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Monthly Informative Application Guidelines, with respect to *Motors & Drives* to keep you better INFORMED.

APPLICATION GUIDELINE #22

(Energy Consumption Facts – Rewind? Or Replace?)

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The savings potential on using mature, proven efficiency technologies and practices is enormous. On average, the manufacturing sector could reduce industrial motor energy use by 11-18%.

Energy costs and potential savings according to select industry groups:

Selected Industry Groups	Motor System Costs	Motor Energy Costs/Total Operating Costs	Estimated Savings per Yr.	Savings as % of Operating Margin
Paper Mills	**$4.6 mm**	**6.5%**	**$659,000**	**5.0%**
Petroleum Refining	**$5.6 mm**	**1.4%**	**$946,000**	**1.0%**
Industrial Inorganic Chemicals	**$1.6 mm**	**10.4%**	**$283,000**	**6.0%**
Paperboard Mills	**$3.0 mm**	**6.4%**	**$492,000**	**5.0%**
Blast Furnaces and Steel Mills	**$6.0 mm**	**2.1%**	**$358,000**	**2.0%**
Industrial Organic Chemicals	**$1.3 mm**	**1.0%**	**$91,000**	**1.0%**
Industrial Gases	**$1.1 mm**	**21.7%**	**$116,000**	**13.0%**
Plastics Material and Resins	**$1.5 mm**	**1.5%**	**$121,000**	**1.0%**
Cemet, Hydraulic	**$2.2 mm**	**9.6%**	**$219,000**	**4.0%**
Pulp Mills	**$1.7 mm**	**6.7%**	**$483,000**	**5.0%**

Showcase Energy Saving Examples:

Company	Type of Plant	Energy Savings kWh/Year	Savings as % of Initial Sys. Energy	Annual cost Savings	Payback on Invest (Years)
General Dyanmics	**Metal fabrication**	**451,778**	**38%**	**$68,000**	**1.5**
3M Company	**Laboratory facility**	**10,821,000**	**6%**	**$823,000**	**1.9**
Peabody Coal	**Coal processing**	**103,826**	**20%**	**$6,230**	**2.5**
Stroh Brewery	**Beer brewing**	**473,000**	**52%**	**$19,000**	**0.1**
City of Milford	**Municipal sewage**	**36,096**	**17%**	**$2,960**	**5.4**
Louisiana-Pacific	**Strand board**	**2,431,800**	**50%**	**$85,100**	**1.0**
City of Trumbull	**Sewage pumping**	**31,875**	**44%**	**$2,614**	**4.6**
Nisshinbo California	**Textiles**	**1,600,000**	**59%**	**$100,954**	**1.3**
Greenville Tube	**Stainless steel tubing**	**148,847**	**34%**	**$77,266**	**0.5**
Alumax	**Primary aluminum**	**3,350,000**	**12%**	**$103,736**	**0.0**
OXY-USA	**Oil field pumping**	**54,312**	**12%**	**$5,362**	**0.5**
City of Long Beach	**Waste incineration**	**3,661,200**	**34%**	**$329,508**	**0.8**
Bethleham Steel	**Basic oxygen furnace Steel mil**	**15,500,000**	**50%**	**$542,600**	**2.1**
Total/Average		**38,663,734**	**33%**	**$2,166,330**	**1.5**

Motor Facts:

- Motors can have a 30 to 40 year service life
- The average integral HP motor is repaired 3 or more times during its life *
- The average integral HP motor consumes 4 to 10 times it's initial cost in electricity per year (120 to 300 times it's original cost over it's service life)
- Equivalent of a car costing over $100K per year to run
- The installed base of integral HP motors in North America is greater than 100 million units
- Industrial electric motors use over 25% of the electricity sold in North America
- Manufacturers sell about 2.2 million units a year
  >1.2 million to new equipment builders
  >1 million to replace failed motors in user facilities

Total cost comparison of operating Standard, Rewind, EPAct and EQP III

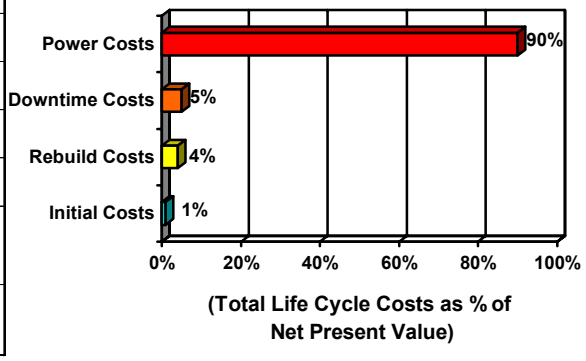
	HP	Initial Cost	Efficiency	Hours Run	Cost kWh	Annual cost of electricity	Simple pay-back in years
Standard	25	N/A	89.3%	8760	$0.045	$8,233	
EQPIII	25	$925	93.6%	8760	$0.045	$7,855	
Cost Difference:		$925		Annual Energy Savings		$378	2.4
Rewind	25	$660	89.3%	8760	$0.045	$8,233	
EQPIII	25	$925	93.6%	8760	$0.045	$7,855	
Cost Difference:		$265		Annual Energy Savings		$378	0.7
EPAct	25	$825	92.4%	8760	$0.045	$7,957	
EQPIII	25	$925	93.6%	8760	$0.045	$7,855	
Cost Difference:		$100		Annual Energy Savings		$102	1.0

