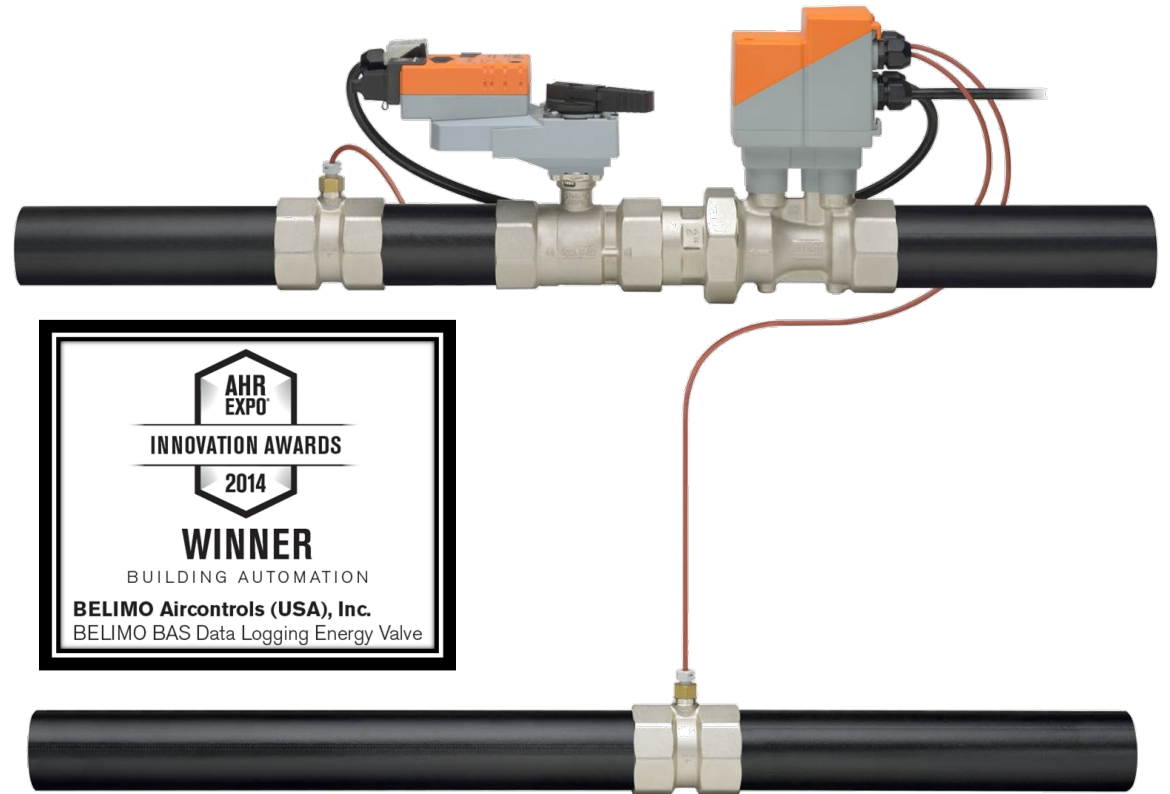


Belimo Energy Valve™ Delta T Manager™



Measures
Energy

Controls
Power

Manages
Delta T

Presentation Agenda



- **Low Delta T at the Coil**
- **Some of Low Delta T Causes**
- **Low Delta T**
 - Cost of Overflowing Coil
 - Cost of Chiller Staging
 - Cost of Over Pumping
 - Occupant Comfort
- **Does it Really Work?**
- **Benefits**

