Energy data management saves energy and cuts costs

Reduce operating costs by managing your energy data

Effective energy data management involves identifying consumers, documenting their load profiles and monitoring power consumption. The objective is to optimize control of the electrical installations so as to achieve the best possible utilization of the transformers, with the ultimate aim of cutting running costs. Energy management specialist FRAKO installed a comprehensive monitoring system in a large theme park. This helped in regulating the electrical equipment via the building services control system

Rising power costs and increasingly stringent environmental regulations are prompting companies to intensify their search for ways to save energy. A continuous energy management system enables them to acquire detailed data on energy flows and consumption, to attribute these to individual consumers or cost centres and to trace the effects of changes. Creating this transparency is an essential prerequisite for identifying the main energy consumers, reducing losses and achieving a lasting reduction in running costs. A theme park offering various indoor pools, a heated outdoor lido open throughout the year, sauna and spa amenities, restaurants, bars, a hotel and live entertainment provides wellness and recreation to over one million visitors each year. All this involves an enormous energy consumption, especially as the water and air temperatures must be maintained at constant levels. FRAKO, a company in Teningen, Germany, specializing in energy management solutions, used a three-step approach to demonstrate the energy flows in the entire complex in such a way that appropriate measures could be taken to optimize capacity utilization.

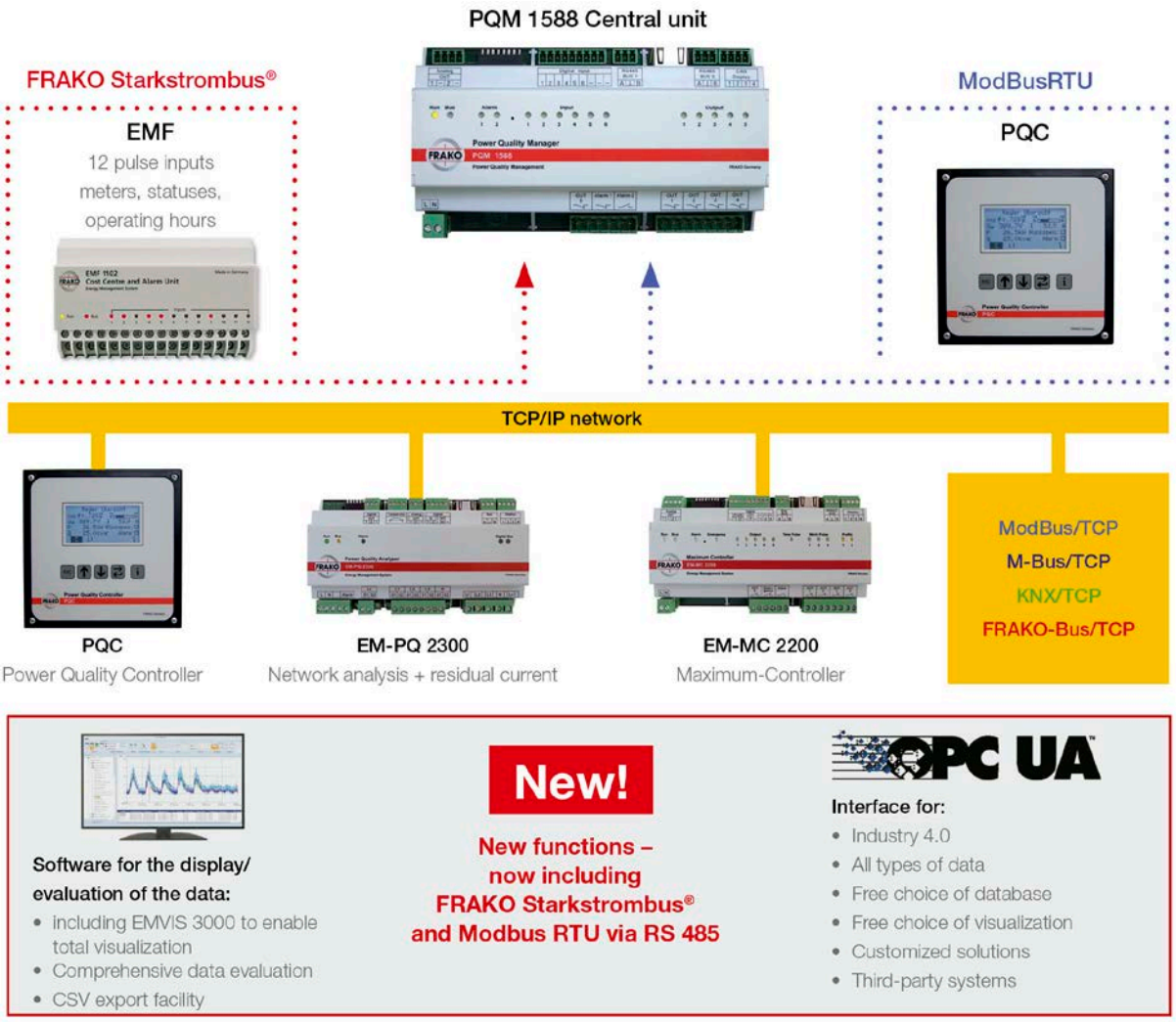
Step 1: Identify the main power consumers

