

DARE2X

Decentralised Ammonia production from Renewable Energy utilising novel sorption-enhanced plasma-catalytic Power-to-X technology

D7.1 – DISSEMINATION AND COMMUNICATION PLAN - VERSION 1

Lead beneficiary: LOMARTOV

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Abstract: This document describes the communication and dissemination activities developed and planned within the framework of the Dissemination & Communication (D&C) Plan of the DARE2X EU Funded project. It outlines a solid communication and dissemination strategy with tailored initiatives aimed at both promoting the further use of the project's results and creating awareness about the topic of sustainable ammonia production, according to the different stakeholders and audiences. This document corresponds to the first version of the D&C Plan, due during the first 6 months of the project. The D&C plan will be constantly updated, and two other versions will be delivered in the next phases.



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WP No.	WP7
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Type ¹	R
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¹ R: Document, report; DEM: Demonstrator, pilot, prototype; DEC: Website, video etc., DATA: Data sets; DMP: Data management plan; ETHICS; SECURITY; Other: Software, technical diagram, algorithms, models etc.

² PU: Public, fully open; SEN: Sensitive.

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ABBREVIATIONS AND ACRONYMS

AB	Advisory Board	IPR	Intellectual Property Rights
AEA	Ammonia Energy Association	KER	Key Exploitable Results
CIP	Copenhagen Infrastructure Partners	KPI	Key Performance Indicator(s)
CL&NT	Clustering and Networking	LOM	LOMARTOV
D&C	Dissemination and Communication	M	Month
DMP	Data Management Plan	MOF	Metal-Organic Frameworks
DTI	Danish Technological Institute	MS	Milestone(s)
EC	European Commission	NH₃	Ammonia
EERA	European Energy Research Alliance	NIC	Kemijski inštitut - National Institute of Chemistry
EU	European	OBJ	Objective
EUDP	Energy Technology Development and Demonstration Program	PtX	Power-To-X
GA	Grant Agreement	TBC	To be confirmed
H₂	Hydrogen	TRL	Technology Readiness Level(s)
HB	Hulteberg Chemistry & Engineering AB	UKRI	United Kingdom research and Innovation
IEA	International Energy Agency	UoL	University of Liverpool
		WP	Work Package

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1. Introduction

DARE2X – Decentralised Ammonia production from Renewable Energy utilising novel sorption-enhanced plasma-catalytic Power-to-X technology – GA No. 101083905 – is a European (EU) Project Funded under the Horizon Europe programme, within the topic *HORIZON-CL5-2021-D3-03-02 – Next generation of renewable energy technologies*.

The project, coordinated by the Danish Technological Institute (DTI), gathers expert European partners **focused on research and innovation (R&I) to disrupt the ammonia (NH₃) production landscape by enabling a sorption-enhanced plasma-catalytic NH₃ synthesis**. Ammonia is the second most produced primary chemical in the world and its centralised production is called the Haber-Bosch process, which is based on the transformation of natural gas (fossil fuel) at high pressure and temperature. Replacing the Haber-Bosch process with a sustainable alternative for the production of NH₃ will contribute to decarbonising the European industry, helping the European Union’s goal of a competitive economy with net-zero greenhouse gas emissions by 2050.

LOMARTOV (LOM) is the company of the consortium in charge of planning and implementing the dissemination and communication (D&C) activities that will allow the project to gain visibility among a wide variety of stakeholders, and to contribute to the scientific community investigating on the same research topic through the exchange of relevant results.

D&C initiatives are an essential activity under any R&I projects. Furthermore, they are also an obligation established by the European Commission (EC) for all beneficiaries of Horizon Europe Fundings, as mentioned in the Article 17 of the Grant Agreement (GA). The present plan endorses the continuous terms of “dissemination” and “communication” as they have been defined by the EU Commission:

- **Communication** means *“taking strategic and targeted measures for promoting the action itself and its results to a multitude of audiences, including the media and the public, and possibly engaging in a two-way exchange. The aim is to reach out to society as a whole and to some specific audiences while demonstrating how EU funding contributes to tackling societal challenges”*³.
- **Dissemination** refers to *“the public disclosure of the results by any appropriate means, including by scientific publications in any medium”*. Besides, dissemination *“makes research results known to various stakeholder groups (like research peers, industry and other commercial actors, professional organizations, policymakers) in a targeted way, to enable them to use the results in their own work”*⁴.

The present document, *D7.1 Dissemination and Communication Plan – Version 1*, describes how these concepts have been implemented in DARE2X project, and how they will be monitored.

³ European Commission, What is the difference between dissemination, exploitation and communication?, published on the 21/01/2021, <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/support/faq/933>

⁴ *Ibid.*



1.1 Context of Work Package 7 and Tasks 7.1 – 7.5

Among DARE2X activities, Work Package (WP) 7 is dedicated to plan, implement and follow-up the dissemination, communication and exploitation actions of the project. This WP pursues different objectives (OBJ):

- **OBJ 7.1:** define a targeted, effective, and high-impact **communication, dissemination, and outreach strategy**, to connect the project with all internal and external possible beneficiaries and interested parties.
- **OBJ 7.2:** **analyse the market opportunities of the Key Exploitable Results (KER)** and settle an exploitation strategy that will enable the project to reach a higher Technology Readiness Level (TRL).
- **OBJ 7.3:** pave the way towards the future market uptake of DARE2X outcomes and technology concept by **defining all the potential applicable business cases**.
- **OBJ 7.4:** **identify the applicable standards and regulations for the project** to enhance its market uptake.
- **OBJ 7.5:** **establish proper D&C channels with relevant projects and networks working in the same field**, in order to capitalize mutual achievements, foster further developments and receive feedback from key actors at EU level.

D7.1 is dedicated to address specifically OBJ 7.1 and OBJ 7.5. These objectives are addressed within the tasks *T7.1 Dissemination and Communication towards impact* and *T7.5 Clustering and networking activities*.

T7.1 is focused on establishing a solid and effective D&C Plan, defining, according to the Grant Agreement (GA) and the suggestions of the consortium, a list of actions aimed at creating awareness on the projects activities and around the topic of sustainable production of NH₃, as well as promoting the use of DARE2X results among different stakeholders and targeted audiences. Under these premises, D7.1 outlines the strategy to carry out project D&C activities and gives a concise summary of how various these initiatives and tools are, and how they interact to reach, involve, and engage the targeted stakeholder groups.

Complementarily to these activities, within T7.5 the consortium is aiming to settle a multilateral cooperation based on knowledge and best practices exchanges among DARE2X and all relevant stakeholders in the NH₃ production, storage and its sectors of application (e.g., energy, shipping fuel and agriculture), including the scientific and research communities, industries, materials and components manufacturers, and policymakers to enhance the development of a “hub” for NH₃ decarbonisation. For this reason, similar EU-funded projects and relevant platforms working on the same topic have been identified and contacted, planning initial joined D&C activities to reach a wider impact on the scientific, industrial and political community.

The D&C Plan is therefore collecting the roadmap for the implementation of all activities targeted under both T7.1 and T7.5.

1.2 Timeline of the implementation of the first D&C activities

During the first six months of the project the dissemination and communication activities have been directed to create a visual identity of the project and to settle the basis for the initial implementation of all the D&C activities established in the plan.

Figure 1 summarises the steps taken from Month (M) 1 – October 2022 up to M6 – March 2023, and provides a guide to follow for future D&C activities.

Task 7.1 Dissemination and Communication towards impact (LOM)

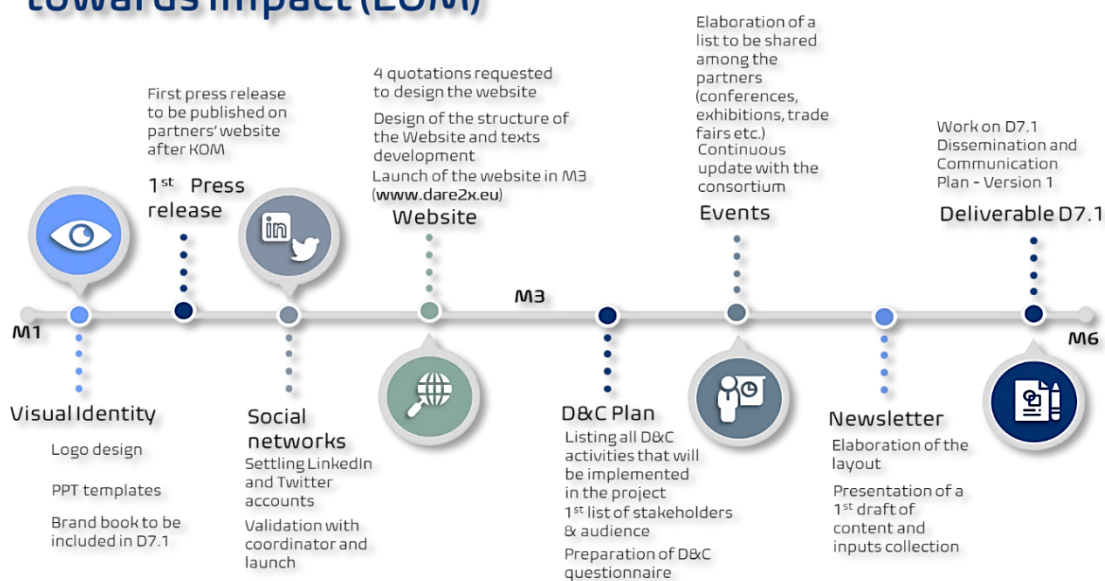


Figure 1: Timeline of D&C activities during the first 6 months

As shown in the picture, digital tools (i.e., social networks, website, online press releases, e-Newsletter) have been privileged as the most effective channels to communicate about the project as they allow to reach a wider number of stakeholders of different nature. These tools will continue to be used to spread the key messages to convey to the different stakeholders at all levels (from experts in the field of ammonia to the general public) with a universal and easy to understand language.

The conception of the dissemination and communication activities are perceived as a dynamic dialogue with all the audiences during the whole duration of the project.

1.3 Content and structure of the D&C Plan

D7.1 details the D&C roadmap followed by DARE2X partnership up to M6 and how these activities will be continued to be updated and implemented in the following months, even beyond the project ends.

After outlining the general considerations and the key messages for the dissemination and communication strategy in *Section 2*, the channels and tools chosen and implemented for the communication activities are described in *Section 3*, while *Section 4* details the same aspects for the dissemination. These sections cover the main points to be addressed under Task 7.1.

The projects and platforms initially selected and contacted within the clustering and networking activities (Task 7.5) are detailed in *Section 5*.

The indicators and targets reached up to M6 of the project are described in *Section 6*.

Finally, a short explanation of the Data Management Plan (DMP) and the Intellectual Property Rights (IPR) and its implication for the D&C activities is given in *Section 7*.

Visual proofs of the first communication tools and channels implemented by the project are provided in the Annexes.

2. Dissemination and Communication Strategy

2.1 General considerations and methodology

The effectiveness of the D&C strategy is a key issue in DARE2X project since the consortium, as well as the EC, aim for the project results to reach a high number of stakeholders and to produce a relevant impact at different levels: scientific, industrial and societal.

The D&C strategy of DARE2X has been structured, following the definitions of dissemination and communication explained in the *Section 1. Introduction*. DARE2X **dissemination strategy** will be aimed at enhancing and promoting the use of the project's results, while the **communication strategy** will be outlined to raise awareness about the project to a wider public and for different targeted purposes. For this reason, different approaches will be followed, and tailored tools will be implemented for each activity.

A first structure of the D&C strategy was already established at the proposal stage. **Based on these premises described in the GA, the first concepts have been outlined and organised under the WHAT, WHO, HOW and WHEN model:**

- **WHAT – Key messages:** definition of the main messages to convey about the sustainable ammonia production system developed by DARE2X and its potential impact at scientific, industrial and societal level.
- **WHO – Targeted audience:** research and confirmation of the main target audiences according to the purpose of the activity, i.e., use of the project results in case of the dissemination, and awareness raising in case of the communication activities.
- **HOW – Tools and channels:** selection of the most appropriate and effective tools to convey the key messages according to the targeted audiences, and the type of actions.
- **WHEN – Timeline:** forecast of an initial timeline of all the D&C activities.

Specific **Key Performance Indicators (KPI)** have been established in order to be able to monitor the achievement of the D&C objectives and to evaluate how the actions implemented will be able to support and facilitate the generation of scientific, economic and societal impacts by the project.

In order to fix these elements and collect information from the partners, an internal Communication and Dissemination questionnaire was created and distributed among the partners, as shown in *ANNEX III: D&C QUESTIONNAIRE FOR PARTNERS*. The questionnaire was articulated in 5 sections in order to collect the following information:

1. **Publications** released and foreseen during the whole duration of the project.
2. Participation in and/or organisation of **events, seminars, conferences and workshops**.
3. **EU Projects** identified to establish possible synergies with DARE2X under the clustering and networking activities.
4. **Social media activity** and number of followers each partner has reached on its institutional accounts.

5. Private companies and organisations that can be crucial to exploit and further scale-up DARE2X results. These actors could also be part of the Advisory Board.

This procedure and methodology are summarised in *Figure 2*.

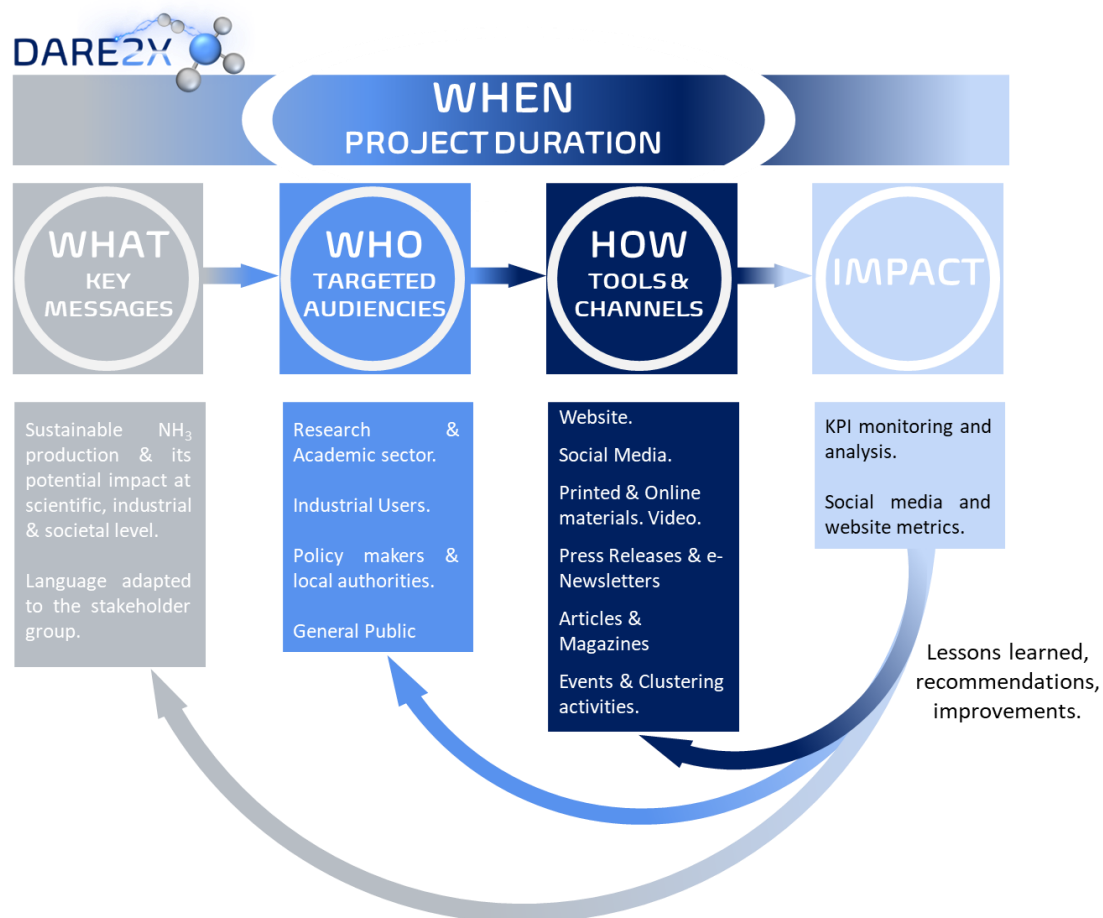


Figure 2: Flowchart of the Communication & Dissemination activities

The same questionnaire outlined in *ANNEX III: D&C QUESTIONNAIRE FOR PARTNERS* will be updated every 6 months by all the partners in order to follow-up and monitor the D&C activities through the project lifetime.

