# TECH SERIES: MOTORS

## BALDOR • PART 1

# More Than Money

### Improve lifecycle costs with premium-efficient motors

**By John Malinowski**
**Senior Product Manager for AC Motors, Baldor**

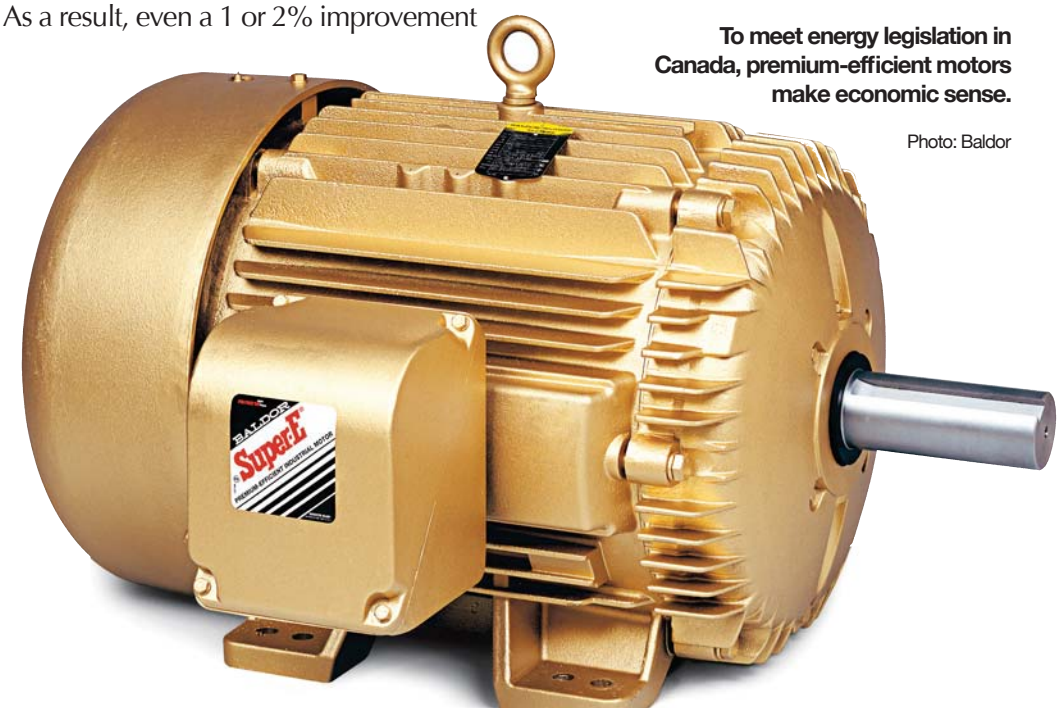
With today's rising gasoline prices, it makes sense that people are looking beyond the purchase sticker of a new vehicle and more closely considering fuel mileage. You might be able to buy a nice truck for far less than you would pay for a hybrid car. However, you may be willing to pay more upfront dollars after considering the lifecycle cost of the vehicle. This simple example can also be applied to motors that are selected for industrial applications.

According to Natural Resources Canada (NRCan), AC-induction motors are the most commonly used motor type in Canadian industry, accounting for about 80% of the annual integral horsepower sales to the industrial sector. With a size range from 1 to 200-HP, these motors account for as much as 20% of the total electricity consumed in Canada every year.

The most recent energy legislation enacted by NRCan requires that a general-purpose motor sold after April 12, 2012, has to meet more stringent efficiency performance standards. This amendment to Canada's Energy Efficiency Regulations means induction motors with an output power rating of 0.75 to 150 kilowatts (kW) (1 to 200-HP) have moved from standards of energy efficiency up to premium-efficient levels. A second group of special-purpose motors and 201 to 500-HP, general-purpose motors have also been added under this new amendment.

Choosing a motor that goes beyond the efficiencies of what the law stipulates, or selecting efficient designs for motors that aren't covered by legislation, however, makes good economic sense if you look at the lifecycle cost of the motor. Because the purchase price represents less than 3% of the lifetime cost for most motors, the remaining 97% goes toward the purchase of electricity to operate them **(Figure 1)**. As a result, even a 1 or 2% improvement in efficiency can provide substantial savings, especially when you consider that electric motors have an average life of 28 years.

Instead of rewinding a failed motor, replacing it with a premium-efficient motor is a good strategy. Since the cost of electricity is only going up, it may also be worthwhile to replace motors before they fail. If the motor is old, then chances are its efficiency is below even the regulated minimum efficiency




**To meet energy legislation in Canada, premium-efficient motors make economic sense.**

Photo: Baldor

standards. Switching to a highly efficient motor would offer even greater operational savings.

If you don't plan to replace motors immediately, it would still be beneficial to develop a strategy for motor replacements before they fail, so the correct motor for the application is available. A plant survey should be conducted to collect data, including motor voltage, kW, speed, efficiency, hours of operation, mounting type and configuration of the motor. Because failed motors need to be replaced quickly, it's better to make these decisions in advance, starting with the motors that have the most critical applications.

When upgrading, you may also want to take the opportunity to add additional features to the motor, which will make it more robust and eliminate downtime. Over 60% of all motor failures are a result of bearing failure. Many companies have standardized on efficient severe-duty NEMA Premium motors. They meet IEEE 841-2009 standards that were developed for the petrochemical industry and also widely used in the pulp and paper sector.

With many companies now establishing "green policies," electric motors should be the keystone in their program, as they use so much of the company's total electricity. By moving beyond the purchase price of a motor and instead considering the lifecycle cost — the cost of consuming electricity can be controlled and managed.

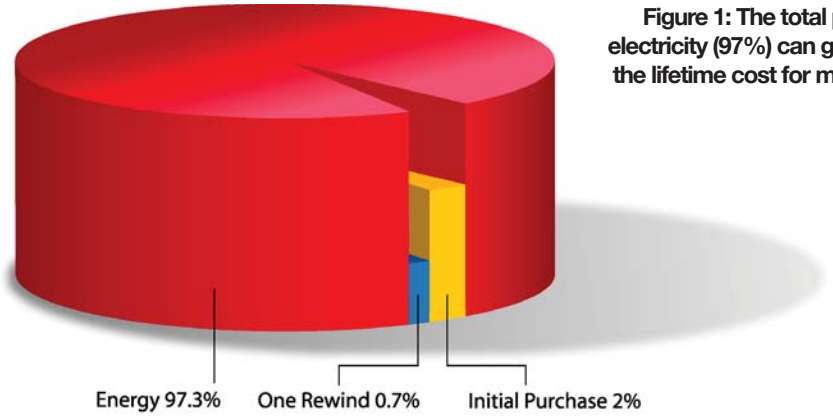



Photo: Baldor

**Figure 1: The total purchase of electricity (97%) can greatly affect the lifetime cost for most motors.**