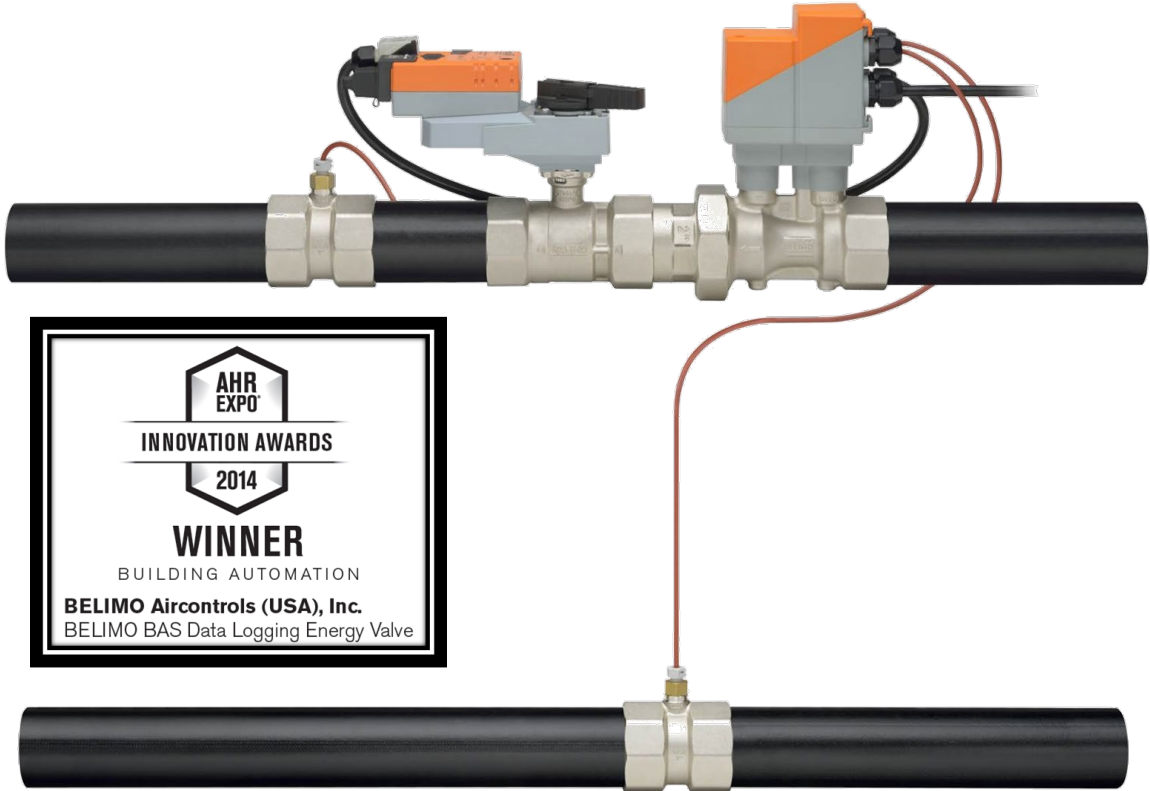


Belimo Energy Valve™ Power Control

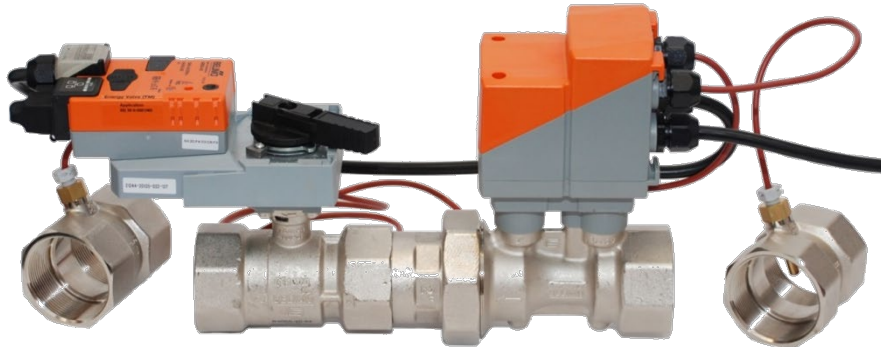


Measures
Energy

Controls
Power

Manages
Delta T

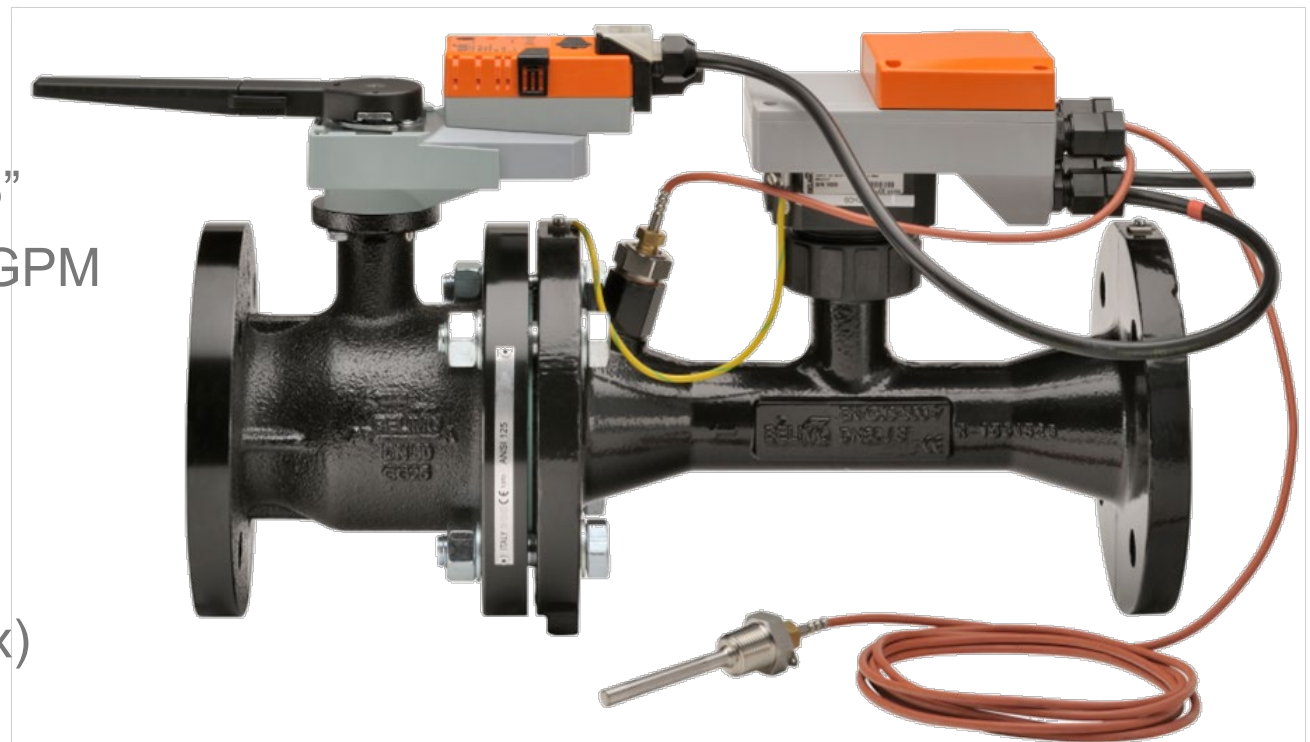
Power Control



Power Control

is a feature that is added to the Energy Valve™ in 2014

- **Expanded Size Range**
 - Sizes from 1/2" through 6"
 - Flow ranges from 1.65 GPM to 713 GPM
- **Powerful New Features**
 - Linear BTU/hr control
 - Maximum Power (P'max)



