SiMon – the energy management system

Maximum energy efficiency through self-learning optimisation

In cooperation with: xNet Software- und IT-Lösungen

ratiotherm Smart Energy Systems

Function description

SiMon is freely programmable software that enables intelligent monitoring and control of energy management systems, whether for single-family homes, larger residential complexes, commercial units or local heating networks.

It can record any number of data points in real time. However, the major advantage is the integrated, self-learning forecasting function based on artificial intelligence.

The data collected from the past is analysed to derive highly accurate forecast values for the future.

The interaction with integrated function modules, such as a sun position calculation or a weather forecast, ensures that the systems can be operated with maximum efficiency and comfort.

SiMon energy management

1 Collect and compile consumption data

2 Evaluate historical data

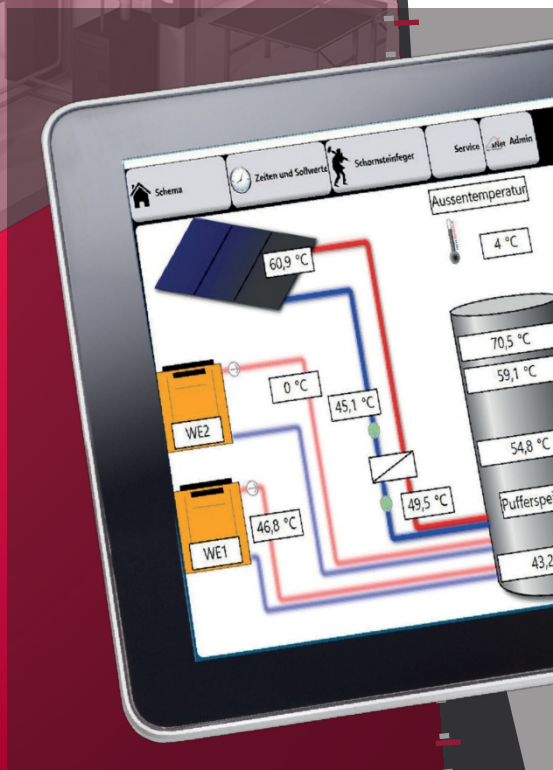
3 Forecast future consumption

4 Enrich with weather forecast

5 Adjust regulation/control accordingly

Further system advantages

- Open system architecture, allowing for customisation to existing and future architectures
- MS Windows operating system ensures a wide selection of hardware
- Option for redundant installation on multiple devices guarantees high availability, which is particularly important in industrial environments
- Secure access from any computer, also possible via the cloud
- Automatic detection of fault messages and errors, with notification via email, text message, etc.
- Freely configurable visualisation in any interface (responsive design)
- Data transfer via interfaces, e.g. to control room



1. Application example: Optimisation of own consumption

Initial situation: Residential complex with 12 residential units whose energy requirements (electricity + heat) are covered by a combined heat and power plant (CHP) with buffer storage. A photovoltaic system on the roof produces additional electricity.

Objective: To maximise the self-consumption of the electricity generated (from the CHP and PV systems) in order to operate the system with the highest possible efficiency.

Challenge: To adjust the heat generation in the CHP to the expected electricity generation by the photovoltaic system in order to avoid excess electricity generation.

The solution: SiMon determines the expected amount of electricity from the photovoltaic system (weather report) and compares this with the forecast heat demand. SiMon controls the CHP on the basis of these determined values. Both the amount of energy and the time of energy generation by the CHP can be specified.

