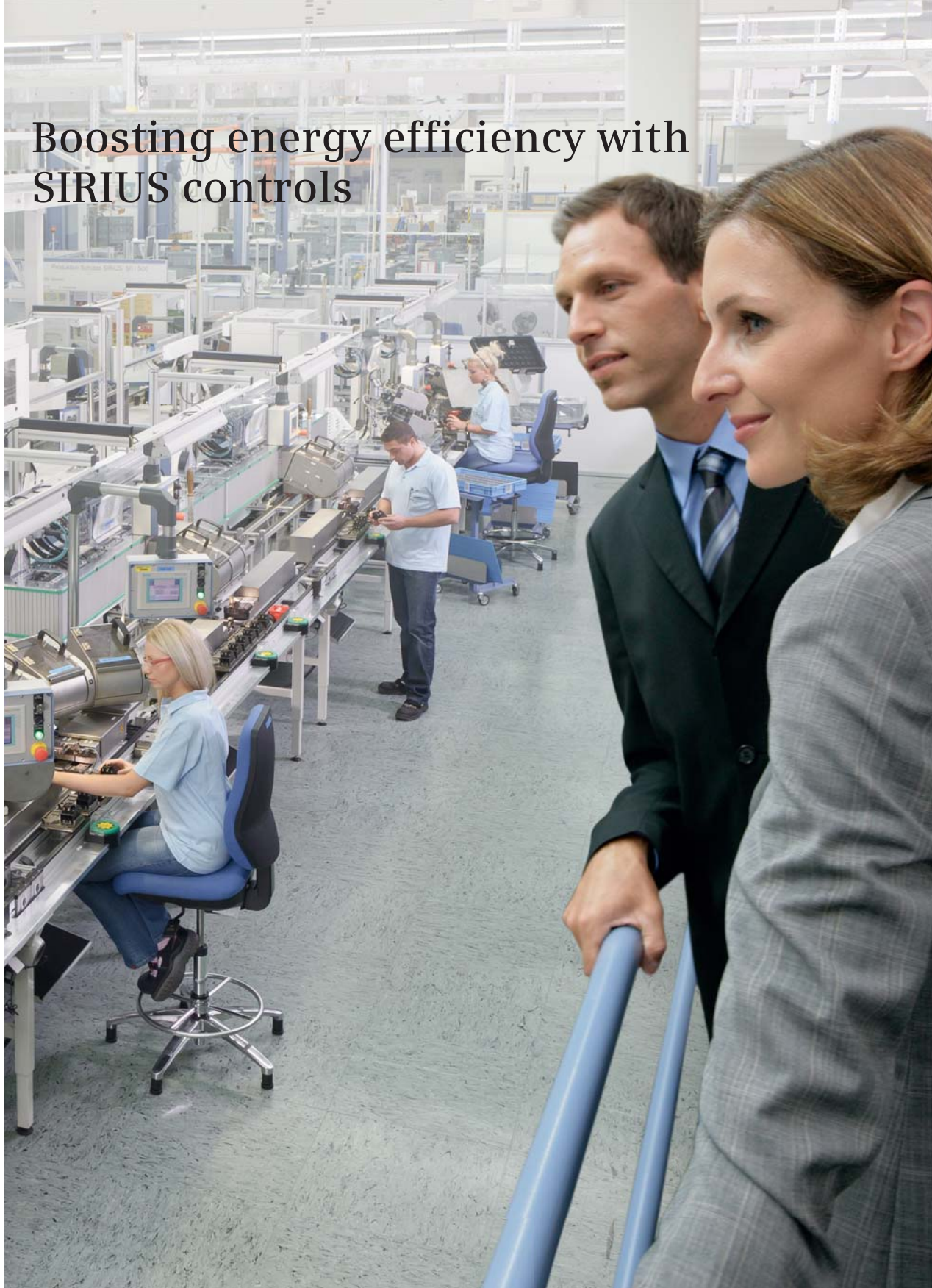


Boosting energy efficiency with SIRIUS controls



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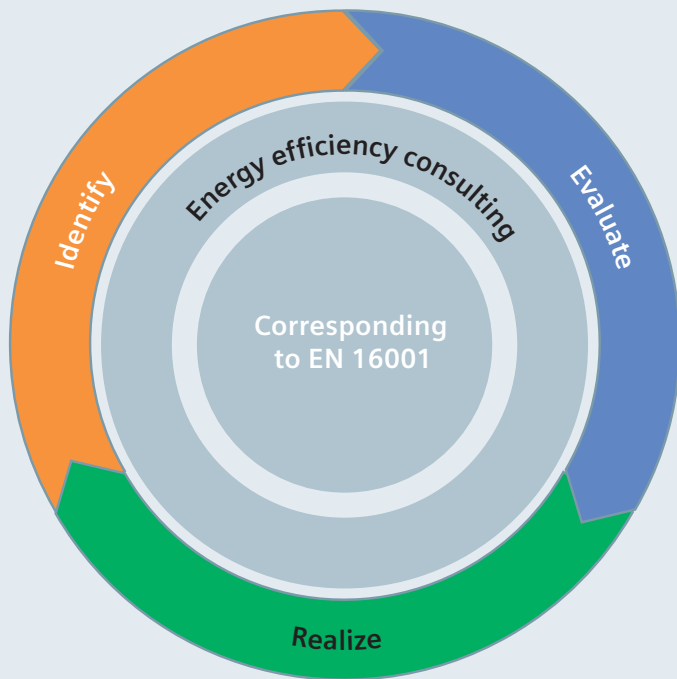
SIEMENS

Saving energy in industry:

SIRIUS controls help to minimize consumption

Increase productivity and minimize manufacturing costs – operate cost-effectively while pursuing the “green philosophy”: One key to this success today is efficient energy management. It is necessary to identify meaningful savings potential here and to realize this potential along the entire process by means of appropriate measures. In the area of production, the electrical drives are clearly the main energy consumers among the electrical loads. They account for 70% of electrical energy requirements. Any energy that can be saved here therefore becomes immediately evident in the form of lower production costs.





Plant energy management is becoming more and more significant in industry:

The reasons for this can be found in rising energy costs and increasingly strict environmental requirements, or the striving for certification in accordance with the energy management standard EN 16001. Energy efficiency in production plants thus contributes crucially to increased production and so improves competitiveness – in all sectors. We offer you a unique portfolio for efficient energy management in industry with which all process energy requirements can be optimally organized. We divide the procedure into three phases for this purpose: “Identify, evaluate and realize”. And we support you in every process phase with the right hardware and software solutions.

Exploiting potential for optimization

To be able to support you in all areas of energy management, we are the only manufacturer to offer you energy-saving solutions along the entire drive chain: from drives through motors, converters and inverters right up to the suitable motion control systems. We achieve perfect interaction of all components with the most up-to-date SIRIUS controls, and that is what we would like to present to you now in more detail.

Implementing energy efficiency

- **SIRIUS motor starters and soft starters** for reducing mechanical and electrical peak loads by up to 60%
- **SIRIUS switching and protection devices** that reduce energy losses by a further 10% in the new device generation
- **PROFenergy** – dynamic energy management that saves energy costs by completely shutting down unneeded loads during breaks in production
- **Customer Support** to support you in upgrading existing drives to ecological systems
- **Air-conditioning of the control cabinet with switching devices** generates no costs or only low costs for heat dissipation – and this results in low operating costs
- **Holistic examination of the drive chain from the energy perspective** – to achieve the best, most energy-efficient solution of the application for fixed speed, variable speed or a combination thereof (cascade operation) in each case

Switching, protecting and measuring in one:

Cost-efficient energy management with SIRIUS controls



SIRIUS: switching devices that measure

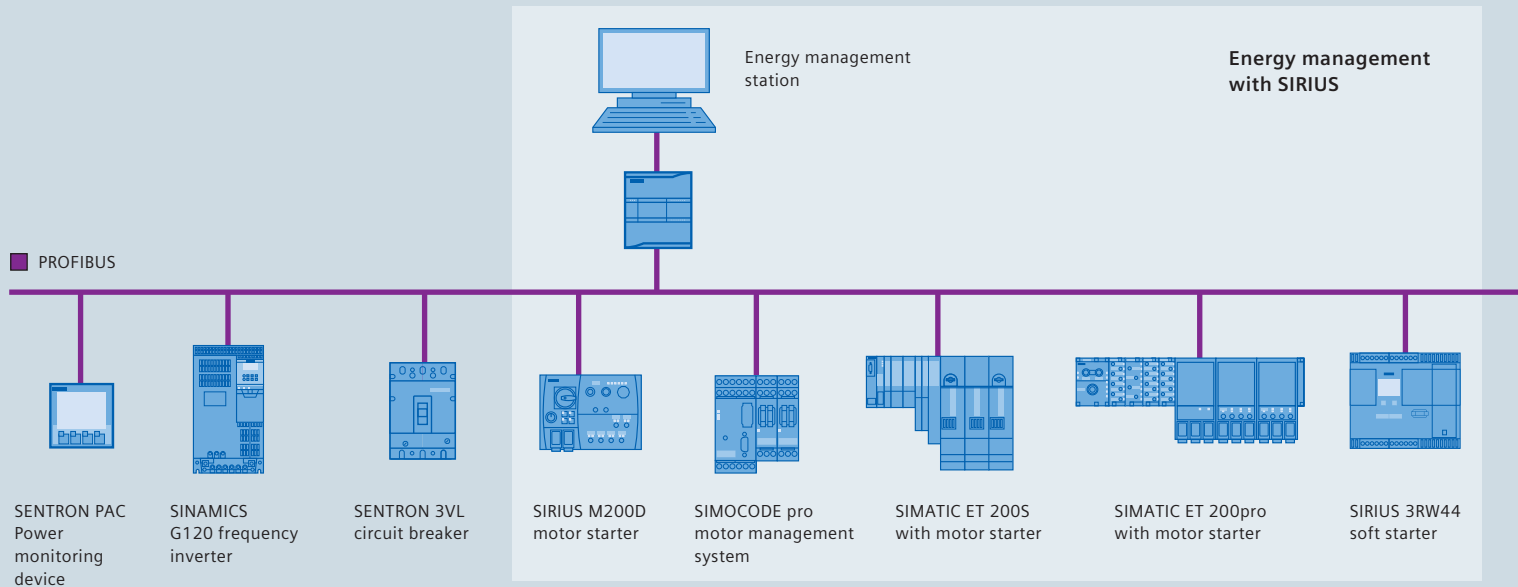
SIRIUS switching devices for transferring measured values? This sounds unusual at first but it is actually quite logical. The first step in the energy management process, the “Identify” phase, is concerned with analyzing energy flows. The aim is transparent representation of the energy requirements of each sub-process. The data gained in this way then enables an initial analysis of the existing savings potential. For this purpose, communication-enabled SIRIUS switching devices supply the energy data required for power management systems – entirely without any additional installation and investment overhead.

SIRIUS: technology that saves power

In the “Realize” phase, modern SIRIUS technology supports energy savings at different points:

- SIRIUS soft starters use bypass contacts after power-up
- SIRIUS overload relays are equipped with solid-state releases instead of bimetal releases and they achieve a greater setting range and reductions of up to 98% in specific power losses
- SIRIUS circuit breakers reduce energy losses by 10% using the latest bimetal materials
- SIRIUS contactors have an electronic coil control that reduces their power losses by up to 92%
- SIRIUS compact starters have 80% less power losses than conventional feeders; this is based on combining the most efficient technologies in a single device

In the “Identify” phase, all communication-enabled switching and protection devices supply energy values continuously to, say, a higher-level power management system without additional installation overhead. They thus offer the required transparency in energy consumption.



Energy efficiency:
When the sensor is also the actuator

Many SIRIUS products record energy data such as current, voltage, power, etc. – and they supply this data to higher-level management systems. The actuator thus also performs the sensor functionality without additional investment or installation costs.