Power Control



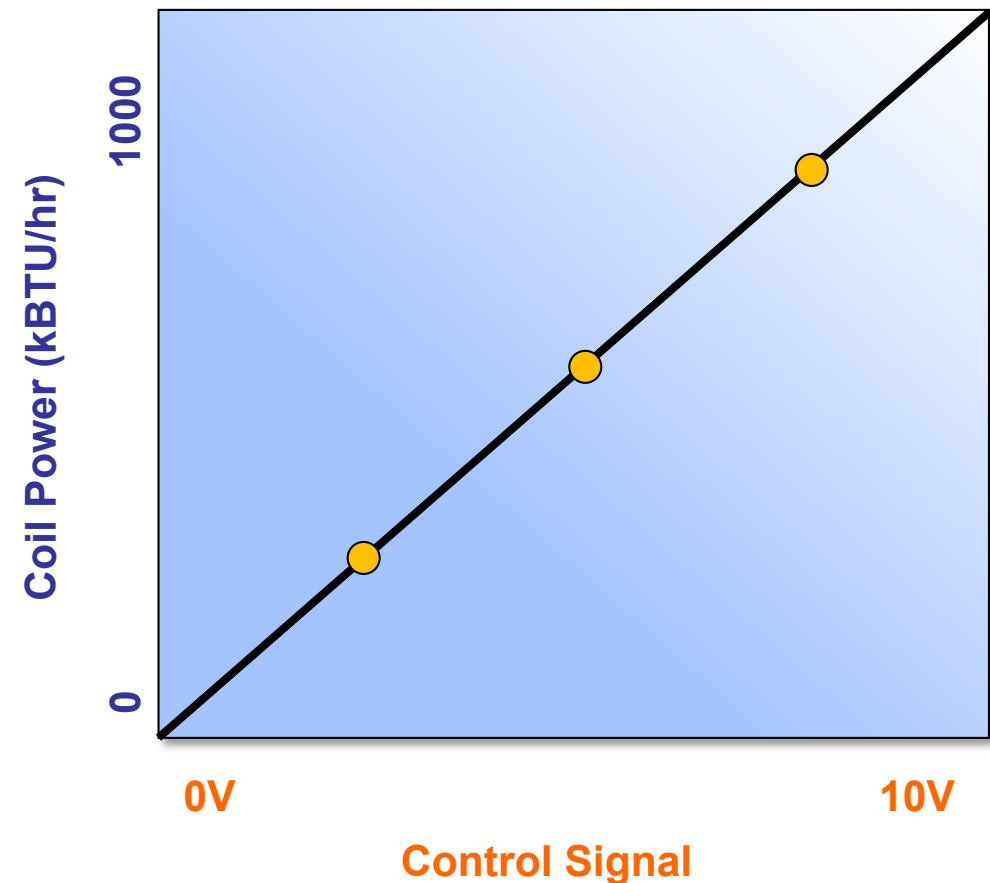
Agenda

- **Power Control**
- Maximum Power (P'_{max})
- Applications

Power Control Definition

What is Power Control ?

- A control algorithm that creates a Linear relationship between control signal and BTU/hr output
- Power Control maintains a coil power set point regardless of pressure and temperature fluctuations



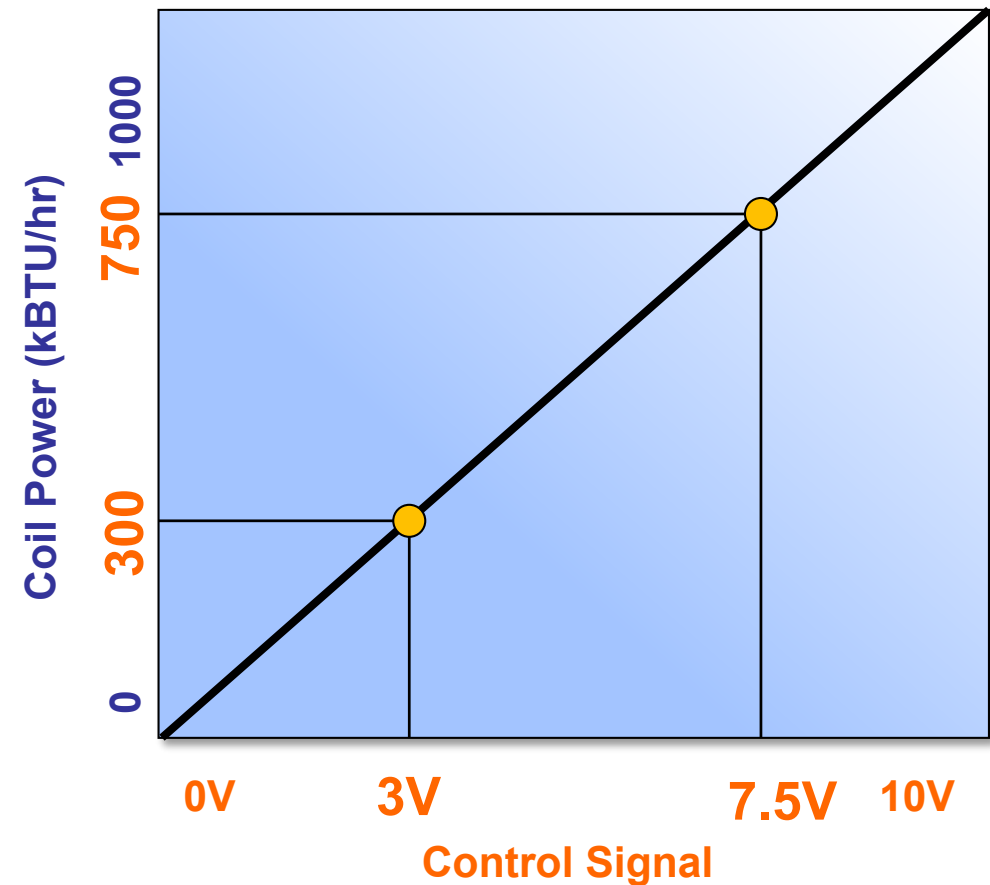
Power Control

- **Power Control allows the controller to deliver exact energy to the space**
- **0 to 10 VDC = 0 to 100% BTU/hr Capacity**

