulated – responsible for deciding the extent to and duration for which primary material is to be retained. When deciding this, **researchers** should consider the value of the primary materials for assessing the results of the research and the physical and technical possibility of storage at the institution.

- iii. **Institutions** should maintain a policy on the retention of primary materials and data that includes information on:
 - a. Storage of primary materials and data
 - b. Secure and safe disposal of primary materials and data after the retention period
 - c. Responsibility for and access to primary materials and data
 - d. Data retention, accessibility and ownership when researchers leave the institution
- iv. **Institutions** are responsible for providing secure data storage facilities that are consistent with confidentiality requirements and applicable regulations and guidelines, e.g. on the processing of personal data.
- v. **Institutions** should allow access to the stored primary materials and data, except when this is in conflict with contractual legal obligations or current regulations on for example ethical, confidentiality or privacy matters or intellectual property rights.

3. Publication and communication

Publication and communication are essential for enabling the research community to scrutinize and discuss research results. Thus, researchers have a right and an obligation to publish and communicate their results to the research community, to professional practitioners, and to society at large.

Research can be communicated through various channels ranging from strictly professional contexts aimed at peers to more popular research communication aimed at a broader audience. Although form, expression and level of detail may differ according to channels employed and audiences addressed, the standards for responsible conduct of research should always be respected when communicating research.

DEFINITIONS

Publication is the process of reporting research and research results to the research community through articles, reports, etc. in periodicals, journals or other academic media.

Communication is the broad concept of conveying information to society at large in any form of media.

3.1. Responsibilities

- i. Research results should be published in an honest, transparent, and accurate manner.

- ii. Publishing the same results in more than one publication should only occur under particular, clearly explained and fully disclosed circumstances.
- iii. Recycling or re-use of primary materials, data, interpretations or results should be clearly disclosed.
- iv. If access to and analysis of all data are subject to limitations, this should be declared in a clear manner to the readers of the publication. Detailed information about any role of the study sponsor concerning research design, collection, analysis and interpretation of data, and publication decisions should be provided in the manuscript.
- v. When using one's own work and the work of other researchers in a publication, appropriate and accurate references to such work should be provided.
- vi. The right of researchers to unrestricted publication of their research should be respected.

3.2. Division of responsibilities

- i. **Researchers** are responsible for publishing and communicating their research.
- ii. **Researchers** are responsible for ensuring adequate reference to the work of others.
- iii. **Researchers** are responsible for ensuring that omission of research results is justified and documented and that data used in the publication are reliable.
- iv. **Researchers acting as peer reviewers and editors** should carry out their review and editorial obligations in an honest and unbiased manner.
- v. **Institutions** should promote and maintain an environment that supports honesty, transparency, and accuracy when disseminating research findings, e.g. through policies and training relating to publication and communication.
- vi. **Institutions** should ensure that sponsors and other funders of research fully respect the duty of researchers to publish research and research results honestly, transparently, and accurately.

4. Authorship

Authorship has important academic, social, and financial implications as it plays an important part in the recognition and status of research and researchers.

Fair attribution of authorship – and appropriate acknowledgement of contributions that do not meet the criteria for authorship – contributes to the transparency and credibility of research, and is thus a key requirement in upholding responsible conduct of research.

DEFINITIONS

An *author* is anyone listed as an originator of a research publication.

4.1. Responsibilities

- i. Attribution of authorship should in general be based on criteria a-d adopted from the Vancouver guidelines¹, and all individuals who meet these criteria should be recognised as authors:
 - a. Substantial contributions to the conception or design of the work, or the acquisition, analysis, or interpretation of data for the work, *and*
 - b. drafting the work or revising it critically for important intellectual content, *and*
 - c. final approval of the version to be published, *and*
 - d. agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- ii. In addition to being accountable for the parts of the work he or she has done, an author should be able to identify which co-authors are responsible for other specific parts of the work.
- iii. The criteria for authorship should not be used to exclude persons who otherwise meet authorship criteria, and therefore persons who meet criterion 'a' should be given the opportunity to meet criteria b-d.
- iv. Authors have a right to decline authorship, e.g. if they disagree with (part of) the methodology or conclusions in the publication. However, substantial contributions to the work should always be disclosed, e.g. as acknowledgements.

