Examining Elevators, Energy and Efficiency

By Sasha Bailey

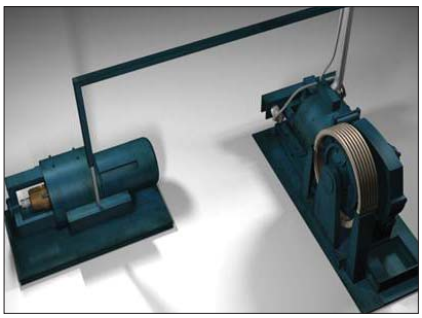
As green initiatives become an essential part of today's building projects, elevator companies need to create plans to execute and maintain long-term visions toward a goal of sustainability.

Some elevator manufacturers have committed to evaluating and quantifying the current environmental impact of their products through lifecycle assessments (LCA). These analyses cover the product's lifecycle, from the impact of procuring or mining virgin resources to the manufacturing processes, shipping, installation, service maintenance, repair and modernization. With this growing emphasis on sustainable building practices, many building owners, facility managers, engineers and architects are looking for ways to increase elevator efficiency and reduce energy consumption by monitoring, upgrading and installing new equipment.

Elevators and Energy

All elevators use energy. Although levels of energy efficiency may vary among different models, a majority of new elevators make up a small percentage (generally assumed to be two to three percent) of a building's overall energy consumption. The energy efficiency of elevators has greatly improved in parallel with technological advances in motor controls. Due to the increasing number of drive technologies created over the last three decades, units manufactured more than 20 to 30 years ago are significantly less energy efficient than today's newer models.

Traction elevators that are more than 20 years old require the use of DC (direct current) hoist motors. These DC hoist motors need a motor generator in order to convert AC (alternating current) power into DC power. The necessity of power conversion is due to the AC motor's inability to provide a precision control on the elevators acceleration and deceleration, which affects ride quality. Over time, manufacturers developed new technologies to convert AC power directly to DC power through SCR (silicon-control rectifiers) drives. SCR drives enable building owners to remove the redundant secondary motor generator that simply converts power from AC to DC.



This elimination has reduced the need for dual motors, leading to significant reductions in energy use and operating costs. If your facility is still operating motor generator technology, you have a significant opportunity to reduce the energy consumption of your elevators.

Expenses associated with creating a sustainable elevator system range from minor upgrades such as lighting improvements to a complete energy-efficient system design and installation. Simple elevator upgrades, like LED lighting, closed-loop door operators or automatic fan and light shut-off, help a building's energy consumption to decrease. This ensures building owners save money each year. Energy-efficient lighting, controls and improved ride and air quality (IAQ) will also benefit building owners through improved tenant attraction and retention.

Destination Control Software

Modernizing elevator systems by installing destination control software can create up to 35 percent more efficient passenger transportation, yielding significant energy savings. Grouping elevators by destination improves routing and enables fewer cars to take fewer trips. A dispatching system directs passengers to the elevator that will get them to their destination with the shortest travel time.

Buttons are not needed inside the car. Instead, passengers use the keypad or touch screen in the lobby to register the floor to which they are traveling. The keypad or touch screen will graphically direct each passenger to the appropriate car for his or her destination. Guided by a formula based on estimated time to destination, the system takes into account each person's desired stop and dispatches the car that will provide the fastest trip time.

Once the elevator car arrives, lobby position indicators allow passengers to see designated stops and direct them to their appropriate ride. Systems equipped with destination control software increase passenger-handling capacity, allowing building owners to accommodate tenants with high-traffic needs. Instead of stopping at multiple floors for different individuals, the dispatch system groups all passengers traveling to a specific floor in one trip.

This practice can reduce user wait-time up to 30 percent and increases handling capacity (e.g., the number of people an elevator can transport efficiently in a set time). Destination control systems improve building efficiency and can even increase overall property value.

Service and Modernization

Elevators running at peak performance use less energy. To maximize the performance and safety

of elevator products, a code-compliant preventive maintenance program is important.

Even after an elevator's warranty expires, it is important it receives preventative maintenance to ensure optimum and safe performance. This maintenance should involve fast, reliable service and trained technicians. Most companies offer programs that can be customized to fit a building owner's specific needs.

The Americans with Disabilities Act (ADA) stipulates buildings must comply with new requirements that make elevators easier to operate by people with special needs. If an elevator is deemed as non-compliant with current regulations, the service provider should be able to provide a quick, cost-effective solution.

Elevator modernizations can update an elevator's performance, reduce energy consumption and decrease the impact on IAQ. Cab and lobby upgrades can offer a new updated look compared to older styles. Experienced technicians and engineers can customize modernization packages that are both time and cost efficient.

Conclusion

With energy consumption reaching an all-time high, builders are looking for green alternatives. Whether customers are upgrading their current system or installing a new elevator, choosing energy-efficient technology should be beneficial for building occupants, owners and the environment.

Sasha Bailey, LEED AP BD+C, is a corporate sustainability manager in ThyssenKrupp Elevator's Americas Business Unit. Email her at Sasha.Bailey@thyssenkrupp.com. **AF**