The following sections detail the key messages (WHAT) defined by the project, as well as the procedures followed to ensure an effective communication at internal level – within the consortium – and a successful communication and dissemination at external level.

2.2 Key messages (WHAT) and target groups (WHO)

The key messages that will be delivered through the implementation of the D&C plan have initially been defined in accordance with the nature of the different target audiences, following a multi-stakeholder approach. Depending on the target group, the message will be in fact presented in a distinct style and using a tailored vocabulary.

Scientific messages will primarily target researchers and the audience from the academic sectors. Technical information will aim specifically at industrial and political actors, highlighting the commercial and economic opportunities that DARE2X solutions could bring to European business, tackling at the same time global challenges. Finally, wider lessons and information will target the general public, regardless their professional background, using a comprehensible and more approachable language.

Table 1 summarises the key messages that DARE2X D&C plan aims at transferring according to the different stakeholders' groups.

Table 1: Key messages of DARE2X according to different target groups

DARE2X project will:	
Research and academic sector	
<i>European & international research groups in the field of CRM-free catalysts and sorption materials, carbon-free fuels, energy storage & transport</i>	
Explore highly innovative scientific routes for the development of effective and safe technologies for production of NH ₃ using renewable energy.	
Disrupt the green NH ₃ production by laying the technological foundations for efficient and scalable plasma-catalytic synthesis.	
Develop novel cost-effective catalyst materials tuned to the use in a plasma reactor, enabling increased NH ₃ yield.	
Develop novel NH ₃ sorption materials tuned to the use in a plasma reactor, able to sorb and shield produced NH ₃ from decomposition by plasma exposure.	
Design a new sorption-enhanced plasma reactor that synergistically integrate catalyst and sorption materials, with optimised interaction with the plasma.	
Validate at TRL4 laboratory scale the sorption-enhanced plasma reactor for NH ₃ production, focusing on energy efficiency and sustainability performance.	
Assess the environmental and economic performance of the reactor and the concept through a life-cycle perspective. Furthermore, it will evaluate the social acceptability of the system.	
Enable new research pathways for future PhDs willing to explore the field of green fuel production (especially NH ₃).	
Enhance and foster European scientific excellence.	
Industrial users	
<i>Industry stakeholders and technology developers; NH₃ producers and end-users; Energy-intensive industries (e.g., steel, chemicals and cement); renewable energy and transport sector.</i>	
Bring hydrogen (H ₂) and NH ₃ industry back to Europe in a sustainable and decentralised context, using renewable energy.	
Open new market opportunities for European industries, bringing revenues and jobs, thanks to the exponential market growth of NH ₃ as a green fuel in the 2050 horizon.	
Increase environmental sustainability for NH ₃ production, ensuring the economic feasibility and the societal acceptability.	
Enable the decarbonisation of highly pollutant industries, thanks to the use of NH ₃ , as a key chemical product for a variety of sectors, as well as a source of green fuel and a potential way to store H ₂ .	
Unlock the decarbonisation of the maritime sector through NH ₃ , among the key transport sectors targeted by the project.	
Enhance and foster European technological excellence.	

Policy makers and local authorities
<i>Policy makers; public authorities; standardisation and certification bodies.</i>
Enable to decarbonise and decentralise NH ₃ production by using renewable energy instead of fossil fuels.
Set the European leadership in production of NH ₃ as key fuel for the decarbonisation of the transport, chemical and energy sector.
Facilitate the creation of novel market opportunities for the European energy, chemical and transport industry.
Explore standardisation and certification routes for the materials and the reactor developed by the project, as well as for the final use of the product.
General public
<i>Wide and different audiences including general media.</i>
Switch the production process of ammonia, from fossil-fuel to renewable energy based.
Enable the research to make further steps towards the achievement of the goals of the Green Deal, reducing greenhouse gases emissions in highly energy-intensity sectors.
Facilitate the European self-sufficiency through the improvement and decarbonisation of the ammonia production process, as a key green fuel for a variety of sectors.
Create new opportunities to bring new revenues and jobs to the European market.
Bring disruptive improvements to the decarbonisation of the energy and the transport sector, especially in the maritime field, where ammonia can be used to fuel ships and vessels.
Bring disruptive improvements to the decarbonisation of the production of ammonia, largely used in the chemical sector and as a fertiliser in the agricultural field.
Contribute to the improvement of the general social wellbeing, by mitigating the effects of climate-change.

2.3 Internal communication

Effective internal communication is essential in order to ensure a timely and efficient project implementation. Communication among members of the consortium is ensured through different internal tools: emails; monthly online meetings through Teams (or other platforms); periodic General Assembly held in person every 6 months.

The consortium is constantly updated on the status of the D&C activities and on what information LOMARTOV was able to collect from the partners. The monthly meetings are used in fact for the following purposes: 1) present to the partners the latest news published through the D&C channels; 2) collect from them information that can be widely communicated or disseminated through specific tools (e.g., scientific publications); 3) gather feedback from the partners on any other relevant activity that could boost the project awareness and results' dissemination.

To facilitate the communication and cooperation among the members of the consortium, a collaborative workspace on SharePoint was created by DTI at M1. The space will serve as a



repository where all partners can easily access and upload documents or update information, for each WP, including WP7 and the dissemination, communication and exploitation activities.

2.4 External communication and dissemination

External communication activities are put in place to reach the broadest audience linked with DARE2X topics, but also indirect stakeholders and the general public. The external strategy of communication and dissemination targets a variety of audiences with different objectives. For this purpose, different channels and tools have been implemented, settling the basis for an effective D&C strategy.

The following sections will outline the detailed description of the communication (*Section 3*) and dissemination (*Section 4*) tools and channels planned and implemented along the DARE2X project.



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3. Communication tools and channels

3.1 Visual Identity and templates

As a first step of the communication activities, **a logo and a visual identity of DARE2X were created within the first three months of the project**. This step allowed in fact to unlock the design and the creation of all the other communication tools (described in the next subsections).

To harmonise all the communication materials and give a consistent visual identity to the project, a brand book has been created (available in *ANNEX I: PROJECT BRAND BOOK*). The brand book provides different versions of DARE2X logo in order to use it on different supports, both digitals and printed. The colour palette and the font to be used in text and D&C materials are as well provided.

Following the brand book, different templates for minutes, deliverables (.docx) and presentation (.pptx) were created in the first three months of the project.

3.2 Website

To help communicate about DARE2X's project results and create awareness about its main scientific topics and challenges, a **website was developed at M3** (<https://dare2x.eu/>) to be accessed and adapted to all devices and screens, paying particular attention to accessibility features.

The DARE2X website is the main portal to entice and inform society, researchers, and end-users about project goals, results, and developments of the research activities. The website is divided in different tabs:

- **Project:** "the project in a nutshell" including information on the purpose, impact, and implementation.
- **Consortium:** information and contact of the members of the consortium.
- **News and events:** repository of all the activities related to DARE2X.
- **Results:** all the project public reports, newsletters, press release and communication materials.
- **Contact:** details to contact with the project coordinator.

Figure 3 shows the whole homepage of DARE2X website.

[Project](#) | [Consortium](#) | [News & Events](#) | [Results](#) | [Contacts](#)

DARE2X

Decentralised Ammonia production from Renewable Energy utilising novel sorption-enhanced plasma catalytic Power-to-X technology

Paving the way for green ammonia production

DARE2X aims to develop a new approach for decarbonizing NH₃ production, enabling future applications such as energy storage as a green fuel.

OUR AIM

NEW RESEARCH ACTIVITIES FOR THE SUSTAINABLE PRODUCTION OF AMMONIA

- Purpose**
 Make green ammonia production cost-competitive and create more EU know-how and innovation excellence.
- Impact**
 The proposed technology will be based on a sorption-enhanced plasma-catalytic synthesis, which will be validated at Technology Readiness Level (TRL) 4.
- Implementation**
 To meet its objectives, DARE2X combines world-leading research institutions and innovative and R&D performing SMEs specialised in renewable technologies, materials engineering, and technology demonstrations.

LATEST NEWS

NEWS | Feb-24, 2023

DARE2X project featured in the media

DARE2X has been portrayed in several Danish media outlets recently. "The prospects for a decentralized production of ammonia fro [...]"

0 76

NEWS | Dec-15, 2022

PAVING THE WAY FOR GREEN AMMONIA PRODUCTION

0 912



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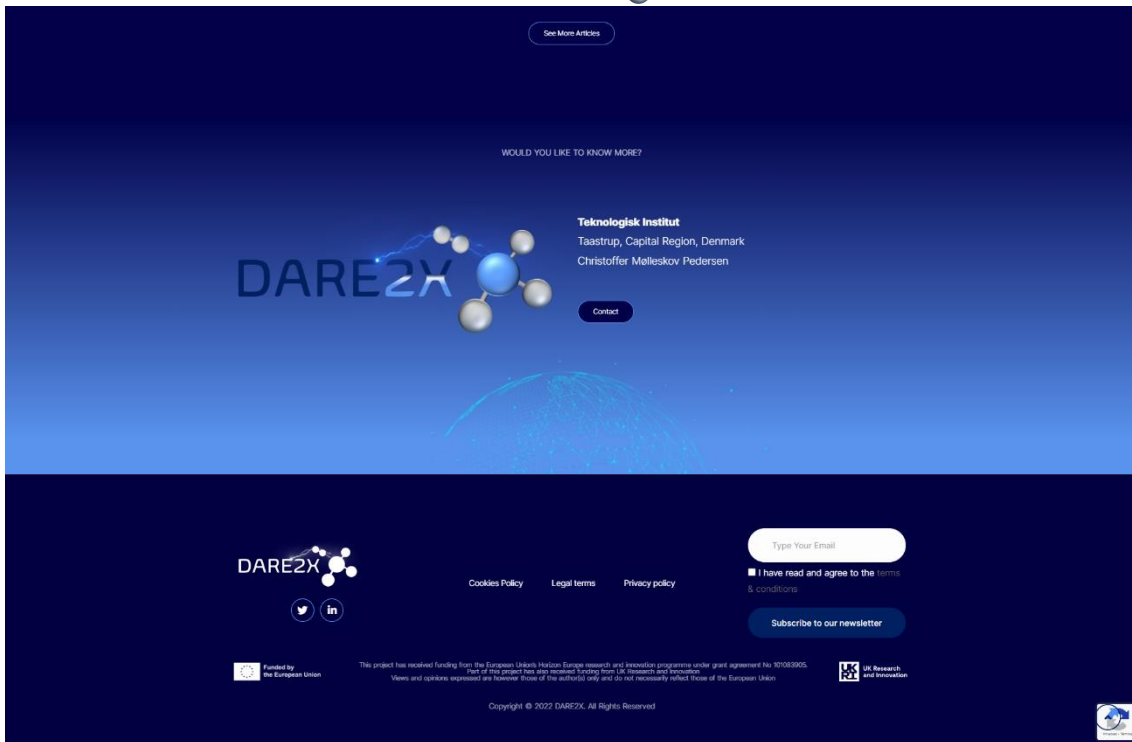


Figure 3: DARE2X Website - Home Page

The project website was set-up by LOMARTOV and will be managed, maintained, and hosted for the duration of the project and beyond, at least 5 years after the completion of the project. General statistics about the website visitors and Google Analytics information will be monitored, as showed in *Section 6*, in order to provide periodic data on the impact of the project website as a universal tool to communicate about the project.

3.3 Social media

Different social media accounts were created between M1 and M3 of the project. **DARE2X currently owns accounts on LinkedIn (#DARE2X) and Twitter (@DARE2X_EU)**, since these two platforms were considered as the most used by the target stakeholders of the project.

Since the launch of the accounts, different contents have been created regularly to start communicating about the first project meetings, its main objectives and expected results, and the outputs of the first laboratory testing, especially from the activity of DTI.

A first **Social Media Campaign** titled “Meet the partners” was launched at M5, and will continue along the following months. Every two weeks the project is publishing a short introduction of each partner, including its role in DARE2X and their expectations towards the project. An example of the first post of this campaign, presenting the coordinator DTI, is shown in *Figure 4*.

