



# Energy Saving for Air Conditioning System (Hong Tai Electric Industrial)



By: Kidd Feng 2013/11/20



## **HONG TAI ELECTRIC INDUSTRIAL CO., LTD**



### **Case Information**

**Location:** Taoyuan, Taiwan

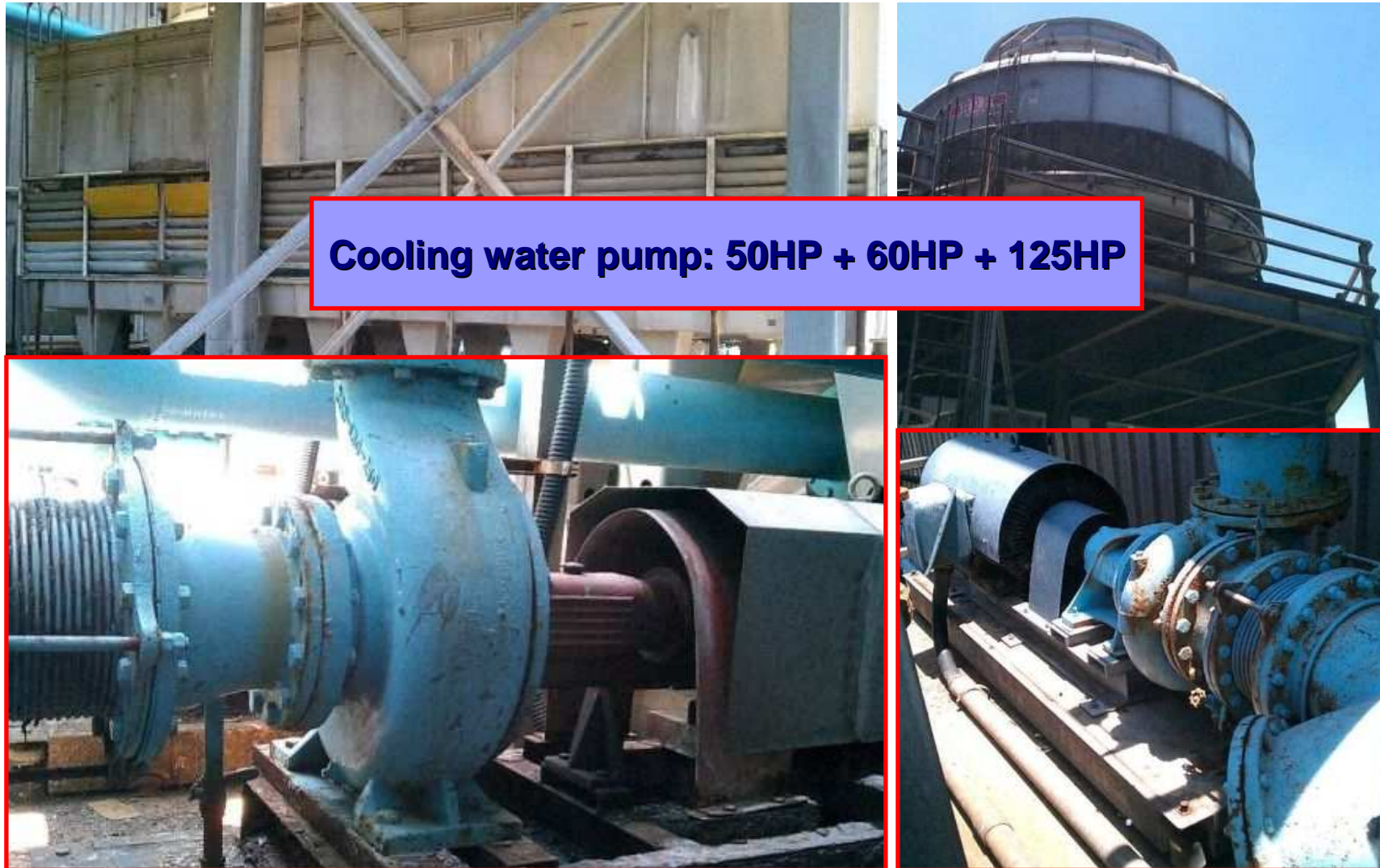
**Industrial:** Copper Clad Laminate (CCL)

**Employees:** About 390 employees (Electronic Materials dept.)

**Requirement:** Energy saving for cool water pump

**Implementation:** Inverter control system is designed for cooling water pump to reduce power consumption

## ◆ Equipment



## ◆ Analysis

Item	Current	Estimate	Guarantee
Horse power (HP)	235	235	235
Consumed (KW)	176.3	176.3	176.3
Using avg. (%)	75%	75%	75%
Energy saving (%)	-	30%	20%
Consumption (KWH/hr)	132.2	92.6	105.8
Operating (hr/day)	24	24	24
Operating (day/month)	30	30	30
Consumption (KWH/month)	95,184	66,672	76,176
Electricity (NT\$/month)	209,405	146,678	167,587
Saving (KWH/month)	-	28,512	19,008
Saving (NT\$/month)	-	62,727	41,818
Implement cost (NT\$)	-		
Return of I.C. (month)	-		