Low Delta T at the Coil

Low Coil Delta T = Inefficient
Heat Transfer



Increase GPM >> No Increase in
Energy output



More Pump HP >> Reduction in
Plant Efficiency



Low Delta T

Some of Low Delta T Causes

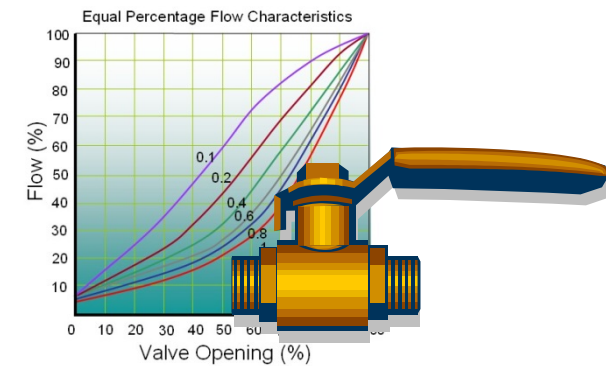
- **Low Control Set Point**



- **Fouled Coils**

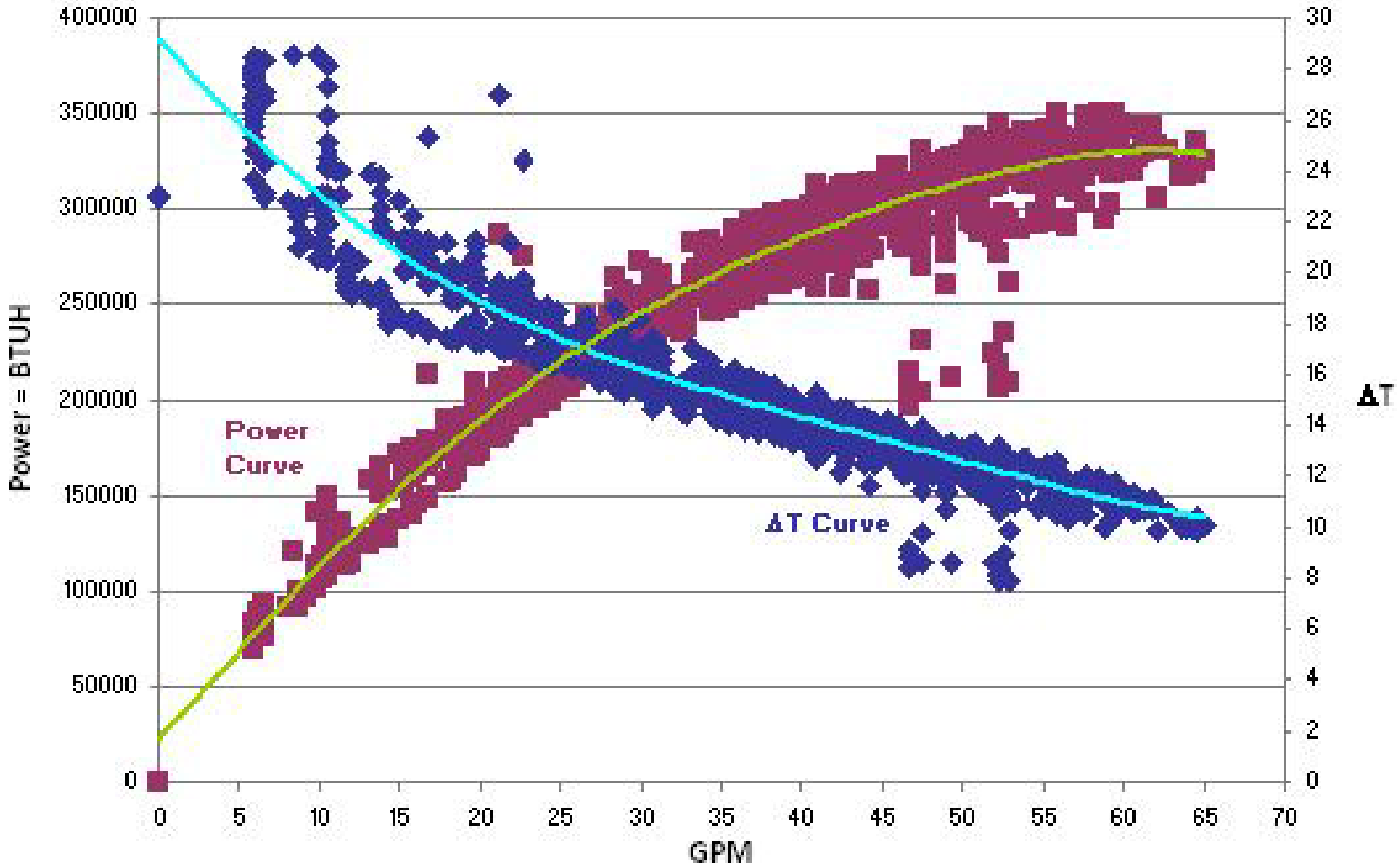


- **Low Valve Authority**



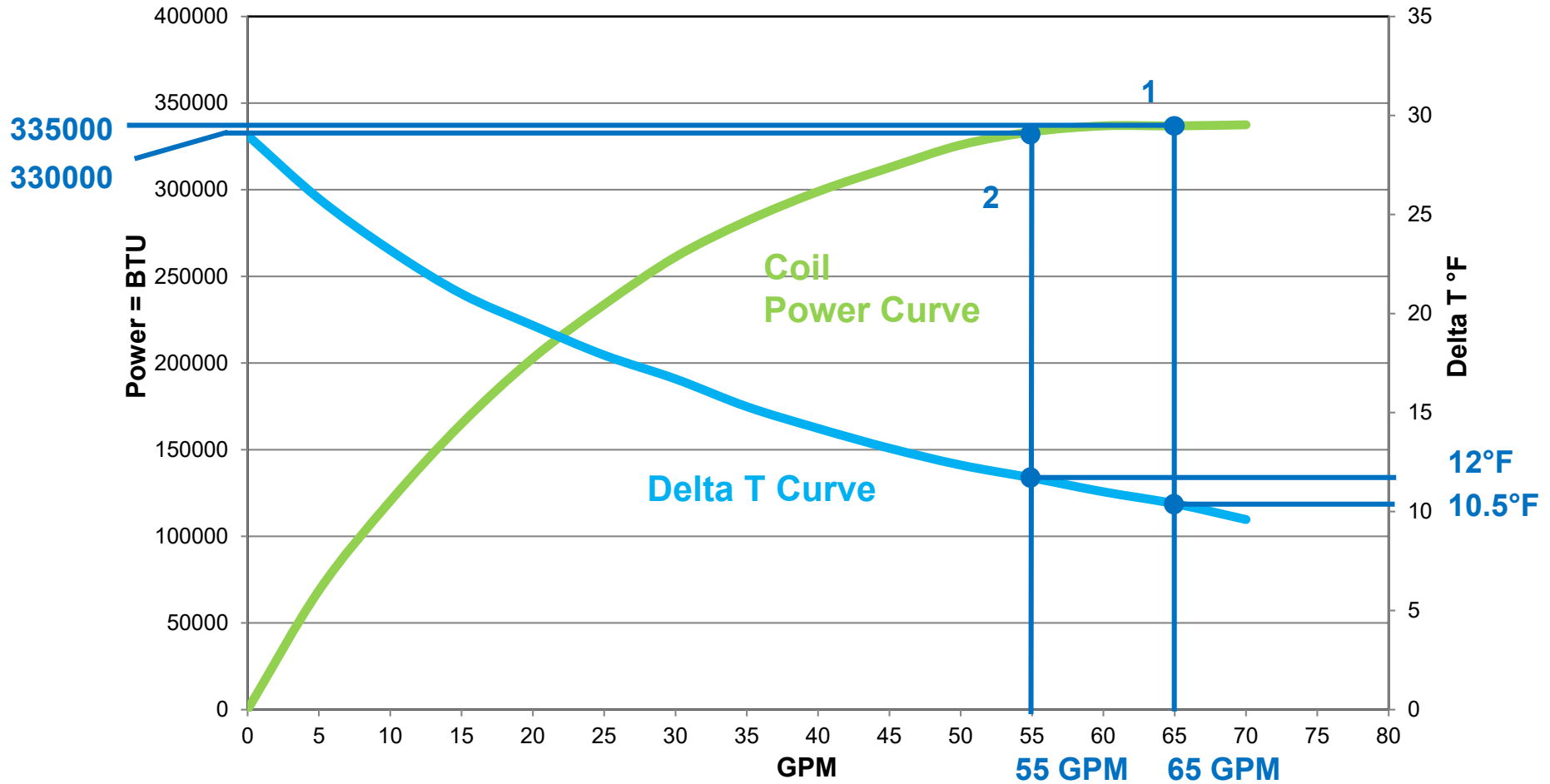
Low Delta T

Coil Power vs Delta T Behavior



Low Delta T

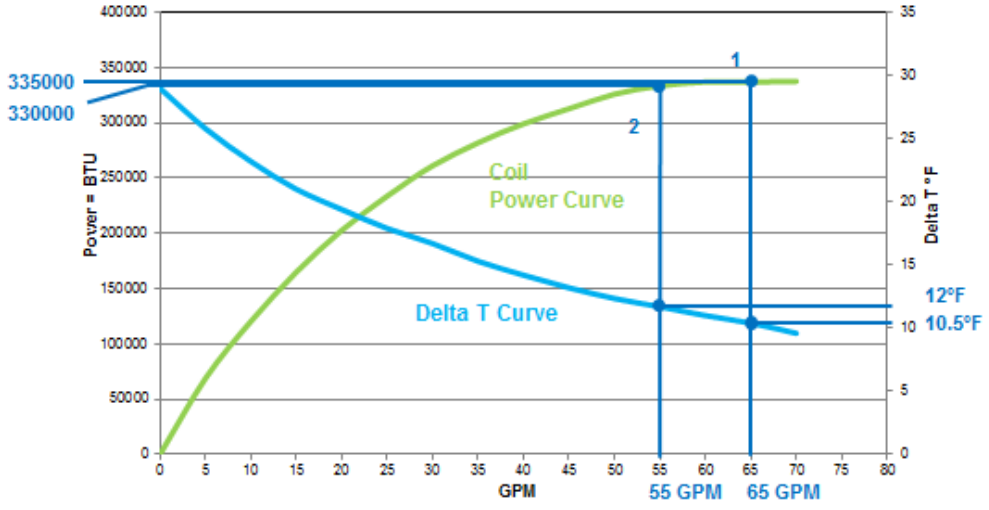
Cost of Overflowing the Coil...



