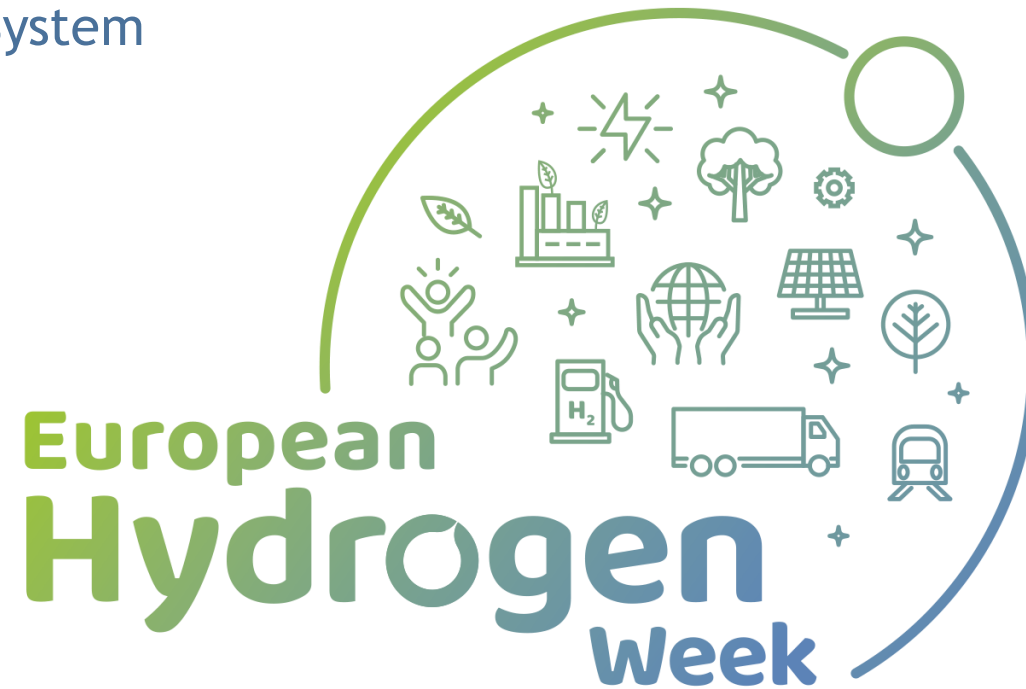


SHIPFC

Green Ammonia Energy System

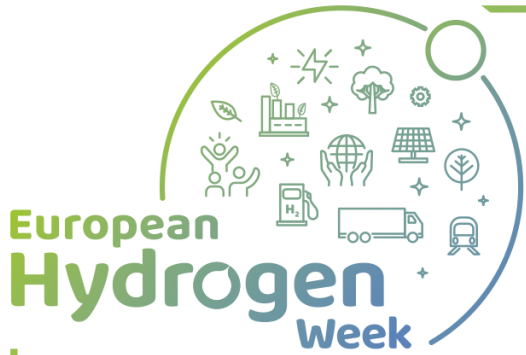


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#CleanHydrogen





Project Overview

Call year: [2019]

Call topic:
[FCH-01-2-2019
– Scaling up
and
demonstration
of a multi-MW
Fuel Cell
system for
shipping]

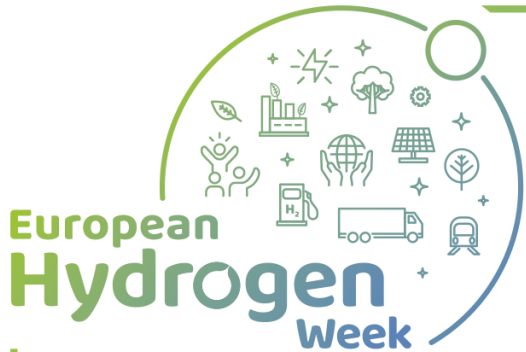
Project dates:
[01.01.2020-31.12.2025]

Total project budget:
[13,179,056.25 €]

ShipFC

**% stage of implementation
01/11/2019: [32 %]**

FCH JU max. contribution:
[9,975,477.50 €]
Other financial contribution:
[100.000 €]



