CALLENBERG TECHNOLOGY GROUP

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Saving energy and the environment with large energy storage solutions

Optimizing shipboard electrical power plants is a well-known challenge for many ship operators. Depending on routes and load profiles the requirements may change. An over-sized power plant consumes more energy, increases maintenance costs and affects the environmental footprint with excessive emissions of CO2 and harmful particle matter.

- Reduced fuel consumption, less maintenance and more sustainable ship operations
- Bespoke or turnkey energy storage solutions
- Containerised options provide flexibility in deploying energy storage solution
- Modular design provides an easy path for future technology upgrades

The challenge

The most common way of producing energy on a ship is with several auxiliary engines (diesel generators), connected or disconnected to the grid as the power demand changes.

Large diesel engines must be run at an operating point around 80-90% of the total capacity. If the engines go below this point, the fuel consumption needed to produce a certain amount of energy increases. This is the main challenge with traditional power plants.

Although power consumption varies, it is very important to avoid the shutting down of the entire system because of a power shortage (black-out). Hence a ships power plant is often oversized and generators run at an unfavorable operating point or even idle, resulting in poor efficiency.

Loss of electrical power is especially a concern for passenger vessels traveling in narrow waters and archipelagos where safety cannot be compromised. Under these circumstances there must always be sufficient power for maneuvering of bow thrusters and a power loss can be devastating.

Solving the challenge

This challenge is solved using new energy storage technology, combined with advanced automation.

By integrating these technologies, it is possible to supply large amounts of electrical energy to cover any peak demands and the inefficient use of diesel generators can be reduced.

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Operational considerations

During operation, the system is connected to the ships power grid, supplying power when needed, and when there is an over capacity in power production the batteries in the energy storage will be charged instead.

When there is no need to run the diesel generator any longer, it will simply shut down. Thus, the number of diesel generators in operation during maneuvering (as an example) are significantly reduced and under some conditions it may be sufficient to only supply power from the Energy Storage. This process is most commonly referred to as “Peak Shaving”.

Ordinarily, a ship is also connected to shore power during port stay. This will give further reductions of emissions and simultaneously charge the batteries before the next voyage.

One consideration when installing an Energy Storage system onboard an existing ship is the modification and integration work needed to fit the new unit to the ships main electric switchboard. Redesigning, rewiring, software changes and new electrical switchgear upgrades are usually required to obtain the desired functionality. Furthermore, the design must consider failure mode operation and ensure a high level of redundancy. Performance should be monitored and in the case of malfunction in the Energy Storage system back-up power must be restored.