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EXSOLUTION-BASED NANOPARTICLES FOR LOWEST COST GREEN HYDROGEN VIA ELECTROLYSIS



Dissemination and Communication Strategy (Deliverable D6.1)

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NOTICES

For information, please contact the project coordinator, Mari Šavel, e-mail: mari.savel@stargatehydrogen.com. This document is intended to fulfil the contractual obligations of the EXSOTHyC project, which has received funding from the Clean Hydrogen Partnership and its members, concerning deliverable D6.1 described in contract 101137604.

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- Mari Savel, Stargate

Table of revisions

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List of Partners

Stargate Hydrogen Solutions OÜ (Stargate)
University of St Andrews (St Andrews)
Agfa-Gevaert NV (AGFA)
Eindhoven University of Technology (TUE)
Fraunhofer IFAM (IFAM)

List of Abbreviations

EU – European Union

HE/HER – Hydrogen Europe/ Hydrogen Europe research

KOLs – Key Opinion Leaders

KPI – Key Performance Indicator

OEM - Original Equipment Manufacturer

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1 Objectives

The document represents the strategy of dissemination and exploitation of the project's outcomes to a broad spectrum of stakeholders to maximise the impact of the outcomes. Moreover, it gives guidelines how to communicate the project's progress in a clear way and thereby ensure broad stakeholder engagement at different levels.

Specifically, the strategy gives means to contributes to:

- **Awareness increase:** Advertising the project aims to raise awareness about its existence, purpose, and significance of the EXSOTHyC project among the target audience. Including beneficiaries, stakeholders and the general public.
- **Interest generation:** Spark interest in the project, enticing individuals or organizations to learn more about it, engage with its activities, or even become partners or collaborators.
- **Engaging drive:** Encourage active participation and engagement with the project by attending events, joining discussions, or contributing resources.
- **Building credibility:** By showcasing the project's achievements, milestones, and endorsements, advertising helps build credibility and trust among stakeholders, reinforcing its legitimacy and impact.
- **Fostering networking:** Create networking opportunities and highlighting potential synergies, advertising can facilitate the formation of partnerships, alliances, or collaborations beneficial to the project's goals.

2 Methodology of the strategy

The aim is to ensure maximum potential reach of all relevant information, by establishing data flows and effective use of channels that shall provide a foundation for an efficient and targeted strategy.

The document involves both, dissemination and communication activities that have the following objectives:

Dissemination Activities

Dissemination shall provide direct outreach to the main stakeholders and potential users of project results and outcomes, aiming to facilitate uptake and prospective use of the results.

Communication Activities

The communication activities should promote the entire action, both the project itself and its ongoing activities and results, to a wider range of audiences, including the general public, traditional and social media.

The EXSOTHyC dissemination and communication strategy is structured as follows:

- target groups, key messages and KPIs
- dissemination and communication tools
- dissemination to the target groups

These elements have been defined in the early stages of the project and are detailed below.

2.1 Target groups, key messages and expected KPIs

We have identified the audience that will be most interested to the project's results, including audience that will deal with the take-up and wider use of the EXSOTHyC outcomes.

The dissemination of results via outreach activities will transfer knowledge from the project team to the project stakeholders and other interested parties throughout Europe and internationally. Table 1 gives an overview of the target groups, as well as highlights the goals of dissemination for each one.