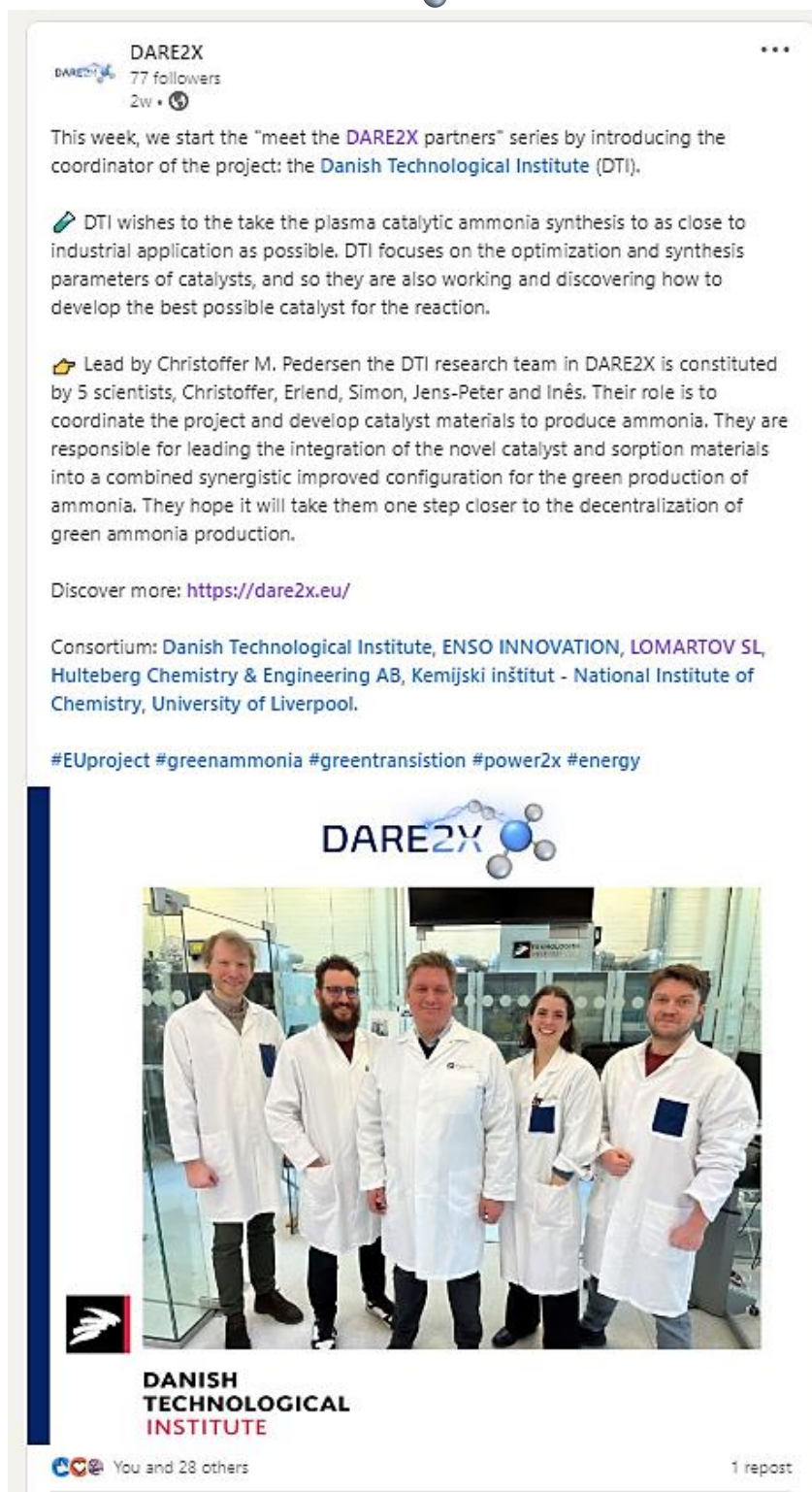


Figure 4: First post of the Social Media Campaign "Meet the partners" (LinkedIn).

Other communications on social media are made according to different events and/or international days (e.g., the post created for the 11th of February - International Day of Women and Girls in Science).

A second social media campaign is ongoing regarding “Clustering and networking activities with similar EU-funded projects”, framed in T7.5, as shown in *Section 3*. The campaign aims to disseminate general information about other projects and initiatives working on similar topics as DARE2X, in order to join forces in raising awareness about the projects’ challenges, objectives and activities.

Further social media campaigns are planned. For instance, in M7 it will be launched a campaign to promote the achievement of the main scientific milestones (MS) of the project.

The project is expected to gain visibility as well through the **social media accounts of all partners**, which have been collected through the D&C questionnaire (*ANNEX III: D&C QUESTIONNAIRE FOR PARTNERS*). Most of the partners own institutional accounts on LinkedIn and Twitter and have already shown a high implication in generating engagement in DARE2X posts and publications.

A series of **Hashtags and Tags** have been used in an effort to increase engagement and the reach of the publications, in order to take advantage of the "multiplier effect" provided by online communication. The usage of tags in publications helps in fact the project identification and makes it easier to connect with other similar accounts. In this sense, it is expected that both the project and the partners will be tagged in the posts shared on social media, related with DARE2X, helping to reach out different stakeholders.

In order to reach new audiences and to join the online synergies and conversation that the use of hashtags generates, DARE2X has compiled a list of hashtags to be used in the publications such as:

#EUproject #greenammonia #HorizonEurope #greentransition #power2x #renewableenergy #hydrogenstorage #sustainablefuel #energy #ammonia #advancedmaterials
--

3.4 Printed and online materials

Different printed and online materials will be developed to convey the project messages to various audiences and to spread the key details of the R&I activities. DARE2X partners plan, in fact, to deliver the following materials:

- A **project brochure**: a visual leaflet, containing all the essential information about the project, the partnership and the concept.
- A **poster**: summarising on a single view main information of the brochure.
- A **roll-up**: a more visual support, rather than informative, containing exclusively essential information about the project, the consortium and the EC - United Kingdom research and Innovation (UKRI) funding.

The purpose of these materials is to be printed, distributed and showed during fairs, seminars, conference and other events.



Under the tab “results” of the DARE2X, a section to download these "[Communication materials](#)" has been created, in order to allow any type of audience to view these supports, which are included in this deliverable in *ANNEX II: COMMUNICATION MATERIALS*.

As established in the GA, the logo and the disclaimer of the EC, as well as the logo of the UKRI entity (financing the activities developed by the University of Liverpool) will be shown in all communication materials and have been included in all project templates.

3.5 Press releases

Press releases will be generated through the duration of the project. The objective is to increase awareness and facilitate the dissemination of any DARE2X information that can be useful or relevant to the targeted stakeholders.

The first press release was published after the Kick-off Meeting held at DTI facilities in Denmark in October 2022, and it is expected that at least one press release per year and per partner will be published along the project lifetime to communicate in each country on the project results to the general public.

The first press release published by the project and spread on each partners’ official website can be found on the [website of the project](#). An overview is shown in Figure 5.

1st Press release



PAVING THE WAY FOR GREEN AMMONIA PRODUCTION

The EU project DARE2X "Decentralised Ammonia production from Renewable Energy utilising novel sorption-enhanced plasma catalytic Power-to-X technology" has officially started.



DARE2X consortium gathered during the kick-off meeting in Copenhagen, at the Danish Technological Institute (DTI), in October 2022.

Copenhagen (Denmark) – October 2022. The consortium of the new European-funded project DARE2X gathered for a two-day meeting on the 19th October 2022. The meeting took place in the Danish Technological Institute (DTI) facility, Denmark, and it aimed to **start the new research activities for the sustainable production of ammonia**. At the meeting, the **DARE2X** partners presented their first research activities and developed a collaborative plan to ensure a successful outcome at the end of the three-year project. The consortium also set goals for the developed technology to be competitive, scalable and relevant for the market.

Figure 5: First press release of DARE2X project

3.6 Articles and general magazines

In parallel to the press releases developed by the project consortium, **it is expected that DARE2X will also communicate its latest news through general media**, such as local newspaper and specialised trade magazines (both printed and online). News, interviews, and articles covering added-value aspects of the project will be published in these media to spread a wider interest and awareness of the topic tackled by DARE2X and its R&I activities. Different contacts with journalists and media outlets are expected (e.g., visits to laboratories; invitation to open events etc.) putting special emphasis on how the concept of this project could help to solve key societal social challenges of our time.

Following this plan, up to M6, DARE2X has been portrayed by 10 Danish media, as shown in *Table 2*.

Table 2: DARE2X articles published on general media.

NAME AND TARGET OF THE MEDIA	TITLE OF THE NEWS/ARTICE	DATE OF PUBLICATION	LINK
Ingénue: Specialized newspaper for Danish Engineers	<i>Teknologisk Institut i spidsen for internationalt projekt: Plasma til fremstilling af grøn ammoniak. // Technological Institute at the forefront of international project: Plasma for the production of green ammonia.</i>	03/02/2023	LINK
Automatik & proces: Online media focused on automation and processes.	<i>PtX-projekt skal skabe grøn energi. Et internationalt projekt, ledet af Teknologisk Institut, skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X, PtX. // PtX project must create green energy. An international project, led by the Danish Technological Institute, will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X, PtX.</i>	03/02/2023	LINK
Effektivt Landbrug: Online media focused on agriculture.	<i>Fossilfri gødning og skibsbrændstof skal produceres med grøn energi. Nyt internationalt projekt skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X. // Fossil-free fertilizer and marine fuel must be produced with green energy. New international project will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X.</i>	03/02/2023	LINK
Alt om teknik: Online media about all kinds of technical solutions			LINK
Søfart: Media about marine sector			LINK
Maritime Danmark: Online media focused on the maritime industry in Denmark	<i>Nyt dansk ledet Power-to-X projekt. // New Danish-led Power-to-X project.</i>	03/02/2023	LINK
ShippingWatch: Online media focused on news related to the shipping industry	EU project aims to make marine fuels with green energy. A new international project intends to use surplus energy to produce ammonia fuel for ships.	06/02/2023	LINK
Dansk Kemi: Online Media focused on chemistry in Denmark	<i>Brug af plasma i PtX-anlæg skal gøre produktion af ammoniak langt mere grøn. // Using plasma in PtX plants should make the production of ammonia much greener.</i>	06/02/2023	LINK
ELFOKUS: Online media for electricians and electrical engineering	<i>Nyt projekt skal udvikle PtX-anlæg der kan placeres lokalt ved vindmøller og solceller. // New project to develop PtX facilities that can be placed locally at wind turbines and solar cells.</i>	08/02/2023	LINK
Klimafokus: Online media focused on climate and environmental technologies.	<i>Ny PtX-teknologi anvender plasma og kan gøre ammoniakproduktion langt mere grøn. // New PtX technology uses plasma and can make ammonia production much greener.</i>	08/02/2023	LINK



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101083905.



UK Research and Innovation

Part of this project has also received funding from UK Research and Innovation.

3.7 E-Newsletter

A project e-Newsletter will be distributed to DARE2X subscribers and shared on social media at least once per year. The newsletter will include updates on DARE2X successful achievements such as the milestones (MS) reached, the experiments developed, the latest scientific publications, as well as the conferences and seminars where the project will be presented.

DARE2X webpage contains a specific section to allow visitors to subscribe to the e-Newsletter. The e-Newsletter's issues will be written in English. Partners are free to repurpose, disseminate, and translate the material into their native languages for the use in their own communities. The newsletter's efficacy will be assessed through plugins to determine its impact.

A template for the e-Newsletter (available in *ANNEX II: COMMUNICATION MATERIALS*) has been created in order to be more responsive when the project will be ready to openly communicate its first results. The consortium plan to publish the first newsletter around M12, when the first technical MS will be reached, i.e., MS2 - *Prototype at lab-scale of plasma reactor*; MS4 - *First catalyst candidates ready for enhanced plasma reactor*. At this time, more advanced information on the project activities will be also available, allowing to attract a wider audience, especially among the scientific and industrial communities.

3.8 Events: attended and organised

Within DARE2X's communication activities, it is also planned to attend different types of events, to spread the awareness about the project in person and to a variety of stakeholders. Thanks to the information already provided in the GA and through the D&C Questionnaire distributed to the partners, LOMARTOV has collected a **list of events where DARE2X partners can attend to present an abstract of the project and distribute the communication materials generated.**

Table 3 collects the events, mainly conferences and symposiums targeting the scientific community, that the partners have identified for this purpose. Such selection at an early stage of development of the project shows a high implication from the partners in the communication activities.

Table 3: Events where DARE2X project will be presented.

PARTNER ATTENDING	NAME & LINK OF THE EVENT	PLACE	DATE	TARGET AUDIENCE
UoL	25th International Symposium on Plasma Chemistry (ISPC25)	Kyoto, Japan	21-26/05/2023	Plasma & chemistry community
UoL	243rd ECS Meeting with the 18th International Symposium on Solid Oxide Fuel Cells (SOFC-XVIII)	Boston, USA	28/05/2023	Electrochemistry community
UoL	Liverpool Pint of Science for public 2024-25-26	Liverpool, UK	Annual event	General public

PARTNER ATTENDING	NAME & LINK OF THE EVENT	PLACE	DATE	TARGET AUDIENCE
DTI	6th European Power to Ammonia® Conference	Rotterdam, Netherlands	8-9/06/2023	Scientific community from the ammonia sector
UoL & HB	15th European Congress on Catalysis - EUROPACAT 2023	Prague, Czech republic	27/08/2023	Catalysis community
NIC	Slovenian Chemical Days (link not available yet)	Portorož, Slovenia	09/2023	Scientific community in general

Other events were also taken into consideration to attend as general public and to network with other similar R&I initiatives. These events are shown in *Table 4*.

Table 4: Events where DARE2X consortium can attend for networking purposes.

NAME & LINK OF THE EVENT	PLACE	DATE	TARGET AUDIENCE
Sustainable nitrogen activation Faraday Discussion	London, UK	27-29/03/2023	Scientific community
ICGC 2023: International Conference on Green Chemistry	Venice, Italy	10-11/08/2023	Green chemistry community
Ecomondo Fair - The green technology expo	Rimini, Italy	7-10/11/2023	General public, industrial actors
Plasma Conferences 2023	Several locations, to be confirmed (TBC)	Several dates between 2023 & 2024, TBC	Scientific community from the plasma sector

This list will be constantly updated to provide to the whole consortium a wide variety of events, fairs and conferences where DARE2X could be presented to the public, either through an official presentation, or simply through the distribution of the communication materials developed by the project. Along its lifetime, **DARE2X project plans also to organise different events for both dissemination and communication purposes:**

- **1 Clustering workshop** organised by LOM at M30 aimed at the industrial community and other similar projects working on the same topics as DARE2X;
- **1 International Workshop** on Green NH₃ Production organised by UoL;
- Different **guided visits to the laboratories of the scientific partners**, to show the demonstrators;
- **2 webinars for scientific and research community** to discuss the main outputs and challenges of the project, as well as to promote new fields for multidisciplinary collaboration.
- **Visits of local secondary schools** to give a lecture on H₂/NH₃ energy and climate change.
- **1 Final event** co-organised by LOM and all project partners, to present the closing results of the project and promote the further uptake of the R&I results.



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UK Research
and Innovation

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3.9 Promotional video

A promotional video of DARE2X project is planned to be released at M34 to communicate in a universal way the project activities. The video plans to show the project partners presenting the main challenges addressed by the project (through real interviews and/or through infographics) and how the R&I activities developed up to M34 constitute a valuable solution for the decarbonisation of many strategic sectors of the European industry and society. The video will be planned to start from M20, when more tangible project results will be visible.



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the European Union

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UK Research
and Innovation

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4. Dissemination tools and channels

Most of the channels and activities used for communication purposes will be also used for dissemination purposes, whenever the language used will not interfere in the message to be conveyed to the target audience. For instance, general press releases or articles aimed at communicating the publication of an outstanding result of the project, can also target scientific and industrial actors, that are likely to use those results for their research purposes. This is important to mention, in order to justify the reduced list of dissemination activities identified at this point of the project, and to highlight that the language used in the communication activities will be also tailored according to this double purpose. Simple and universal language will be used for solely communication purposes to the general public, while more scientific and technical vocabulary will be used if the activities targets both communication and dissemination purposes.

Regarding the specific case of the dissemination of the project results, in order to allow their further use among relevant actors, scientific publications have been selected as the most relevant tool for this purpose, along with scientific conferences and seminars.