- A new Buyer decides to "save" $265 and rewind the standard efficiency motor
  - This decision cost you **$7,182**
    ($378-$265) + ($378 x 19 years)
- The same Buyer decides to purchase an EPAct motor to "save" $100
  - This decision cost you = **$1,940**
    ($102-$100) + ($102 X 19 years)

The cost of the motor is "insignificant" compared to the cost of the electric power required to run it. See the following examples:

	Automobile	60HP Motor
Purchase Price	**$20,000**	**$2,000**
Annual Use	**20,000 miles**	**8,000 hours**
Efficiency	**12km/litre**	**93.6%**
Fuel/Energy Cost	**$0.70/litre**	**$.062 kWh**
Annual Energy Cost	**$1,166**	**$23,719**
Energy Cost as % of Purchase Price	**6%**	**1186%**

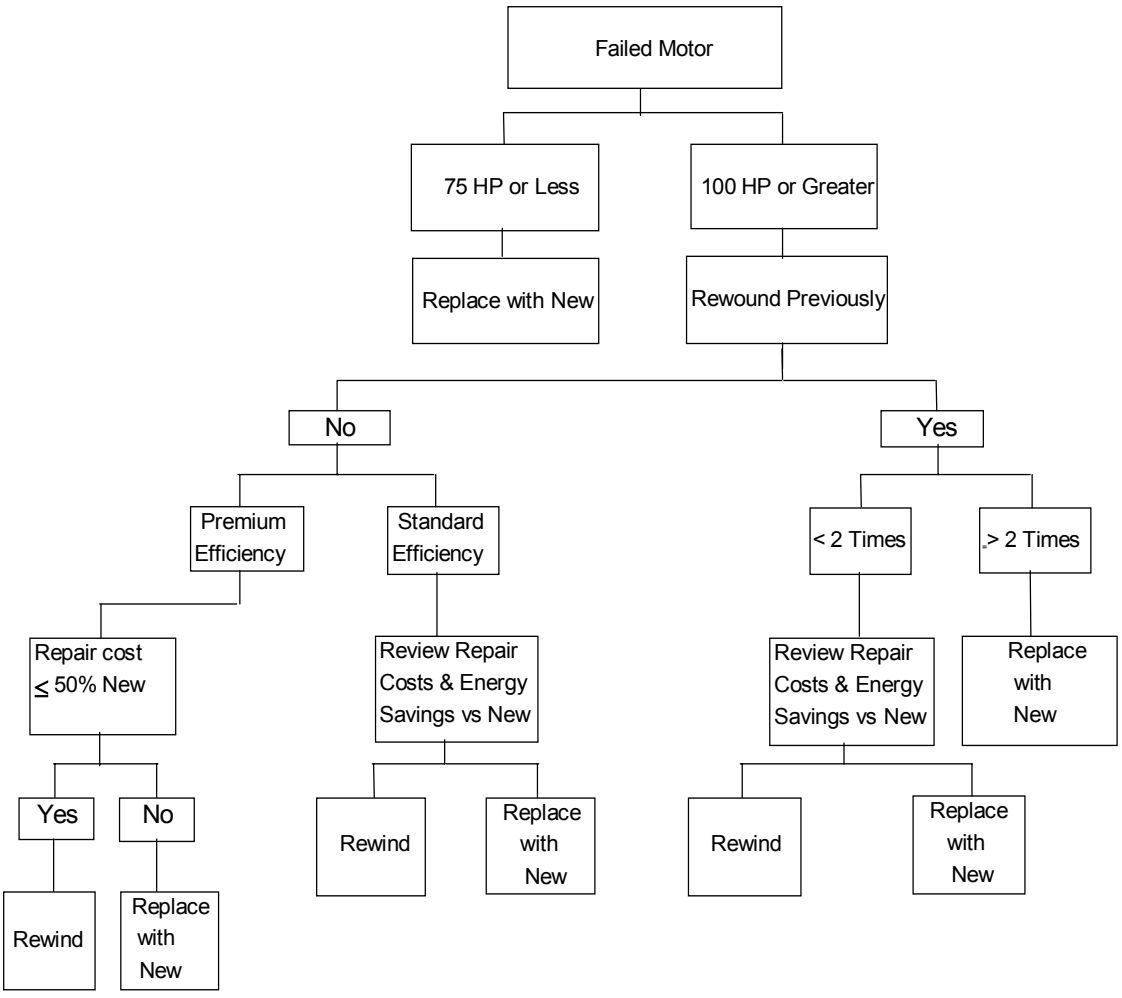
20 Year Life Cycle Costs:



The extra cost of an energy efficient motor is often quickly repaid in energy savings.
Annual energy savings = Hp x Load x 0.746 x annual.hrs. x Energycost x [100/std Eff – 100/Premium Eff]
The **annual value of a one point efficiency gain** (based on 8,760 hours of use at full load)

Horsepower	Annual Savings $0.05/KWh	Annual Savings $0.06/KWh	Annual Savings $0.07KWh
5	$23	$28	$33
10	$44	$53	$61
20	$83	$100	$117
50	$194	$233	$272
100	$381	$457	$533
200	$735	$882	$1,029

Sample Decision Tree:



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