Partners

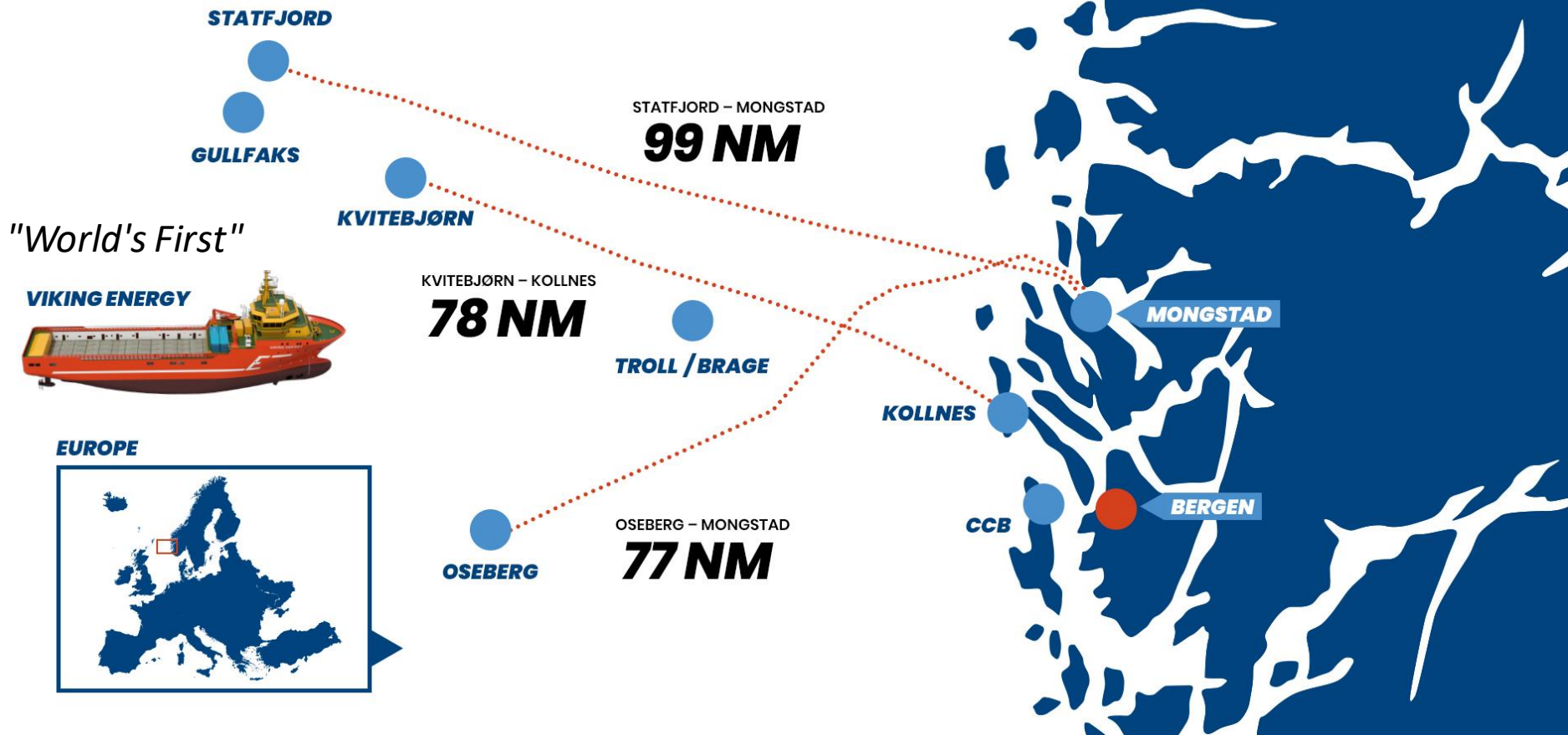


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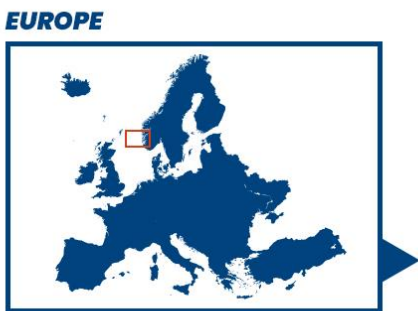


Objective 1: "Prove the case for long-range high-power zero-emission shipping"

"Operation of a 2MW SOFC for 12+ months that is close to zero emission " Demonstration from 2024



"World's First"

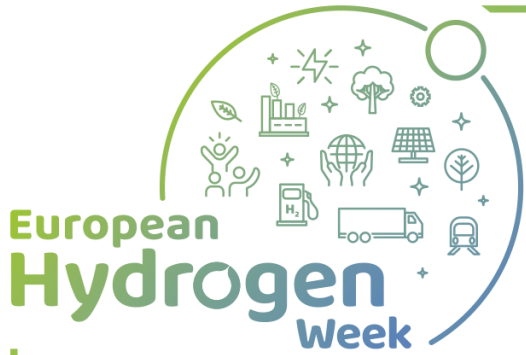


Project objectives

PO2: *Prove the case for scalable, large-scale zero-emission fuel infrastructure, through a realistic business model:*