Low Delta T

Cost of Overflowing the Coil...

	1	2	Δ
BTUh	330,000	335,000	1.5%
GPM	55 GPM	65 GPM	18%
Pump hp	Hp increase = $(65/55)^3$		65%

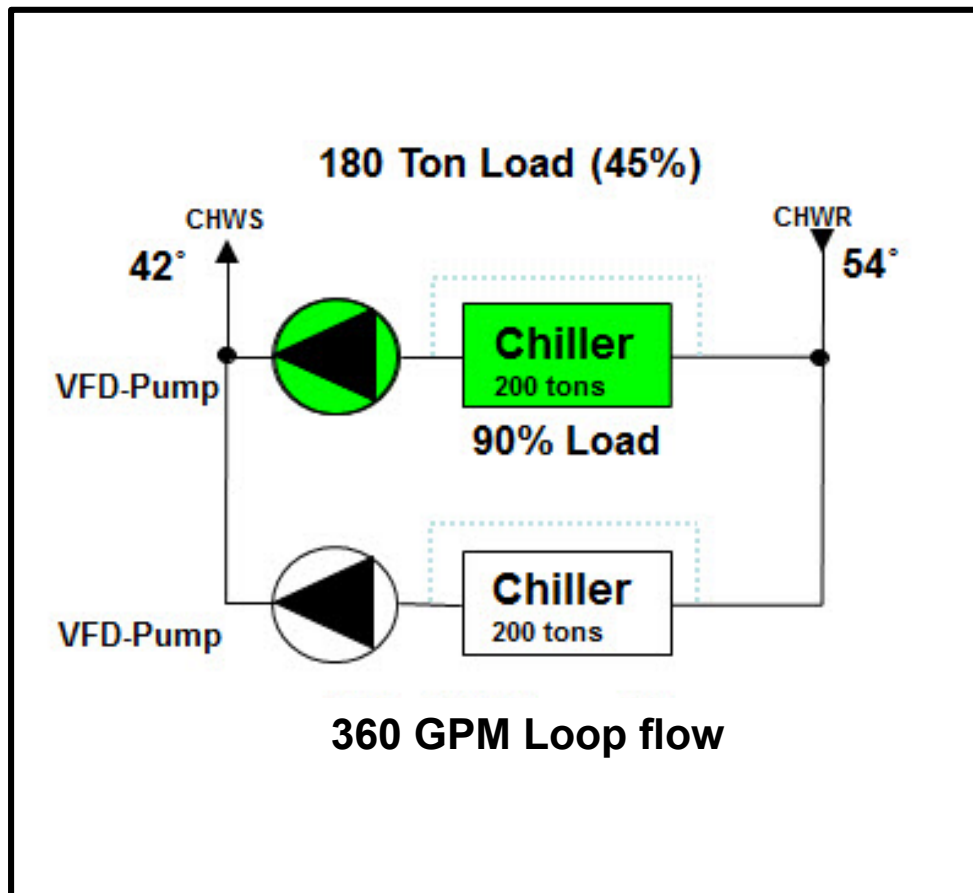


$$\frac{HP_2}{HP_1} = \frac{GPM_2}{GPM_1}$$

Delta T Manager™

Cost of Chiller Staging

Chiller Plant Efficiency



Design Condition

- Design $\Delta T = 12^{\circ}\text{F}$ ($54^{\circ}\text{F} - 42^{\circ}\text{F}$)
- 360 GPM
- 1 Chiller, 90% Load (180 Ton)