Table 1 EXSOTHyC target groups

Message and objective	Activities
Target group: Industry (electrolyser manufacturers, component manufacturers, OEMs, ammonia, refining, methanol, steel), energy companies and renewable energy sector Example companies: Rockfin sp. z o.o, Milani SPA with whom Stargate has already signed LOIs	
Introducing and promoting the wide-scale uptake of the alkaline electrolysis technology by easy-to-digest high-level information about EXSOTHyC to engage with new potential customers.	Organise live-demos, dissemination workshops, face-to-face meetings and free online webinars. Posts on professional social media, newsletters. Provide benefit and performance reviews to facilitate the uptake of the project outcomes.
Target group: Related scientific community, academics	
Increased scientific cooperation, knowledge transfer, greater spill-over effect; introduce the results of the EC-supported project.	Articles in scientific journals, participation at scientific events; national and international media; skill development materials; press releases, website.
Target group: Policy makers, KOLs, Hydrogen Europe, Hydrogen Europe Research, Environmental organisations	
Directions for on-going and future policy making; base for other research projects that might grow out of developed components and knowledge as well as reducing the impact of human activities on the environment.	Discussions to initiate novel technology uptake for the EU and to implement the EU Green Deal, RePower and other policies. Especially, when designing policy measures on electrolysers, alkaline electrolysers are often considered as inflexible, unable to follow intermittent loads and having the minimum load issue. Once the goals achieved and results commercialised, the policy measures would have to be updated. For better communication, also SSH disciplines will be deployed.
Target group: Standards organizations, standards bodies	
To improve safety, simplify the installation, design, and permitting process, helping thus to speed up H2 projects.	The outcomes of the accelerated testing procedure (WP4) could provide input for relevant technical standards.
Target group: Wider society	
Overall awareness increase on alkaline electrolysis technology and green hydrogen in general.	Articles in national and international media; posts on popular social media platforms.

Expected KPIs:

Target group	KPIs
Industry	Prototype stack demonstration workshops; presentations at relevant events (major fair trades, conferences); face-to-face meetings; newsletters.
Related scientific community, academics	Participation at scientific events, wherefrom presentations in ≥ 15 events and ≥ 10 articles in journals.
Policy makers, KOLs, HE/HER, Environmental organisations	Whitepapers, meetings / suggestions. Participation in related social EU organised workshops/discussion.
Standards organizations, standards bodies	Joining the committees of affected stakeholders for developing respective standards. E.g. Stargate is a co-founding member of the national Technical Committee on Hydrogen Technologies, actively establishing the regulative framework for green H ₂ projects in EU.
Wider society	Articles in national and international media; news on television; website; posts on social media and tech platforms; press releases.

2.2 EXSOTHyC brand and developed communication tools

2.2.1 Visual identity

We have created materials and tools with common look and feeling for visual representation of the project that is easily recognisable. The below will be used for look for project-related documents, papers, deliverables, technical reports, presentations, fact sheets and other assets.

Project logo

The EXSOTHyC logo follows the best practices of graphic design that are simplicity, memorability and versatility.

The logo is the visual representation of the project's brand, encapsulating its essence, values, and promise in a single mark. It's the first impression, the ambassador, and the timeless symbol that resonates with audiences, fostering recognition, trust, and loyalty.

For this project, the logo is composed by two parts, the icon and the type, that together complete the EXSOTHyC brand identity. The icon is based on the exsolution materials that resemble small particles evenly distributed on larger particles. The type part is written in

“A logo doesn't sell (directly), it identifies”.

Paul Rand, the father of graphic design

one of the world most known fonts, Arial. The first part is written in bold and stands for the exo-particles. Exo that from Latin means external.

The brand follows a thoughtfully crafted colour palette with complementary colours that play a vital role in defining the brand's differentiation. It contributes significantly to the overall effectiveness and impact of the logo design especially when compared with other projects under the same scope that usually are designed in tones of green and can be easily mistaken for one another. Moreover, the logo was designed in a way that allows it to be used in black&white without losing its recognition.