Example: 83 Ton AHU
83 Tons ~ 1000 kBTU/hr coil

3 VDC = 300 kBTU/h

7.5 VDC = 750 kBTU/h



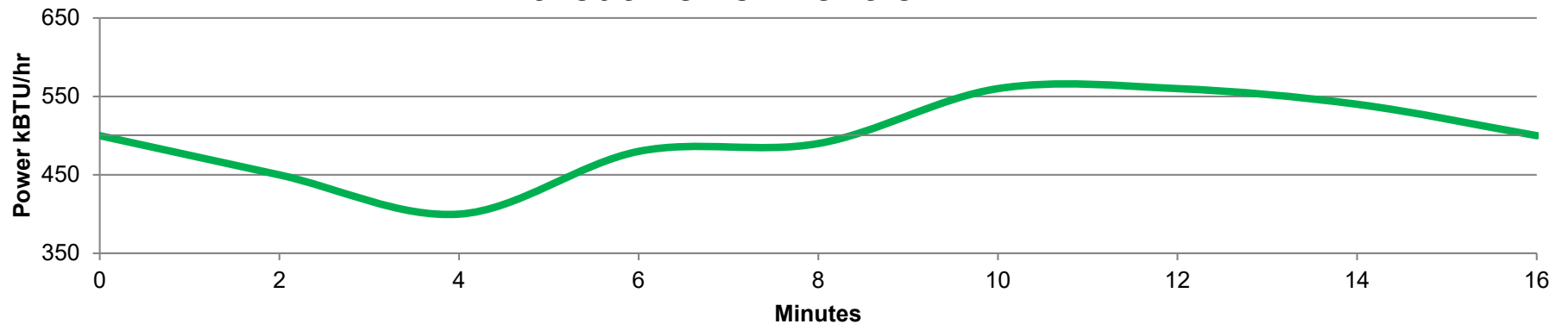
Without Power Control - Standard Control



Flow Rate, Supply Water Temperature (DAT) level (140°F) is inserted after

Minutes	0	2	4	6	8	10	12	14	16
SWT °F	45	46	47	47	48	48	47	46	45
RWT °F	55	55	55	55	55	55	55	55	55
DAT °F	55	55	55	56	57	57	56	55	55
Flow gpm	100	100	100	120	140	160	140	120	100
Power kBTU/hr	500	450	400	480	490	560	560	540	500

Without Power Control



Increase in supply water temperature takes time to recover.

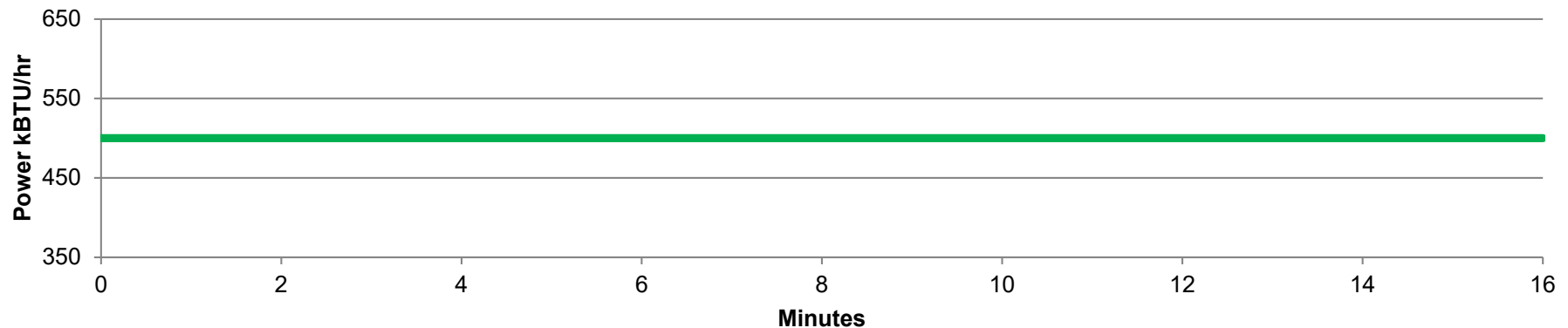
With Power Control – Energy Valve



Power remains stable regardless of SWT changes

Minutes	0	2	4	6	8	10	12	14	16
SWT °F	45	46	47	48	48	48	47	46	45
RWT °F	55	55	55	55	55	55	55	55	55
DAT °F	55	55	55	55	55	55	55	55	55
Flow gpm	100	111	125	143	143	143	125	111	100
Power kBTU/hr	500	500	500	500	500	500	500	500	500