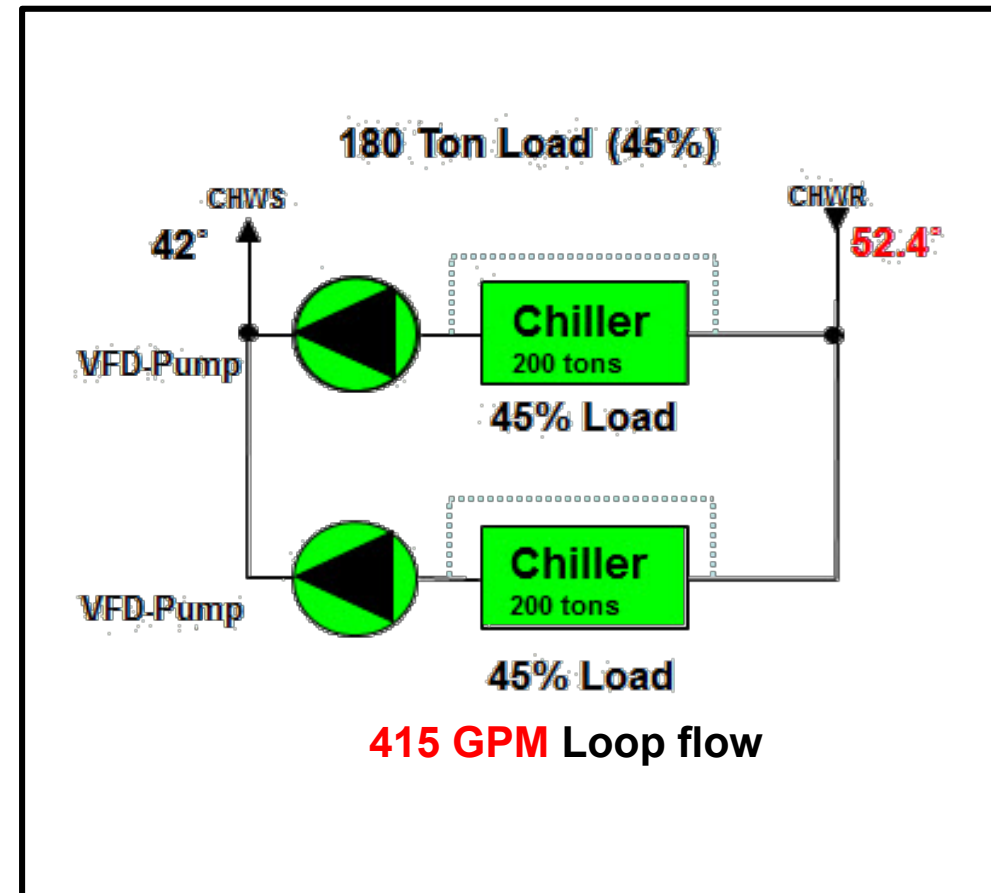
Delta T Manager™

Cost of Chiller Staging

Chiller Plant Efficiency

Low ΔT

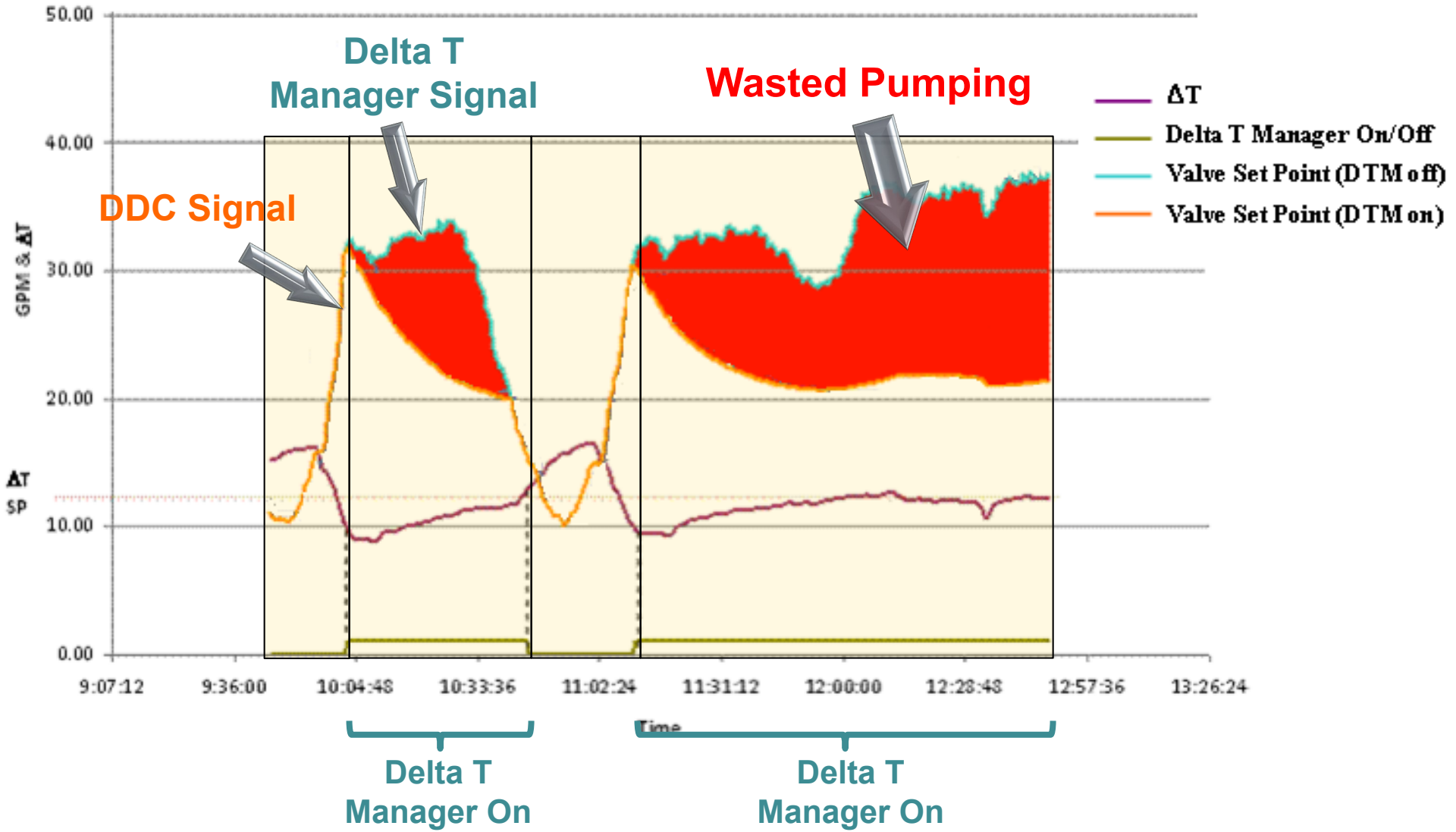
- $\Delta T = 10.4^\circ\text{F}$ ($52.4^\circ\text{F} - 42^\circ\text{F}$)
- **415 GPM**
- 2 Chillers, 45% Load (180 Ton)