4.1 Scientific publications

Different journals were identified by the consortium as channels to publish relevant scientific publications, as soon as the project will produce the first public results. A non-exhaustive list of these journals is provided as follows:

Journal of Power Sources; Energy & Environmental Science; Materials Science and Engineering; Advanced Energy Materials; Journal of Catalysis; Nature Catalysis; Critical Reviews in Environmental Science and Technology; ACS Sustainable Chemistry & Engineering/Catalysis; Green Chemistry; Environmental Science and Policy; Sustainable Materials and Technologies.

The DARE2X's partners will adhere to the Open Science⁵ approach, including Open Access Publishing scheme (e.g., Creative Commons Attribution International Public Licence – CC-BY), or similar for scientific publications. The scientific partners will make all the necessary efforts in order to achieve the publication of their research outputs in either open access or hybrid journals that shall provide immediate open access to these publications. The Open Access Infrastructure for Research in Europe ([Open Research Europe](#)) will be used as well to publish DARE2X's results and to find the best repository. The eventual costs associated with the publication in Open Access journals will be undertaken by the project partners, as described in the Data Management Plan deliverable.

As it will be shown in *Section 6*, the consortium is expected to publish at least 10 publications/articles in specialised media reaching more than 500 readers.

The D&C Questionnaire served as well to collect an updated list of the scientific publications that partners plan to deliver within the project lifetime. Up to M6, the same **initial list of publications** proposed in GA was confirmed by the consortium as follows:

⁵ An approach to the scientific process based on open cooperative work, tools, and diffusing knowledge.

- “Atom scale NH₃ synthesis/decomposition reactions modelling”, expected at M12;
- “Towards the understanding of the interplay between NH₃ synthesis catalyst- NH₃ absorption material for improving NH₃ synthesis rate at low pressure”, expected between M10-M12;
- “Catalytic and absorption materials for low pressure NH₃ synthesis” expected between M18-24;
- “Catalyst scale NH₃ synthesis/decomposition reactions modelling”, expected at M24;
- “Plasma catalytic NH₃ synthesis using multicell DBD reactor and over Ni based bimetallic catalysts”, expected at M32;
- “Life cycle Associated with document assessment of NH₃ production at low-pressure and long-term H₂ storage strategy” expected at M36.

The authors of these publications will be defined in further stages of the project, after confirming the ownership of joint results. This list will be updated and edited in the following months, according to the scientific advancements of the project.

4.2 Scientific conferences and seminars

As mentioned in the introduction of *Section 1*, most of the tools targeted for communication purposes will also serve for dissemination purposes. This is particularly true for the participation at events. The presentation of DARE2X results in seminars, workshops, fairs and any other kind of event, initially for communication aims, might in fact trigger the interest from the targeted audience to know more about those outputs, promoting the further use of the project’s results. These events are already listed in *Table 3: Events where DARE2X project will be presented*. and *Table 4: Events where DARE2X consortium can attend for networking purposes*.

Particularly with regards to the attendance at conferences and seminars, where the public will be mostly from the scientific community, the main aim for the partners will be to transfer the project’s results.

Up to M6, it is important to mention that **HB submitted an abstract** to participate in the [15th European Congress on Catalysis - EUROPACAT 2023](#), which will be held in Prague, from August 27th to September 1st 2023. The title of the abstract is “*Room Temperature Plasma-Based Ammonia Synthesis – Designing an Optimal Absorbent*”. If the abstract is accepted, the main objective of this presentation will be to raise awareness about DARE2X, among the scientific community working on advanced materials, and also to start announcing the expected results to be disseminated in the future.

5. Clustering and networking activities

As mentioned in the introduction, beside task *T7.1 Dissemination and Communication towards impact*, the current deliverable is also addressing the activities planned and developed within the task *T7.5 Clustering and networking activities*.

Within this task, the consortium is aiming to settle a multilateral cooperation based on knowledge and best practices exchanges among DARE2X and all relevant stakeholders in the NH₃ production, storage and its sectors of applications (e.g., energy, shipping and agriculture). Other EU-funded projects, initiatives, and associations relevant in these sectors have been selected to find synergies and set a common ground for joint D&C activities.

The ultimate objective of this task, expected to be reached at the end of the project and to be continued beyond it, is to establish a “hub” for NH₃ decarbonisation, promoted by DARE2X as a highly disruptive and innovative project.

The timeline for the first 6-months activities of Task 7.5 was established at the beginning of the project and approved during the Kick-off Meeting. The planning, as shown in *Figure 6* highlights the steps taken in order to achieve the MS associated to this task: MS 3 - List of associations and projects to be clustered to the project.

Task 7.5 Clustering and networking activities (LOM)

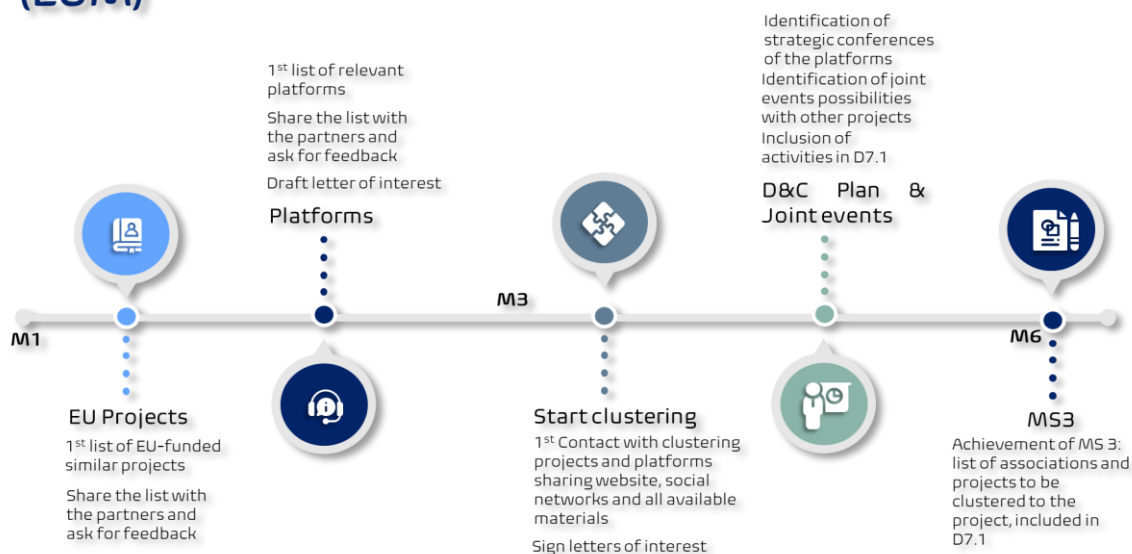





Figure 6: Timeline of the clustering and networking activities

The initial list of relevant EU projects, associations and companies presented in the GA, was confirmed and complemented through the D&C questionnaire distributed among the partners. This complete list is shown in *Table 5* detailing the name, the objectives of each project, the specific synergies with DARE2X, as well as the link to its webpage and the topic under which it was financed.



Table 5: List of EU Projects for Clustering and Networking activities

Classification by colours according to their relevance: ● Very relevant | ● Potentially Relevant | ● Concluded /close to finish but with relevant outcomes.

NAME	WEBPAGE & LOGO	GOAL	SYNERGIES WITH DARE2X	CALL & TOPIC
AMBHER – Ammonia and MOF Based Hydrogen storage for euRope. ●	LINK 	For long-term storage, advanced materials (catalysts & membranes) and their combination in an intensified 3D-printed periodic open cell structured reactor will be developed to allow hydrogen storage in the form of NH₃ in a cost-efficient and resource-effective process at lower temperatures and pressures compared to conventional systems.	AMBHER is validating both short and long-term technologies at TRL 5 addressing the positioning of the solutions in relevant business cases. Synergies could be established at TRL5 phase.	HORIZON-CL4-2021-RESILIENCE-01-17 - Advanced materials for hydrogen storage (RIA)
Ammonia2-4 - Demonstrating a 2- stroke and 4-stroke large scale ammonia marine engine. ●	LINK 	Develop and demonstrate a four-stroke and a two-stroke dual-fuel marine engine running on ammonia as the main fuel . It will be a new engine while the two-stroke can be retrofitted to any commercially available two-stroke engine. The two engines have the potential to reduce greenhouse gas emissions by at least 80 % including nitrous oxide emissions.	Use of NH ₃ as marine fuel considering aspects such as health & safety, supply infrastructure, crew training & acceptance, but also novel standardisation pathways for regulating emissions from NH ₃ marine engines. These developments could be useful for DARE2X.	HORIZON-CL5-2021-D5-01-14 - Proving the feasibility of a large clean ammonia marine engine (ZEWTPartnership)
HyStrAm – Hydrogen Storage and Transport using Ammonia ●	LINK 	Demonstrate a compact containerised NH₃ synthesis system based on two main consecutive stages: 1) A short-term storage H ₂ vessel which will serve as a buffer to store and transport the H ₂ produced by electrolysis. 2) An a NH₃ synthesis reactor based on an improved Haber-Bosch process where the stored H ₂ will react with N ₂ to form NH ₃ using the novel catalysts and sorbents developed in HyStrAm.	NIC is a partner in this project. Some synergies could be developed between the two projects.	HORIZON-CL4-2021-RESILIENCE-01-17 - Advanced materials for hydrogen storage (RIA)










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Part of this project has also received funding from UK Research and Innovation.

NAME	WEBPAGE & LOGO	GOAL	SYNERGIES WITH DARE2X	CALL & TOPIC
HiPowAR - Highly efficient Power Production by green Ammonia total Oxidation in a Membrane Reactor	LINK 	Develop a new membrane reactor for the efficient energy production from NH₃ . The project focuses on a breakthrough in the direct conversion of NH ₃ into energy. This is driving the acceptance of NH ₃ as a synthetic fuel without CO ₂ emissions. The membrane reactor developed is based on a MIEC membrane and achieves higher efficiencies in energy production than internal combustion engines and steam generators.	They propose a sustainable NH ₃ production and utilization in a SOFC, thus decreasing primary energy demand by lower utilization of resources. The data from their study might be useful for the environmental assessment impact.	FETPROACT-EIC-05-2019 - FET Proactive: emerging paradigms and communities
CAMPFIRE - Wind and water to ammonia. Marine fuel and energy storage for a zero-emission future	LINK 	Interregional initiative in the Baltic Sea Region, developing innovative technologies for the seasonal and decentralised production of ammonia from locally generated wind or solar power, air and water , as well as on the utilisation of ammonia as an innovative energy carrier for use in zero-emission maritime mobility and in the stationary energy supply.	Coordinated by the same institution as HiPowAR. Larger initiatives which act in Northern Europe. Promoting different projects that could find links with DARE2X.	German Federal Ministry of Education and Research
ORACLE - novel routes and catalysts for synthesis of ammonia as alternative renewable fuel	LINK 	Concept based on three methods to produce ammonia (1. electro-catalytic; 2. plasma-assisted electro-catalytic; and 3. electro-thermo catalytic systems) by developing catalysts and reactors and build on previous feasibility tests and longstanding collaboration among the partners.	The project hosted the first Aarhus PtX Symposium in 2022 including topics such as green fertilizer from green ammonia feedstock. These are very relevant for DARE2X.	LC-SC3-RES-25-2020 - International cooperation with Japan for R&I on advanced biofuels and alternative renewable fuels

NAME	WEBPAGE & LOGO	GOAL	SYNERGIES WITH DARE2X	CALL & TOPIC
METHAREN - Innovative bioMETHAne system integration boosting production while managing Renewable energies intermittency	LINK 	Demonstrate a cost-effective, innovative, more sustainable and circular biomethane production system enabling renewable energy sources intermittency management . To do so, METHAREN is providing improvements beyond the state-of-the art along four main axes related to: i) the biogas plant efficiency; ii) flexibility and energy management for RES integration; iii) the circularity approach for sustainable production and iv) innovative business models and adapted policies.	LOM is a partner in this project. The consortium of METHAREN is interested in the NH ₃ production process developed by DARE2X. Invitation to open dissemination and communication events. TECHNIP Italy has been invited to join the Advisory Board of the project.	HORIZON-CL5-2021-D3-03-16 - Innovative biomethane production as an energy carrier and a fuel on as an energy carrier and a fuel
MOF2H2 - Metal Organic Frameworks for Hydrogen production by photocatalytic overall water splitting	LINK	Reach a world-record efficiency for sun-driven clean hydrogen production of 5 % solar-to-hydrogen efficiency, using metal-organic frameworks (MOFs) as photocatalysts (through photo-dissociation of water). To this end, the project will synthesise and optimise several generations of MOFs and related composites. Its final goal is to optimise and upscale the best materials and prototypes under sustainable and economically viable conditions.	The project started at the same time of DARE2X project. MOF materials could also be considered for DARE2X reactors. Further interactions might raise depending on the results of the MOF stability.	HORIZON-CL5-2021-D3-03-02 - Next generation of renewable energy technologies
ARENHA - project Advanced materials and Reactors for ENergy storage tHrough Ammonia	LINK 	Catalysts for low-temperature/pressure ammonia synthesis , solid absorbents for ammonia synthesis intensification and storage and membrane reactors for ammonia decomposition to pure hydrogen (> 99.99 %).	Demonstration of the full power-to-ammonia-to-usage value chain at TRL 5. The project started on 1 April 2020 and counts with international Advisory Board composed of key energy stakeholders from the 5 continents.	LC-NMBP-29-2019 - Materials for non-battery-based energy storage (RIA)

NAME	WEBPAGE & LOGO	GOAL	SYNERGIES WITH DARE2X	CALL & TOPIC
PlasNH3 - Developing Plasma-assisted ammonia technology for decarbonisation of power production 	LINK	Optimise the existing burner for pure NH₃ while maintaining high fuel efficiency and low combustion emissions. It will also assist in overcoming current challenges that are slowing its introduction. The project is built on an ongoing project by the Gas Turbine Research Centre of Cardiff University, which has already started investigating ammonia flames.	This is an individual fellowship, therefore the only partner to be contacted is the University of Birmingham. Results could be relevant for DARE2X.	MSCA-IF-2020 - Individual Fellowships
RECYCALYSE - New sustainable and recyclable catalytic materials for proton exchange membrane electrolyzers 	LINK 	Disrupt the energy storage market through the development and manufacture of highly active sustainable oxygen evolution catalysts, and through a recycling scheme for membrane electrolyzers catalysts, electrodes and overall system. This technology will help to reduce or eliminate use of critical raw materials, thus decreasing CO ₂ emissions and reducing costs.	Coordinated by DTI. Sustainability aspects are also tackled by DARE2X and synergies could be established in the life cycle assessment methodology.	LC-NMBP-29-2019 - Materials for non-battery-based energy storage (RIA)
PIONEER project - Plasma catalysis for CO ₂ recycling and green chemistry 	LINK 	European training network aiming at educating a generation of experts in the multidisciplinary field of plasma/catalysis for CO₂ conversion. The challenge requires to understand in detail the role of surfaces in contact with molecular plasmas, in order to invent and synthesize new materials having the required properties for taking advantage of the strong electric field and reactive species provided by the unique medium that are Non Thermal Plasmas.	This project ended on December 31 st , 2022. UoL is a research partner of the Consortium. Results could be exploited in DARE2X especially regarding the plasma technology.	MSCA-ITN-2018 - Innovative Training Networks

Parallely to the list of pertinent projects, relevant associations, partnerships and companies, which DARE2X partners could cluster with, were also identified, as shown in *Table 6*.

