

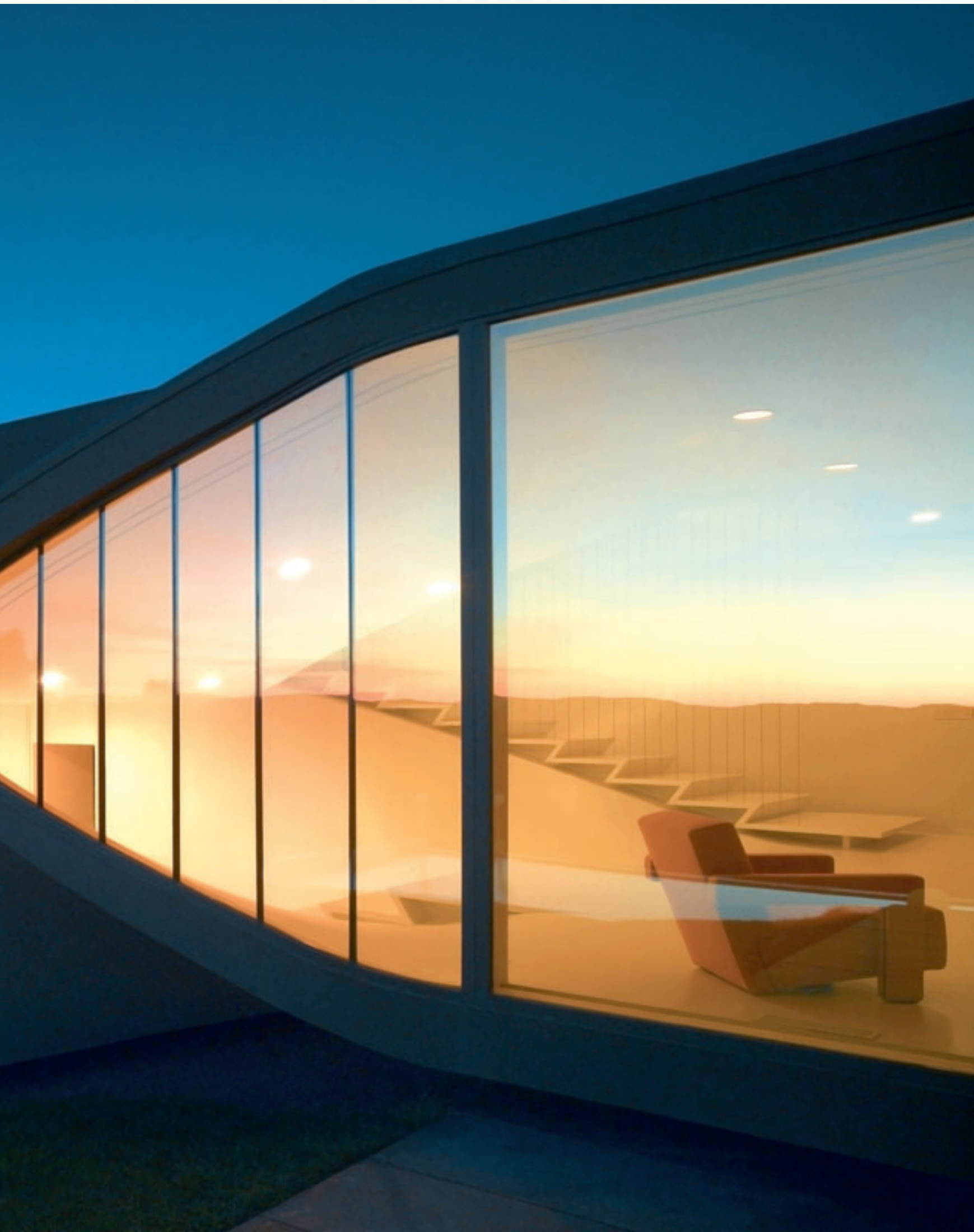
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Energy Innovations

Intelligent solutions for energy efficiency in buildings

Lighting, heating, air conditioning and similar installations in buildings account for 40 percent of the global energy consumption, yet this consumption can be significantly reduced by using intelligent building automation and comprehensive energy performance contracting solutions.



TECHNICAL EQUIPMENT such as boilers, refrigerators, motors, pumps and lights may create a comfortable, healthy living and working environment, but they are responsible for around 40 percent of global energy consumption, and therefore 21 percent of the world's total greenhouse gas emissions. Siemens is prepared for the future with products, systems, solutions and strategies designed to improve energy efficiency in buildings. The key to this is intelligent integrated building and room automation that brings about substantial energy savings without sacrificing comfort.

Perfectly regulated and controlled

An optimized building automation system for measurement and control equipment can increase the energy efficiency of heating, air conditioning and water heating systems (for example, in commercial buildings) by up to 30 percent. This corresponds to energy efficiency class A according to the EN 15232 European standard for "Energy performance of buildings – impact of building automation, controls and building management," which grades building automation according to energy efficiency classes ranging from A to D.

