In order to meet the increasing energy demand in a sustainable and reliable way, a variety of energy resources must be combined. Our energy management system (MAN EMS) is a dynamic software-based system designed to optimize the dispatch strategy and for operating, monitoring and controlling energy resources which can be used in a variety of power plants, hybrid plants and microgrids.

**Benefits at a glance**

- Reduce total levelized costs of electricity (LCOE), fuel and maintenance costs
- Safeguard security of supply, voltage and power quality
- Ensure availability and expected useful and economic lifetime of components
- Improve grid independence with renewable energy sources (RES)
- Decrease overall CO₂ emissions
Energy management:
power with control

Managing the flow
The energy that goes through your grid can have different types of sources and applications. You can combine renewables, thermal power (including existing power generators), and energy storage with your main grid. And you may want to sell your energy at different times. In addition, there are external influences such as weather or demand and supply that must be considered. Monitoring and controlling all these factors calls for a very smart system.

An advanced EMS must provide solutions for the following applications: fuel saving, peak shaving, and controlling the operating and spinning reserves. It should also be able to smooth RES power supplies and provide grid ancillary services and demand-side management (DSM). Other useful options include power arbitrage, and black start and grid forming capacity. MAN EMS can optimize your system to provide all these features.

Monitoring loads, saving costs, increasing stability
An energy management system is a combination of computer-aided tools at the disposal of your grid operators. The MAN EMS is a dynamic software-based system that can operate, monitor and control energy resources and a variety of power plants, hybrid plants and microgrids.

MAN EMS categorizes energy consumers into two types: controllable and non-controllable. Controllable energy consumers can be used by the EMS as spare generating capacity and energy storage capacity. The EMS can be configured through customizable plant-specific control sets for adjusting loads to manage the dynamics of the microgrid.

EMS load control can reduce the need for additional infrastructure such as energy storage systems (ESS). Monitoring loads and analyzing data through the EMS can result in significant energy savings. For example, when combined with weather forecasting, the management of thermal loads located in the microgrid can provide significant energy savings.

After carrying out a technical economic feasibility study, the EMS can implement dispatch and/or non-dispatch options. This results in cost savings, increased reliability and availability, plus lower CO2 emissions.

MAN EMS reduces energy costs, maintains grid stability and ensures high power quality by responding to external influences such as high fossil fuel prices, grid blackouts, CO2 emission constraints and the fluctuations of renewables.

General competence
MAN will engineer a customized EMS for your project with a focus on lowering operating costs by optimizing the use of smart auxiliary management to reduce energy consumption. The EMS functionality is self-learning and improves continuously in order to optimize the overall system. Customization also improves the integration of RES, reducing emissions and the total cost of energy. MAN’s digital cloud platform CEON allows the sharing of plant data with MAN, enabling further reductions in energy generation costs and improved plant availability and efficiency. Thanks to the high data resolution at the first level of processing, the EMS is very fast.

System solutions
MAN EMS in conjunction with ESS including renewable sources
Energy storage combined with an EMS enables the integration of renewables while maintaining a stable, reliable and predictable power system. The EMS is able to dispatch this energy at a later point when there is an energy deficit or based on other commercial drivers.

MAN EMS in conjunction with ESS without renewable sources
When no renewable sources are directly available, the EMS can utilize the energy storage systems for:
- Peak shaving/shifting
- Reduced rotating reserve
- Grid/utility support (KW & KVAR)
- Failure ride through (grid or generating resource)
- Harmonic compensation
- Load averaging/balancing

MAN EMS with external connectivity
MAN EMS offers many channels for external or remote control, including cloud solutions. However, it is strictly managed and can be set to have no external communication.

Key control functions
EMS uses AI algorithms for the adaptive and predictive control functionality that optimizes microgrid operations while not affecting the core functionality of the microgrid to provide stable and predictable power. Feedback from the optimization process is provided to these algorithms to achieve a self-learning machine environment.

External data is used for many optimization functions, these include:
- Variable fuel prices
- Electrical energy prices
- Weather predictions
- Real-time weather data.
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