No change to the load, but a 2nd Pump and 2nd Chiller are started.

Low Delta T

Cost of Over Pumping



“How can I let the Delta T Manager limit flow if it doesn’t measure discharge air temperature?”

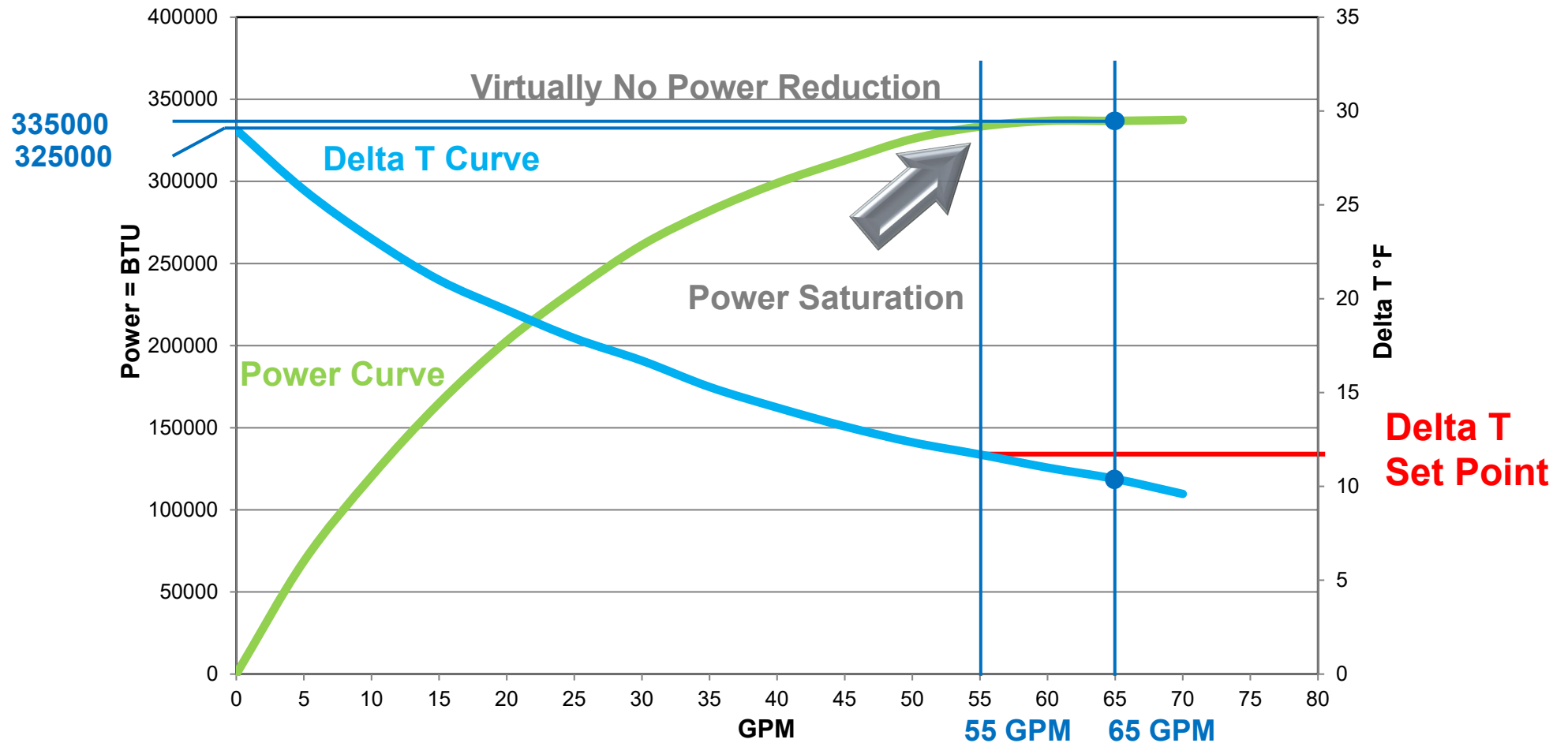
What about occupant comfort?!?”