Delivery: *A full green ammonia fuel system, that can easily be scaled to a global scale through existing infrastructure.*





Project Progress/Actions - Demonstrating multi-MW FC

System design and lab testing ongoing

0h
0MW



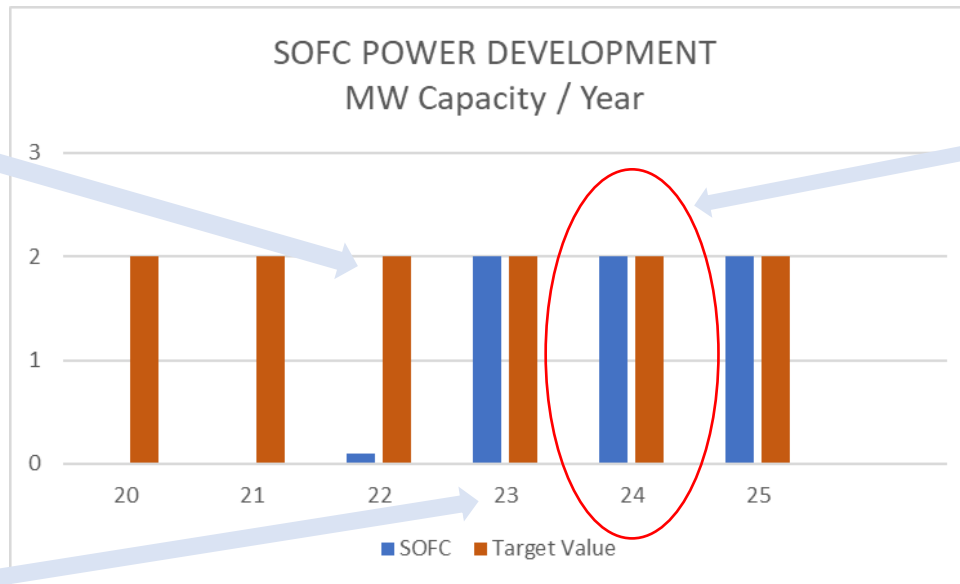
25%

50%

75%

3000h
2MW

2022:
Initial scale up
100kW test

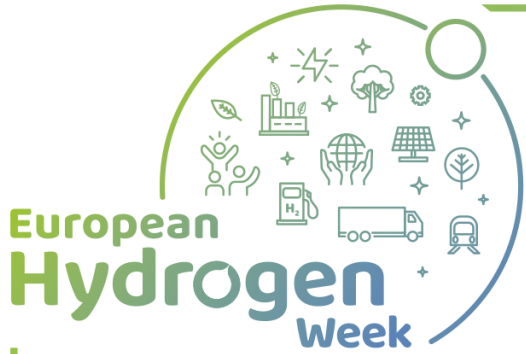


2024:
Onboard Pilot
2MW
3000h

2023:
Onshore system
test

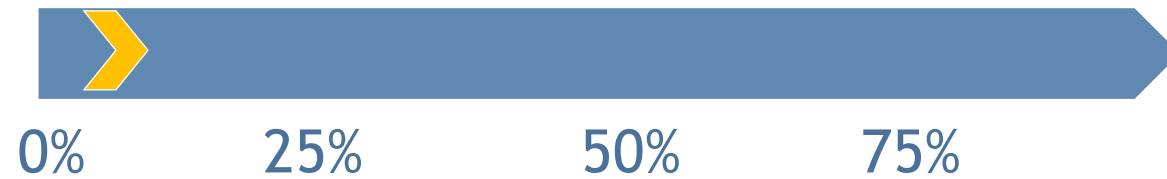
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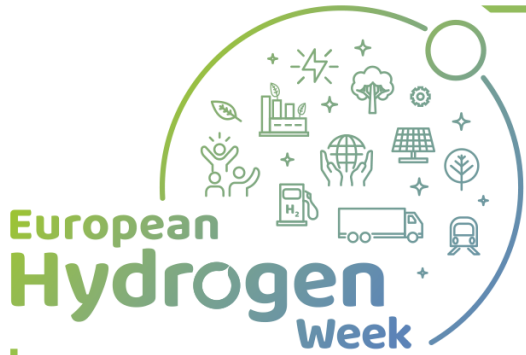