¹ International Committee of Medical Journal Editors – Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals, Updated December 2013.

- v. Important work and intellectual contributions of others that have influenced the reported research but do not meet the criteria for authorship should be appropriately acknowledged.
- vi. Participation solely in the acquisition of funding, in the collection of data, or in general supervision of the research group does not justify authorship.
- vii. If authorship is by a group name, all members of the group should fully meet the criteria for claiming authorship.
- viii. Guest authorship (i.e. listing authors who do not qualify as such) or ghost authorship (i.e. omitting individuals who should have been listed as authors) should not take place.
- ix. Decisions concerning publication and authorship should be agreed on jointly and should be communicated to all members of the research team. Any alterations to manuscripts after submission should be approved by all authors.
- x. All authors are responsible for the content of the publication. However, the responsibility of each author should be assessed subject to their individual role in the research by considering their area of expertise, their experience and seniority, a possible supervisory role, and other relevant factors. Thus, in some cases an author may have a wider responsibility than others for ensuring the integrity of the publication or specific parts of the publication.

4.2. Division of responsibilities

- i. **Researchers with author roles** are jointly responsible for ensuring that all persons named as authors qualify as such and for ensuring appropriate acknowledgment of contributions that do not meet the criteria for authorship, cf. the requirements for authorship as set out above.
- ii. **Researchers** should address issues relating to authorship – especially the roles of all collaborators and contributors – at an early stage while recognising that roles and contributions may change during the time span of the research.
- iii. **Institutions** should maintain a policy on the attribution of authorship and on how to handle authorship disputes.

5. Collaborative research

Research is increasingly a collaborative undertaking involving researchers from different disciplines, institutions, and countries. Such collaboration can present challenges, as research cultures and perceptions of research integrity may differ across disciplines, institutions and countries.

The key purpose of guidelines for collaborative research is to support a common understanding of and framework for the application of responsible conduct of research.

DEFINITIONS

Collaborative research is research based on cross disciplinary, cross institutional, cross sectorial and/or cross border collaboration.

Collaborating partners are all parties involved with the collaborative research, including researchers, students, technical personnel, administrative personnel and institutions.

5.1. Responsibilities

- i. All collaborating partners should – to the extent possible – take responsibility for the integrity of the collaborative research.
- ii. Collaborating partners should – if feasible and preferably as early as possible in the research process – establish agreements on all relevant areas, and specify how responsible conduct of research will be applied throughout the collaborative research.²
- iii. Where appropriate, common agreements should – in addition to standard agreements on the practical implementation of the research – be established on the following:
 - a. Intellectual property rights
 - b. Procedures for addressing conflicting laws, regulations, practices, etc.
 - c. Procedures for resolution of conflicts between collaborating partners
 - d. Publication issues
 - e. Use, sharing, ownership and management of data
 - f. Confidentiality
 - g. Conflicts of interest
 - h. Procedures for reporting and handling breaches of responsible conduct of research, including research misconduct

5.2. Division of responsibilities

- i. **Researchers** should identify areas in the collaborative research where common agreements may be necessary.

² When entering into international collaborative research, the boilerplate text from the OECD Global Science Forum 'Investigating Research Misconduct Allegations in International Collaborative Research Projects – A Practical Guide' (2009) may serve as inspiration for the collaborating partners.

- ii. **Institutions** are responsible for providing the tools and support necessary for establishing agreements as specified above.

6. Conflicts of interest

Responsible conduct of research includes disclosure of all potential conflicts of interest. This allows financial or other interests to be assessed on an informed basis in order to evaluate possible bias of professional judgement.