Delta T Manager™

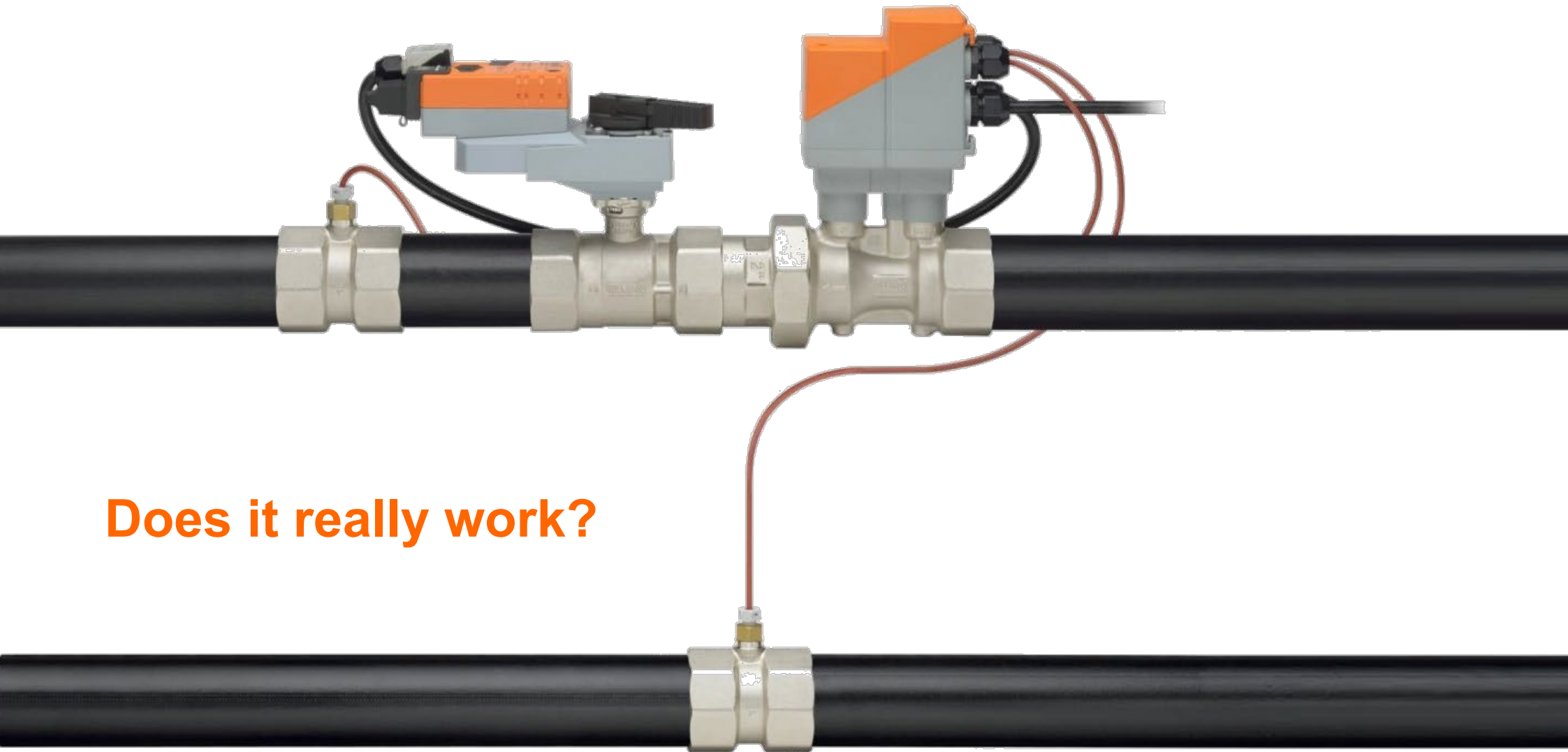
Occupant Comfort



Delta T Manager adjusts the valve if the ΔT drops below the set point in order to maintain peak coil efficiency