Logo placing delimitations



EXSOTHyC fonts

Fonts

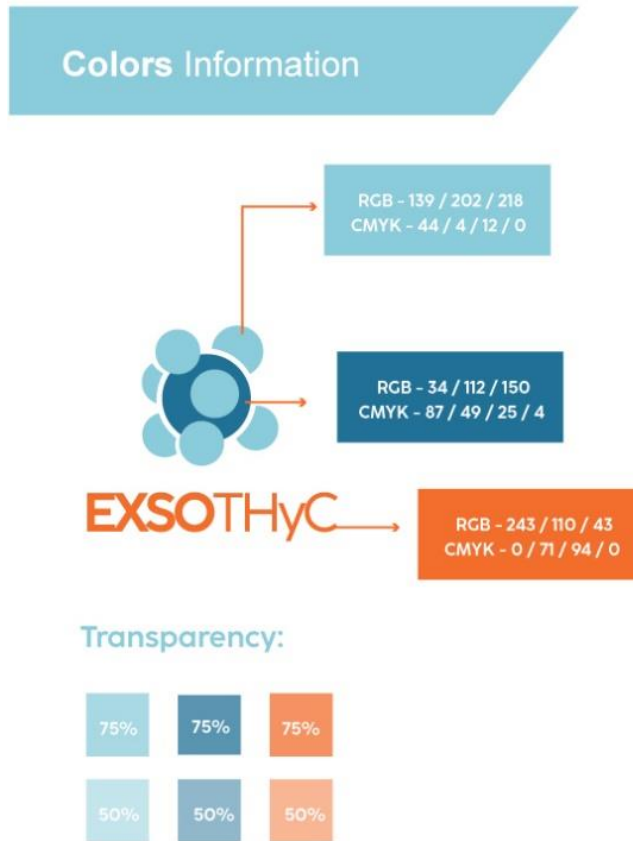
Arial regular

Arial Bold

ABCDEFGHIJKLMN
OPQRSTUVWXYZW
123456789

Spacing between letters = 10 pts

RGB and CMYC colour codes



Power Point Template



2.2.2 Press release

HEADING: EXSOTHyC: A new European project tackles green hydrogen production costs via material innovation

[Tallinn, 20 March 2024] – The consortium partners are thrilled to announce the commencement of EXSOTHyC, a three-year research project funded by the Clean Hydrogen Partnership focusing on electrolyser innovation. The project is a joint effort between the European industry and research organisations.

EXSOTHyC is coordinated by Stargate Hydrogen and project partners include the University of Saint Andrews, Agfa-Gevaert, Eindhoven University of Technology, and Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM. The project brings together researchers and engineers from five countries: Estonia, the UK, Belgium, the Netherlands, and Germany.

In contrast to the commonly adopted approach, the EXSOTHyC project will optimise electrolyser operation towards lower voltages and higher efficiencies. Within the project, a breakthrough concept for catalyst materials, cell and stack components for alkaline electrolysers will be developed. The full name of the project is ‘Exsolution-based Nanoparticles for the Lowest Cost of Green Hydrogen via Electrolysis’. A class of ceramic materials that form highly active metallic nanoparticles on the surface upon exposure to reducing atmosphere (a process called ‘exsolution’), plays a central role in the project.

Rainer Küngas, the CTO of Stargate Hydrogen, says: *“Exsolution materials have revolutionized the fields of automotive emissions control and solid oxide electrolysis. In EXSOTHyC, we are demonstrating the potential of this versatile class of ceramic materials for improving the performance of alkaline electrolysers.*

We are proud to be coordinating the project and look forward to developing the world’s first alkaline electrolysis stack based on exsolution materials as part of the project.”

The development of exsolution materials in the project will be spearheaded by Professor **John T. S. Irvine** and his team at the **University of St. Andrews**. Prof. Irvine has authored many of the seminal publications on exsolved nanoparticles, demonstrating the performance and versatility of this class of materials, as well as their unique resilience to degradation.

However, the EXSOTHyC project is not only about making the use of exsolution materials in low-temperature electrolysis applications less exotic, but includes several important further innovations.

The electrode development and fabrication efforts in the project are led by the Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) in Dresden.

Dr.-Ing. Nadine Eißmann, Group Manager Functional Materials at Fraunhofer IFAM, comments: *“We are excited to coat this new class of catalyst material on highly porous three-dimensional electrodes. We will pay special attention on activity, robustness, and long-term durability of the resulting electrodes to enable the path for an industrial application within the upcoming years.”*

The operating window of state-of-the-art alkaline electrolyzers is often limited due to gas crossover, a phenomenon where gases pass through the porous diaphragm separating the anode and the cathode in the cell. Agfa-Gevaert, the producer of Zirfon® membranes, will develop next-generation diaphragms in the project to improve the performance of alkaline cells, particularly at lower current densities.

Ruben De Bruycker, Innovation & Strategy Manager at Agfa says: *“EXSOTHyC allows us to explore breakthrough membrane concepts, focusing on improving the interplay with electrodes and further increasing the dynamic behavior of alkaline water electrolyzers.”*

The project further involves the development of novel membrane electrode assembly concepts, integrating electrodes onto Zirfon® membranes, as well as investigations in the dynamic operation stability of alkaline electrolyzers. These two activities in the project are led by Eindhoven University of Technology.

