



Qualifying and Applying for Utility Energy Savings Rebates

by Don Vollrath and Ross Smith



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In many areas of the U.S., outside parties will help pay for an elevator modernization. The payment comes as an energy rebate. In areas of the country with a green outlook, state or local government has created funding (often financed by utility surcharges) for energy initiatives. While some funding is directed toward alternative energy (including wind, solar, biofuel and fuel cell), the majority of local initiatives are directed at energy savings. In other areas, utilities have acted independently or in cooperation with government agencies to create energy-savings policies or programs.

In general, there are two types of rebates that apply to elevators:

- 1) Flat-rate funding is based on horsepower (hp) nameplate capacity. For example, a rebate of US\$50 per hp is awarded to the end user upon the installation of a variable-frequency drive.
- 2) In more aggressive programs, the energy-savings rebate is based on the actual energy saved. Depending on the utility or state, this can be paid as an initial lump sum or on an annual basis over a fixed term. While there might be a separate category for elevators, more often this incentive will fall into a "custom application" category.

In some areas, both types of rebates are available. It is up to the user to decide which incentive is most favorable. Rebates based on actual energy savings are increasingly being applied.

In energy-savings rebate programs, there have been a number of ap-

proaches for estimating and verifying energy savings in an elevator modernization project. For example, at one site, Vollrath's Calculator™ from Magnetek was used to submit an estimate, a utility-grade meter was installed to verify that estimate and the actual results were submitted to the utility. For future projects, the utility has indicated that it will not require actual field monitoring and will accept the Vollrath's Calculator estimates.



How Vollrath's Calculator Works

Vollrath's Calculator uses typical elevator-design data to calculate the flow of energy during separate portions of the elevator duty cycle. One can rationalize total equipment mass and mechanical- and electrical-efficiency losses in the system by knowing payload capacity and speed.

All electric motors can act like an electric generator. When an elevator lifts the mechanical equipment and payload against gravity, the potential energy of the combined weight multiplied by distance and the kinetic energy of motion are added to the moving masses. All the energy comes from metered electrical-utility lines. The energy of motion is removed by the regenerative braking action of the motor as the elevator comes to a halt.

When the elevator and load lower, the stored potential energy of gravity pushes the motor, allowing it to generate electricity that may be returned to the utility power grid. When this occurs, the metering system for the building doesn't need to run backward. The equipment for elevators consumes only a small portion of the whole building's energy. Simply slowing down the rate of total building power consumption for a few seconds, to account for regenerated energy, will also save money.

Some of the regenerated energy supplies power to losses in the system. Whatever energy is lost by the inefficiency of individual system components or is turned into heat by the braking action of non-regenerative drives is consumed. Simple multiplication by the average number of runs per day – a calculation of wasted energy while the elevator is idle – and the cost of energy complete the power-consumption estimates. Comparative calculations for several different motor equipment and drive types are relatively straightforward.

Worth the Effort

A little effort up front can be worth it for building owners and managers. Energy savings rebates are probably not

Getting Started

1) Contact the local utility.

All of the programs require an application to be submitted. Many programs require pre-approval prior to the installation of any equipment.

2) Find out whether you need to get a baseline measurement of energy usage.

Usually, the elevators will not be on a separate meter, but each elevator does have an individual local feeder that can be monitored. Your local utility might furnish a meter.

3) Complete Vollrath's Calculator.

Consultants can access the calculator by contacting Magnetek for a username and password at phone: (262) 252-2957 or e-mail: kgrote@magnetek.com.

4) Submit paperwork to the utility.

the primary reason to upgrade an elevator, but they can be an incentive to move forward with the modernization. Rebates from as small as US\$2,500 (total) to US\$44,000 (annually) have been given for these upgrades. 

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Drive / Mtr Type	QUICK COMPARISON -		GEARED	
	kWh / day estimate	\$ per Year estimate	Relative kWh Consumption	
m-g DC (Regen)	53.51	\$1,536	1.000	Savings
SCR-DC (Regen)	40.98	\$1,177	0.766	23.4%
Quattro PWM-DC(regen)	30.63	\$879	0.572	42.8%
Ind. AC non-Regen	42.24	\$1,213	0.789	21.1%
Ind. AC w/ Regen	30.61	\$879	0.572	42.8%
PM AC non-Regen	N/A	N/A	N/A	N/A
PM AC w/ Regen	N/A	N/A	N/A	N/A

NOTE: CALCULATED DATA FOR PM ASSUMES A GEARLESS MACHINE

350 FPM

2500 LBS

1000 RUNS / DAY