Delta T Manager™

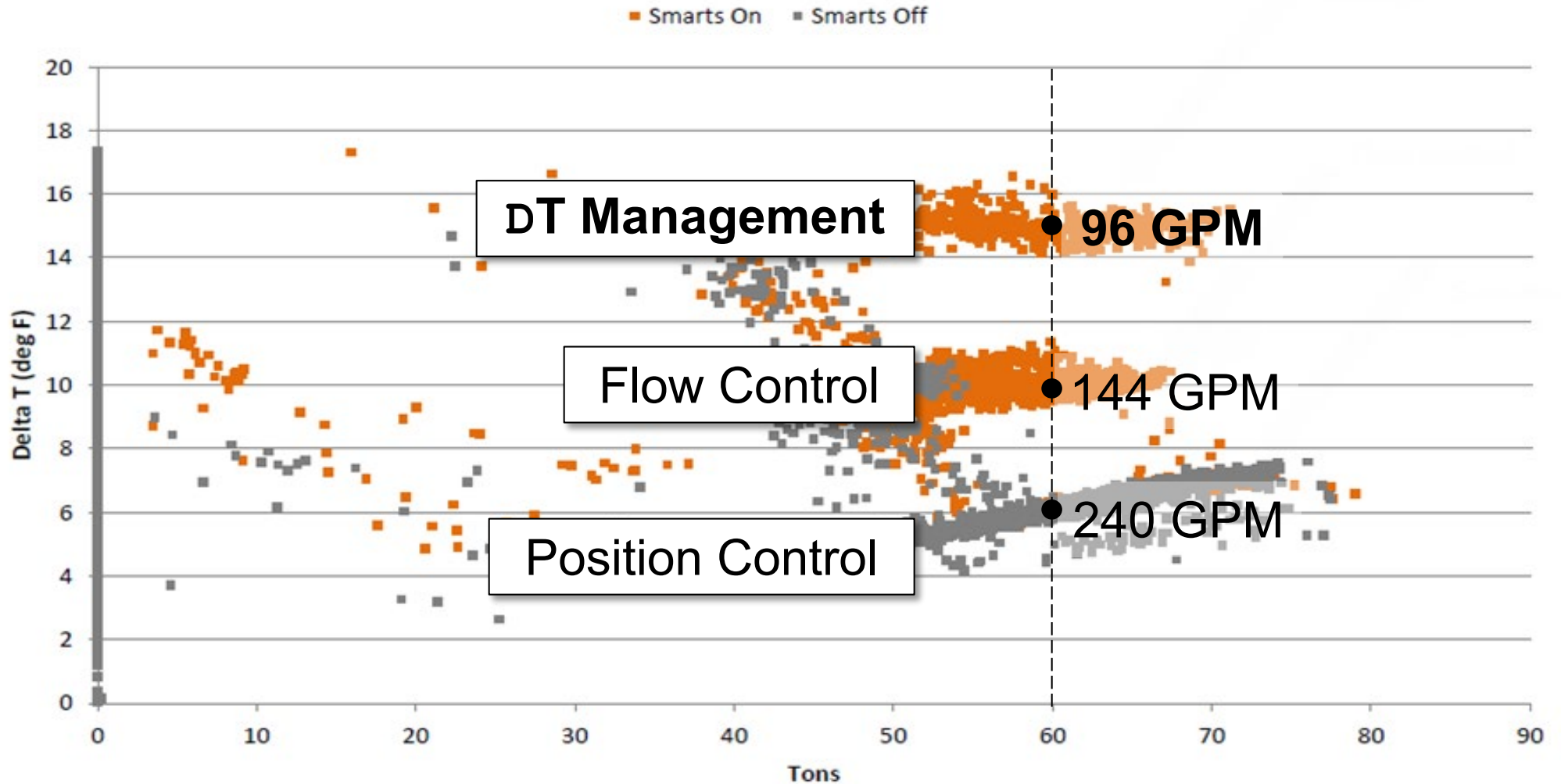


Does it really work?

Case Study

Large Tech Company in North Carolina

Delta T vs. Tons - B500 AHU3



Case Study

MIT University Hayden Library - Boston, MA

Building and Project Details

- 150,000 sq. ft. on 3 floors
- 6 AHU provide majority of the cooling

Results

- Aug 9 - Oct 9, 2010
 $\Delta T = 6.15^{\circ}\text{F}$
- Aug 9 - Oct 9, 2011
 $\Delta T = 12.14^{\circ}\text{F}$



Case Study

University of Miami Hospital

Building and Project Details

- Rosenstiel Building
- 11 AHUs
- 2600 Tons of Cooling
- **Over 10,000 GPM**

Results

- Delta T raised from
5.5°F to 10.5°F
- Flow ~ **5600 GPM**
- Estimated \$66,000/yr savings
- Estimated 2.9 year payback



Delta T Manager™

Benefits



- **Coil**
 - ΔT Managing for peak coil efficiency
 - Optimization in retro-fit applications
- **Chiller Plant**
 - Improved chilled water plant efficiency
 - Released chiller capacity
- **Pump**
 - Reduced pump energy
- **Occupant Comfort**
 - No reduction in supplied energy