DEFINITIONS

A *conflict of interest* is a situation in which financial or other interests have the potential to compromise or bias professional judgement.

6.1. Responsibilities

- i. All parties involved with the research in question should disclose any conflicts of interest.
- ii. Assessors of research and research proposals (e.g. editors, reviewers, research councils, etc.) who have a conflict of interest should withdraw from any involvement in the process.
- iii. All parties involved with the research in question have a joint responsibility for handling issues relating to conflicts of interest.

6.2. Division of responsibilities

- i. **Researchers** are responsible for disclosing all conflicts of interest related to the research they are involved with.
- ii. **Institutions** are responsible for addressing conflicts of interest, and for ensuring that all conflicts of interest are handled adequately. In this context **institutions** should have a policy for handling conflicts of interest, which includes information on:
 - a. Situations that constitute a conflict of interest
 - b. Disclosure of conflicts of interest, including how to handle confidentiality issues

III. Research integrity teaching, training, and supervision

The Danish Code of Conduct on Research Integrity outlines a basic platform for research integrity teaching, training and supervision at the institutional level.

Fostering a culture of research integrity is a key element for ensuring high quality and integrity in research. In this context, teaching, training, and supervision are essential for developing and sustaining a culture of research integrity and for establishing and sustaining basic knowledge on research integrity among those involved in research.

It is important that institutions take responsibility for ensuring that researchers under their auspices receive relevant teaching, training, and supervision in the principles of research integrity and responsible conduct of research. The main purpose is to incorporate the elements of research integrity into the day-to-day work of researchers, and to promote a mind-set that supports research integrity.

A fundamental part of sustaining and developing a culture of research integrity is the role of supervisors and senior researchers acting as mentors and role models. Thus, it is important that supervisors and senior researchers engage in research integrity teaching, training, and supervision.

1. Teaching, training, and supervision in the principles of research integrity and responsible conduct of research

The purpose of research integrity teaching, training, and supervision is to promote a research culture in Denmark that is governed by the principles of research integrity and responsible conduct of research.

Teaching, training, and supervision are of pivotal importance in raising awareness of research integrity because it provides a proactive and positive approach to promoting research integrity as central to the research mission.

Research leaders and supervisors have particularly important roles in research integrity teaching, training, and supervision.

DEFINITIONS

Research leaders are individuals with the overall professional academic responsibility for the research carried out.

Supervisors are experienced researchers providing guidance for Master's students, PhD students, and less experienced colleagues.

1.1. Responsibilities

- i. The principles of research integrity and responsible conduct of research should be an element of all research undertakings and educational curricula, and should pervade the research process.
- ii. All involved in the research process should promote and maintain an environment that fosters research integrity where the fundamental values of research integrity are emphasized and practised as a matter of routine.
- iii. Research integrity teaching, training, and supervision should include:
 - a. Principles of research integrity
 - b. Responsible conduct of research
 - c. Research misconduct and breaches of responsible conduct of research, including the procedures for handling suspicions
 - d. Relevant regulations
- iv. Undergraduate (bachelor) and graduate (master's) programmes should include an introduction to the principles of research integrity and responsible conduct of research.

- v. Technical personnel should receive specific research integrity teaching and training.
- vi. PhD and postdoctoral programmes should include specific research integrity teaching and training. In this context, supervision of PhD students and postdocs should include guidance on research integrity.
- vii. Research leaders and supervisors should receive specific research integrity teaching and training to support their mentoring roles in fostering a culture of research integrity.

1.2. Division of responsibilities

- i. **Research leaders** and **supervisors** should act as role models, and manage research under their auspices in accordance with the principles of research integrity and responsible conduct of research.
- ii. **Research leaders** and **supervisors** should nurture a culture of research integrity and mutual respect in accordance with the principles of research integrity and responsible conduct of research.
- iii. **Supervisors** should take measures to ensure that the research carried out by researchers, research trainees, and students under their supervision is conducted in observance of the principles of research integrity and responsible conduct of research.
- iv. **Institutions** are responsible for ensuring that all staff (including guest researchers) and students involved in research have sufficient knowledge of and receive training in the principles of research integrity and responsible conduct of research.