Fourteen transformer stations supply power to the resort and its various facilities. As each transformer is allocated to a specific section of the theme park, some grouping was already in existence, enabling a structured approach to be adopted. It was unclear, however, which parts of the resort, at which times, consumed the most power. The management only knew the overall monthly power demand. In order to carry out detailed energy monitoring, FRAKO specialists installed an EM-PQ 2300 Power Quality Analyzer at each transformer station.
These instruments transmit their data via Ethernet to a PQM 1588 Power Quality Manager, which serves as a central unit collecting the energy consumption data from all the transformers. EMVIS 3000 software is then used for the visualization, evaluation and documentation of these data. In this way, EKATO experts acquire the load profiles of all the electrical consumers such as pumps, fans, compressors, heating systems, water treatment units, etc., connected to each individual transformer. These power consumers are monitored and regulated by a building services control system.

Step 2: Define the potential

To establish the relationships between the various processes and the measured energy consumption, the measurement results must be interpreted and conclusions drawn from them. When this is done, it is important that the data acquisition from all the different systems takes place in real time without delays at the interfaces.
All of the many pump control units at the site were already networked via KNX and integrated in the existing instrumentation and control system. The PQM 1588 has OPC UA server functionality and can acquire data via KNX and other protocols such as Modbus/TCP or M-Bus/TCP. *As an independent communications protocol, OPC UA* is ideal for a standardized rapid transfer of data between various devices regardless of their manufacturers. It was therefore an obvious solution to have the PQM 1588 Power Quality Manager acquire all the energy data from the pumps, compressors and other building automation equipment via their various protocols, and then forward these data to a central database. The EMIS Report evaluation software accesses this database and evaluates the energy data with respect to the cost centres concerned, thus enabling a comparison of the different energy consumption figures to be made. EMIS Report exports these data as CSV

files, with no delays at interfaces, so that they can then be displayed and analysed by the getFM facility management software. In addition, the energy data from all the transformers and equipment linked to the PQM 1588 are forwarded online via the OPC UA interface to the building services control system, which works with the BACnet communications protocol.



Step 3: Make the decisions and implement the solution

Analysis of the operating data now gives the building manager an accurate overview of the various activities in the theme park and their corresponding impact on energy demand. In this way, inefficiencies such as consumers that are continuously operating, even when they are not needed, can be identified, as can electric motors that are over-dimensioned and only run at part load.

Detailed data acquisition is a prerequisite for the optimum control of equipment and systems, the accurate calculation of individual sections and the best possible loading of the transformers. This means that business decisions can now be reached on the basis of actual

data, with no need to rely on ‘gut feeling’ alone. Real energy data also enable realistic payback times to be calculated, thus giving enterprises more certainty in their investment strategy.

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