Table 6: List of associations and partnerships for Clustering and Networking activities

NAME & LINK	GOAL	SYNERGIES WITH DARE2X
Ammonia Energy Association (AEA) LINK 	Industry association that promotes the responsible use of ammonia in a sustainable energy economy. Their mission encompasses both the decarbonization of ammonia for existing applications, as well as the adoption of low-carbon ammonia in new applications.	They have an accessible large list of members that match the end-users' stakeholders of DARE2X.
Energy Technology Development & Demonstration Program (EUDP) LINK	Programme under the Danish Energy Agency. Supporting private companies and universities to develop and demonstrate new energy technologies. Support is given in accordance with EU state aid rules.	Thanks to the Danish coordinator, DARE2X could find support for its further scale-up and market uptake.
European Energy Research Alliance (EERA) LINK 	Membership-based, non-profit association, constituting the largest low-carbon energy research community in Europe and a key player in the European Union's Strategic Energy Technology Plan. Catalyst of the European energy research for a climate-neutral society by 2050.	Key European actor in the energy sector to include in any public large-impact activity of DARE2X thanks to its close relations with policy makers.
Hydrogen Europe Association LINK 	European association representing the interest of the hydrogen industry and its stakeholders and promoting hydrogen as an enabler of a zero-emission society. Promoting, enabling and coordinating different R&I and industrial activities to boost the adoption of hydrogen as energy carrier.	Within its industrial uptake, DARE2X could find synergies also with key actors
International Energy Agency (IEA) LINK 	International agency, working closely with governments and international organisations to shape a secure and sustainable energy future for the society, through different instruments including international public and private research partnerships.	Key international actor in the energy sector to include in any public large-impact activity of DARE2X thanks to its close relations with policy makers.

Lastly, relevant companies and industries that could also take part in the Clustering and Networking (CL&NT) activities have been selected. This list is still very preliminary, since the consortium is also selecting the industrial actors that could be part of the Advisory Board (AB). The companies selected at the moment are shown in *Table 7*.

Table 7: List of companies for Clustering and Networking activities and for the AB

NAME & LINK	ACTIVITY	AB	CL&NT
<p>A.P. Moller - Maersk LINK  MAERSK</p>	<p>The logistics company is on a quest to find the marine fuels of the future with green ammonia being one of three preferred fuel types. In 2021 they announced plans for the establishment of Europe’s largest production facility of green ammonia.</p>	X	X
<p>Copenhagen Infrastructure Partners (CIP) LINK  <small>Copenhagen Infrastructure Partners</small></p>	<p>The company announced in 2022 the development of the first phase of Project Catalina in partnership with Enagás, Naturgy, Fertiberia and Vestas. It is a pioneering green H₂ and green NH₃ GW-scale project that aims to bring the abundant renewable resources of Aragon region in Spain to the industrial consumption points on the Spanish Eastern coast through energy efficient & environmentally friendly infrastructure.</p>		X
<p>Fertiglobe LINK </p>	<p>World’s largest seaborne exporter of urea and ammonia combined, the largest producer of nitrogen fertilizers by production capacity in the Middle East and North Africa region, and an early mover in clean ammonia.</p>		X
<p>First Ammonia LINK </p>	<p>USA based Company developing the first modular, commercial-scale plant to produce green NH₃ from intermittent renewable energy and the first to use SOEC technology. Its first plant is expected to be fully operational in 2025. Affiliated to First Ammonia Motors, to build the first combustion engine to run on 100% NH₃. Interested in the high number of projects developing green NH₃ in the USA & Northern Germany.</p>		X
<p>Nitrofix Solutions LINK </p>	<p>The early-stage Danish company will be developing a small-scale ammonia synthesis unit, to give farmers control over fertilizer production. The electrochemical process is being patented.</p>		X
<p>Siemens UK LINK </p>	<p>Technology company focused on industry, infrastructure, transport, and healthcare. The company is building the Siemens Green NH₃ Demonstrator based at the Rutherford Appleton Laboratory in the UK, which brings together all the technologies required to demonstrate the complete NH₃ energy cycle.</p>	X	X
<p>Technip Energies LINK </p>	<p>World-leading engineering and technology player for the energy transition. Leveraging their engineering expertise and technologies to develop new projects in hydrogen, sustainable chemistry, biofuels, CO₂ management/ decarbonization in addition to other solutions. Different offices and plants in Europe.</p>	X	X
<p>Thyssenkrupp LINK  <small>thyssenkrupp</small></p>	<p>Engineering company focused on chemical and process technologies. Their Green Ammonia unit is developing small scale plants for the production of ammonia coupled with large scale electrolysis plants. The company is also working on revamping existing ammonia plants to make their process more sustainable.</p>	X	X
<p>Yara Clean Ammonia LINK </p>	<p>World’s leading crop nutrition company and a provider of environmental and agricultural solutions. Their clean NH₃ unit is capturing growth opportunities in emission-free fuel, carbon-free food production and a NH₃ for industrial applications. Its headquarters are based in Norway.</p>		X



In order to raise awareness about the project among these groups, LOM, supported by the consortium contacts' portfolio, contacted all these actors to establish a first interaction and propose them to take part in the CL&NT activities of the project.

A letter of interest has been prepared and is being distributed among these stakeholders (EU funded Project coordinators, associations and companies). The letter lists an initial proposal of activities in which these actors could jointly participate with DARE2X in order to multiply the respective impacts of the initiatives:

- Stay informed on the technical advancements and results of DARE2X in order to disseminate the information within the project/association/company's activities/members and provide feedback when necessary.
- Provide feedback to specific scientific reports and public deliverables produced by DARE2X consortium, if requested (signing a Non-Disclosure Agreement under this case).
- Support DARE2X in its communication and dissemination activities, sharing information through our official channels (e.g., social networks, website), and mailing lists, in order for the members/partners to receive the information.
- Participate in events, conferences, workshops, and/or meetings organised by the DARE2X consortium, in line with the project/association/company's topics of action, where the project/association/company's consortium could be invited to join.
- Consider future collaborations with the DARE2X's consortium in order to promote the upscaling and further development of DARE2X's results.
- Establish synergies to increase the outreach of potential stakeholders, exchange and capitalize knowledge, experience, and best practices around the topic of green ammonia production.

Up to M6, the consortium received positive feedback from the following projects: CAMPFIRE, HiPowAR, MOF2H2 and RECYCALYSE. Additionally, a first interaction has been established with AMBHER and ARENHA projects. Further CL&NT activities have been proposed with these projects:

- **Joint social media posts:** both DARE2X and the clustered projects can mutually publish about the respective projects' news, objectives and results. DARE2X has started a social media campaign promoting RECYCALYSE project that already agreed to this activity.
- **Joint publications on the websites:** both DARE2X and the clustered projects can write joint articles and press releases to be published on their websites, focusing on common challenges and joint technical approaches to tackle the solutions.
- **Joint factsheet:** the clustered projects can publish joint factsheets, infographics or posters on different joint topics tackled by the projects. An example could be the "Top 5 reasons to find alternative resources for the Energy storage".
- **Joint webinars and events:** the organisation of joint webinars aimed at a more technical, industrial and scientific audience is also taken into consideration, as well as the mutual invitation to official conferences and events. This activity can be particularly beneficial for both DARE2X and the clustered project in order to multiply the impacts towards key stakeholders and capitalise the D&C efforts, especially for market uptake purposes.



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Regarding the associations, partnerships and companies, the consortium will continue to nourish these connections and to find the proper occasion to engage them in any relevant D&C activity where these actors could also find a direct benefit for their members and/or industrial activity.

To further promote the CL&NT activities, **an additional page dedicated to the clustered projects, associations and companies will be created on DARE2X website in the following months**, in order to show those actors that formally manifested their support to DARE2X and their willingness to establish joint activities. Thanks to the development of these actions, MS 3 - *List of associations and projects to be clustered to the Project* was reached and will continue to be updated along the project lifetime.



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6. Indicators, targets, and metrics

6.1 D&C KPI monitoring

One of the key actions under T7.1, beside defining and implementing the most appropriate and efficient D&C activities, is also to monitor their performance according to the Key Performance Indicators (KPI) established at the proposal stage of the project. *Table B* shows the main KPI defined for each cluster of D&C activities, grouped according to the main targeted audiences. For each set of D&C tools and channels, a cross indicates if the actions are targeting either communication (C) and/or dissemination (D) purposes.

Table B: Summary of the of DARE2X's D&C activities, including KPI and target groups.

TOOLS & CHANNELS	TARGET GROUP	C	D	KPI
<ul style="list-style-type: none"> Events attended and organised, especially industrial fairs. Organisation of a workshop at M30. Distribution of project's communication materials. 	Industry stakeholders and technology developers.	X	X	<ul style="list-style-type: none"> At least 50 companies reached directly as engaged stakeholders during the project. Participation in at least 10 European industry-relevant events.
<ul style="list-style-type: none"> Events attended and organised, especially conferences and seminars. Distribution of project's communication materials, especially the e-Newsletter. Scientific publications. 	Scientific-technical Community	X	X	<ul style="list-style-type: none"> Participation in at least 12 International scientific-technical events, reaching at least 40 participants to the webinars and other events. At least 10 publications/articles for specialised media.
<ul style="list-style-type: none"> Invitation to the Clustering & international workshops and other projects key events. Invitation to guided visits to the laboratories of the scientific partners. 	Political stakeholders	X		<ul style="list-style-type: none"> Participation of policy representatives in events organised by the Consortium.
<ul style="list-style-type: none"> Invitation to project's events. Invitation to guided visits to the laboratories of the scientific partners. Social media campaigns & distribution of project's communication materials. 	Social actors (civil society, environmental agencies etc.).	X		<ul style="list-style-type: none"> At least 1 social stakeholder reached per partner, with an impact communication capacity of more than 200 people.
<ul style="list-style-type: none"> Articles and scientific publications with technical and economic information. Interviews of project partners. invitation to attend project's events and guided visits. 	Specialised media		X	<ul style="list-style-type: none"> At least 10 publications/articles in specialised media, reaching more than 500 readers.



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TOOLS & CHANNELS	TARGET GROUP	C	D	KPI
<ul style="list-style-type: none"> • Press releases & interviews in partners' countries. • Invitation to attend project's events and guided visits. • Distribution of project's communication materials. 	General media	X	X	<ul style="list-style-type: none"> • 1 press release per year per partner. • 1 project video shared through online general media.
<ul style="list-style-type: none"> • Press releases & interviews in local media of partners' countries. • DARE2X promotional video on social media and specific social media campaigns. • Visits of local secondary schools to give a lecture on H₂/NH₃ energy and climate change. • Presentation at Liverpool Pint of Science for public. 	General public	X		<ul style="list-style-type: none"> • At least 30,000 people reached throughout all communication activities.

The project KPI have been designed to be **ambitious**, to produce the desired impacts at scientific, economic and societal level, and also **reachable**, according to the size of the consortium, the duration and the means of the project.

Up to M6, the consortium has been working to settle the main tools and channels in order to reach the target groups through the communication of key messages. As shown also in *Section 3* and *Section 4*, **the main progresses in reaching these KPI have been achieved in the following activities:**

- Publication of **1** press release after the Kick-off Meeting on the project's and the partners' website.
- Publication of **8** articles on **10** different media, both general and specialised magazines.
- Launch of **3** social media campaigns, "Meet the partners", "Clustering activities" and "Milestones", in order to reach the widest number of stakeholders possible and maintain DARE2X social media constantly active.
- Submission of **1** abstract by HB to attend the [15th European Congress on Catalysis - EUROPACAT 2023](#) and present DARE2X.
- Contact established with **3** companies and industrial actors to invite them to either be part of the Advisory Board, or to attend general D&C activities.

The extent of achievement of all KPI will be closely followed-up and monitored through the project, to provide periodic reporting on their current status. For this purpose, it will be essential for all the partners to constantly update the D&C Questionnaire created by LOM, that will specifically serve this purpose. Another essential tool used to monitor the KPI, and the impact of D&C activities will be the analysis of the main website and social media statistics, as shown in the following section.

6.2 Website and social media metrics

Besides the official KPI established in the proposal, another important indicator of the performance of the D&C activities, the visibility of the project and the profile of the actors reached is the analysis of the website and social media statistics.

Starting from the **website of the project** launched from January 2023, the following pictures show the main figures of different indicators of the website, extracted through Google Analytics, taking into consideration the period from the 1st of January 2023 up to the 14th of March 2023.

Figure 7 shows that DARE2X website engaged **247 users** from its launch, with an average **engagement time of 1 minute and 14 seconds**. This result is highly positive given the short period of time considered (only 3 months), and also the early stage of the project lifetime.

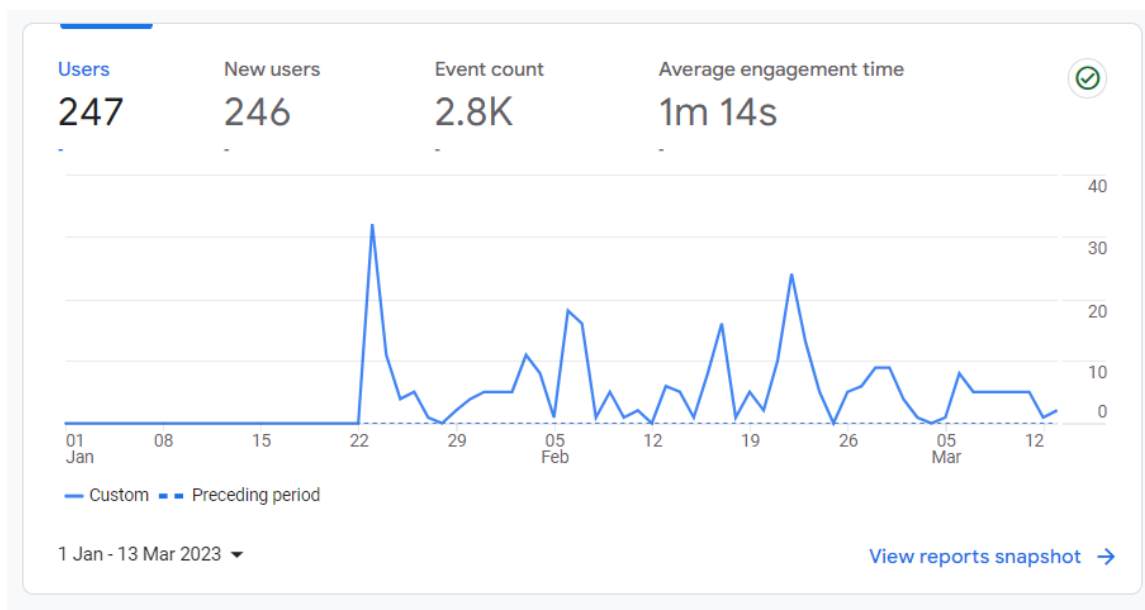


Figure 7: General statistics on the users of DARE2X website

When analysing the visitors of **DARE2X website by countries**, we can observe that most of the users are from the European continent, particularly from Denmark, Spain, the Netherlands, and Germany (*Figure 8*). This data could initially reveal that the topic of green ammonia production produces interest mainly in Northern European countries, where most of the companies working on innovative ammonia production plants are located (as also shown in *Section 5, T*). At international level, users from the United States are also reported, confirming the high interest that Northern American industries show in R&I European projects working on this topic.



