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# GEMS Fleet Director

## SPECIFICATION SHEET


The GEMS Fleet Director provides centralised, real-time visibility into a global fleet of power plants. The Fleet Director is hosted in the cloud and allows for secure monitoring of real-time equipment status, operation history, and aggregated alarms at the fleet, power plant, and individual device levels. It works closely with GEMS Power Plant Controllers installed onsite to enable the intelligent operation of renewable, thermal, energy storage, and hybrid power plant assets.

### ADVANTAGES

**Maturity** – Refined over multiple software generations, the GEMS Fleet Director has been deployed at and currently manages over 60 power plants worldwide.

**Intelligence** – Intelligent operation dispatches driven by Wärtsilä's advanced machine learning and forecasting technologies.

**Performance and Scalability** – A single Fleet Director installation can manage a large number of power plant sites and capture over 100,000 data points per second per site.

**Security** – The GEMS Fleet Director follows modern industry standards, such as OWASP, and includes security features like user authentication, role-based plant data access, data encryption, and audit trail. **GEMS Power Plant/Grid Controller software installed in GEMS racks is IEC 62443-4 certified.**

### KEY FUNCTIONS

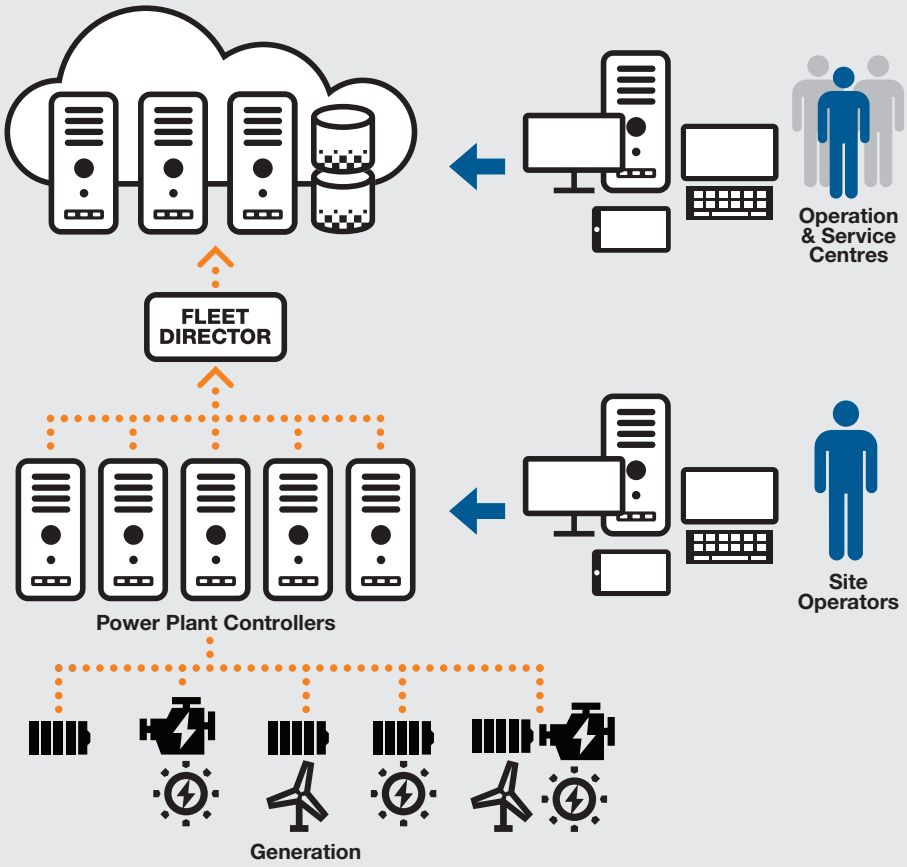
- Power plant data aggregation
- Weather and market data subscriptions for specific regions
- Renewable and load forecasts for advanced operation
- Secure web-based user interface for real-time plant monitoring, historians, reports, manual plant control, and data download, day ahead forecasting insight
- Configurable event notifications to registered users via email and text messaging

### HOSTING OPTIONS

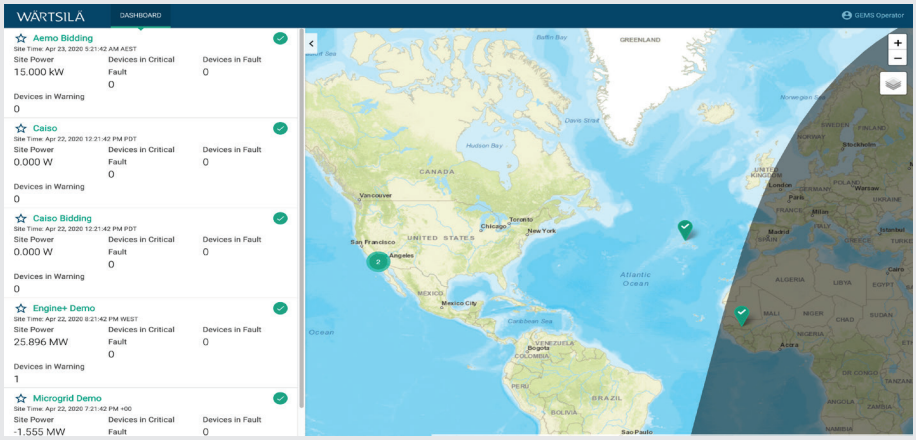
**Cloud Hosting** – Wärtsilä provisions Fleet Director's hosting in the secure Google cloud and manages its data storage, network security, and data replication to ensure high reliability, performance, and availability. Wärtsilä works with customers to establish a secure connection between GEMS Power Plant Controllers installed at power plants and GEMS Fleet Director hosted in the cloud.