Project Progress/Actions - Green Ammonia fuel delivery

Ammonia fuel commitment signed

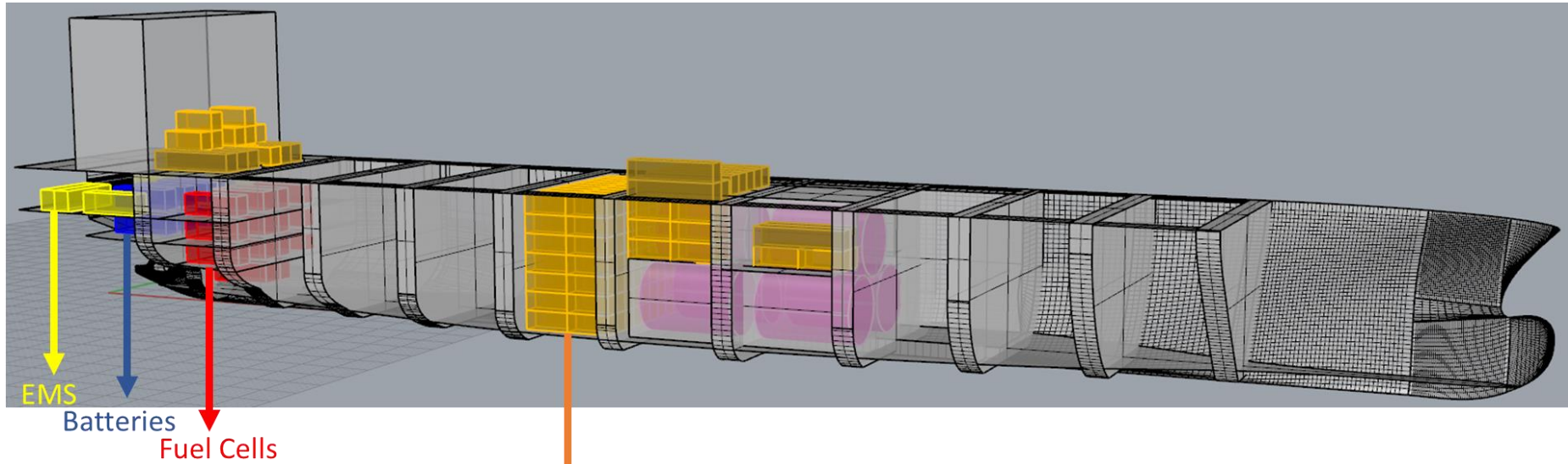
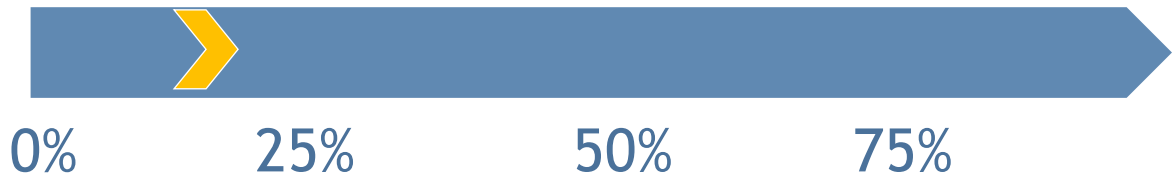


- Green Certificates
- Green Ammonia production initiatives
- Ammonia bunkering concepts under development
- Analysis of market potential for domestic, Norwegian, shipping towards 2030 ongoing
- The above initiatives will contribute to development of fuel agreement for the pilot

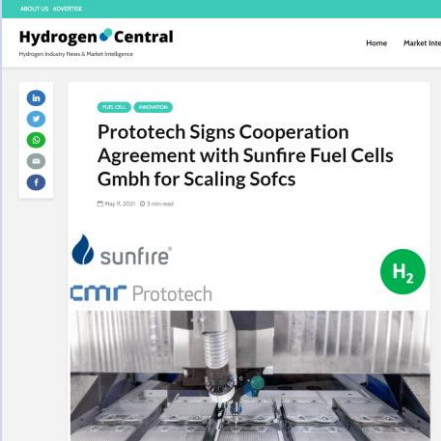


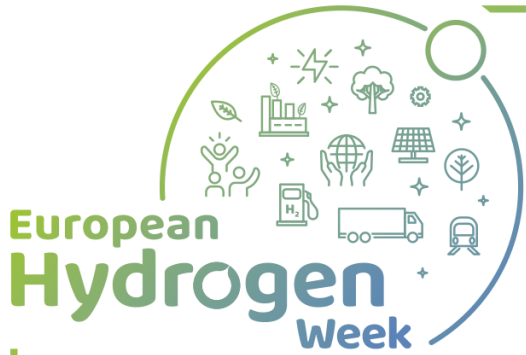
Project Progress/Actions - 20MW replicators