Figure 8: Users of DARE2X website according to the country identification

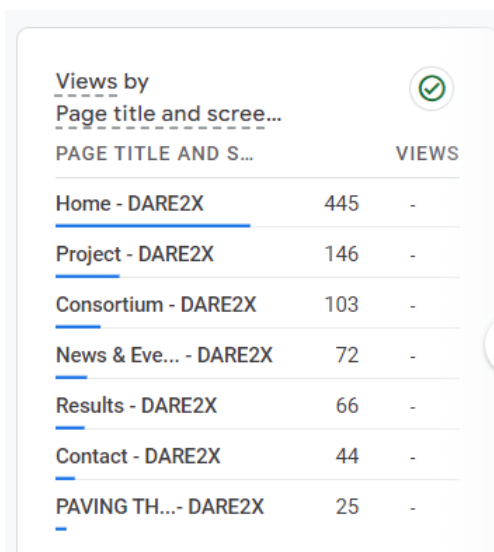
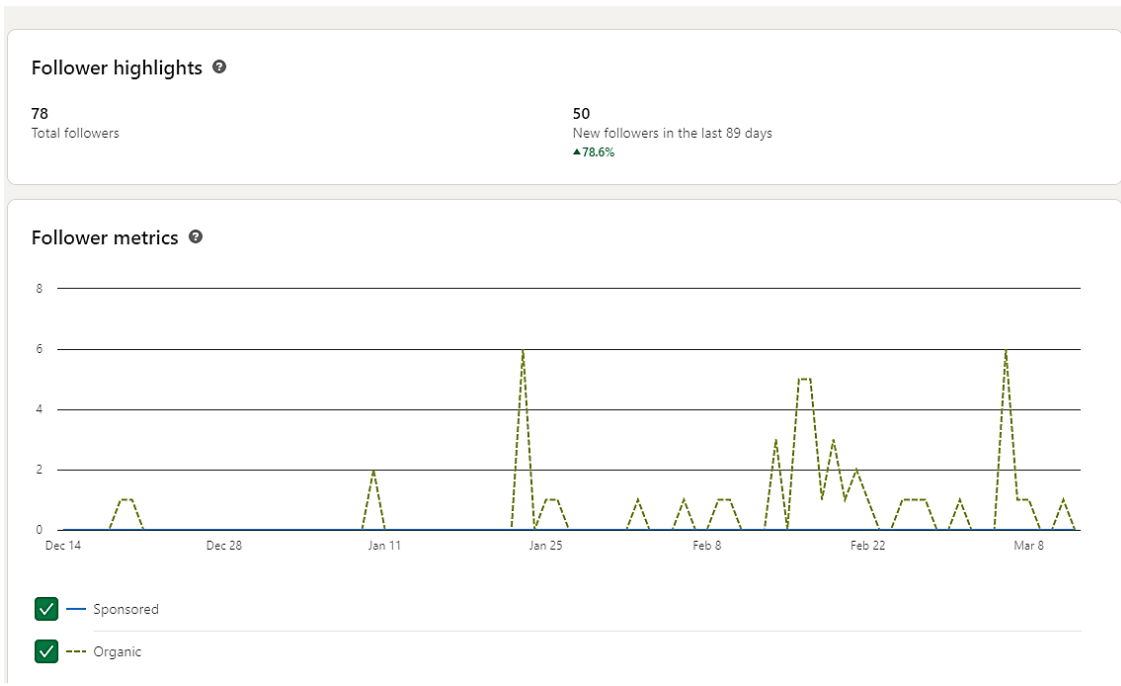


Figure 9: Views of DARE2X website by pages

Finally, by looking at the pages of the website that attract more visitors, as shown in *Figure 8*, it is interesting to observe that the sections of the website that are most visited are the ones that include more descriptive and informative text about the project, i.e. “Home” which summarises all the main information; “Project” which describes the objectives and activities; “Partners” which details the entities behind the DARE2X consortium. Concerning the **social media accounts, LinkedIn (#DARE2X) and Twitter (@DARE2X EU) analytics** also allow to have a clearer view of the profile of the stakeholders attracted through these first C&D activities. The period considered goes from the 14th of December 2022 up to the 14th of March 2023. LinkedIn statistics allow to analyse the data both from the followers (i.e., people actively following DARE2X

LinkedIn page) and the visitors point of view (i.e., people who are not subscribed and visit the page only occasionally). *Figure 10* and *Figure 11* highlight the main points of attention to be discussed.



Follower demographics

Industry

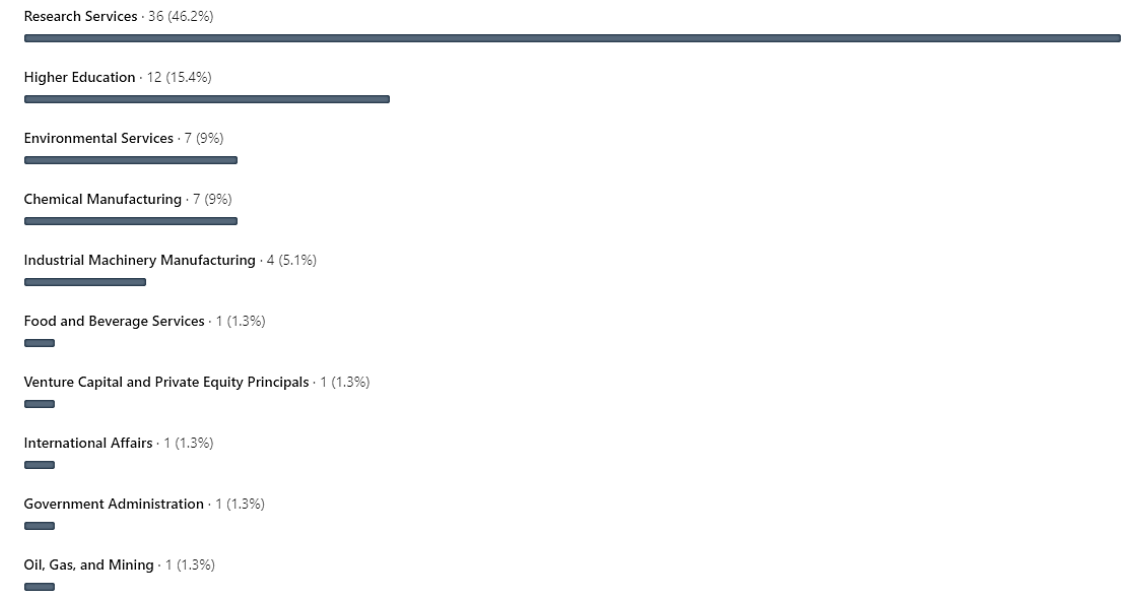
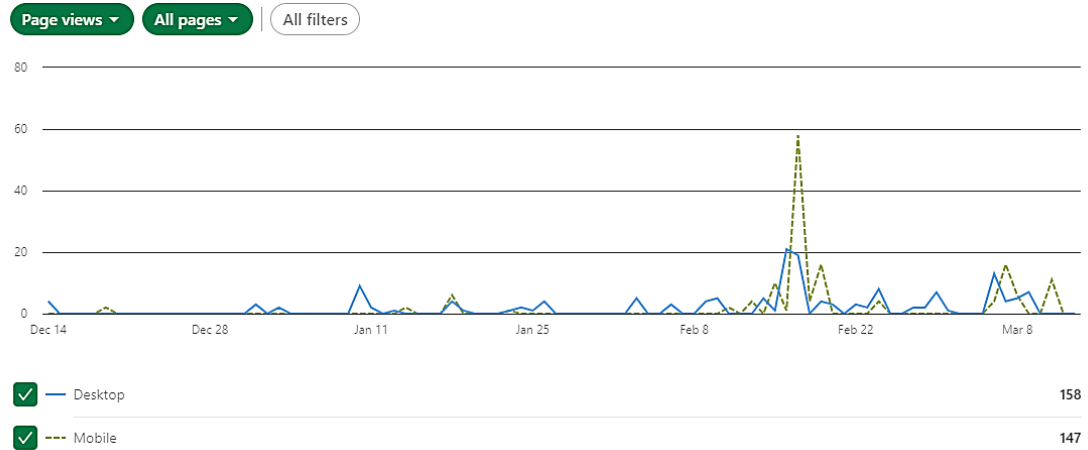


Figure 10: DARE2X LinkedIn Followers' analytics

Visitor highlights

<p>305 Page views ▲369.2%</p>	<p>118 Unique visitors ▲372%</p>	<p>20 Custom button clicks</p>
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Visitor metrics



Visitor demographics

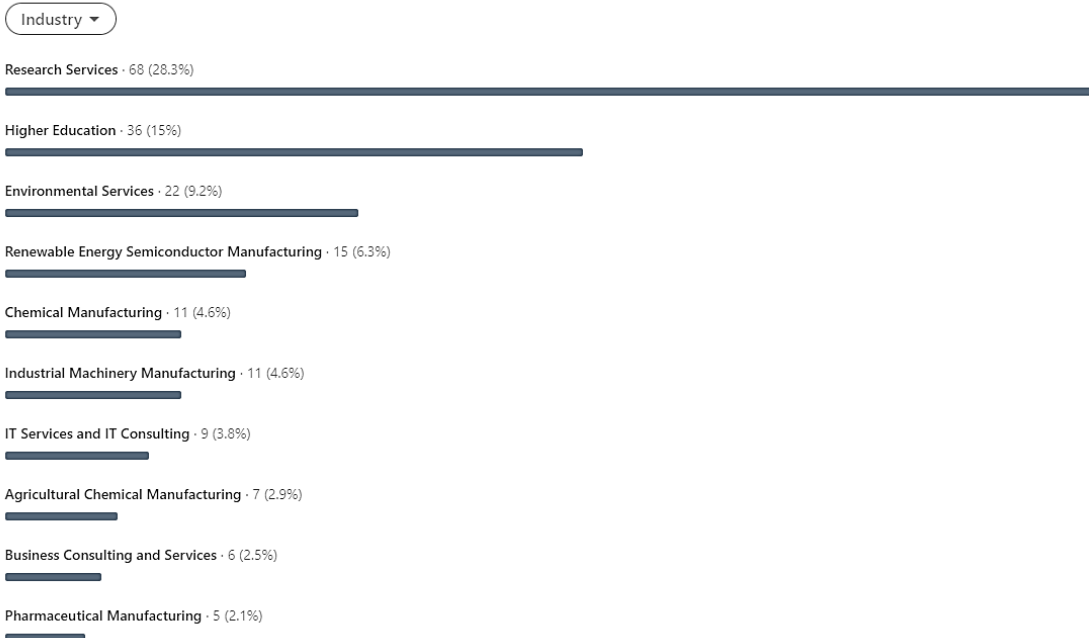


Figure 11: DARE2X LinkedIn Visitors' analytics

From the followers' statistics, *Figure 10* shows that DARE2X has gained **78 followers on LinkedIn** in less than 4 months from the launch of the profile. These actors show a constant activity through the profile. According to the professional sector, more than **45% come from the R&I sector**, while the other most representatives' sectors are higher education (15%), environmental services (9%), chemical (9%) and industrial machinery manufacturing (5%). An interesting data to highlight is the fossil fuel, gas and mining sector which represents 1.3% of the followers. This is particularly significant for DARE2X, revealing the interest that the project is raising even from competitors and highly pollutant energy sectors.

Regarding the visitors of DARE2X LinkedIn profile, *Figure 11* displays that the page gained over **300 visitors**, of which 118 are unique visitors. Regarding their professional sector, we can emphasise the **diversity of the sectors**, being the **research and higher education professional backgrounds** the most represented (with 28% and 15% of the visitors, respectively, coming from this field), but identifying users also from the Environmental services (9%), renewable energy semiconductor manufacturing (6%), chemical and industrial machinery manufacturing (10%), and other sectors less represented such as IT services, agricultural chemical manufacturing and business consulting.

Regarding the **Twitter analytics**, as shown in *Figure 12*, DARE2X profile, gained **21 followers**. This number is relatively low compared to the number of followers on LinkedIn, although this figure is quite common under Twitter accounts of European projects. Nevertheless, the content shared from the consortium through the attractive pictures of the first laboratory testing and the social media campaigns showed good results in terms of visits.

DARE2X tweets gained over **1,000 impressions** between January and March 2023, showing a high level of visibility of the publications made during the project. Although clicks on links and retweets still report low value, the engagement rate of DARE2X twitter shows very positive results. This value is calculated as the sum of: (Likes + Retweets + Quotes + Replies) divided by the number of tweets, divided then by the total number of followers, and finally multiplied by 100.

In the case of DARE2X, the engagement rate at **1.4%** shows indeed that, although publications on Twitter are not made on a daily basis, all posts trigger impressions and therefore interest from both viewers and followers.

