

ENERGYwise

FOR YOUR BUSINESS



Premium-Efficiency Motors

Invest in premium-efficiency motors and watch the savings add up.

Have you ever wished for a capital investment that could repay many times its original value over the next 20 years? Energy-efficient motors pay for themselves in a few years, or sometimes, even a few months. It's important to look at the operating cost, not just the initial cost, when buying a new motor. After they pay for themselves, motors will continue to pile up savings worth many times their purchase cost for as long as they remain in service. This investment can also improve equipment reliability, reduce downtime and minimize repair costs.

Value for your business

The chart below illustrates the energy- and cost-savings available when replacing a serviceable standard-efficiency motor with an EPart-level or NEMA premium motor.

HP	Standard Efficiency Motors, Average Efficiency		Replace with EPart Motors				
	Efficiency at 75% load	Annual Energy Use (kWh), cost	Purchase Price (35% discount)	% Efficiency at 75% load	Annual Energy Use (kWh), cost	Annual Savings kWh, \$	Payback Period (years)
5	84.0%	26,644	\$ 233	88.2%	25,374	1,270	2.44
		\$ 1,998			\$ 1,903	\$ 95	
10	86.75%	51,653	\$ 375	90.0%	49,773	1,919	2.60
		\$ 3,874			\$ 3,730	\$ 144	
15	87.55%	76,771	\$ 562	91.0%	73,780	2,991	2.50
		\$ 5,758			\$ 5,534	\$ 224	
20	89.3%	100,206	\$ 666	92.6%	96,626	3,579	2.48
		\$ 7,515			\$ 7,247	\$ 268	
25	89.9%	124,457	\$ 800	93.1%	119,952	4,505	2.36
		\$ 9,334			\$ 8,996	\$ 338	
50	91.6%	244,211	\$ 1617	93.9%	238,027	6,185	3.48
		\$ 18,316			\$ 17,852	\$ 464	

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Who can participate?

- Dakota Electric members who own a commercial building, farm or business. If you have questions about your eligibility, contact Dakota Electric.

Rebates apply to motors from one-to-200 horsepower installed in retrofit applications that meet the National Electrical Manufacturers Association (NEMA) premium efficiency motor standards, where a non-NEMA premium efficient motor is being replaced. Rewound or repaired motors do not qualify. The nameplate of the new motor must clearly state the NEMA nominal premium efficiency and meet the following criteria:

- AC polyphase induction motor
- Squirrel cage rotor design
- NEMA design B torque characteristics
- Synchronous speeds of 3600, 1800, 1200 rpm

What you'll receive

- The maximum rebate amount is limited to 50 percent of the project costs and \$100,000 annually per member.

What you need to do

- You are responsible for checking with Dakota Electric to verify funding availability and program parameters.
- Installation must be complete before funds will be issued.
- Itemized invoices from equipment vendors must accompany the rebate application.
- Invoices must itemize labor charges, quantity and price of the equipment installed.
- Invoices must include manufacturer and model numbers for the installed equipment.
- Dakota Electric reserves the right to conduct inspections.

Contact the Energy Experts[®]

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Programs are subject to terms, conditions and change without notice.

Success Scenario:

Anderson Printing replaces an old, 75-horsepower standard-efficiency boiler forced-draft fan motor with a NEMA premium-efficiency motor. The existing motor operates at a 75 percent load for 8,000 hours per year with an efficiency (n_{std}) of 91 percent. Assume the replacement motor has an efficiency (n_{PE}) of 95.4 percent and electricity is priced at \$0.075/kWh.

Energy Savings = $hp \times load \times 0.746 \times hours \times (100/n_{std} - 100/n_{PE})$
= $75 \times 0.75 \times 0.746 \times 8,000 \times (100/91 - 100/95.4)$
= **17,014 kWh/year**

Energy Cost Savings = $17,014 \times \$0.075 = \$1,276/\text{year}$

Over a 10-year operating period for a 75-horsepower motor, the purchase price might represent just two percent of the total motor installation and operating costs. Energy and maintenance costs account for the remaining 98 percent. Even a small improvement in motor operating efficiency can produce significant savings and provide a rapid return on investment.

Source: Premium-Efficiency Motors and Transformers, CDA, 2008