Dr. Maximilian Demnitz, from TU/Eindhoven comments: *“We at TU/e are excited to be part of the cross European consortium to enhance alkaline water electrolysis technology. Within the EXSOTHyC project, TU/e will focus on multiple core aspects of AWE, such as improving the electrode diaphragm interface via catalyst coated diaphragms, developing accelerated stress test strategies, and deciphering the role of shunt and reverse currents within electrolyser stacks. As the project brings together excellent research institutions as well as front industry runners for the technology, we look forward on how to best make cheap green hydrogen a reality through our combined efforts.”*

The EXSOTHyC Project represents a collaborative endeavor at the forefront of innovation, bringing together diverse expertise to address the urgent need for sustainable energy solutions. The project’s esteemed partners are committed to driving the world towards a cleaner, greener future via breakthrough innovation in alkaline electrolysis technology.

For media inquiries, please contact:

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Learn More about EXSOTHyC:

On the following channels you can find more information about EXSOTHyC objectives and contact details for inquiries at www.linkedin.com/company/exsothyc.

About the consortium partners:

Stargate Hydrogen - <https://stargatehydrogen.com/>

In 2021, Stargate began its quest to combat climate change with affordable green hydrogen. Stargate's novel alkaline electrolyser stacks and systems enable its customers to produce green hydrogen at high efficiencies and low production costs. The scale-up of Stargate's unique electrolysis technology has been identified by the European Commission as an Important Project of Common European Interest (IPCEI).

Fraunhofer - <https://www.ifam.fraunhofer.de/en.html>

The Fraunhofer-Gesellschaft, based in Germany, is the world's leading applied research organization. By prioritizing key technologies for the future and commercializing its findings in business and industry, it plays a major role in the innovation process. A trailblazer and trendsetter in innovative developments and research excellence, it is helping shape our society and our future. With its expertise in powder metallurgy, material development and component characterization for alkaline electrolysis, Fraunhofer IFAM brings its highly specialized expertise to complement those of the other partners. With regards to hydrogen-related technologies, Fraunhofer IFAM is a driver in the development and implementation of new technologies, including those around electrodes utilised in the production of hydrogen via alkaline electrolysis.

Agfa - www.agfa.com/

The Agfa-Gevaert Group is a global imaging technology leader with over 150 years of innovation. From healthcare to printing, industrial applications and green hydrogen solutions, Agfa develops cutting-edge analogue and digital systems. We operate through three divisions - HealthCare IT, Radiology Solutions, Digital Print & Chemicals. Headquartered in Mortsel, Belgium and with major centers worldwide, Agfa is committed to driving positive change for a greener, healthier, and brighter future.

Eindhoven University of Technology - <https://www.tue.nl/en/>

Eindhoven University of Technology is a research-driven university of international standing, where excellent research and excellent education go hand in hand. The

university connects students, researchers and entrepreneurs and believes innovation starts with people, not with technology.

University of Saint Andrews - <https://www.st-andrews.ac.uk/>

The University of St Andrews is Scotland's first university, founded in the early 15th century. It is the third oldest university in the English-speaking world and has received the title of Top University in the UK in 2024 and Number 1 in the UK for the second year in a row according to the Guardian University Guide 2024.

Distribution list:

- Science Journalists
- Science Communication Outlet
- Research Institutions and Universities
- Industry Publications
- Professional Organizations and Societies
- Government Agencies
- Online Science Communities and Blogs
- Local Media Outlets
- Existing Collaborators and Partners

By diversifying the outreach across these above listed categories, the project ensures visibility and resonance of the press release.

2.2.3 Project website

The project website is up and running since 26.03.2024 in the domain www.exsothyc.com. The aim of the website is to address customer inquiries and build trust on a wider scale.

The website is structured with the following sections:

- **Section 1** – Above the fold – The project's punchline describing its objective followed by the partner's group picture.
- **Section 2** – Project's description
- **Section 3** – Project's concept
- **Section 4** – List of work packages
- **Section 5** – List of partners with direct links to their websites
- **Section 6** – Project's Motivation
- **Section 7** – Project's objective
- **Section 8** – Project's impact
 - **Scientific**
 - **Economic**
 - **Societal**
- **Section 9** – Latest news
- **Section 10** – Contact form
- **Section 11** – Downloadable resources
- **Section 12** – Footer



EXSOThyC Home | Consortium | News & Events | Downloadable | Contact

Efficiency Redefined. Exsolution-Based Nanoparticles for the Lowest Cost of Green Hydrogen.