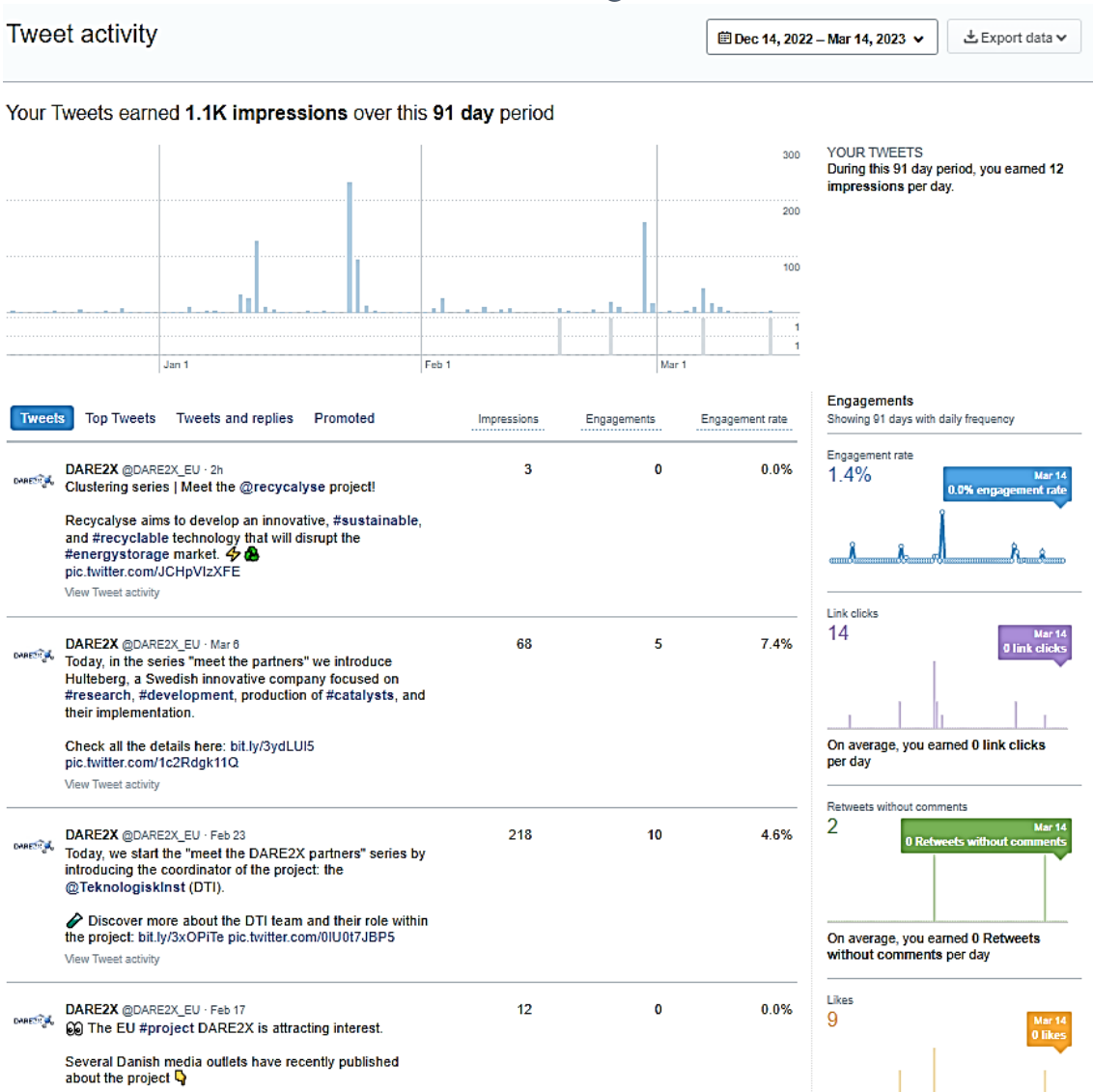


Figure 12: DARE2X Twitter analytics

After analysing the website and social media metrics, we can conclude that all these tools have reached a high satisfactory level of engagement from the viewers, and that these channels are surely valuable for the dissemination and the communication of the project’s results and activities.

7. Data Management Plan and Intellectual Property Rights

Along with the deliverable *D7.1 - Dissemination and Communication Plan - Version 1*, the first Data Management Plan (DMP) is to be delivered in M6 – March 2023 (D1.2). The objective of this deliverable is to coordinate and integrate all the data that the DARE2X project generates during its lifetime, and to manage how it will be accessed, exploited, and preserved in the afterlife of the project, according to the Findability, Accessibility, Interoperability and Reusability principles (i.e. FAIR principles).

The DMP will also serve to elaborate a first questionnaire to collect the KERs from the partners as part of the *Task 7.2 Market Analysis & Watch Activities for DARE2X exploitation strategy*.

During the lifetime of the project, and as soon as the scientific and industrial partners will produce the first outputs, these aspects will be also addressed from the D&C perspective, considering the classification of the information contained in the DMP, and ensuring that D&C tools and channels can also serve as a mean to implement the FAIR principles when it comes to public data.



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8. Conclusions

DARE2X is an ambitious R&I project investigating on a new process to produce green ammonia as a key chemical to enable the green energy transition. In force of this strategical objective, the consortium has recognised the importance of establishing an ambitious and effective D&C plan defined in the present deliverable D7.1.

The D&C plan describes in detail a multi-channel and multi-stakeholder strategy to allow raising awareness about the project and, at the same time, to enable the re-use of the scientific and technical results. The D&C strategy of DARE2X has been structured following the definitions of dissemination and communication, provided by the EC, and considering the key messages (WHAT) to be conveyed to the main stakeholders (WHO) through tailored channels (HOW) according to the project timeline (WHEN). All these elements will be measured through KPI allowing to evaluate the level of achievement of the D&C objectives.

Taking into consideration the double objective of the D&C plan, **different tools and channels have been implemented** up to M6 – March 2023 in order to be continuously updated with the contribution of the partners.

Among the communication tools, the visual identity, the website, the social media accounts and the printed and online materials were released. The first press release and articles were published both on the project website and other media. The e-Newsletter template was designed, and all the potential events where DARE2X results and activities could be presented have been identified. A promotional video is also planned to be released before the end of the project. Most of these means of communication are shown in the Annexes. These channels will be also used for dissemination purposes, when relevant, along with more specific tools, such as scientific publications and the attendance to specialised conferences and seminars.

Additionally, in order to enhance the D&C activities effectiveness, initial relations have been established between DARE2X and other similar EU-funded projects, as well as relevant companies and associations working on the topic of ammonia.

A simple methodology to allow the continuous monitoring of the D&C activities has been established, gathering periodic reporting from the partners' D&C activities. LOM, leading this group of tasks, will be responsible for collecting this information, as well as monitoring the KPI and the metrics of the online communication tools.

Thanks to the outstanding engagement of the partners, all these elements have shown that DARE2X project is advancing very positively through the implementation of an effective D&C strategy in order to produce the desired outputs and impacts at scientific, economic and societal level.

An updated version of this deliverable will be produced at M18 – March 2024.



ANNEX I: PROJECT BRAND BOOK

Vectorised Logo – all versions

DARE2X LOGO - PANTONE



DARE2X LOGO – BLUE 2 INKS



DARE2X LOGO – BLACK NO BACKGROUND



DARE2X LOGO – WHITE NO BACKGROUND



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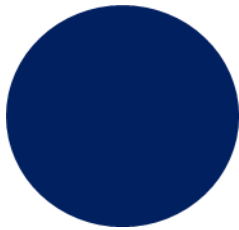
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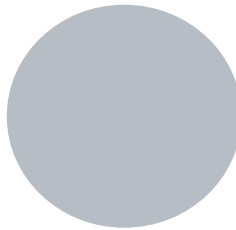
Colour palette



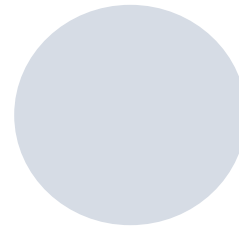
Red: 0
Green: 32
Blue: 96
Hex: #002060



Red: 88
Green: 146
Blue: 238
Hex: #5892EE



Red: 183
Green: 189
Blue: 196
Hex: #B7BDC4



Red: 214
Green: 220
Blue: 229
Hex: #D6DCE5

Font setting print & desktop presentation

Titles:

BIOME BOLD

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

abcdefghijklmnopqrstuvwxyz

BIOME REGULAR

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

abcdefghijklmnopqrstuvwxyz

BIOME LIGHT

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

abcdefghijklmnopqrstuvwxyz

Body:

Calibri (Body)

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

abcdefghijklmnopqrstuvwxyz



ANNEX II: COMMUNICATION MATERIALS

Brochure



Figure 13: Front view of DARE2X brochure



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Figure 14: Inside view of DARE2X brochure



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Figure 15: Exhibition view of DARE2X poster.



Figure 16: DARE2X poster.

Roll up



Figure 17: Exhibition view of DARE2X roll-up.




Figure 18: DARE2X roll-up.



e-Newsletter template

View this email in your browser

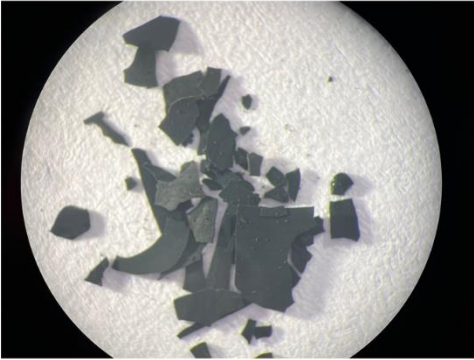


Dear reader,

Now that you've selected a template, you'll define the layout of your email and give your content a place to live by adding, rearranging, and deleting content blocks.

When you're ready to change the look of your email, take a look through the "design" tab to set background colors, borders, and other styles.




If you need a bit of inspiration, you can [see what other Mailchimp users are doing](#), or [learn about email design](#) and blaze your own trail.





Microscopic image of the catalysts - Cobalt samples. Cobalt is part of the transition metal group in the periodic table. The transition metals form colorful ions, so by looking at the color of our catalysts we can have an idea of the oxidation state our catalyst is in. DT1, 2022.

DARE2X IN THE NEWS

The DARE2X has been portrayed in several media outlets. You can read all the news the dedicated post in [DARE2X website](#).




  

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 Share  Tweet  Forward

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Want to change how you receive these emails?
You can [update your preferences](#) or [unsubscribe from this list](#).

"!IF:REWARDS!" "HTML-REWARDS!" "END:IF!"

Figure 19: DARE2X e-newsletter template.



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ANNEX III: D&C QUESTIONNAIRE FOR PARTNERS



This questionnaire consists of five tabs covering different topics and information that LOMARTOV will collect throughout the project in order to fulfill the objectives of WP7. The purpose of this questionnaire is to collect as much information as possible to help define the communication, dissemination, and exploitation of the project. This questionnaire will be sent to you every six months, and you will be responsible for updating it with new information.

- 1) **Publications released and foreseen** during the whole duration of the project. You can choose in the scroll down menu: Paper, Magazine, Website, Other
- 2) **Participation in / organisation of events.** Report all relevant data regarding any event related with DARE2X that you have attended or organised.
- 3) **EU Projects** - possible synergies with DARE2X. Comment if one of the project selected is not relevant for you and add any other relevant project which we should consider to establish synergies.
- 4) **Social media activity.** Indicate the number of followers you have reached up to the current date.
- 5) **Private companies and organisations** that can be crucial to exploit and further scale-up DARE2X results. Indicate any relevant company or industrial partner which could be crucial for the future upscale and exploitation of DARE2X. These actors could also be part of the Advisory Board.

Please note the following:

- 1) Sometimes it won't be possible for you to fill out all entries for a given activity (e.g. the estimated audience at events where you presented/are going to present the project). That can happen and it is OK, just please keep in mind that the more inputs you manage to provide the better, as this kind of data is requested by the European Commission.

Please check the completeness of your contribution with the communication officers of your organisation



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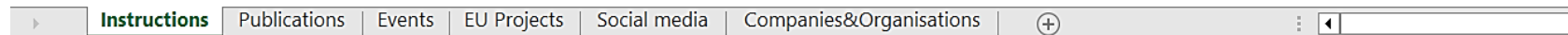


Figure 20: D&C questionnaires for partners - Instructions



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Part of this project has also received funding from UK Research and Innovation.

Please insert the name of your organisation and list the types of publications that you already made and/or that you plan to realise during the project with a date estimation. Please choose the type of publication according to its nature: Paper (scientific publication for advanced audiences), magazine/newspaper (printed or on-line version of a magazine/newspaper) our website (web of your institution/organisation). In the tab "Type of audience" define if the publication is targeting a broad audience or a scientific/industrial audience. Please also specify which sector are you targeting (e.g. ammonia, transport, chemicals, plasma technology etc.)

Partner	Type of publication	Type of content	Name of the publication	(Expected) publication date	Useful information pages, URL	Type of audience
LOMARTOV SL	Our Website	Press release	Lomartov website - Paving the way for green ammonia production	10/11/2022	https://lomartov.com/paving-the-way-for-green-ammonia-production/	General public
LOMARTOV SL	Our Website	News	Lomartov website - First newsletter	01/10/2023		General public, scientific community and industries from the end users selected by DARE2X (to be)
Kemijski institut - National Institute of Chemistry	Paper	Article	Scientific paper - title TBD	2024		Scientific community
Teknologisk Institut	Magazine/newspaper	News	Ingénue - Teknologisk Institut i spidsen for internationalt projekt: Plasma til fremstilling af grøn ammoniak. # Technological Institute at the forefront of international project: Plasma for the production of green ammonia.	03/02/2023	Teknologisk Institut i spidsen for internationalt projekt	Specialized newspaper for Danish Engineers
Teknologisk Institut	Magazine/newspaper	News	Automatik & proces - PtX-projekt skal skabe grøn energi. Et internationalt projekt, ledet af Teknologisk Institut, skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X, PtX. # PtX project must create green energy. An international project, led by the Danish Technological Institute, will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X, PtX.	03/02/2023	Et internationalt projekt, ledet af Teknologisk Institut, skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X, PtX. # PtX project must create green energy. An international project, led by the Danish Technological Institute, will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X, PtX.	Automatik & proces: Online media focused on automation and processes.
Teknologisk Institut	Magazine/newspaper	News	Effektivt Landbrug - Fossilfri gødning og skibsbrændstof skal produceres med grøn energi. Nyt internationalt projekt skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X. # Fossil-free fertilizer and marine fuel must be produced with green energy. New international project will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X.	03/02/2023	Effektivt Landbrug - Fossilfri gødning og skibsbrændstof skal produceres med grøn energi. Nyt internationalt projekt skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X. # Fossil-free fertilizer and marine fuel must be produced with green energy. New international project will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X.	Online media focused on agriculture.
Teknologisk Institut	Magazine/newspaper	Article	Alt om teknik - Fossilfri gødning og skibsbrændstof skal produceres med grøn energi. Nyt internationalt projekt skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X. # Fossil-free fertilizer and marine fuel must be produced with green energy. New international project will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X.	03/02/2023	Alt om teknik - Fossilfri gødning og skibsbrændstof skal produceres med grøn energi. Nyt internationalt projekt skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X. # Fossil-free fertilizer and marine fuel must be produced with green energy. New international project will make it possible to produce fossil-free ammonia for fertilizer and fuel using Power-to-X.	Online media about all kinds of technical solutions
			Søfart - Fossilfri gødning og skibsbrændstof skal produceres med grøn energi. Nyt internationalt projekt skal gøre det muligt at producere fossilfri ammoniak til gødning og brændstof ved hjælp af Power-to-X. # Fossil-free fertilizer and marine fuel	03/02/2023		

Figure 21: D&C questionnaires for partners - Publications

DARE2X In this tab, you can include any events in which you plan to participate or organize. For planned conference you can also highlight in which one you plan to assist.

