

## How They Work



*Photo provided by  
TECO-Westinghouse Motor Co.*

*Energy-efficient motors like this can save money and energy.*

Electric motors operate on the principal of magnetism. When electricity is fed into one end of the motor, an axle rotates on the other end, producing power to run the machine. The armature around the axle is an electromagnet that spins as its ends are attracted and repelled simultaneously by the field magnet surrounding it.

## The Power of Today

Motors are just one example of why electricity is the clean power of today. People are discovering that electric technologies are more **efficient and cleaner** than combustion energy sources. Electric technologies simply do more with less energy.

But the story doesn't end with motors. There is a broad spectrum of options available to help you **save money and increase energy efficiency**. Talk to your electric cooperative today about installing an energy-efficient motor and learning other ways to be an efficiency champion.

## Energy Efficient

# Motors

*Energy efficiency that keeps on saving*



Your Touchstone Energy® Cooperative   
*The power of human connections*

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To learn more about your motor options, talk to your local electric cooperative.

## Energy Savings



Photo provided by  
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Motor systems comprise more than half of the country's electrical energy usage. Improving their efficiency not only has the potential to save energy and reduce operating costs, it can improve productivity within the United States. According to the U.S. Department of Energy (DOE), **motors offer a tremendous opportunity for energy savings, between 62 to 104 billion kilowatt-hours (kWh) annually.**

Because the energy cost of running a motor is much higher per year than the initial purchase price, efficiency is an important component to consider when purchasing or rewinding a motor. According to the DOE, a continuously running 20-horsepower motor – even at a relatively low rate of \$0.04/kWh – will use approximately six times its initial purchase price worth of electricity on a yearly basis.

## Improving Efficiency

The efficiency of motors is determined by the ratio of mechanical power output to the electrical power input. The output of an energy-efficient motor is significantly higher per unit of electricity consumed than that of a standard motor. This is due to considerable improvements in the design, materials and manufacturing techniques used to produce energy-efficient motors.

To qualify as being energy efficient, the performance of a motor must meet or surpass the nominal full-load efficiency values determined by the National Electrical Manufacturers Association.

### Additional benefits

- Reduction in utility bill costs and improvement of bottom line
- Improvements that require little or no extra investment, are easy to implement, and have payback times of less than a year
- Reduction in operating and maintenance costs, less waste and enhanced production
- Reduction of negative impacts on the environment

### When should you buy an energy-efficient motor?

Purchasing an energy-efficient motor when making new installations, purchasing equipment packages or making major modifications will help save you money. Replacing oversized motors with more efficient models also conserves energy, so you should consider this instead of rewinding older units.

## Powerful Savings

Put money back in your wallet by installing energy-efficient motors for new projects or to replace old motors. The high energy savings of energy-efficient motors make them cost effective for home and business use.

### Simple payback

New motor =  $\frac{\text{price premium} - \text{utility rebate}}{\text{annual dollar savings}}$   
(years)

Replacement motor =  $\frac{\text{motor price} + \text{installation charge} - \text{utility rebate}}{\text{annual dollar savings}}$   
(years)

### Not looking to purchase a new motor?

These electric motor controls can save you money and increase energy efficiency:

- **Phase converter** – Converts single phase to three phase to run larger and more energy-efficient electric motors.
- **Soft start** – Slowly ramps up speed of electric motors to limit potentially harmful current spikes during startup.
- **Speed control** – Run your electric motors at the precise speed required for more efficient operation.
- **Auto start** – If power is interrupted, the controller will restart and resume optimum speed automatically.