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Plan book

Replacement High Efficiency Motor of cooling water pump 6 unit

29Nov 24

IT Forging (Thailand) Co., Ltd.

- 1) reduce energy consumption of cooling tower system
- 2) reduce co2 emission

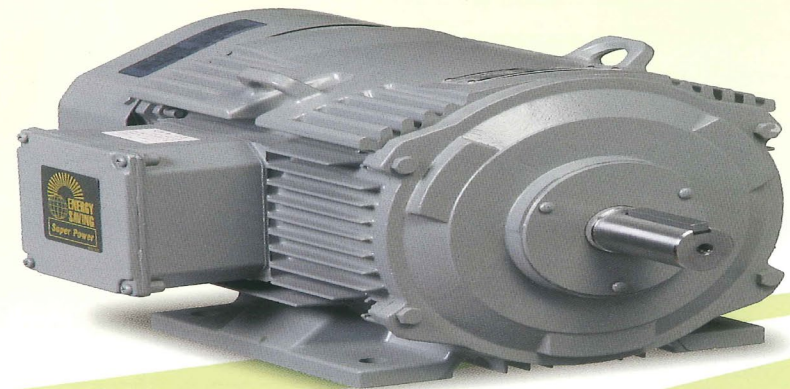
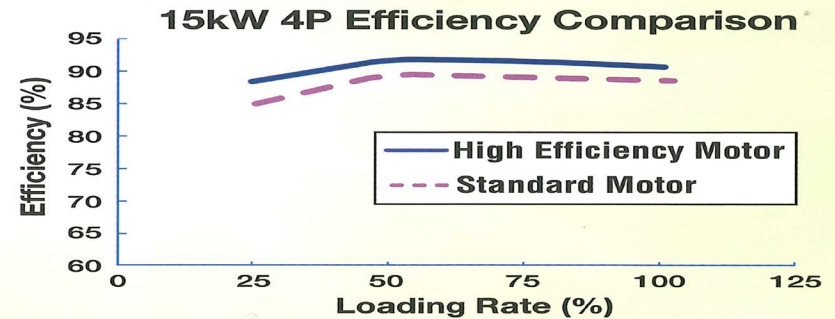
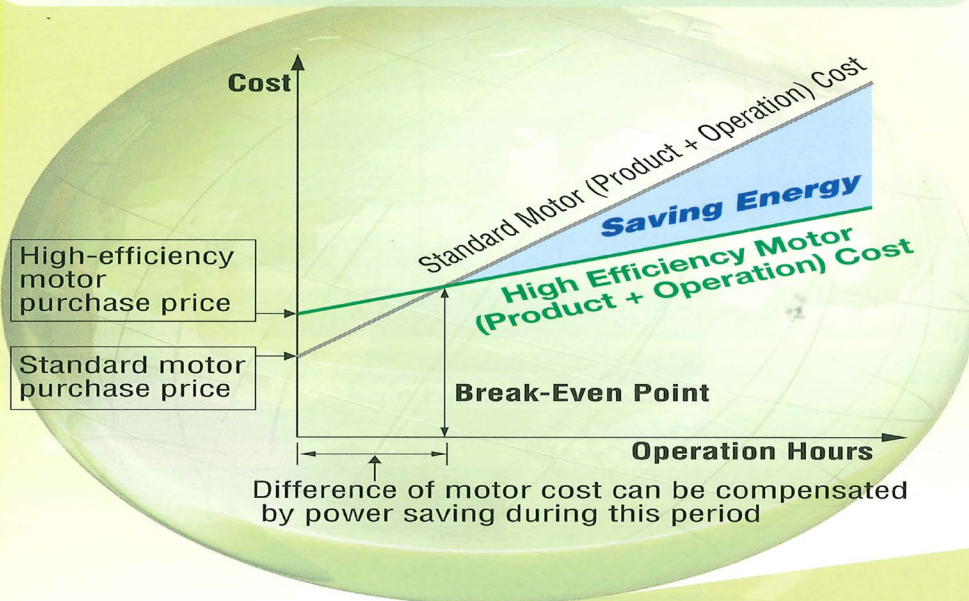
picture cooling tower



Main 45 kw 8 unit run 6 unit spare 2 unit

6. Operational cost saving

- Considering the operational cost under long term period, the best idea is to adopt the high efficiency motors
- The point is just not to consider the initial cost of motor but overall cost including long term operation



• The annual energy savings with high efficiency motor can be estimated by following formula

$$\text{The annual saving fee} = \text{Output (kW)} \times \text{Operation hour (Hour/year)} \times \text{Power charge cost (Cost/kWh)} \times \left[\frac{100}{\text{Standard Motor efficiency (\%)}} - \frac{100}{\text{High efficiency motor efficiency (\%)}} \right]$$

High efficiency motor saves energy consumption in proportion to operating hour.

Sample calculation

Motor output : 15kW
High-efficiency motor efficiency : 90.6%
Standard motor efficiency : 88.5%
Annual operation hours : 4,800hours (16h/day)
Electric power rate : US\$0.15/kWh

Annual energy saving
Approx. US\$282.86

- Existing low efficiency motor 88.5 %
 - cooling water system have suction pump 8 unit
run 6 unit spare 2 unit
 - driven by electric motor 45 kw 2 P 3000 rpm
eff 88.5 % load 80 %
 - run time 24 hr 313 day
 - electric consumption = $45 \times 0.80 \times 24 \times 313 \times 6 / 0.885$
= 1,833,437 kwh
 - electric baht/kwh = 4.0 baht/kwh
 - total electric = 7,333,749 baht/year

Improvement High efficiency motor 0.927

- cooling water system have suction pump 8 unit
run 6 unit spare 2 unit
- driven by high eff electric motor 45 kw 2 P 3000 rpm
eff 92.7 % load 80 %
- run time 24 hr 313 day
- electric consumption = $45 \times 0.8 \times 24 \times 313 \times 6 / 0.927$
= 1,750,368 kwh
- electric baht/kwh = 4.0 baht/kwh
total electric = 7,001,475 baht/year
reduce cost = 7,333,749 - 7,001,475
= 332,274 baht/year

investment cost	1,684,000	baht
motor 6 unit	$264,000 \times 6 = 1,584,000$	baht
installation and	100,000	baht
save electric cost	332,374	baht/year
break event point	$1,684,000 / 332.274 = 4.98$	year
spare part depreciation	5	year
cost investment	336,800	baht/year
merit energy running	332,374	baht/year

実行計画 – Implementation plan

Confidential
Prohibited to disclose for
unrelated person.

Replace High efficiency motor and overhual pump of cooling tower 1

ITEM	FY2024			FY 2025											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1 TSD ISSUE															
2 RC MTG															
3 ISSUE PR PO															
4 Motor delivery															
5 Overhual pump															
5 Test run and SOP															



Thank you