Huge potential savings can be achieved by using electronic individual room control systems to adjust radiators, fan coil units and cooling ceilings as required. For example, the Desigo RX individual room control systems have been certified by the European Building Automation and Controls Association (eu.bac) for their high control accuracy, which optimize conditions in a room to ensure maximum comfort. Reducing the set temperature by just one degree Celsius results in energy savings of up to six percent. Controllers certified by eu.bac save up to 14 percent more energy than uncertified controllers.

A significant portion of the energy is used to power the respective device. The main power

guzzlers are the pumps and fans used in heating, ventilation and air conditioning equipment, so highly efficient three-phase asynchronous motors are genuine energy savers, which dissipate up to 40 percent less power than standard motors. When calculating the total cost of a motor, the purchase price is much less significant than the cost of the energy it uses during its service life, so this type of motor can result in substantial savings, depending on its application and hours of operation.

True energy savers – frequency converters and energy saving motors

Pumps and fans rarely operate at full capacity, because the technical systems are designed for use in extreme summer and winter conditions. However, they are generally less efficient when running at partial capacity, and therefore use more energy. Airflow is often mechanically restricted, which requires the drive to work at maximum capacity. In other words, the fan motor on an air conditioning unit runs at full power even though only a small amount of air is required. This wastes a great deal of energy, especially when the high annual running time of pumps and fans means that these components account for a large portion of the operating costs in a system's life. Frequency converters are the ideal solution here, given the fact that they use only the energy that is actually required at a particular point in time.

Siemens has developed the SED2 frequency converter especially for building technology. This converter ensures that units always run in the optimum operating range, thus using up to 50 percent less energy than traditional mechanical solutions (throttles). The potential savings that can be achieved with a new frequency converter and the payback period (normally only a few months) can be calculated quickly and easily using the accompanying SED2 EasySave software.

A. Keller/darimages

Siemens provides intelligent building and room automation systems to save energy without compromising on comfort

New standard for building automation

The EN 15232 European standard for "Energy performance of buildings – impact of building automation, controls and building management" came into force in July 2007, and covers the following key points:

- Process for calculating energy efficiency, taking into account user profiles for different types of buildings
- These elements are combined to provide clear guidelines on attaining a particular efficiency class
- There are four efficiency classes, from A = very efficient to D = inefficient

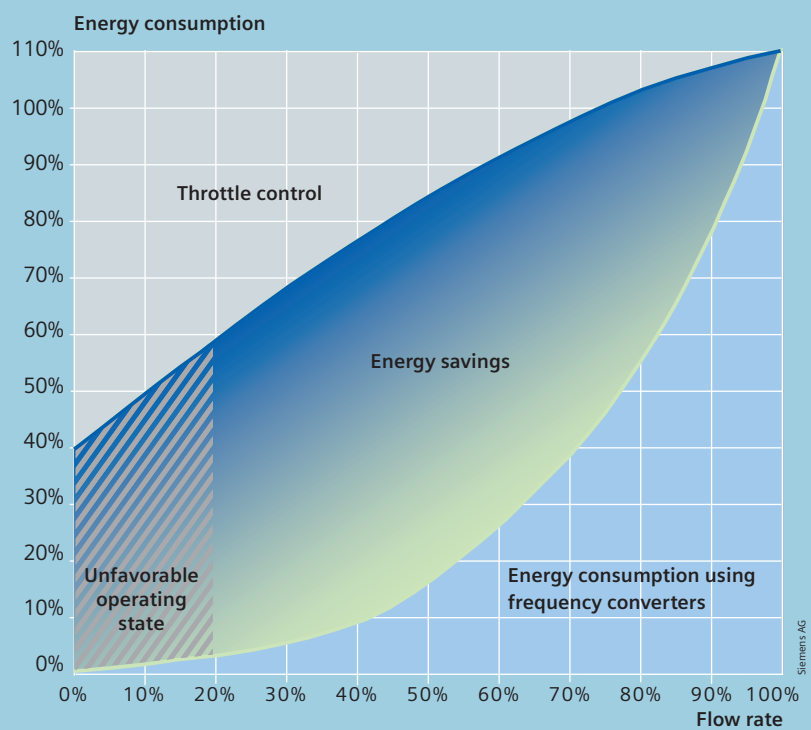


Key factor: process transparency

Another key factor for energy conservation, besides the reduced use of primary energy, is process transparency. The only way to identify the full scope of potential for energy savings and to realistically assess the success of optimization measures is to continuously record and examine energy consumption. Obtaining reliable information about a building's energy requirements means taking external influencing factors into account and comparing energy consumption with previously defined set values. The Siemens Energy Monitoring & Controlling (EMC) application is an Internet-based solution for efficient, cost-effective energy management, and enables energy consumption to be monitored and controlled easily. The consumption data is recorded either manually or automatically on a central Siemens Internet server using a secure personal user account. Any standard PC with Internet access can be used to run EMC and to view the energy reports.

Customized system optimization

The Siemens energy savings concept for building technology also includes service and customer-oriented solutions such as energy performance contracting. This comprehensive solution for modernizing technical systems that require a lot of power



brings about sustained improvement in energy efficiency throughout the system life cycle. The investments are always refinanced through contractually guaranteed savings (see page 14 for further information on energy performance contracting). **B1**

This graph shows how the use of frequency converters permits energy savings of up to 50% compared to mechanical systems with the same output power

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