Ten reasons for a smart grid with DEMS

DEMS offers intelligent solutions for central control of decentralized systems for power supply companies, industrial companies, operators of functional buildings, municipalities and regions, as well as energy service providers in deregulated markets.

1. Everything under control with three components

Energy optimization with DEMS makes use of three tools which are interconnected in a smart network. This helps you save money directly in two respects: through energy efficiency, and through reduced costs for energy optimization.

2. Intelligent forecasting and planning

With the planning component, DEMS automatically delivers forecasts for renewable power generation and consumption. On the basis of these forecasts, you can draw up the time schedules for the decentralized generation plants. In this way, you can optimise dispatch for the following day or following week.

3. Simple real-time optimization

You can use the system operation component via a process coupling to monitor adherence to the time schedule you have drawn up for your decentralized energy park. DEMS compensates optimally for any unforeseen deviations, for example in renewable power generation or loads.

4. Integral consideration of all resources

DEMS takes into account the interconnections between electricity, thermal and cooling energy, gas, and other energy sources, as well as DSM concepts. Decentralized power plants are used with minimum operating costs and at the same time contribute to reducing environmental pollution and the depletion of resources. For instance, you can achieve a significant reduction in CO2 emissions.

5. Decentralized power generation with the character of a power plant

Intelligent control of your assets allows you to react flexibly to changes in demand. That offers an approach for the fluctuating supply of electricity from renewable sources, such as wind and sun, for example using combined heat and power plants with heat storage.

6. Standardized Excel files

Standardized Excel files facilitate the importing of equipment data into the system.

7. Scalable system

Combining several DEMS systems permits large-scale utilisation of decentralised power supply concepts in case of small-scale distributed generating units – for example, small domestic cogeneration systems – a concrete offers large savings in ac-

8. Windows-based software

The software is based on Windows standards. The operator control and visualization functions are based on the Windows-oriented Siemens product, WinCC. With DEMS, you will benefit from proven software technology that is known all over the world.

9. Comprehensive mapping of units

The Decentralized Energy Management System handles:
- Contracts for power import and export (electricity, primary energy, reserves)
- Controllable, switchable, and noncontrollable loads (electric, thermal, gas)
- Power plants – for example, biomass cogeneration plants, wind turbines, and photovoltaic systems
- Electric and thermal storage.

10. Clear, straightforward operation

Standardised Excel files facilitate the importing of equipment data into the system.

11. Decentralized Energy Management System DEMS

The intelligent way to manage decentralised generation and virtual power plants.

Answers for energy.
Prepared for change in the power supply

Over the next few years the number of decentralized generating units – such as wind, photovoltaic, fuel-cell, biomass, and block heating power plants – will increase sharply. The reasons for this include the efforts to reduce environmental pollution and the depletion of resources, as well as deregulation and liberalization of the market. With DEMS you can network these decentralized generating units in a smart grid, control them centrally, and optimize their use both economically and ecologically.

DEMS as the “brain” of a decentralized generator park

Intelligent integration of decentralized energy supply structures

Fully exploiting the potential of virtual power plants

Linking together a number of individual generating units creates a virtual power plant which can be controlled as a whole. The components of the power plant, however, retain their individual characteristics. The power plants are connected as a large-scale virtual power plant. The system uses all important information, such as weather forecasts, current electricity prices, and the energy demands. This data forms the basis for drawing up and monitoring a generally optimized dispatch plan.

Up-to-date forecasts for optimal scheduling

Forecasting

Electrical and thermal loads are typically forecast as a function of the type of day (work day or weekend, for example) and time of day. The forecast of renewable energy generation is also important, and is based on a wide range of meteorological parameters.

Planning

Short-term scheduling for all the configured units is carried out in order to minimize the costs of power generation and operation in accordance with the general technical conditions and terms of the contracts. This is done in a 15-minute time grid for a maximum of a week in advance. The calculated dispatch plan is based on the weather forecast and the daily and weekly dispatch planning bands, and energy limits. The optimized dispatch plan for thermal power plants takes into account power-out,...

Real-time optimization

Based on the dispatch plan, any deviations that occur during operation are distributed cyclically at the lowest cost among generating units, storage systems, and loads, which can be influenced to this end. Using high-speed communication technology, any external stipulations relating to import, supply, or corresponding contracts are fulfilled.

Powerful communication for real-time optimization

Communication

Standardized data interfaces based on TSOIP, such as Web-based XML, are used for the exchange of individual values and sequences of values between DEMS and the components involved. Some common standards include OPC, GPRS, bus systems, or ISDN lines, which can be combined using adapters to create a powerful communications infrastructure.