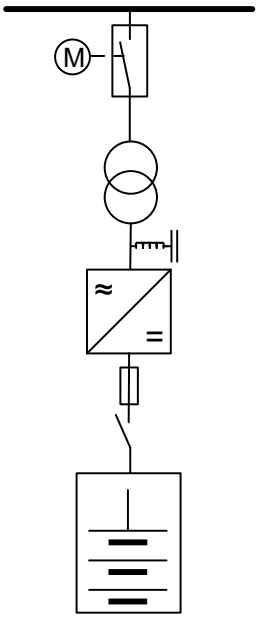
Striking Business Case and less CO_2

MAN Energy Solutions
Future in the making

MAN Hybrid EcoAux

MAN Hybrid EcoAux is the new solution to save energy, emissions and running hours for auxiliary engines on board of a vessel. The system comprises an energy storage system (ESS) and the related power electronics, that together act as a “Solid State Generator” (SSG). This reduces the number of required auxiliary engines while at the same time providing safe and reliable electric power supply. Payback times can be as low as 0 years.

MAN Hybrid EcoAux acts as "Solid State Generator" (SSG)



Single Line Diagram

Electric power generation on board a vessel is based on redundant sources. In order to guarantee a safe and stable supply, especially during e.g. maneuvering or cargo handling, at least two of these sources are running in parallel, so that in case of a failure, the remaining one prevents a total loss of electric power. This often leads to two or more engines operating at only low load outside their optimum, thus leading to increased fuel consumption.

Replacing one of the auxiliary engines by a so called Solid State Generator (SSG) allows to run in single-genset mode. In case of a failure, the SSG jumps in and bridges the time until the next genset has been started up (failure ride-through). Instead of operating two auxiliary engines with poor efficiency, only one is running with high loading. This setup will save fuel and maintenance cost, and will also protect the environment.

Main components
Hybrid EcoAux system
- Energy Storage System (Battery)
- Bi-directional Active Front End converter
- Isolation transformer
- Filter
- Energy Management System (EMS)
- Interface to the vessel´s power management system

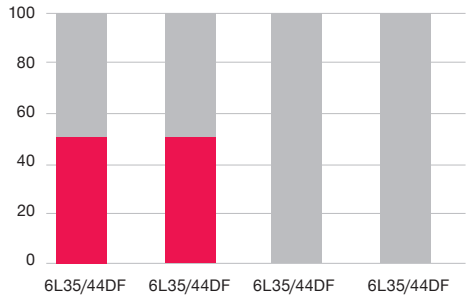
Typical applications
- LNG carriers
- Geared Bulkers
- Product Tankers
- Container Feeder Ships

Less OpEx and less CO_2

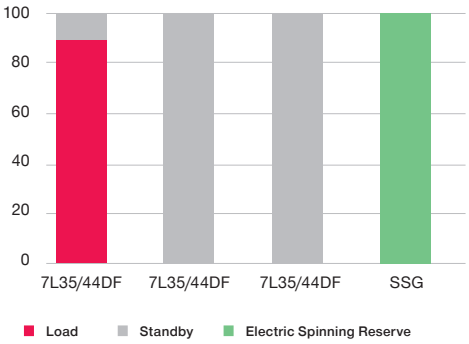
Benefits

Functionally, a reduced number of auxiliary engines plus SSG equals with a conventional layout of auxiliary power. But there are vital savings with regard to space, weight, running hours, energy consumption, emissions of CO_2 and GHG (CH_4, in case of a DF engine). The installation of MAN Hybrid EcoAux can even be CapEx-neutral.

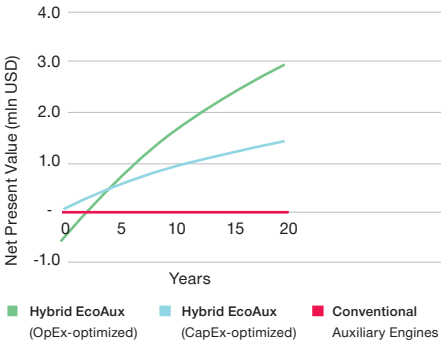
Conventional auxiliary power plant



MAN Hybrid EcoAux



Example business cases:



On a large merchant ship, instead of 4 x auxiliary engines, 3 x auxiliary engines + 1 x SSG are installed. Depending on the size of the battery in the SSG, total system CapEx can be equal to four aux. engines or slightly higher. The battery size also determines the achievable annual OpEx savings, resulting in payback times between 0 and 2 years.

In either case, the financial benefit and the positive impact on environment is significant.

LNG Carrier

Conventional layout	MAN Hybrid EcoAux	Benefits
4 x 6L35/44DF Operation sea-going: – 2 engines @ 51% load – Running hours p.a.: 12,800	3 x 7L35/44DF + 405 kWh SSG (5C) Operation sea-going: – 1 engine @ 88% load – Running hours p.a.: 6,400	– Spinning reserve for 10 min. – Fewer and smaller engines – Energy savings of 8% p.a. – Saving of 6,400 rh p.a. – Saving of CO_2 and other emissions

Geared Bulker

Conventional layout	MAN Hybrid EcoAux	Benefits
3 x 5L23/30H Operation maneuvering / crane operation: – 2 engines @ 40% load – Running hours p.a.: 2,628	2 x 5L23/30H + 135 kWh SSG (5C) Operation maneuvering / crane operation: – 1 engine @ 80% load – Running hours p.a.: 1,314	– Spinning reserve in case of a load drop – Fewer engines, smaller footprint – Energy savings of 5% p.a. – Saving of 1,314 rh p.a. – Saving of CO_2 and other emissions

MAN Hybrid EcoAux

System sizes	Voltage towards grid	Frequency
625 kWh SSG (5 C)	400 V - 690 V	60 Hz, 50 Hz
405 kWh SSG (5 C)	400 V - 690 V	60 Hz, 50 Hz
270 kWh SSG (5 C)	400 V - 690 V	60 Hz, 50 Hz
135 kWh SSG (5 C)	400 V - 690 V	60 Hz, 50 Hz

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