➤ First iteration design



Risks, Challenges and Lessons Learned

Risk	Mitigation	Supporting document/literature
<p>Availiability of High-Quality FC stacks</p>	<p>Project Partner Prototech has entered into a frame-agreement with Stack supplier</p>	
<p>General increase in lead times</p>	<p>Early RFQ processes (where possible)</p>	<p><i>"Lengthened lead times and slowed supplier deliveries are not unique to any one industry. ISM's report assesses 18 industries, and 17 reported slower supplier deliveries in June."</i> <i>(Source: Institute for Supply Management July 2021)</i></p>



Exploitation Plan/Expected Impact

ShipFC: Exploitation

We expect the following main exploitable results:

1. Research data
2. ShipFC demonstrator vessel
3. Analysis of replicators

We'll define the full potential in the Exploitation plan, developed by M36, but initially we expect:

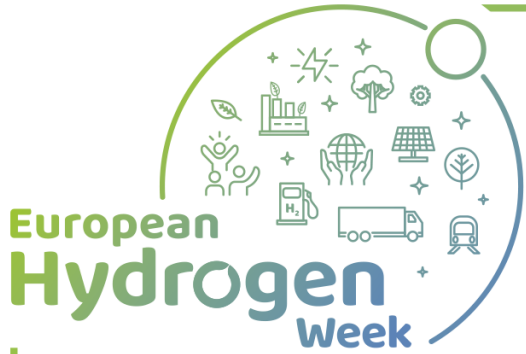
- using project results in further research activities;
- developing, creating and marketing new solutions.

The ShipFC project has already resulted in partners establishing new ventures providing clean power technologies for the maritime sectors.

Impact

The exploitation plan will be a measure for the impact of the project, but activities expected are:

- **Ship equipment suppliers** strengthening their positions within zero emission waterborne markets,
- **Ship Operators** improving their operations in terms of cost-efficiency and better environmental impact,
- **Public stakeholders** using the results to improve environmental regulations.



C&D Activities

- High-level launch at the vessel in M1
- [Website](#) and [LinkedIn](#) page created
- 3 well visited workshops on ammonia as a green shipping fuel completed
- Interest from international media
- 30+ conference presentations
- 6 journal papers

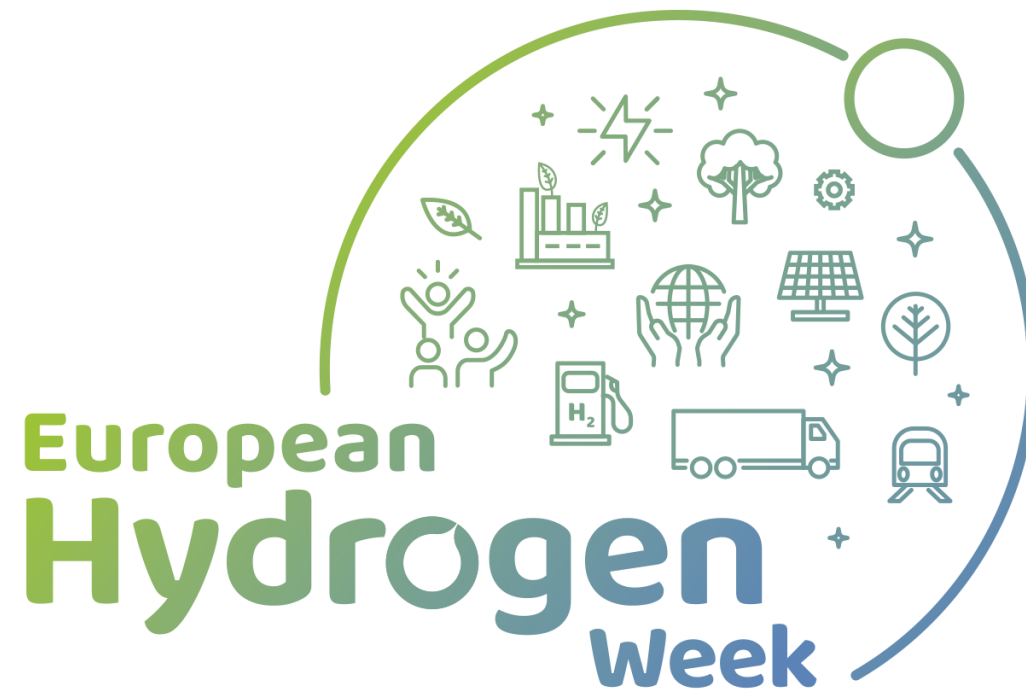


Digital Workshop
Ammonia as a green shipping fuel: challenges and opportunities

23 September 2021
10:00 CEST

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European
Hydrogen
Week

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