**Customer Data Centre** – Customers can license the GEMS Fleet Director software and install it in their own data centre. Customers provide and manage the hosting servers and conduct network management tasks including the secure communication between GEMS Power Plant Controllers and GEMS Fleet Director.

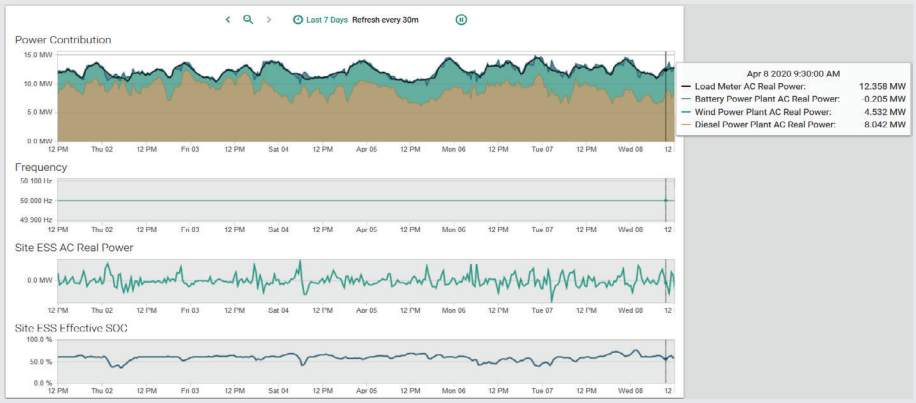
GEMS Deployments



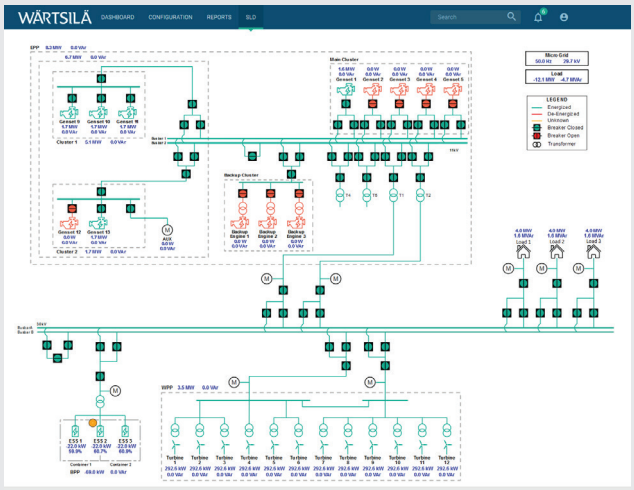
## WEB USER INTERFACE (UI) FEATURES




**Fleet View** – Real-time and customisable high-level status and health of an entire power plant fleet on a world map.




**Plant Dashboard** – Customisable, detailed information illustrating the most important aspects of the power plant on a single view. *This example shows the power contributions of colocated engine, wind, and battery assets, as well as grid frequency and battery state of charge.*




**Single Line Diagram** – Interactive equipment layout diagram showing the health of individual devices and operating status.

**Site Dashboard Customisation** – The GEMS UI allows deep customisation to fit customer needs.

**O&M Features** – Custom reports can be created and shared among GEMS users to show real-time and historic views of subsets of GEMS data points. Alarms and events are trackable in real-time as well as in historic views.

**Data Export** – All historical data can be exported from the GEMS platform for further data processing.

## DATA COLLECTION AND RETENTION

- 1 Second Data Retention: 2 Months (configurable)
- 1 Minute (Down Sampled) Data Retention: Site Lifetime (configurable)

## OPERATION INTELLIGENCE FEATURES

**Machine Learning** is used to combine historical data and real-time status with physical equipment models and various algorithms to forecast the future state of connected sites such as load level, renewable energy generation, and battery conditions.

**Control Optimisation** is performed based on forecasted data and operational constraints. This module plans optimal plant operation schedules and device controls to achieve the highest possible plant performance, maximum economic return, and minimum operating costs.

## SECURITY

**User Management** – Central user management system provides authentication and authorisation for all connected power plants.

**Access Control** – Access to power plants can be restricted per user group within an organisation. Each user group can be assigned specific access controls per power plant (such as direct device commands, operation control, site configuration, etc.).

**Single Sign-on** – The GEMS Fleet Director is an OAUTH2/OpenID Connect server for providing SSO access across all connected power plants. This system can also be integrated with an existing SSO provider (LDAP or RADIUS). The GEMS Fleet Director also supports multi-factor authentication (MFA).

## SYSTEM INTEGRATION

Third party software systems can interact with Fleet Director via its built-in RESTful Web API to retrieve real-time data or send control commands.

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