IV. Research misconduct and breaches of responsible conduct of research

The Danish Code of Conduct on Research Integrity outlines the responsibility for addressing research misconduct and breaches of responsible conduct of research and presents recommendations for a basic institutional platform.

The standards for responsible conduct of research in this document are not legally binding regulations. As a consequence, breaches of those standards will not *per se* result in legal sanctions.

Nevertheless, in order to maintain confidence in research, including the scientific community's own confidence in research and the public's perception of the trustworthiness of research, it is important that suspicions of breaches of responsible conduct of research are brought forward and dealt with adequately. This includes situations of research misconduct (see the current definition used by the Danish Committee on Scientific Dishonesty in the textbox) as well as situations that do not reach the threshold of research misconduct.

Institutions and researchers share a responsibility for addressing and taking appropriate measures when encountering breaches of responsible conduct of research.

In Appendix 1, recommendations for establishing a basic platform for institutions to deal with suspicions of breaches of responsible conduct of research are outlined. The institutional systems are intended to co-exist with the central national body, the Danish Committees on Scientific Dishonesty. Thus, the recommendations in appendix 1 lay out basic guidelines for institutional systems for dealing with such suspicions, whereas the implementation of specific processes should rest with the individual institution.

1. Breaches of responsible conduct of research

To ensure high integrity in research, all parties involved should be aware of their responsibility for addressing breaches of responsible conduct of research. Thus, institutions and researchers should support initiatives for handling breaches of the responsible conduct of research.

DEFINITIONS

Breaches of responsible conduct of research are breaches of current standards on responsible conduct of research, including those of the Danish code of conduct, and other applicable institutional, national and international practices and guidelines on research integrity. If serious enough, a breach may also represent research misconduct, cf. the definition used by the Danish Committees on Scientific Dishonesty.

1.1. Responsibilities

- i. All parties involved in the research share responsibility for ensuring that well-founded suspicions of breaches of responsible conduct of research put forward in good faith are addressed adequately.
- ii. Systems for addressing these matters should be clearly described and easily accessible.

1.2. Division of responsibilities

- i. **Researchers** and **institutions** are responsible for creating and maintaining an environment where it is acceptable to bring forward well-founded suspicions of breaches of responsible conduct of research in good faith.
- ii. **Researchers** are responsible for supporting the handling of such suspicions.
- iii. **Institutions** are responsible for ensuring that a system for addressing well-founded suspicions of breaches of responsible conduct of research is in place at the institutional level.
- iv. **Institutions** should have a policy which describes their system for addressing suspicions of breaches of responsible conduct of research, including:
 - a. Where and to whom a person can turn to for advice on a well-founded suspicion of a breach of responsible conduct of research
 - b. The step-by-step procedure for addressing such suspicions
 - c. The possible outcomes of an investigation
 - d. The sanctions that may be imposed at the institutional level

- e. Dealing with suspicions that involve research or staff from other institutions, including institutions abroad
- f. Other relevant information

THE DANISH COMMITTEES ON SCIENTIFIC DISHONESTY

The Danish Committees on Scientific Dishonesty (DCSD) form a central national body tasked with handling allegations on research misconduct based on complaints brought before the committees by individuals or institutions. The DCSD is an independent body established by an Act of Parliament under the Ministry of Higher Education and Science.

The DCSD's mandate is limited to allegations concerning research misconduct (referred to as 'scientific dishonesty' in the Act) as defined in Consolidated Act no. 365 of 10 April 2014 on the research advisory system, etc., section 2 (3):

"The term 'scientific dishonesty is defined as: falsification, fabrication, plagiarism and other serious violations of good scientific practice committed intentionally or due to gross negligence during the planning, implementation or reporting of research results."

