

Practical example: New elevator technology reduces energy costs by 80%

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The elevator systems at an intergovernmental organization in Munich with over 3,000 employees are heavily used every day. To increase comfort and significantly improve energy efficiency, the organization's management decided to comprehensively modernize 21 elevator systems.

The result exceeded even the experts' expectations: energy consumption was reduced by over 80%-equivalent to savings of around 231,800 kWh per year.

Initial situation and solution

The existing elevators had rated loads between 1,250 and 2,000 kg, reached speeds of up to 1.6 m/s, and had travel heights of up to 31.7 m. Due to the high volume of visitors, continuous high availability was essential.

Initially, the lift engineer recommended using tried-and-tested gear-based drive technology. However, the company responsible for the project, Butz Aufzüge, recognized the considerable potential for greater sustainability and proposed a forward-looking alternative: gearless lift drives.

These drives are significantly more efficient, especially in the frequently used partial load range. In addition, plastic-coated ropes were used, which enable a more compact and resource-saving drive unit. The additional balance system ensures 100% load balancing between the ropes. Instead of conventional brake resistors, grid feedback units were also installed.

Normally, the energy generated during generator operation is converted into heat and unnecessarily heats up the machine room. The new energy recovery technology instead feeds this energy directly back into the building network, where it benefits other consumers.

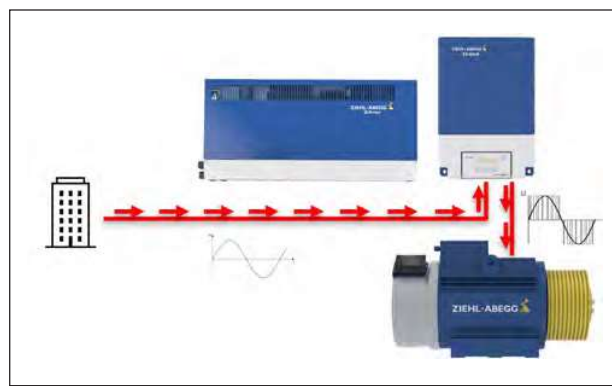
Implementation

The client and specialist planners followed the elevator manufacturer's future-oriented concept – but without compromising on quality, reliability, or service. Only components from renowned manufacturers were used.

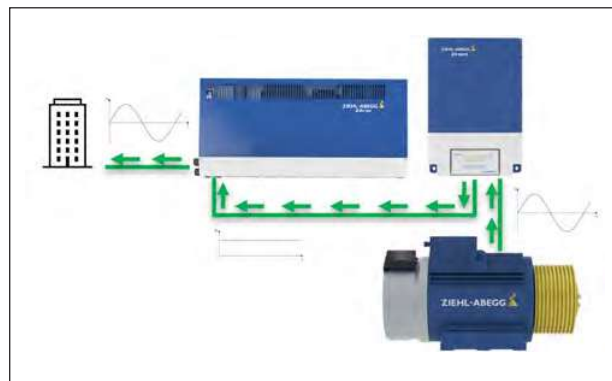
The gearless ZAtop drives and shieldless ZAdyn converters from Ziehl-abegg have already proven themselves many times in practice. ZAreC power factor correction units were selected for trouble-free integration into the existing building services engineering system – with particularly clean current return (only 5% harmonic content).

In addition, current values and the cumulative energy recovery value can be conveniently read at any time.

The systems were easy to install and operate fully automatically.



ZAreC4C – power recuperation unit / Motor operation
Photo: BUTZ AUFZÜGE GmbH



ZAreC4C – power recuperation unit / Regenerative operation
Photo: BUTZ AUFZÜGE GmbH

Scientifically evaluated energy savings

The results were independently confirmed by one of the most research-intensive universities for applied sciences:

Before modernization, energy consumption was 13,262 kWh per cable elevator per year, totaling 278,502 kWh annually for 21 systems. After the upgrade, this figure was reduced to just 2,225 kWh per elevator, or a total of 46,725 kWh per year.

Data at a glance:

Before	After
13,262 kWh per system per year	2,225 kWh per system per year
278,502 kWh for 21 systems per year	46,725 kWh for 21 systems per year
Reduction or savings: - Around 83% > approx. 231,800 kWh per year - Around 81,100 € per year (35 ct/kWh) - Around 85 t CO₂	

This corresponds to savings of around 231,800 kWh per year – over 80% less energy consumption. An ecological and economic success in equal measure: The annual CO₂ savings amount to around 85 tons, with monetary savings of around € 81,200 based on an electricity price of 35 ct/kWh.

The project impressively demonstrates how the intelligent use of carefully selected components in elevator technology not only achieves sustainable benefits, but also significantly reduces operating costs in the long term.



Old - Drive technology with gearbox and steel cables

Photo: BUTZ AUFZÜGE GmbH



New - Gearless ZAtop drive with plastic-coated cables

Photo: BUTZ AUFZÜGE GmbH



New - Balance system for compensating rope tension
Photo: BUTZ AUFZÜGE GmbH



New - Gearless ZAtop drive with ZAdyn converter and ZAreC mains feedback unit
Photo: BUTZ AUFZÜGE GmbH