

NEWSLETTER 3

IGF CODE

In order to define the new guidelines for an effective introduction of hydrogen in maritime passenger transport sector, e-SHIPS has dedicated a task to the analysis of the State of the art of safety regulatory and standardization framework. The task is intended to review the state of the art in terms of Regulations, Codes and Standards (above all, IGF Code), pre normative documents, technical reports and specification, Interim Guidelines (IG) to code amendments at international (ISO/IEC) and European (CEN, EU states) level. The final aim is to identify initial standards and normative gaps and possibly define appropriate scenarios to study them.

A public document, the deliverable D1.3 State of the art of safety standardization framework, will be published at the end of the task (December 2022).

In 2022 the task is focusing in particular on conducting a review of the IGF Code, the International Code of Safety for Ships using Gases or other Low-flashpoint.

The IGF Code is a mandatory code for ships using gases or other low-flashpoint fuels, and includes also training requirements for seafarers working on those ships. It was issued by IMO – International Maritime Organization on 1 January 2017 and aims to minimize the risk to ships, their crews and the environment, given the nature of the fuels involved.

IGF Code considers other low-flashpoint fuels may also be used as marine fuels on ships, provided they meet the intent of the goals and functional requirements of the IGF Code and provide an equivalent level of safety. So far, there are no explicit requirements for Hydrogen (although some activities are ongoing in IMO committees).

e-SHIPS wishes to give its contribution, so the consortium is trying to understand:

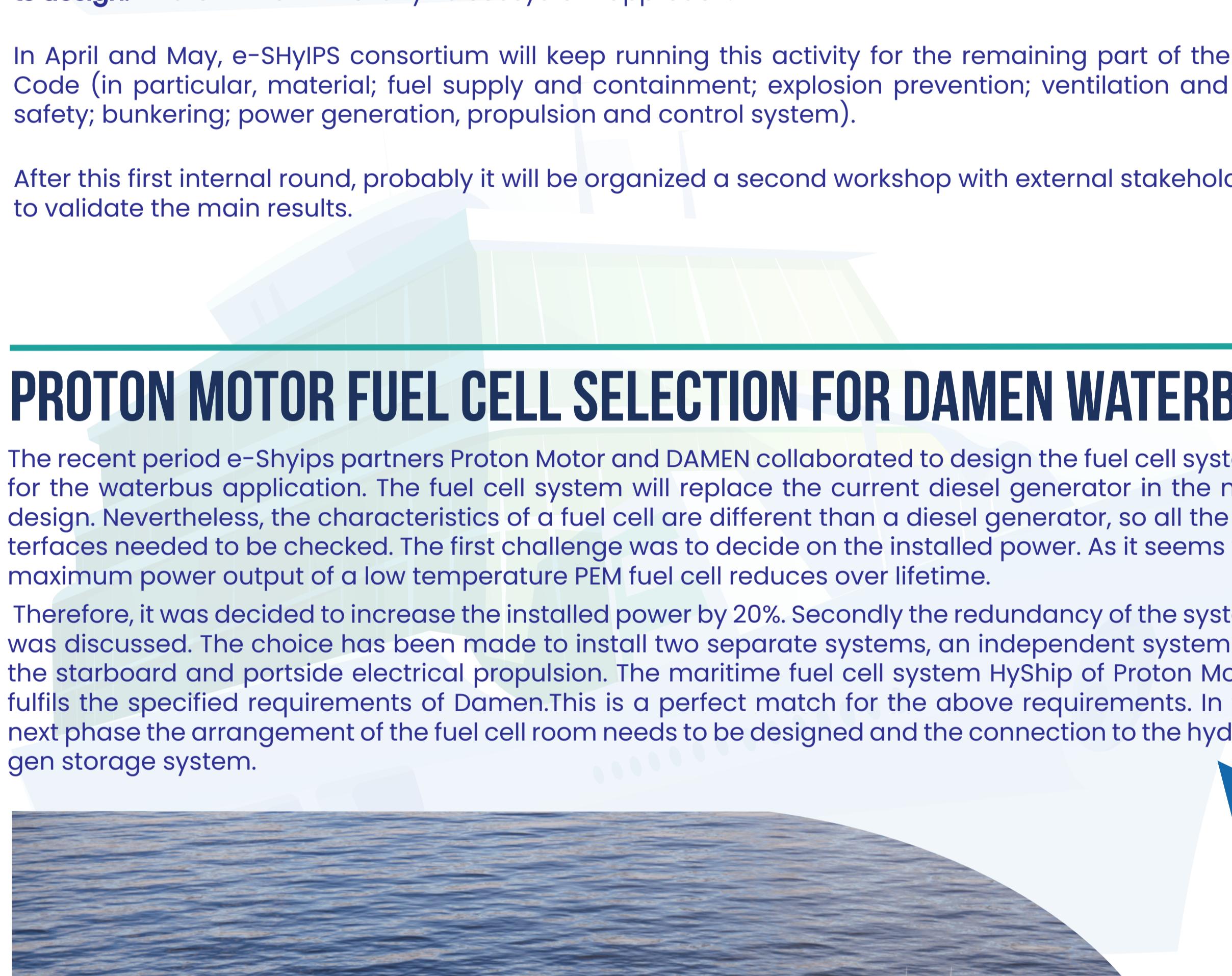
1. following the current structure and sections of the current IGF Code, which are the similarities between natural gas and hydrogen, and if existing standards already let meet the requirements;

2. focusing on the Hydrogen Properties and Hydrogen technologies peculiarities, which missing knowledge should be included.