Thus, the DCSD cannot deal with cases solely concerning breaches of responsible conduct of research, if such breaches do not represent research misconduct as described above.

More information on the mandate and structure of the DCSD is available at www.ufm.dk/uvvu

Appendix 1– Recommendations for responding to breaches of responsible conduct of research

A prompt and effective response to suspicions of breaches of responsible conduct of research is required in order to maintain general confidence in research, including the scientific community's own confidence in research and the public's perception of the trustworthiness of research.

At the national level, the Danish Committees on Scientific Dishonesty can handle cases concerning research misconduct (for more information on the Danish Committees on Scientific Dishonesty see the textbox below). However, it is important that each research institution has its own system in place for handling breaches of responsible conduct of research, as such breaches may in many cases not constitute research misconduct as defined in the regulations governing the Danish Committees on Scientific Dishonesty.

Institutional systems for addressing suspicions of breaches of responsible conduct of research co-exist with the Danish Committees on Scientific Dishonesty. Thus, institutional systems do not limit researchers or others from putting forward their suspicions of research misconduct directly to the Danish Committees on Scientific Dishonesty.

Institutional systems and procedures should comprise at least the following elements in order to ensure coherent and effective handling of suspicions of breaches of responsible conduct of research at the institutional level.

1. Preliminary advice concerning a suspicion of a potential breach

Anyone with a well-founded suspicion that a breach of responsible conduct of research has occurred should have the opportunity to request personal, impartial and professional advice concerning the suspicion, e.g. through a 'named person' or similar.

In cases of qualified grounds for the suspicion, the case should be submitted for further investigation in accordance with institutional procedures and the parties to the case should be informed immediately.

2. Investigation of a well-founded suspicion

When addressing and investigating suspicions of breaches of responsible conduct of research, the general principles governing public decision making as well as the following principles should be observed:³

- a) The persons involved in addressing the suspicion and handling the investigation should be impartial.
- b) The investigators should possess professional competences within the specific fields of research and thorough knowledge of responsible conduct of research. Preferably, one or more investigators should have prior experience with cases concerning research misconduct and/or breaches of responsible conduct of research.
- c) The parties to the case should be highly involved in processing the case by being allowed to comment on the investigational material and by being continually informed of the status of the case.
- d) The parties to the case should be protected to the extent possible so that:
 - persons bringing forward suspicions in good faith ('whistle-blowers') are protected from reprisals
 - complaints strictly brought forward in bad faith (as harassment) should in themselves be considered a breach of responsible conduct of research
 - the identities of the parties are kept confidential to the extent possible.
- e) Similar cases/situations should be treated similarly.
- f) Investigation procedures should be made public.
- g) Cases should be concluded efficiently, so that no person is part of an investigation longer than strictly necessary.

The investigation should end with an ascertainment of whether a breach of responsible conduct of research has occurred. If there is a suspicion that the breach qualifies as research misconduct, the institution may choose to refer the case to the Danish Committees on Scientific Dishonesty.

3. Conclusion of the investigation/sanctions

If the institutional investigation concludes that a breach of responsible conduct of research has taken place, it is the responsibility of the institution(s) where the research has been carried out and/or where the researcher is employed to impose relevant sanctions.

³ The recommendations for institutional systems for responding to breaches of responsible conduct of research should be viewed and interpreted in accordance with Danish legislation such as Danish administrative law, e.g. on status as party to the case, access to information, etc.

Appendix 2 – Members of the working group on the Danish Code of Conduct for Research Integrity

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Appendix 3 – Bibliography

The Danish Code of Conduct for Research Integrity was developed with inspiration from various initiatives from the Danish universities and the sector research institutes of Denmark and from the following list of international initiatives.

The European Code of Conduct for Research Integrity (2011)

European Science Foundation (ESF)/All European Academies (ALLEA)

ERC Scientific Misconduct Strategy (2012)

European Research Council (ERC)

Responsible Conduct in the Global Research Enterprise (2012)

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