Overview: energy efficiency with SIRIUS

- Reduction in pick-up and holding currents of the contactor coils – through electronic control (AC/DC with wide range)
- Reduction in the current path resistances through optimized main contacts and bypass contacts
- Reduction in power losses in the case of overload thanks to new bimetal materials or electronic current sensing
- Reduction of the heat generated in the control cabinet



PROFenergy: selectively disconnects inactive loads

PROFenergy is an intelligent, vendor-independent system that disconnects loads in a coordinated and centralized way across all devices during breaks in production. This saves time on the one hand since it eliminates the need for costly manual switching while, on the other hand, it helps to save power sensibly during short breaks. The new SIRIUS M200D motor starters with PROFenergy ensure selective disconnection of the load. By switching off unnecessary loads, users are able to make significant savings in energy costs. Existing hardware and software can be easily integrated into the power management system via the PROFenergy-enabled power module of the SIMATIC ET 200S and the function blocks in the controller. In conjunction with the PROFINET I-Device functionality, PROFenergy also enables coordinated disconnection/connection of entire plant sections. The reloadable function blocks ensure low configuring costs here. Standardized measured value formats make the analysis of available data very easy.

Field-proven:

SIRIUS controls in application-specific solutions



Wastewater treatment plant and water industry: driving pumps only

Since use of the pumps in the wastewater treatment basin is only necessary if the volume of water in the basin falls to the minimum level, an automatic on/off function for the pump makes sense. With new SIRIUS controls, the pump and drive are only connected when they are needed and are otherwise not in operation. As well as protecting the devices, this results in significant potential for energy cost savings compared to other drive concepts.

Advantages

- Reduction of peak loads by up to 60 %
- Approximately 30 % savings in energy costs compared to other solutions
- Avoidance of problems like water hammer thanks to soft starting
- Longer service life of the motors thanks to soft starting and stopping

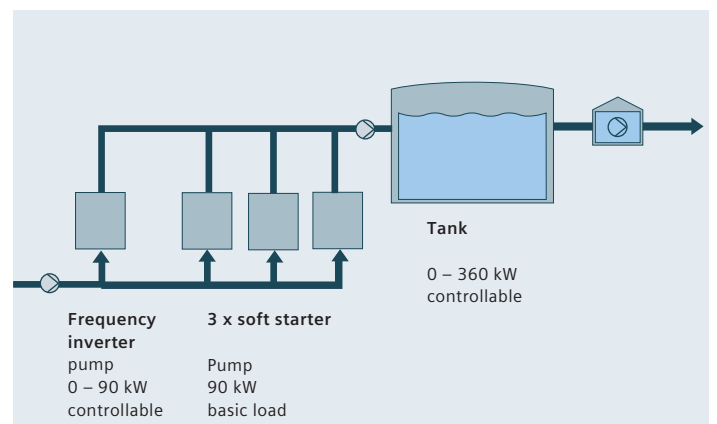
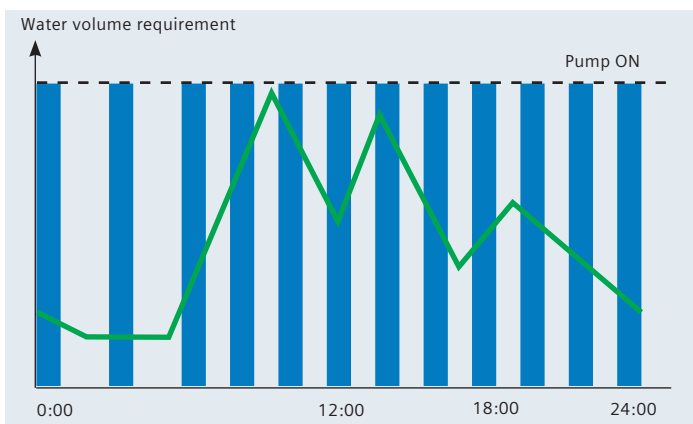


Pumping systems: savings through cascade connection

A cascade connection of frequency inverters and soft starters offers the ideal combination of switching and inverter systems. In the example application, a frequency inverter and three soft starters save approximately € 12,000 in procurement costs compared to the use of four frequency inverters. Depending on water demand, up to 3 pumps can serve the basic load while the 4th pump covers the variable demand. In this way, up to € 5,000 of energy costs* and approximately 26 tons of CO₂ emissions can be saved every year.

