

ABI Phoenix

Refrigeration Optimisation Project

The beginning:

Success on other Energy Saving projects at the ABI Phoenix Plant led ABI to ask Magnet to investigate energy saving opportunities in their refrigeration plant. Research papers recommended allowing the discharge pressure on chillers plants to “float”. A lot of optimisations seem to simply reduce the set point without getting all the possible benefits.

Cooling Tower Fan Control:

- Typically switch on and off
- One better is to have variable speed drives
- Floating heat pressure control is a further improvement
- Magnet considered the overall heat balance, type of compressor, comparing cooling tower capacity to compressors, load profiles, weather etc

Cooling Tower Fans:

- Running fans harder will use more fan energy but reduce pressure and save on compressor power
- Condensing temperature is limited by wet bulb temperature
- In Durban everyone thinks wet bulb is about 26°

Magnet’s Solution:

- Monitor the wet bulb temperature
- Control discharge pressure at set point

Plant Information & Project Savings	Nov - Feb	March - June	July - Oct	Total / Avg
Hours / day	24	16	16	19
Day / week	7	5	6	6
Hours / day / week	7 * 24	16 * 5	16 * 6	
Comp load Avg	1.7	1.3	1.3	1.4
Power Weekday Avg	400	204	204	268.9
Savings Weekday	14%	24%	40%	26%
kW Saving Weekday	56	49	81	62.1
Saving average 24 hours	56	35	70	53.6
Cst Pressure Set Point of 9 bar (g)	12%	22%	16%	0.2
Avg Fan Power Penalty estimate	8.5	12.7	3.6	8.3
Avg Saving with Fixed 9 bar(g) Pressure Set Point	39	19	24	27.7
Savings of Optimized system vs Standard Method	142%	181%	287%	203%
Project Payback period				< 2 years

RESULTS, DISCHARGE PRESSURE MEASUREMENTS