The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.



The concept

The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.

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EXSOThyC

Efficiency Redefined. Exsolution-Based Nanoparticles for the Lowest Cost of Green Hydrogen.

EXSOThyC

Efficiency Redefined. Exsolution-Based Nanoparticles for the Lowest Cost of Green Hydrogen.

EXSOThyC

Efficiency Redefined. Exsolution-Based Nanoparticles for the Lowest Cost of Green Hydrogen.

The objective

The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.

The motivation

- The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.
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- The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.

Work packages

- WP1: Exsolution-based nanoparticle synthesis
- WP2: Exsolution-based nanoparticle synthesis
- WP3: Exsolution-based nanoparticle synthesis
- WP4: Exsolution-based nanoparticle synthesis
- WP5: Exsolution-based nanoparticle synthesis
- WP6: Exsolution-based nanoparticle synthesis
- WP7: Exsolution-based nanoparticle synthesis

The impact

Scientific

The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.


Economic

The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.

Societal

The EXSOThyC consortium is led by two world-leading research centers, which will bring together the best minds in exsolution-based nanoparticle synthesis, catalysis, and hydrogen production to create a new generation of green hydrogen.

Consortium partners



News & Events

EXSOThyC

EXSOThyC

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Contact

First name: Last name: Email:

Message:

Receive EXSOThyC newsletter

Downloadable resources

EXSOThyC

EXSOThyC

EXSOThyC

EXSOThyC

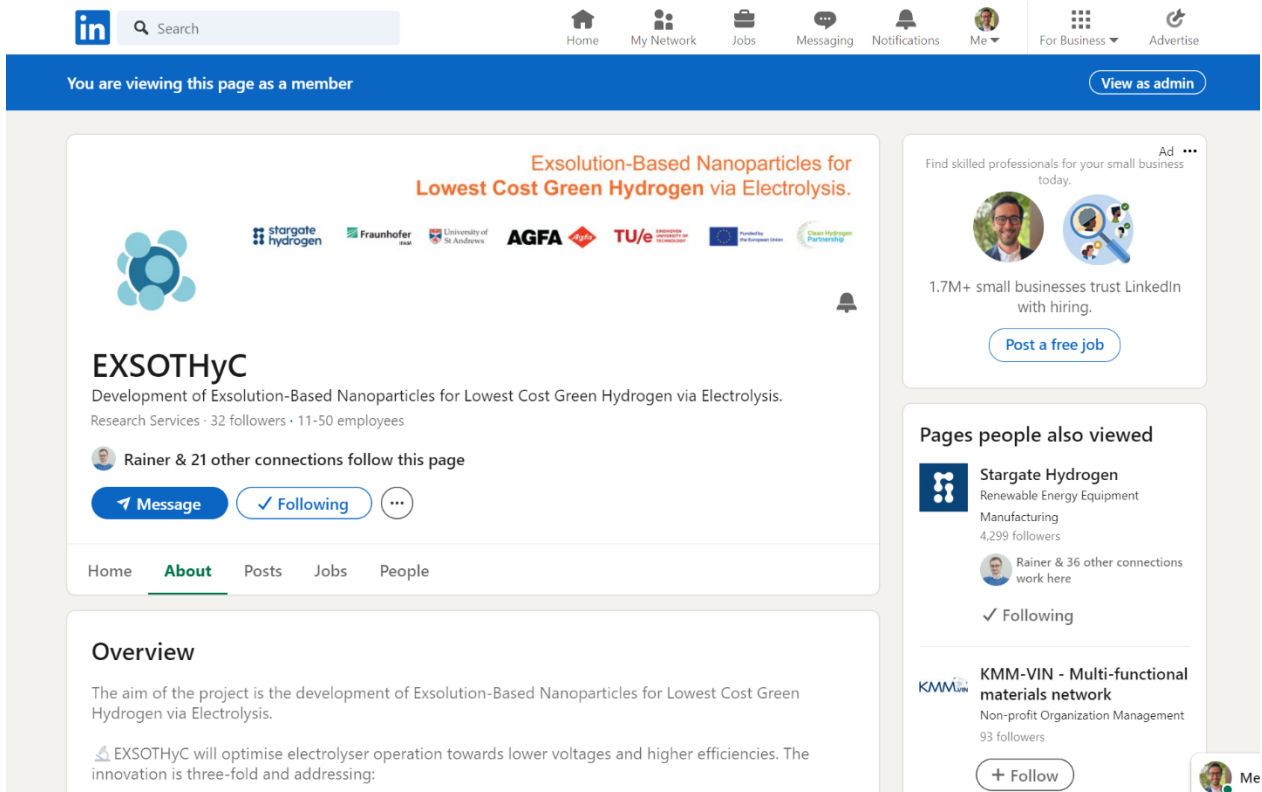
EXSOThyC Home | Consortium | News & Events | Downloadable | Contact