NT\$2.2 /KWH

## ◆ Energy saving system



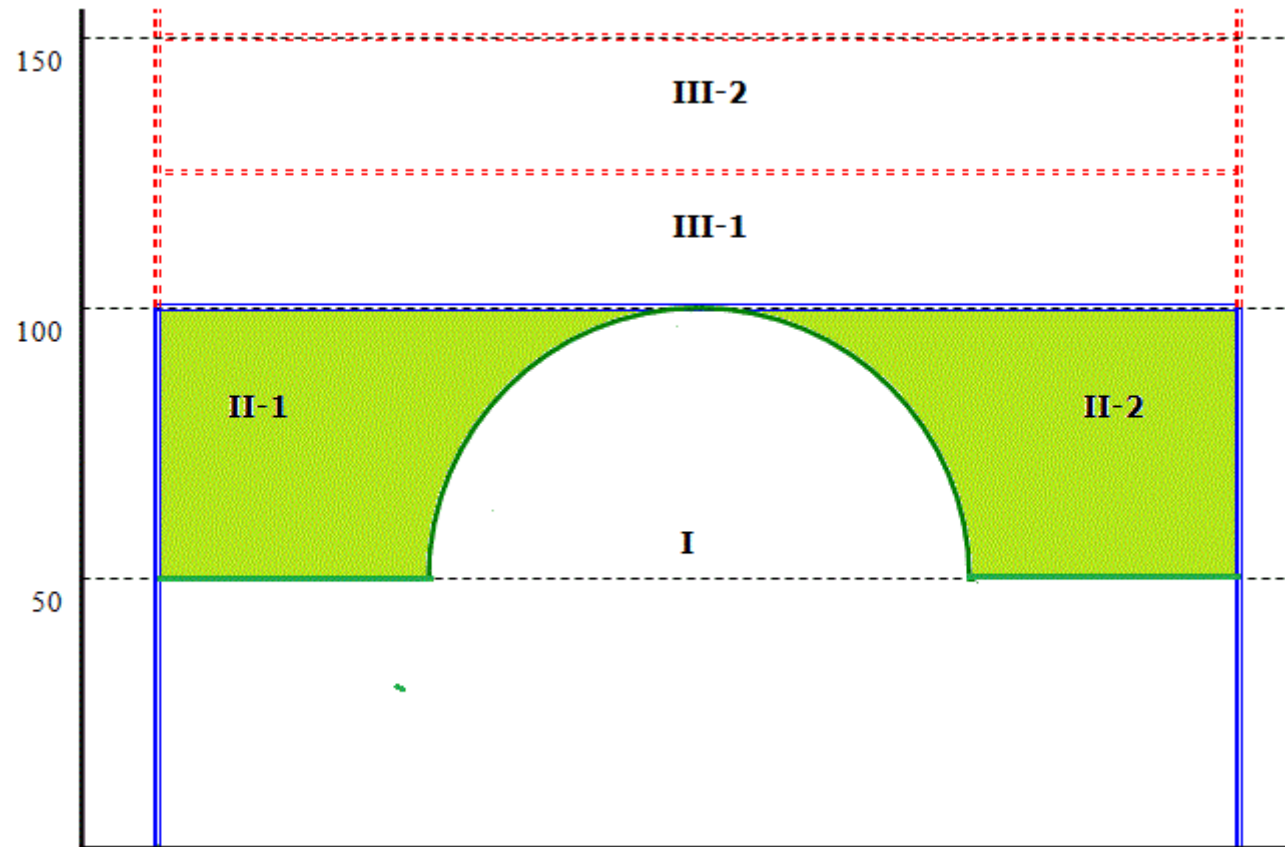
← ↓ 125HP



↖ 50HP  
← 60HP



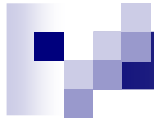
## ◆ Theorem



- Power consumption of water pump = I + II-1 + II-2 + III-1~2.
- Energy saving by VFD only = III-1~2 (over design).
- Energy saving by VFD with controller = II-1 + II-2 + III-1~2.

## ◆ Benefits

Place	Hong Tai Electric Industrial				
Equipment	Cooling water pump (125+60+50HP)				
Item	First test		Second test		Average
	Setting	Saving	Setting	Saving	Saving
125HP	37°C	38.5%	35°C	10.7%	24.6%
60HP	29°C	16.4%	30°C	25.6%	21.0%
50HP	29°C	30.8%	30°C	34.6%	32.7%
125+60+50HP	28.9%		21.3%		25.1%
Acceptance	Qualified (energy saving more than 20%)				
Saving (KWH/month)	25,511		18,799		22,155
Saving (NT\$/month)	NT\$56,124		NT\$41,358		NT\$48,741
Saving (NT\$/year)	NT\$673,488		NT\$496,296		NT\$584,892
Explanation	1. The higher temperature is set, the better energy saving will be. 2. The case is tested in summer time when the temperature is above average, which leads to a poor energy saving result.				



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