

## Energy Saving Regenerative Drives (ReGen) in Elevators – New Builds and Retrofits

**Environmental and Human Health Impact:** Installation of ReGen drives in approximately 2,500 elevators at Kaiser Permanente by 2020 will provide 15.72 million kWh per year of potential energy savings and reduce emissions of 7.7 metric tons of CO<sub>2</sub> per year

**Business Impact:** Cost neutral

### Challenge

Kaiser Permanente's overarching objective over the next 10 years is to implement an energy strategy that is focused on energy efficiency for all facilities while maintaining an environmentally responsible and healthy environment for staff and members. To support this goal, the facilities team looked at the elevators that we ride day in and day out to identify an energy efficient solution.

### Aim/Goal

- Reduce the energy load of our elevators while ensuring that safety, reliability, and the ride in our elevators are not compromised.

### Team

Paul Gilman – Senior Consultant, National Facilities Services  
 Bill Pickford – Principal Planner, National Facilities Services  
 Andrew Graham – Sourcing Manager, Procurement & Supply (PS)

### Actions Taken

- ✓ KP engineers and PS, recognizing the need to have an energy efficient solution, partnered with elevator manufacturer to understand more efficient elevator models and retrofit opportunities.
- ✓ The team also devised a plan that incorporated specific energy savings targets from the National Energy Strategy for new installations at KP facilities.

### Results

- ✓ OTIS, one of the largest manufacturers of elevators, was in the midst of creating a Regenerative (ReGen) drive. Since this solution, along with their maintenance and sales support package and pricing, met KP's needs, OTIS was made a preferred supplier.
- ✓ The ReGen drives were incorporated in their new product called Gen 2. Gen 2s are propulsion elevators where a polyurethane coated steel belt replaced a conventional steel rope and a closed loop regenerative drive replaced a conventional drive and a

gearless machine replaced a geared machine offering better energy efficiency and a better ride.

- ✓ In ReGen drives, electric power is generated when an elevator travels upwards with a light load, and when it travels downward with a heavy load during the elevator system deceleration process. In effect, a fully loaded, descending elevator can provide a significant portion of power for an adjacent ascending elevator.
- ✓ While the amount of energy savings per elevator depends on various system parameters and configurations, savings for typical Gen 2 elevators installed in a new low to mid-rise facility is shown here for comparison purposes:

Duty/Speed	Gen2 System, ReGen Drive		Conventional Drive/Geared System	
	Energy Consumed (Kwh/Y)	Annual* Cost	Energy Consumed (Kwh/Y)	Annual Cost
1275 kg / 1.6 m/s	3640	\$381.47	9,930	\$1,040.76
1600 kg / 1.6 m/s	4431	\$464.36	12,258	\$1,284.63

\*Data for 20 floor building, 60 meter rise, 300K trips/year at \$0.104Kwh rate

- ✓ When Kaiser Permanente migrates all of its existing and planned 2,500 elevators to this Gen 2 system by 2020, it will have the potential to save 15.72 million kWhs or 63 percent of energy consumed by elevators per year.
- ✓ This will result in annual CO<sub>2</sub> emissions reduction of 7,747 tons.

### Lessons Learned

- ✓ Kaiser Permanente should proactively pursue more opportunities to identify and reduce heat sinks within its facilities Programwide and initiate projects related to energy efficiency.

### Next Steps

- ✓ Complete conversion from conventional to ReGen drives for all low to mid-rise facility elevators by 2020.
- ✓ Perform energy audits to identify other opportunities for energy savings in Kaiser Permanente facilities.