2.2.4 Social media

LinkedIn page - www.linkedin.com/company/exsothyc/

In today's interconnected landscape, establishing a LinkedIn page for a scientific project is a strategic move with multifaceted benefits. Firstly, LinkedIn serves as a hub for professional networking, offering access to a diverse array of potential collaborators, investors, and stakeholders crucial for the project's growth and success. By cultivating a presence on this platform, the project gains traction, builds credibility, and attracts the attention of key players in its field.

Furthermore, LinkedIn provides an invaluable platform for thought leadership and knowledge dissemination within the scientific community. Through consistent updates, engaging content, and active participation in relevant groups and discussions, the project can establish itself as a leading voice, sparking meaningful dialogue and driving innovation. Moreover, by connecting with like-minded professionals and organizations, the project opens doors to collaboration opportunities, fostering knowledge exchange and accelerating progress. In essence, leveraging LinkedIn isn't just about visibility—it's about strategically positioning the scientific project for maximum impact and advancement in its field.



The screenshot shows the LinkedIn profile page for EXSOThyC. The page header includes the LinkedIn logo, a search bar, and navigation icons for Home, My Network, Jobs, Messaging, Notifications, Me, For Business, and Advertise. A blue banner at the top indicates "You are viewing this page as a member" with a "View as admin" button.

The main content area features the EXSOThyC logo and a banner for "Exsolution-Based Nanoparticles for Lowest Cost Green Hydrogen via Electrolysis." Below the banner are logos for partner organizations: Stargate Hydrogen, Fraunhofer, University of St. Andrews, AGFA, TU/e, and the European Union. The profile name "EXSOThyC" is displayed, followed by the description: "Development of Exsolution-Based Nanoparticles for Lowest Cost Green Hydrogen via Electrolysis." It also shows "Research Services · 32 followers · 11-50 employees" and "Rainer & 21 other connections follow this page." Action buttons for "Message" and "Following" are visible.

The "About" tab is selected, showing an "Overview" section with the text: "The aim of the project is the development of Exsolution-Based Nanoparticles for Lowest Cost Green Hydrogen via Electrolysis." and "EXSOThyC will optimise electrolyser operation towards lower voltages and higher efficiencies. The innovation is three-fold and addressing:".

On the right sidebar, there is an advertisement for hiring small businesses and a "Pages people also viewed" section featuring "Stargate Hydrogen" (Renewable Energy Equipment Manufacturing, 4,299 followers) and "KMM-VIN - Multi-functional materials network" (Non-profit Organization Management, 93 followers).

2.3 Dissemination to the target groups

In relation to the target groups and general public, the developed tools presented in previous section, will be exploited to ease the dissemination of results and to engage relevant communities to interact with the project findings and, as much as possible, to implement them into their context.

