Energy Management and Audit

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Energy management for motors, systems, and electrical equipment

Fuel as electricity		**Electricity consumption in the industry**	
Energy sector	**Percent**	**kWh 10^9**	**Percent**
Electric drives	20	580.9	69
Electrolytic	3	100.8	12
Direct heat	2	90.4	11
Other	1	71.6	8
Total	26	843.7	100

Systems and equipment

- The radial system
- The secondary-selective system
- The primary-selective system
- The looped primary system
- The secondary-network system

Industrial plants

These losses in the electrical distribution system appear as listed:

a) Conductor losses (I2R)

b) Magnetic material losses

c) Rotating equipment friction and windage losses

d) Stray load losses

ECO in Hydraulic elevators

- Performing passenger traffic studies carefully to select the appropriate speed and car capacity
- Installing microprocessor elevator controls
- Installing high-efficiency motors for the pumping unit
- The most practical rated speed for a hydraulic elevator is between 90 ft/min and 125 ft/min
- Roped hydraulic application utilizes a 2:4 roping configuration for mechanical advantage thereby reducing required torque

ECO in Traction elevators

- Motor-generator set with variable-voltage dc operation and geared hoisting machine (200+ ft/min)
- Single-speed ac geared hoisting machine (speed to 150 ft/min)
- Special elevator drive system utilizing an electronic ac drive and eddy current braking
- 4Conversion of ac to dc using silicon-controlled rectifiers (SCRs) for the supply to the dc variable-voltage geared hoisting motor
- 5Variable-voltage variable-frequency (VVVF) four-quandrant control pulse-width-modulated (PWM) drive systems

ECO in power walks

- Use of high-efficiency motors
- Adjusting operating hours to traffic demand
- Using variable speed ac drives that would allow the unit to slow down when the escalator has no load. The escalator is then gently accelerated when passengers are present, using automatic sensors as input to the controller. This can provide a superb quality ride and energy savings up to 30%.

ECO in power walks

- Modifying the operating mode for new escalators that allow the standard singlespeed motor to operate in a wye configuration for light loads and to switch to the normal delta configuration as load increases. This produces energy savings but also gives a noticeable speed change when the switch is made. Use of additional sensors is recommended to make the transition before passengers enter the unit. The solution is less costly than a variable-speed drive but the performance is not as good