Secure energy supply

Energy Automation for Airports
Airports – Hubs of international mobility

Safety – from check-in to take-off
For airport operators around the world, the highest priority is always the safety of passengers and employees. And this safety simply cannot be ensured without a reliable supply of electrical power. It’s vital for the smooth interoperation of the various complex technologies for monitoring and controlling air traffic, for handling passengers and baggage, and for building automation including the use of installed security systems. And because speed is essential in the event of a fault or a dangerous situation, airport operators need a reliable and fast overview of the components in the power network and efficient access to their controls. This is the only way to ensure that safe operation is restored in the shortest possible time.

Securing the power supply in airports
The power supply for an airport usually comprises switching and distribution systems for the high, medium and low-voltage levels, complete with local automation and protection systems. It may also include power generation plants and the required emergency power systems.

Ensuring smooth operation at all times requires an energy automation system tailored to the individual subsystems. This guarantees that there is always sufficient electrical power available wherever and whenever it is needed.

The increasing complexity of these subsystems creates a wide variety and high density of information, and airport operators require a master control system to effectively and productively use this data. Aspects such as user-friendly alarm signaling, a reduced volume of information and reliable operator dialogs at central human-machine interfaces all contribute to stable and economical operation of the entire power supply system.

Fig. 1: From power infeed to the ultimate consumers, a reliable power supply must be guaranteed for the entire airport.
Energy automation from Siemens – consistent and reliable

Using standards, setting the standard
Our automation system is based on the Microsoft operating system and uses established PC and industry standards, international standardized design principles and communication protocols. As the central component, it handles the entire information processing and control of the power supply system. Our system fits seamlessly into the processes and is ideally equipped for integration in the IT environment at airports.

The basic operational functions comprise operation and monitoring, logging, controlling, tracking, marking and alarm signaling. In addition alarms can be forwarded, for example using paging and/or Intranet/Internet. This allows unmanned maintenance through automatic alerting, during the day or at nighttime as needed. The operating options are further enhanced by messages and values generated using logic functions and automatic command outputs.

Integrated system
The process interface enables an end-to-end communication with telecontrol equipment and with secondary automation equipment and systems, and allows data to be exchanged with other automation systems. A process connection to the installed telecontrol system can easily be established via the standard protocols IEC 60870-5-101, -104 and numerous vendor-specific telecontrol protocols available.

Linking secondary automation systems is also easy and possible, for example, by means of PROFIBUS or directly via the OPC interface (OLE for Process Control). BACnet (Building Automation and Control networks) is a possible option for connection to building automation.

Maintaining an overview
A visualization providing a clear overview is a top priority of our system. Measured values can also be displayed in form of bar and curve diagrams, and messages can be logged and used for generating signal lists after filtering and prioritization. This makes it possible to separate out certain alarms, such as from the secondary automation system outside the actual power supply. The operator is warned via visual and/or acoustic alarms, and the identified cause of fault can be called up directly from the signal list in the form of a graphical display with classification of the messages according to importance.
Other operation-facilitating features include:
- the topological coloring of network sections and network groups,
- checking of 1:1 and topological interlocking conditions,
- fault location in the supply network,
- indication of ground-faulted network sections on the basis of messages from the protection equipment,
- location of faulty equipment and
- highlighting of network sections with no power supply.

Pre-tested switching sequences – either fixed or freely definable – support fault-free network operation in the case of recurrent actions (safety disconnections, changing busbars, transformer switchovers) and plannable operating processes (maintenance work, network expansions and conversions). Integrated notebook functions and counting of operating hours and switch operating cycles further facilitate system management. Special applications, such as load flow calculation and short-circuit calculation, increase the availability and operating reliability of extensive power supply systems at airports, especially through simulation of possible system states in advance. This helps to prevent inadvertent switching errors that could cause overloads or a network failure.

**Perfect efficiency**
Load management monitors and optimizes the energy import and verifies observance of the limit values agreed contractually with the power suppliers. It includes load forecasting, monitoring of energy import as well as load distribution and control, and runs in both proposal mode and automatic mode. Used in conjunction with the possibility to temporarily disconnect loads such as aircondition, this approach ensures optimal supply quality with maximum economy and optimum use of the airport’s own power generation facility.

**Optimum availability**
The dependability and availability of a control system are vital factors for its reliable operation. Our energy automation systems meet these needs by providing comprehensive backup and monitoring functions integrated in the basic system. The availability of hardware and software components of the control system can be individualized by tailoring the allocation of redundancy to the customers’ requirements.

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**Fig. 2:**
Our solutions integrate all voltage levels and all necessary information from the power supply environment into one system.
Our energy automation systems are always designed and optimized to meet the specific requirements of our customers. Since major portions of the system are based on standard components, we can scale the system in every respect.

This means we can offer you a comprehensive range of solutions, from a straightforward visual display system for the power supply to a professional energy control system with special control functions and algorithms for the energy flows.

But all functions share a common goal: They are designed to prevent unwanted interruptions of the power supply and thus eliminate possible danger to people and equipment. A further main task of the system is cost-optimized control of the energy used throughout the entire airport.

Our energy automation systems offer the following functional modules:
- Protection and automation of the power supply
- Calculation and storage of power supply system parameters
- Monitoring and control of the entire power supply system (SCADA)
- Alarm management and logging functions
- Comprehensive analyses
- Load management including controlling of power generation
- Load shedding in the event of overload and crisis situations
- Automatic restarting of loads (Load Restoration)
- Energy management
Concrete benefits for you

- **Integrated solution**
  The view of the overall system quickly shows you where the fault lies and how it can be most quickly rectified. With our energy automation system, you can manage and supervise all relevant information about your high-, low- and medium-voltage installations in one system, on one monitor. You couldn’t ask for a better overview.

- **Central human-machine interface**
  Switching and administration can be carried out conveniently from a central operator terminal. In an emergency, you can inform all relevant departments quickly, specifically and fully automatically by SMS or e-mail. In this way, you can detect an imminent fault in good time and intervene quickly in the right place to prevent a potential loss of the power supply.

- **Highest supply reliability**
  Reduce the risk of an interruption of the supply by selectively disconnecting less important areas of the airport. Load shedding functions assist you if any instabilities occur in the power supply, such as load unbalances or overloads.

- **Optimum utilization of electrical energy**
  Special load management functions guarantee that you have exactly the amount of energy available that is needed at any given time. Unnecessary energy consumption can be detected and avoided in the future by taking suitable action.

- **High availability and reliability**
  The use of rugged, industry-tested components and proven standards ensure high availability and reliability of the power supply and of the individual areas within your airport. We can adapt the level of automation optimally to your processes, and thus help you to react quickly and correctly in critical situations.

- **Lower operating and maintenance costs**
  The system can automatically perform standard functions, such as logging of energy data. Continuous monitoring makes it possible to plan required maintenance activities in advance and carry out preventive maintenance. This helps to increase the availability and reduces the time and costs required for maintenance work.

**Partnership with power**

- **We are represented in virtually every country in the world and have a presence on all continents. With this global network we can assist you practically anywhere in the world with the implementation of a tailored energy automation system for your airport.**
The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.