As a first step, UNI, the Italian standardization body, mapped existing hydrogen standards in non-maritime applications (as input) and the consortium tried to match them with the different chapters of the code. This is in order to understand if some requirements of the code (when it comes to H₂ applications) may already found some answers in existing standards in non-maritime applications.

This approach has also been discussed with the Advisory Board of the project in a dedicated workshop in March, when important feedbacks have been gathered.

The IGF Code review has stepped forward during the e-SHIPS General Assembly, held in Milan from March 28th to 30th. Indeed, during the first day, a dedicated workshop was organized by UNI with the support of DNV GL and POLITECNICO of Milan.



e-SHIPS partners went through the requirements of the code focusing on **ship design and arrangement** and discussed the existence of any gaps for Hydrogen applications. Talking also about if current standards (also in non-maritime sector) contain any relevant information.

The discussion was really fruitful and **more than 10 gaps related to Hydrogen risks were identified**. So the consortium has decided to keep using this operational approach:



The gaps identified (which we still have no solution for) should be considered in the **e-SHIPS experiments design**. This is in line with e-SHIPS ecosystem approach.

In April and May, e-SHIPS consortium will keep running this activity for the remaining part of the IGF Code (in particular, material; fuel supply and containment; explosion prevention; ventilation and fire safety; bunkering; power generation, propulsion and control system).

After this first internal round, probably it will be organized a second workshop with external stakeholders to validate the main results.

PROTON MOTOR FUEL CELL SELECTION FOR DAMEN WATERBUS

The recent period e-SHIPS partners Proton Motor and DAMEN collaborated to design the fuel cell system for the waterbus application. The fuel cell system will replace the current diesel generator in the new design. Nevertheless, the characteristics of a fuel cell are different than a diesel generator, so all the interfaces needed to be checked. The first challenge was to decide on the installed power. As it seems the maximum power output of a low temperature PEM fuel cell reduces over lifetime.

Therefore, it was decided to increase the installed power by 20%. Secondly the redundancy of the system was discussed. The choice has been made to install two separate systems, an independent system for the starboard and portside electrical propulsion. The maritime fuel cell system HyShip of Proton Motor fulfills the specified requirements of Damen. This is a perfect match for the above requirements. In the next phase the arrangement of the fuel cell room needs to be designed and the connection to the hydrogen storage system.



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HYDROGEN AND YACHTING SECTOR: CHALLENGES AND OPPORTUNITIES FOR THE FUTURE OF ZERO EMISSION TECHNOLOGIES

POLITECNICO DI MILANO, MILANO, APRIL 8TH 2022

e-SHIPS was the leading actor in the Italian conference on hydrogen application for the nautical sector, an event organized by Politecnico di Milano with the support of Atena Lombardia and POLLdesign, hosted by Made Competence Center I4.0.

The event, dedicated to the yachting sector with contaminations on maritime and other transportation sectors, was attended by national and international nautical industry stakeholders such as shipbuilding companies, yacht designers, and experts in the hydrogen propulsion technologies.

Within the European strategy for more sustainable mobility, companies, professionals, and research projects are essential in opening up the market for hydrogen applications in the maritime sector: a contamination between experimental paths that is at the core of e-SHIPS project with its ecosystemic approach in knowledge sharing.

The seminar fostered a fruitful discussion among the actors involved to provide an overview of the development prospects of the hydrogen value chain: from market strategies to the needs of infrastructure and logistics, from technical aspects to safety, up to the experiments in the leading Italian shipyards. Filippo Ceragioli, ambassador of Parley for the Oceans, opened the session, focusing on the perspective of a future greener yachting market, while the technical and environmental director of SYBA (Superyacht Builders Association), Lorenzo Pollicardo, spoke about the role of the superyacht industry as a driver of change in regulation for sustainable propulsion.

Then, the technical session investigated the designer role and technological challenges thanks to the contributions of yacht design firms like Micheletti + Partners, Zerocoil, and H2Boats.

Among the speakers, Arianna Bionda, a researcher at Politecnico di Milano, introduced the challenges of pre-normative research for passenger ferries highlighting the role of e-SHIPS in being a European protagonist in the ecological transition for waterborne transport.

During the second part of the day, representatives from some of the most relevant Italian shipbuilding companies, like Amer Yacht, Rossinavi, and Persico Group, joined a round table to discuss the industrial future perspectives and challenges to tackle the zero-emission navigation and the hydrogen adoption.

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