The project outcomes will be disseminated mostly via:

- Electronic means: project website, press releases, project social LinkedIn page
- Presentations at events to promote the project towards research-intensive entities and networks
- Publications in scientific and popular scientific/technical journals
- Discussions of the project results with the energy experts, KOLs, and government representatives to initiate innovative technical and legislative hydrogen regulations for the region
- Collaboration with other EU JTI and HEU CI5 funded projects, networks and initiatives in hydrogen, energy, and other related research sectors

2.3.1 Presentations at events

Conferences and large-scale industry trade events – Being present in the most visited events will enhance visibility and give the chance to engage with potential customers and conduct demos for better overview of the future alkaline electrolysers, using the EXSOThyC outcomes, capabilities. Below is the non-exhaustive list of events the project partners intend to visit in 2024¹:

Event	Link	Focus of the event, attendees	Date and venue
Hannover Messe Hydrogen Technology Expo	Link	Joint presentation of over 300 exhibitors from 25 countries in the field of Hydrogen and Fuel Cell Technologies. Stargate, TUE, Agfa	22-26.04.2024, Hannover Germany
1st National Symposium on Electrochemical Conversions	Link	A meeting to discuss, share, and ultimately unlock the potential of electrochemistry in the Netherlands in generating sustainable chemicals and fuels. TUE	21.05.2024 Hague, The Netherlands
Electrochemical Society (ECS) Meeting	Link	ECS brings together over 8000 scientists, engineers, and researchers from academia, industry, and government laboratories to share results and discuss in a variety of formats such as oral presentations, poster sessions, panel discussions, tutorial sessions, short courses,	26-30.05.2024, San Francisco US

¹ Please note that not all of the events are published by the time of this deliverable submission

		professional development workshops, and exhibits. Stargate	
Aarhus Power-to-X Symposium 2024	Link	Each day of the main event covers both the mature innovative developments, and the early-stage insights that will shape the PtX market of tomorrow. TUE	27-31.05.2024 Aarhus Denmark
Connecting Green Hydrogen Europe	Link	Europe's premier event for Green Hydrogen. This event will bring together over 5,000 participants, including industry leaders, government officials, CEOs, and 100+ exhibitors.	25-27.06.2024 Madrid Spain
European Electrolyser and Fuel Cell Forum	Link	The forum will address issues of science, engineering, materials, systems, applications and markets for all types of Solid Oxide Fuel Cell and Electrolysis technologies	2-5.07.2024, Lucerne Switzerland
Annual meeting of the International Society of Electrochemistry	Link	The meeting will cover all the scientific interests of the ISE membership and of the electrochemical community at large.	18- 23.08.2024, Montréal Canada
Euromembrane conference 2024	Link	The event brings together researchers and practitioners from different fields and industries who are interested in membrane processes. Agfa	8-12.09.2024 Prague Czech Republic
European Hydrogen Week	Link	At the event, the latest developments happening at national, European, and global level will be discussed directly with the hydrogen experts who are directly involved in these developments. Stargate	18-22.11.2024 Brussels Belgium
European Hydrogen Forum	Link	The event brings together over 1700 stakeholders from industry, civil society, research bodies, investors, and public authorities. The Alliance holds two Forums per year.	TBD
Fraunhofer IFAM workshop on advanced alkaline electrolysis	TBD	A platform for industry leaders to learn about the latest developments in key components of alkaline water electrolysis technology.	09.2024 Dresden Germany

2.3.2 Publications in technical and scientific journals

All the scientific findings will be published in renowned international journals for improving our credibility on the market.

The initial and noncomprehensive list include:

