Digital Era Controls That “Take The Load Off Your Buildings”

Demand Based Controls
Today’s Expectations

- Increased tenant comfort
- Faster response
- Better stability
- Increased system efficiency
- LEED / GRIHA Certification
Conventional PID Feedback Loop Control

Challenges:

- Multiple reset points
- Comfort
- Hunting
- Silo operation not plant efficiency
Traditional PID controls

TYPICAL PID CONTROL SEQUENCES

- Capacity Based sequencing
- Constant flow cooling towers, CWT setback
- 3 system feedback PID loops Demand Based Control
Digital Era controls for Plant Automation

What is “Different”?
- All variable speed plant with variable speed tower pump, tower fan, primary pump.

CONTROL SEQUENCES
- Natural curve sequencing
- Equal marginal performance principle
- Demand Based Control
Variable Speed Devices Are More Efficient At Part Load By Design

Different Performance Curves
Different Method Of Control
Part Load operation is the key!

VS Chiller kW/ton (Centrifugal)

- 55 Deg F
- 65 Deg F
- 75 Deg F
- 85 Deg F

% Chiller Load

Innovative Building Control Systems
Natural Curve Effect With Variable Flow and Variable Speed Tower

- Lower approach temperature provides the opportunity to operate on the lower curves on the previous slide (i.e., higher chiller eff.)
Plant Health Monitoring & Verification

Why Monitoring is important.

- Saves the owner money.
- Confirms that plant operates as predicted
- Eliminate risk of human nature – cannot humanly monitor all trends to detect system issues
Case Study - All Variable Plant Control for a Hotel Project

- Predicting 8760hrs Load profile.
- Weather profile.
- Equipment efficiency at various Load conditions.
- Energy analysis / calculations with permutation and combination.
- Selecting equipment based on the results.
Energy Analysis

Load Profile and Wet Bulb

Plant Performance and Load Profile

Equipment Speed as function of plant load

kW Per Equipment
Estimated savings And Payback on Incremental project cost

- Estimated Base case plant annual kw/TR - 0.71

- Proposed case plant annual kw/TR - 0.598

- Savings by demand based controls - 12%

- Payback on Incremental cost - 16 months
Performance Monitoring

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Performance Monitoring

- 23 plant performance and trending views
- Accessible through remote connection
- Downloadable dataset that holds 1 year of operating data-points
- Alarms from plant events recorded
- Alerts Sent through email.
Armstrong Solutions: Two Configurations

IPC 11550 System

OPTI-VISOR™

Integrated Plant Control (IPC) System
ECO*PULSETM Health Management System

- Web Based Asset Management Service
- Real time predictive performance assessments
- Quarterly Reports
- Data compliance for 189.1
- Trouble shooting recommendations
- Time of use utility rate schedule
- Scheduled Event Pre-conditioning
- Comfort Assessment
- Environmental Impact Trending
- Bench Marking

IPC 11550 System  OPTI-VISOR™
Thank You