Advantages

- Avoidance of peak loads through the use of SIRIUS controls
- Savings of approximately 60% in current peaks
- Reduction of the overall energy costs by approximately 65 %
- Reduction in procurement costs by approximately 70 % compared to conventional solutions
- Protection against problems like water hammer thanks to soft starter
- Longer runtimes of the motors thanks to gentler operation
- Controllable flow possible without throttle valves



* Calculation example with 12 cents/kWh



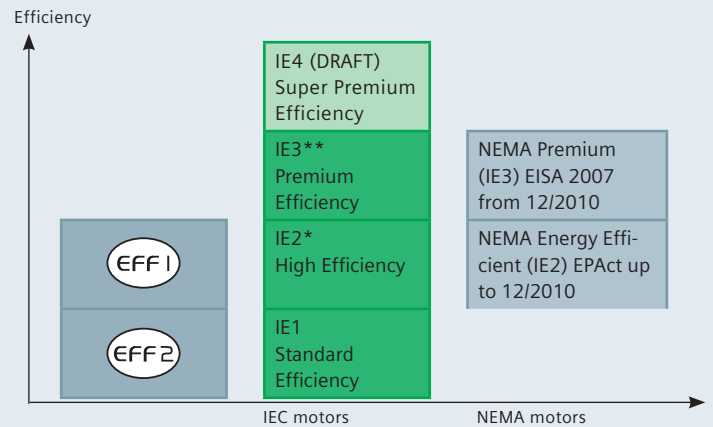
Ventilating and cooling in the greenhouse: temperature-dependent two-level control

Compensating for temperature fluctuations is an essential requirement in industrial-scale greenhouses. Automatic detection of temperature conditions and the associated processes of switching the ventilation system on and off provide crucial help here in minimizing energy consumption. In our application example, a two-level control was installed with SIRIUS controls that now switches and controls the ventilation and cooling system energy-efficiently.

Advantages

- Energy-efficient operation through low power losses
- Space-saving design of the SIRIUS controls in the cabinet
- Autonomous operation of the overall ventilation and cooling system
- Higher efficiency in overall operation with lower energy costs

New efficiency classes for low-voltage asynchronous motors



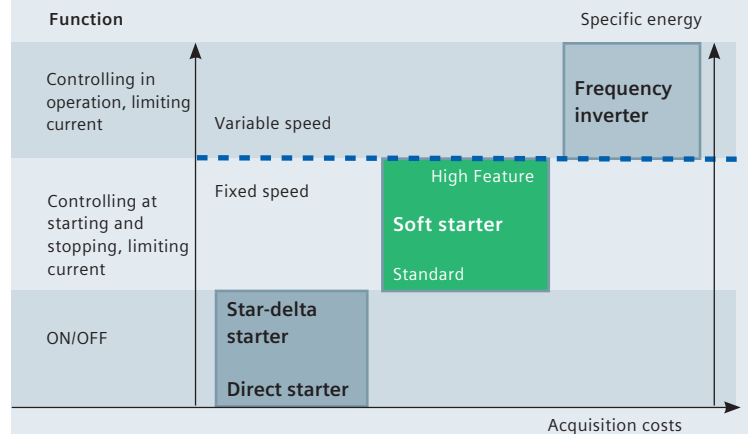
IE = International Efficiency

* Europe from 16.6.2011

** Europe from 1.1.2015: Compliance with legally required minimum efficiency levels IE3 for power ratings from 7.5 kW to 375 kW and from 1.1.2017: Compliance with legally required minimum efficiency levels IE3 for power ratings from 0.75 kW to 375 kW



Conditions of use for switching devices: fixed speed – variable speed



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