- Proceedings of the European Electrolyser and Fuel cell Forum
 - *EFCF - Europe's largest scientific event dedicated to electrolyzers, fuel cells & hydrogen - Conference Series Est. 1994*
- International Journal of Hydrogen Energy
 - *a peer-reviewed scientific journal covering all aspects of hydrogen energy, including hydrogen generation and storage. It is an official journal of the International Association for Hydrogen Energy. Impact factor: 7.139 (2021). Publisher: Elsevier*
- Journal of Physics: Energy
 - *An interdisciplinary and fully open access journal with an impact factor of 6.9 and citescore of 10.5*
- Solid State Ionics
 - *Solid State Ionics is a monthly peer-reviewed scientific journal published by Elsevier since 1980. Impact factor 3.785 (2020)*
- Journal of Power Sources
 - *A peer-reviewed scientific journal covering all aspects of electrochemical energy conversion. The journal has a 2021 impact factor of 9.719. Publisher: Elsevier.*
- Electrochimica Acta
 - *A peer-reviewed scientific journal which is the official publication of the International Society of Electrochemistry and it is published bimonthly. According to the Journal Citation Reports, the journal had a 2013 impact factor of 4.086.*
- Journal of Applied Electrochemistry
 - *A peer-reviewed scientific journal published by Springer Science+Business Media, focusing on the technological applications of electrochemistry. Impact factor: 2.925 (2021)*
- Nature Energy
 - *A monthly peer-reviewed scientific journal published by Nature Portfolio. Impact factor: 67.439 (2021)*
- The Journal of Membrane Science
 - *A peer-reviewed scientific journal, covering research on membrane permeation, selectivity, formation, structure, fouling, processing and application. Impact factor: 9.5 (2022), publisher: Elsevier*
- Journal of the Electrochemical Society
 - *A monthly peer-reviewed scientific journal covering the field of electrochemical science and technology. It is published by the Electrochemical Society. Impact factor: of 4.316 (2020)*
- Chemical Engineering Journal
 - *An international research journal focusing on catalysis, chemical reaction engineering, environmental chemical engineering, green and sustainable science and engineering, and novel materials. Impact factor: 15.1 (2023)*

- **Journal of Electroanalytical Chemistry**
 - *A peer-reviewed scientific journal on electroanalytical chemistry, published by Elsevier twice per month. Impact factor: 4.598 (2021)*
- **Energy and Environmental Science**
 - *A monthly peer-reviewed scientific journal covers work of an interdisciplinary nature in the biochemical and biophysical sciences and chemical and mechanical engineering disciplines. It covers energy area. Impact factor: 39.714 (2021), publisher: Royal Society of Chemistry*

2.3.3 Discussions

We aim to launch discussions about the project results with the energy experts, KOLs, and government representatives to initiate innovative technical and legislative hydrogen regulations for the region. These discussions are essential for creating a supportive ecosystem that fosters the success of the project. They facilitate the alignment of technical innovations with regulatory frameworks, promoting sustainable growth and environmental responsibility in the region.

Engaging with energy experts and KOLs allows for the exchange of valuable insights and expertise. Collaborative discussions enable the sharing of knowledge, best practices, and lessons learned, fostering a more comprehensive understanding of green hydrogen technologies and their potential applications.

For example, Stargate is in active discussion with the Ministry of Economic Affairs and Communications as the ministry is responsible for hydrogen-related activities in Estonia. The close cooperation is a result of the Stargate-led IPCEI² project. We see the project outcomes could help to create a shared understanding of the project's importance and facilitates the integration of green hydrogen initiatives into broader energy and environmental policies. Establishing clear regulations for green hydrogen production, provides a foundation for industry growth and sustainability, creating a supportive environment for investors and stakeholders. In addition, by actively participating in discussions and shaping regulatory frameworks, EXSOTHyC will thus contribute to mitigating potential risks and obstacles to the project's success.

2.3.4 Collaboration

I foresee collaboration with other EU-funded projects, networks and initiatives in hydrogen, energy, and other related research sectors.

For example, many EXSOTHyC partners are already involved in such initiatives and can create a direct link between EXSOTHyC and other projects. Namely, Stargate and IFAM are also involved in a common HE project ENDURE (GA: 101137925), Stargate is involved also in another HE project ELECTROLIFE (GA: 101137802) where we see opportunities for collaboration as both projects are about to further develop hydrogen technologies.

² Important Projects of Common European Interest

2.4 EXSOTHyC dissemination and communication quantification

We have set the following measurable goals for the dissemination and communication activities. Measuring the serves several important purposes from the project development level.

With measuring the activities, we can evaluate the project performance and make data-driven decisions for continuous project improvement.

The table below will be updated by the time of reviews with the actual achieved values compared to the set target values.

Dissemination Activity over 3 years	Target Value
Journal publications (peer-reviewed)	≥10
Publications and presentations in conferences	≥15
Publications in Magazines and Blogs	≥5
Patent applications	2
Newsletter issues	6 (two per year)
Participations in exhibitions and public demonstrations	6
Workshops organized by EXSOTHyC	2
EXSOTHyC visual identity	1
Project website created/traffic + LinkedIn	1/5 000 visits; weekly posts