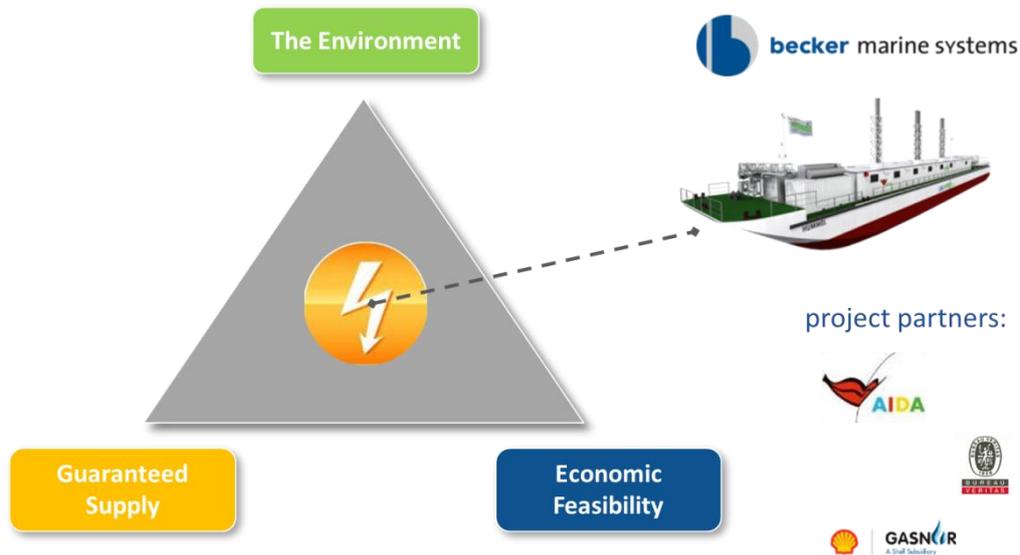


Emission optimized power supply in Ports

Shore power is an established solution – exploited by the navy for decades. To make it available for all types of vessels some technical rules, financial aspects, laws and regulations has to be followed. In general the room for manoeuvre is limited between the three main goals: Environment, guaranteed supply and affordable prices.



The existing LNG Hybrid Barge "Hummel" is such a smart solution and able to reach all three goals. The key benefit is her flexibility. But it is a different flexibility than the PowerPacs[®], which are designed for the container vessels.

Project: LNG Hybrid Barge

On average, cruise ships spend 40% of their operating time in port.

Traditionally, they use their onboard machines to generate power by using heavy fuel oil. This causes a high amount of emissions.

Becker Marines Systems and AIDA Cruises initiated the classified seagoing LNG Hybrid Barge as an innovative pioneering project to provide a quick and flexible power supply to cruise ships during their laytime in port – one which is more eco-friendly, more flexible and more economic than all other current options.

While onshore power supply (OPS) is not available for cruise ships in Europe, yet and the provision of the respective infrastructure will still take time, the LNG Hybrid Barge can easily be made available to all interested ports within a short period of time.

OPS or known as HVSC (High Voltage Shore Connection) is a step into the right direction, but one step isn't enough. This solution is fixed to one berth or just to one point on a berth, a big frequency converter is needed for the transmission of the frequency from 50 to 60 Hz and the emissions are transferred from the cruise ship to the power plant on shore. In the end, this might even result in higher emissions than those you have, when you generate the needed power in a coal-fired power plant. In this regard, onshore power supply has strong limitations and does not necessarily guarantee cleaner air in ports.

A floating LNG Hybrid Barge, however, can be transferred and used in various terminals in a port, all-year-around and independently from calls of port. When cruise season is off, the produced electrical power and heat can be fed in local grids and supply households in Hamburg which is an additional option and benefit. The power can be delivered in the required frequency of 60 Hz for the majority of

cruise ships or 50 Hz for public grid and industrial customers. No separate and expensive converter on shore-side is needed.

On the LNG Hybrid Barge, liquefied natural gas (LNG) is converted to electric power up to 7.5 MW by five generators and then fed into the onboard power grid.

In the future, no more sulfur oxides (SOx) and diesel particles will be produced during port laytime, unlike when conventional marine diesel with a sulfur content of 0.1% is used. Emissions of nitrogen oxide (NOx) are reduced by up to 80%, and emissions of carbon dioxide by a further 20%.

In the cruise ship season, AIDA Cruises will make 73 calls just in the Port of Hamburg. Based on this number of calls we are able to save up to 616 t of carbon dioxide, about 53 t of nitrogen oxides and no particles and no sulfur oxides will be produced at all.

The whole system complies with the IEC/ISO/IEEE 80005-1 regulation, making it possible to serve all ships complying with the international standard.

Projekt: LNG PowerPac®

The average power demand of a container vessel is between 1.0 – 3.0 MW and taking into account the fact that their operating time in ports is much longer, in total the emissions nearly the same than cruise ships are polluting. To use the LNG Hybrid Barge is not an option for cold ironing. To connect the Barge with one or two container vessels in parallel is difficult and the costs of a terminal grid are highly expensive. Container vessels need a smaller, more flexible solution. Becker Marine Systems designed the LNG PowerPac® in the dimension of two 40ft high-cube-container, integrated with a 1.5 MW genset and a LNG-tank with fuel for 30 hours. In the port the first move will bring the PowerPac® on board and after a short connection time the container vessel will have an environmental friendly power supply. For larger power demand, two PowerPac® can run in parallel and more LNG-Tanks can be installed.



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