With Power Control



Increase in supply water temperature has no effect on power
Power Control is Pressure and Temperature Independent.
Precise temperature control for temperature critical applications.

Field Test - Busch Gardens, Florida



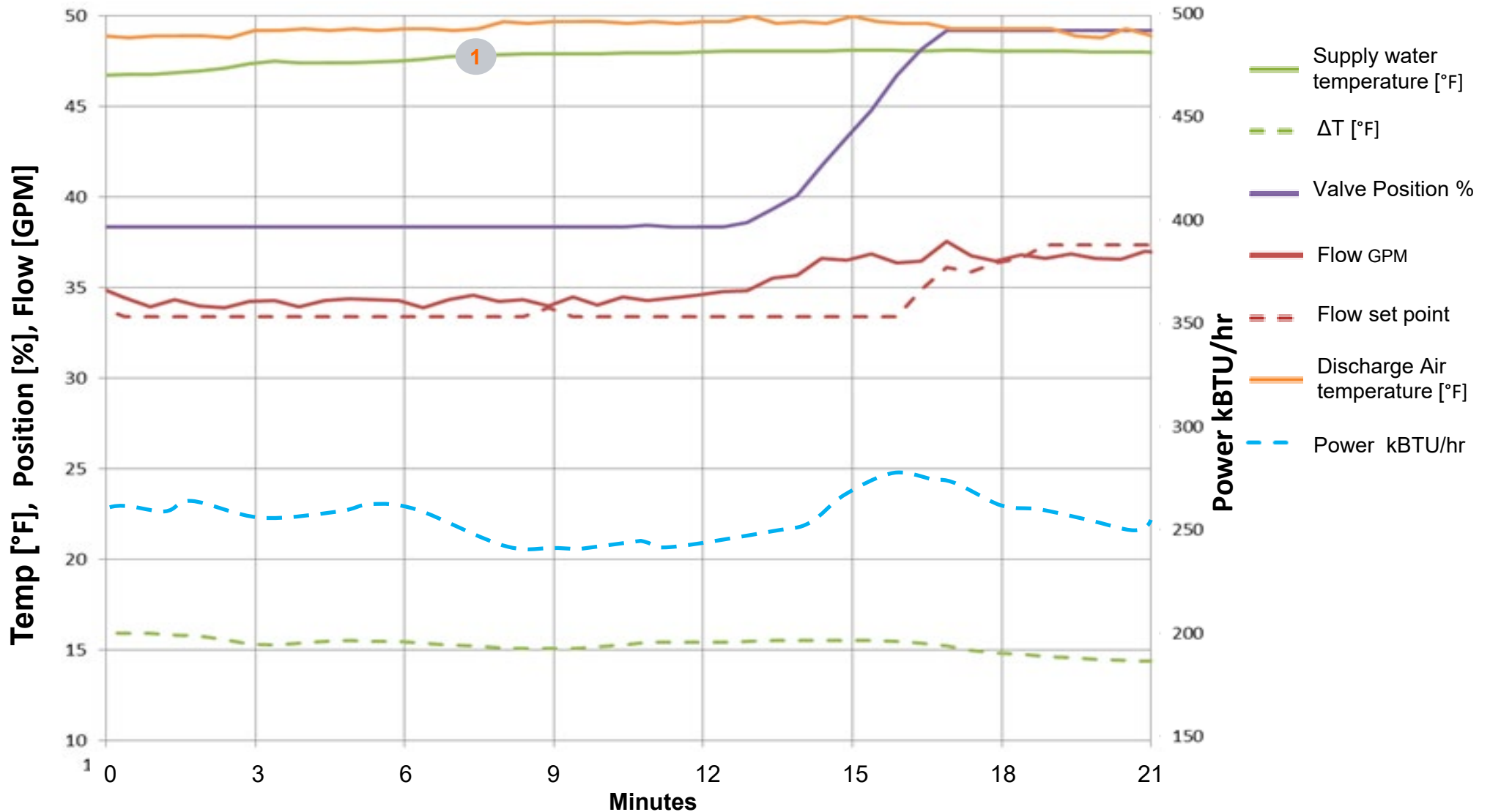
Application

- Timbuktu 4D Cinema
- Energy Valve in Pressure Independent Mode
- Energy Valve using Power Control