Partner	Your role	Type	Name of the event	Venue	Date	Importance for DARE2X	Topic	Objetives	Type of audience (general, scientific community...)	Number of participants - Audience reached (after the event)	Link
	Participant	Fair	Ecomondo - The green technology expo	Rimini, Italy	7-10/11/2023	Visibility of the project	From the recovery of materials and energy to sustainable development	Networking - The benchmark event in Europe for technological and industrial innovation. An international event with an innovative format that brings together all sectors of the circular economy on a single platform from the recovery of materials and energy to sustainable development.	General, industrial		https://en.ecomondo.com/eco-mondopresentation
	Participant	Conference	Plasma Conferences 2022/2023/2024	Different places in Europe	2023 & 2024	Visibility of the project and specific talks on the innovation brought by the use of plasma technology	<i>please all partner check these conferences and select which one you think would be more suitable from your point of view</i>	Present the first results on the use of plasma in the reactor?	Scientific community from the plasma sector		https://conferenceindex.org/conferences/plasma
Teknologisk Institut	Participant	Conference	6th European Power to Ammonia® Conference	Rotterdam, Netherlands	8-9/06/2023	Early 2023 the registration for the NH3 Event Europe 2023 will open. First official presentation of the project in front of an audience experienced in NH3 research	<i>please all partner check if you could assist this conference. Costs is about 1450 to present</i>	General presentation of DARE2X concept. Knowledge sharing and networking	Scientific community from the ammonia sector		https://nh3event.com/event/h3-event-europe-2023/
	Participant	Conference	6th AMMONIA AS FUEL WORLD SUMMIT	Online	30/01/2023	First official presentation of the project in front of an audience experienced in NH3 research	<i>please all partner check if you could assist this conference. Attendance should be completely online</i>	General presentation of DARE2X concept. Knowledge sharing and networking	Scientific community from the ammonia sector		https://www.equip-global.com/ammonia-as-fuel-world-summit
	Participant	Conference	ICGC 2023: International Conference on Green Chemistry	Venice, Italy	10-11/08/2023	First official presentation of the project in front of an audience experienced in green chemistry	<i>please all partner check if you could assist this conference</i>	General presentation of DARE2X concept. Knowledge sharing and networking	Scientific community from the ammonia sector		https://www.icgc-green-chemistry-conference-in-august-2023-in-venice
Kemijski inštitut - National Institute of Chemistry	Participant	Conference	Slovenian Chemical Days	Portorož, Slovenia	sep-23	Presentation of scientific output	Modelling and/or synthesis	Present the results on modelling and/or synthesis	Scientific community in general		Not available yet
University of Liverpool	Participant	Conference	15th European Congress on Catalysis EuropaCat	Prague, Czech republic	27/08- 1/09/2023	Presentation of scientific output	Synthesis	Present the results on synthesis	Catalysis community		https://www.europacat2023.cz/
University of Liverpool	Participant	Conference	25th International Symposium on Plasma Chemistry (ISPC25)	Kyoto, Japan	21-26/May/2023	Presentation of scientific output	Synthesis	Present the results on synthesis	Plasma chemistry community		https://www.ispc25.com/
University of Liverpool	Participant	Conference	243rd ECS Meeting	Boston, USA	28-may-23	Presentation of scientific output	Synthesis	Present the results on synthesis	Electrochemistry community		https://ecs.confex.com/ecs/243/efc.cgi
	Participant	Conference	MATSUS Materials for Sustainable	Palacio de Congresos, Valencia	06-10/03/2023	Presentation of the project		MATSUS will consist on a forum for directing the knowledge and tools of science and technology of advanced materials to contribute to solve major			http://www.nanoge.org/MATSUS23/home

Figure 22: D&C questionnaires for partners - Events



In this tab, you can find a list of EU projects that could be relevant for DARE2X. Please add more if you know of some other EU projects, and kindly help verify and identify the synergies with each of the projects in the table. Please also indicate if a project does not seem relevant to DARE2X.

Name of project	Goal	Possible synergies with DARE2X	Programme	Topic	Call for proposal	Coordinator	Contact	Link to CORDIS	Link to the project website	Have you contacted the Project?	Keywords
METHAREN – Innovative biomETHANE system integration boosting production while managing Renewable energies intermittENeG	Demonstrate a cost-effective, innovative, more sustainable and circular biomethane production system enabling renewable energy sources intermittency management. To do so, METHAREN is providing improvements beyond the state-of-the-art along four main axes related to: i) the biogas plant efficiency; ii) flexibility and energy management for RES integration; iii) the circularity approach for sustainable production and iv) innovative business models and adapted policies.	Lomatorv is a partner in this project. The consortium of METHAREN is interested in the ammonia production process developed by DARE2X. Invitation to open dissemination and communication events.	HORIZON.2.5 - Climate, Energy and Mobility	HORIZON-CL5-2021-D3-03-16 - Innovative biomethane production as an energy carrier and a fuel	HORIZON-CL5-2021-D3-03	TEN NETHERLANDS BV Netherlands, France, Italy	Coordinator: Stephane stephane.walspurger@technipenergies.com (technip Netherlands). Contact technical coordinator Xavier Miller and xavier.millerand@technipenergies.com (technip France)	https://cordis.europa.eu/project/id/101084288	Not available yet	Yes, LOMARTOV has direct contact	Electrolysis, renewable energy, biofuels
H5tRAm – Hydrogen Storage and Transport using Ammonia	The project will demonstrate a compact containerised ammonia synthesis system which is based on two main consecutive stages: 1) A short-term storage hydrogen vessel which will serve as a buffer to store and transport the hydrogen produced by electrolysis; 2) An ammonia synthesis reactor based on an improved the Haber-Bosch process where the stored hydrogen will react with nitrogen to form ammonia using the novel catalysts and sorbents developed in H5tRAm.	kemijski institut is a partner in this project. Some synergies could be developed between these two projects.	HORIZON.2.4 - Digital, Industry and Space	HORIZON-CL4-2021-RESILIENCE-01-17 - Advanced materials for hydrogen storage (RIA)	HORIZON-CL4-2021-RESILIENCE-01	Aalborg University Denmark	Flora Champetier: fch@adm.aau.dk	https://cordis.europa.eu/project/id/101058443	https://www.h5ttram.eu/		electrolysis, thermodynamics, catalysis, sorbents, energy and fuels, ammonia synthesis reactor.
AMBER – Ammonia and MOF Based Hydrogen storage for eEurope	For long-term storage, advanced materials (pore catalysts and membranes) and their combination in an intensified 3D-printed intensified periodic open cell structured reactor will be developed to allow hydrogen storage in the form of ammonia (NH3) in a cost-efficient and resource-effective process at lower temperatures and pressures compared to conventional processes.	AMBER project is validating both short-term and long term solutions at TRL 5 addressing the positioning of the solutions developed in relevant business cases. Some synergies could be established at TRL phase.	HORIZON.2.4 - Digital, Industry and Space	HORIZON-CL4-2021-RESILIENCE-01-17 - Advanced materials for hydrogen storage (RIA)	HORIZON-CL4-2021-RESILIENCE-01	FUNDACION TECNALIA RESEARCH & INNOVATION Spain	Dr. José-Luis Viviente: jose.luis.viviente@tecnalia.com	https://cordis.europa.eu/project/id/101058565	https://www.amberproject.eu/	Yes, LOM contacted. Waiting for the feedback from the coordinator.	catalysis, chemical process engineering.
PlasNH3 – Developing Plasma-assisted ammonia technology for decarbonisation of power production	The EU-funded PlasNH3 project aims to optimise the existing burner for pure ammonia while maintaining high fuel efficiency and low combustion emissions.	This is an individual fellowship, therefore the only partner to be contacted is the University of Birmingham.	H2020-EU.1.3 - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions	MSCA-IF-2020 - Individual Fellowships	H2020-MSCA-IF-2020	THE UNIVERSITY OF BIRMINGHAM United Kingdom	Mehdi Jangi m.jangi@bham.ac.uk	https://cordis.europa.eu/project/id/101020492	Individual Fellowships		electrolysis, hydrocarbons, energy and fuels
Ammonia2-4 - Demonstrating a 2-stroke and 4-stroke large scale ammonia marine engine	Develop and demonstrate a four-stroke and a two-stroke dual-fuel marine engine running on ammonia as the main fuel. The four-stroke will be a new engine while the two-stroke can be retrofitted to any commercially available two-stroke engine. The two engines have the potential to reduce greenhouse gas emissions by at least 80% including nitrous oxide emissions.	Use of ammonia as marine fuel considering aspects such as health & safety, ammonia supply infrastructure, crew training & acceptance, but also novel standardisation pathways for regulating emissions from ammonia marine engines. These developments could be useful for DARE2X.	HORIZON.2.5 - Climate, Energy and Mobility	HORIZON-CL5-2021-D5-01-14 - Proving the feasibility of a large clean ammonia marine engine (ZEV7 Partnership)	HORIZON-CL5-2021-D5-01	WARTSILA ITALIA SPA Italy	info@wartsila.com	https://cordis.europa.eu/project/id/101056835			energy and fuels, sea vessels
MOF2H2 - Metal Organic Frameworks for Hydrogen production by photocatalytic overall water splitting	The MOF2H2 project positions itself as a game changer to produce hydrogen from water through a more sustainable process: photocatalytic overall water splitting using non-noble materials.	The project started in Nov 2022. Share results on water splitting technology?	HORIZON.2.5 - Climate, Energy and Mobility	HORIZON-CL5-2021-D3-03-02 - Next generation of renewable energy technologies	HORIZON-CL5-2021-D3-03	ECOLE SUPERIEURE DE PHYSIQUE ET DE CHIMIE INDUSTRIELLES DE LA VILLE DE PARIS France	christian.zerne@espclps.eu Industrial relations: brigitte.beaussart@espclps.eu	Metal Organic Frameworks for Hydrogen production by photocatalytic overall water splitting MOF2H2 Project 1 Fact Sheet HORIZON CORDIS		Yes, LOM contacted and received feedback. They forwarded us to the project coordinator, who is interested in exploring synergies. Waiting for a response.	photocatalysis, hydrogen energy
ARENHA - project Advanced materials and Reactors for EMergy storage through Ammonia	Catalysts for low-temperature/pressure ammonia synthesis, solid adsorbents for ammonia synthesis intensification and storage, and membrane reactors for ammonia decomposition to pure hydrogen (> 99.99 %).	ARENHA will demonstrate the full power-to-ammonia-to-usage value chain at TRL 5. The project started on 1 April 2020 and counts with international advisory board composed of key energy stakeholders from the 5 continents.	H2020-EU.2.13 - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced materials	LC-NMBP-29-2019 - Materials for non-battery based energy storage (RIA)	H2020-NMBP-ST-IND-2018-2020	FUNDACION TECNALIA RESEARCH & INNOVATION Spain	Dr. José-Luis Viviente: jose.luis.viviente@tecnalia.com	https://cordis.europa.eu/project/id/101058482	https://arenha.eu/	Yes, LOM contacted. Waiting for the feedback from the coordinator.	catalysis, multiphysics, hydrogen energy

Figure 23: D&C questionnaires for partners – EU projects for CL&NT activities



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Part of this project has also received funding from UK Research and Innovation.



In this tab, you can include the metrics for your social media accounts. This information will give us an estimation on the audience we can reach.

Partner	Type of support (Website, Twitter, LinkedIn etc)	Date of action	Description	Link	Outreach	Method of outreach measurement
LOMARTOV SL	Twitter	14/12/2022	Publication	https://twitter.com/lomartov?s=20&t=clZ2j0aVYvBTc9ploPnu6A	147 followers on Twitter. NOV 2022: 2.0K impressions	Twitter metrics
LOMARTOV SL	LinkedIn	14/12/2022	Publication	https://www.linkedin.com/company/lomartov-sl/	1296 followers on LinkedIn. The followers are mainly based in Europe and 12.1% work as researcher followed by 9.1% in Operations and 8.2% in Engineering.	LinkedIn metrics
LOMARTOV SL	Website	14/12/2022	Publication: Paving the way for green ammonia production	https://lomartov.com/paving-the-way-for-green-ammonia-production/ https://www.linkedin.com/company/teknologiskinstitut/	NOV 2022: 1.67K Web impressions. Most searches come from Spain, France and Italy.	Google analytics
Teknologisk Institut	LinkedIn	01/11/2022	Publication	https://www.linkedin.com/company/teknologiskinstitut/	34,393 followers on LinkedIn. NOV 2022: 16 posts with 119k views and 3,650 engagements	LinkedIn metrics
Teknologisk Institut	Website	01/11/2022	Publication	https://www.teknologisk.dk/	For entire 2022: 716k users, of which 969k were new. 2M unique views, with average time of 1min24s and a bounce rate of 67%.	Google analytics
Hulteberg Chemistry & Engineering AB	LinkedIn	09/03/2023	Publication	https://www.linkedin.com/feed/update/urn:li:activity:7038479539357794305?utm_source=share&utm_medium=member_desktop	386 followers on LinkedIn. March 2023	LinkedIn metrics
ENSO INNOVATION	LinkedIn	01/11/2022	Publication	https://www.linkedin.com/company/o-innovation-sl-dare2x-horizoneurope-ammonia-activity-6991060738849038336-https://ensoinnovation.com/?s=dare2x	157 followers. March 2023	LinkedIn metrics
ENSO INNOVATION	Website	02/02/2023	Publication	https://ensoinnovation.com/?s=dare2x	TBC	Google analytics
		DD/MM/YYYY				
		DD/MM/YYYY				
		DD/MM/YYYY				
		DD/MM/YYYY				
		DD/MM/YYYY				
		DD/MM/YYYY				
		DD/MM/YYYY				

Figure 24: D&C questionnaires for partners – Social Media



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Indicate any relevant company, industrial partner or association which could be crucial for the future upscale and exploitation of DARE2X. Association are marked in blue. Please add any comment in the column F (objection or further information). *Associations are marked in blue

Name of the company/Organisation	Country and Headquarters	Possible synergies with DARE2X	Link to website	Keywords	Comments
Technip IT	Technip Energies N.V., ORIGINE, 2126 boulevard de la Défense, CS 10266, Nanterre CEDEX, 92741, France - a company incorporated under the laws of The Netherlands, with its corporate seat in Amsterdam, and registered with the Dutch Chamber of Commerce under number 76122654.	World-leading engineering and technology player for the energy transition. Leveraging their engineering expertise and technologies to develop new projects in hydrogen, sustainable chemistry, biofuels, CO2 management/ decarbonization in addition to other solutions. Different offices and plants in Europe.	https://www.technipenergies.com/en	Renewable energy, biofuels, Low carbon (blue)ammonia, Low-carbon hydrogen	
Ammonia Energy Association (AEA)	Ammonia Energy Association 77 Sands Street, 6th Floor Brooklyn, NY 11201	They have an accessible large list of members that match the end-users stakeholders of DARE2X.	https://www.ammoniaenergy.org/about/	energy transition, decarbonization of ammonia	
First Ammonia	One Rockefeller Plaza, Suite 2416 New York, NY 10020	modular, commercial-scale plant to produce green NH3 from intermittent renewable energy and the first to use SOEC technology. Its first	https://firstammonia.com/	energy transition,	
Fertiglobe	OCI N.V. Honthorststraat 19 1071 DC Amsterdam The Netherlands	ammonia combined, the largest producer of nitrogen fertilizers by production capacity in the Middle East and North Africa region, and an early mover in clean ammonia.DARE2X	https://www.oci.nl/hydrogen/clean-ammonia/	Blue and green ammonia, bio ammonia	
Yara Clean Ammonia	Drammensveien 131 0277 Oslo - Norway	World's leading crop nutrition company and a provider of environmental and agricultural solutions. Their clean NH3 unit is capturing	https://www.yara.com/yara-clean-ammonia/		
Copenhagen Infrastructure Partners (CIP)	Copenhagen Infrastructure Partners Amerika Plads 29 DK-2100 Copenhagen Ø	development of the first phase of Project Catalina in partnership with Enagás, Naturgy, Fertiberia and Vestas. It is a pioneering green H2 and green NH3 GW-scale project that aims to bring the abundant renewable resources of Aragon region in Spain to the industrial	Link	green fertilisers, green ammonia, green hydrogen	

Figure 25: D&C questionnaires for partners - Events



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