

The Usage of Hydrogen in Shipping – Chances and Risks

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Combining competencies and being present in the maritime market with a single brand is how Hybrid Port Energy (HPE), a subsidiary of Hamburg-based ship supplier Becker Marine Systems and the maritime division of E-Cap Mobility, a leading provider of electromobility solutions, are responding to the challenge of making the shipping industry more environmentally friendly since January 2021. A well-known project of HPE was the 7.5 MW LNG-barge that generated shore power for the AIDA Sol during its stay in Hamburg. After the rebranding, the company focusses on alternative fuels and hydrogen-based compact containerized shore power generation systems, called PowerPac, as well as ship conversion. Therefore, E-Cap Marine ensures full project management and teams up with a wide range of partners, which provide for example funding consultation, fuel cell and battery systems.

The potential of emission free power generation by using hydrogen is huge, as well as the demand in maritime, automotive, and industrial applications. The efficiency of hydrogen-based power generation systems is often criticized, as the process of generating hydrogen itself already approximately halves the energy. This drawback may be neglected in cases of total emission-free hydrogen production, as the advantage of generating no harmful emissions at all is too appealing. This form of hydrogen production, for example using leftover wind, solar or water energy, is called green hydrogen and may be a great chance for sustainable energy storage.

To achieve the climate goals and consequently fulfil the rules by the IMO that get stricter and stricter regarding the reduction of harmful emissions, hydrogen-based power generation systems are highly requested also in the shipping industry. Therefore, we must be open-minded and may also think about a completely different engine room design when we want to integrate fuel cell systems into ships. The best advantages of this system are low lifetime costs as well as fewer personnel costs if the power generation system is completely rethought. These benefits need to be considered for all upcoming projects that want to reduce their emissions in total. For ship conversions, also the hydrogen internal combustion engine could be an alternative-fueled solution.

Considering the handling of the highly explosive gas hydrogen, still a lot of tests and regulations by classes need to be done. The state of the art regarding the classification process is, that only case by case approvals can be given by the classification societies. The risks of the handling procedures are probably higher than those that have been investigated for using LNG or Methanol as fuels. But it is clear, that a strict recommendation for actions with hydrogen needs to be provided to everyone that uses hydrogen in shipping.