2. Application example: Local heating network

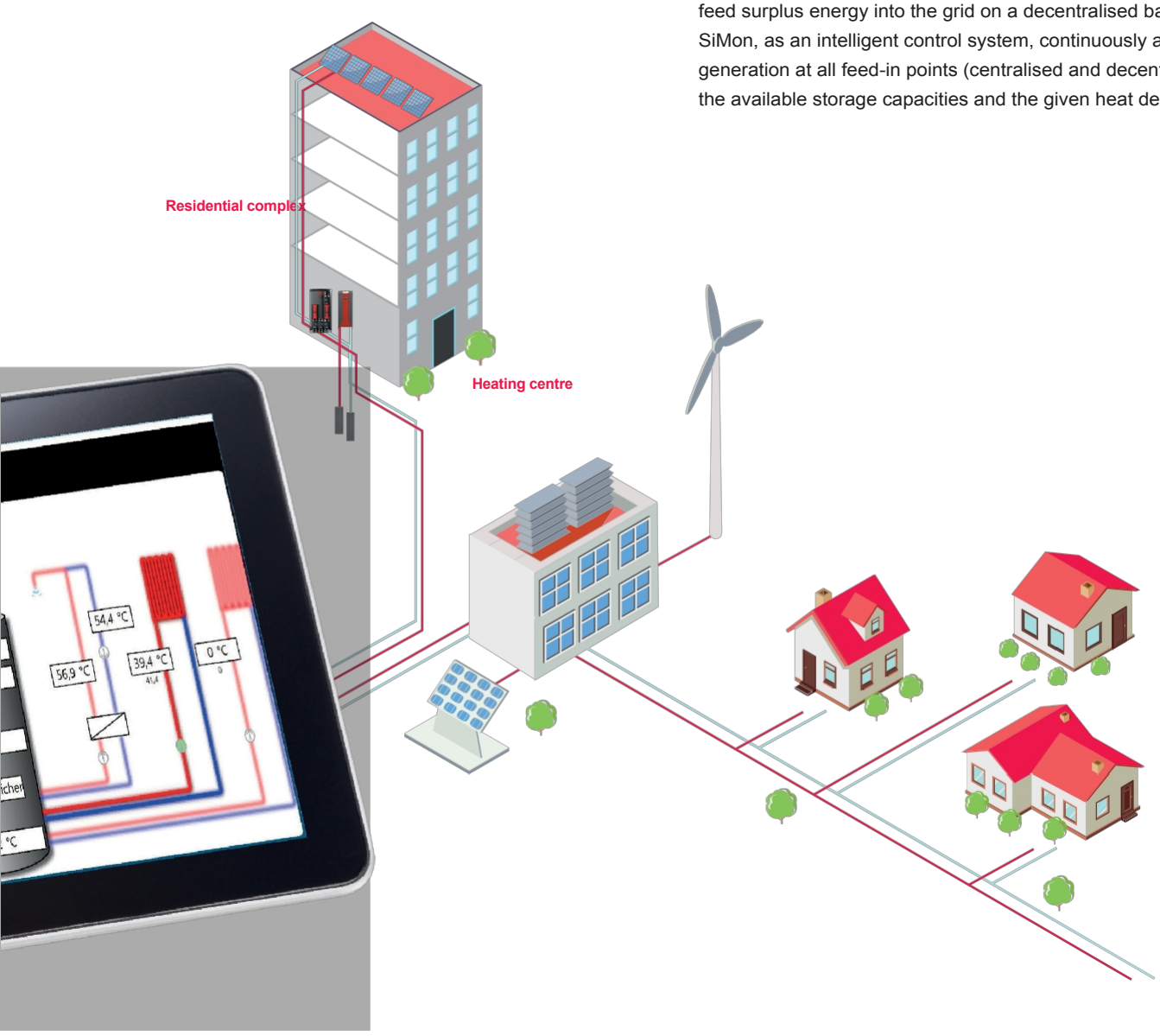
Initial situation: A small community for which climate protection plays an important role. Energy requirements are to be met as self-sufficiently as possible and from renewable energies.

Objective: To set up a low-temperature local heating network; the required energy is to be generated by heat pumps combined with solar thermal energy. A gas-fired combined heat and power plant is also used.

Challenge: Minimising the running times of the gas-fired combined heat and power plant while ensuring maximum comfort and optimum energy utilisation.

The solution: A central heating circuit (local heating network) was set up to supply households with hot water. This water is heated by a central groundwater heat pump combined with solar thermal energy and stored in large buffer tanks. Peak loads are covered by a gas boiler. The electricity required for the heat pumps is provided by municipal PV systems and the CHP plant.

The connected households now function not only as heat consumers. Since they have their own storage tanks and heat pumps or, in some cases, solar thermal systems, they can also feed surplus energy into the grid on a decentralised basis. SiMon, as an intelligent control system, continuously adjusts heat generation at all feed-in points (centralised and decentralised) to the available storage capacities and the given heat demand.



Your advantages at a glance

For the user:

- Optimal adaptation to individual interests and the given technical requirements
- Independence from energy suppliers and raw material prices
- Greater cost certainty in the long term

For network operators:

- Data access on the device itself, via network or via the Internet (user-dependent content and access options)
- Monitoring of fault signals and notification including fault report by e-mail or SMS
- Evaluation and availability of historical data (e.g. diagrams);
  Export to external files (e.g. Excel) possible
- Option for redundant installation on multiple devices, ensuring high system availability

For planners, energy consultants:

- Open system architecture allows for customisation to existing and future infrastructures
- Wide selection of usable hardware (MS Windows as operating system)
- Pre-installed, modularly expandable function library (e.g. sun position calculation, weather forecast, home automation, heating with cascade connection, etc.)
- Programming via integrated interface on the device or via PC using a network
- Freely programmable interface for individual displays and function masks; visualisation of any processes and data
- No quantity restrictions with regard to the number of controllable IO components, the mathematical functions that can be displayed and the macros to be managed

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