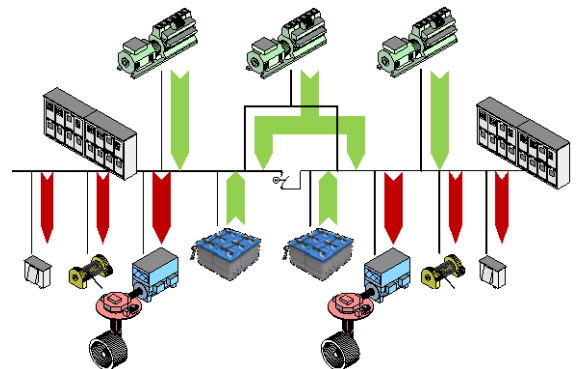


# Hybrid approaches for onboard power generation and propulsion drives

## Abstract

Today's environmental protection regulations and energy saving approaches have born a various number of solutions for onboard power generation and propulsion drives.

This lecture will display some of the solutions demonstrating their individual pro and cons.



To make the right choice for diesel-electric variants under operating conditions that are getting more complex, more knowledge about the advantages and disadvantages of such configurations as well as some specific electrical requirements are required.

The necessary topics will be introduced in this lecture and a cross-view of the relevant shipping types will be presented with the accompanying examples and solutions.

The propulsion solutions available today cover a wide performance spectrum and display considerable flexibility.

In the past the prevailing mixed propulsion solutions for container vessels with waste heat recovery consisted of 2-stroke diesel engines and a shaft generator/motor system. This hybrid configuration enabled parallel operation of the 2-stroke drive and the E-drive as well as energy feedback from the heat recovery system.

So what of tomorrows' technology?

The introduction of emission control areas and the rising expectations of cruise liners customers resulted in the development of emission reductioning equipment (scrubbers, SCR, LSF, designer fuels, shore connections, etc.) Nevertheless the idea of zero emission in harbor and critical areas is challenging the industry today.

The resulting energy storage approach with battery banks or other storage systems including the integration of alternative power sources requires new technologies for the power grid design as well.

On the low voltage level those systems have been introduced already many years ago. (DC-grid solutions up to 1.000V)

Due to further development of semiconductor technology the medium voltage approach is possible now as well.

The biggest challenge nowadays still is the energy storage over long periods with large discharge capacity. Decentralized storage systems with high availability seem to be at least one of the realistic approaches.