Bush Garden Test – Without Power Control



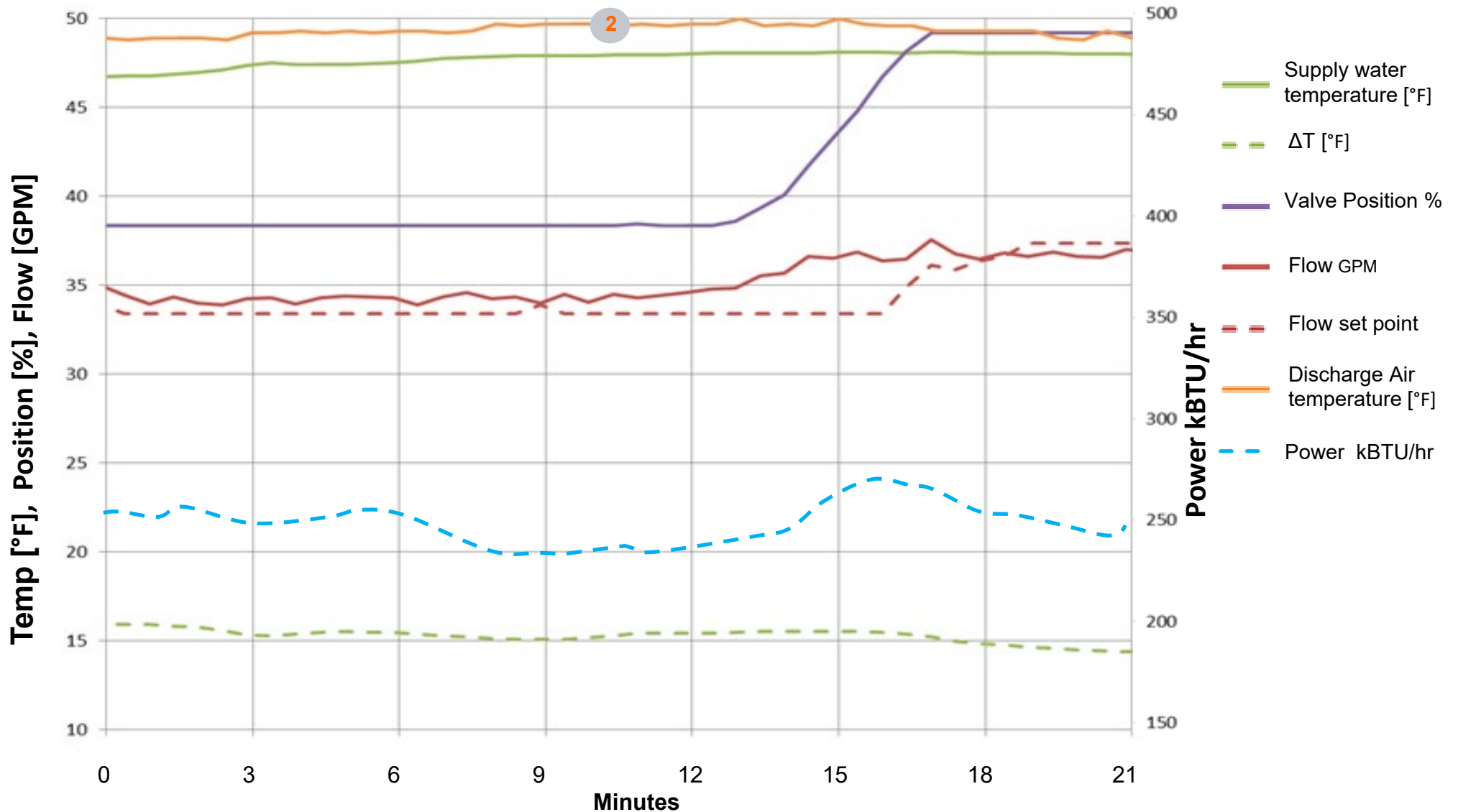
1. Supply Water Temperature (SWT) increases by 1.4°F



Bush Garden Test – Without Power Control

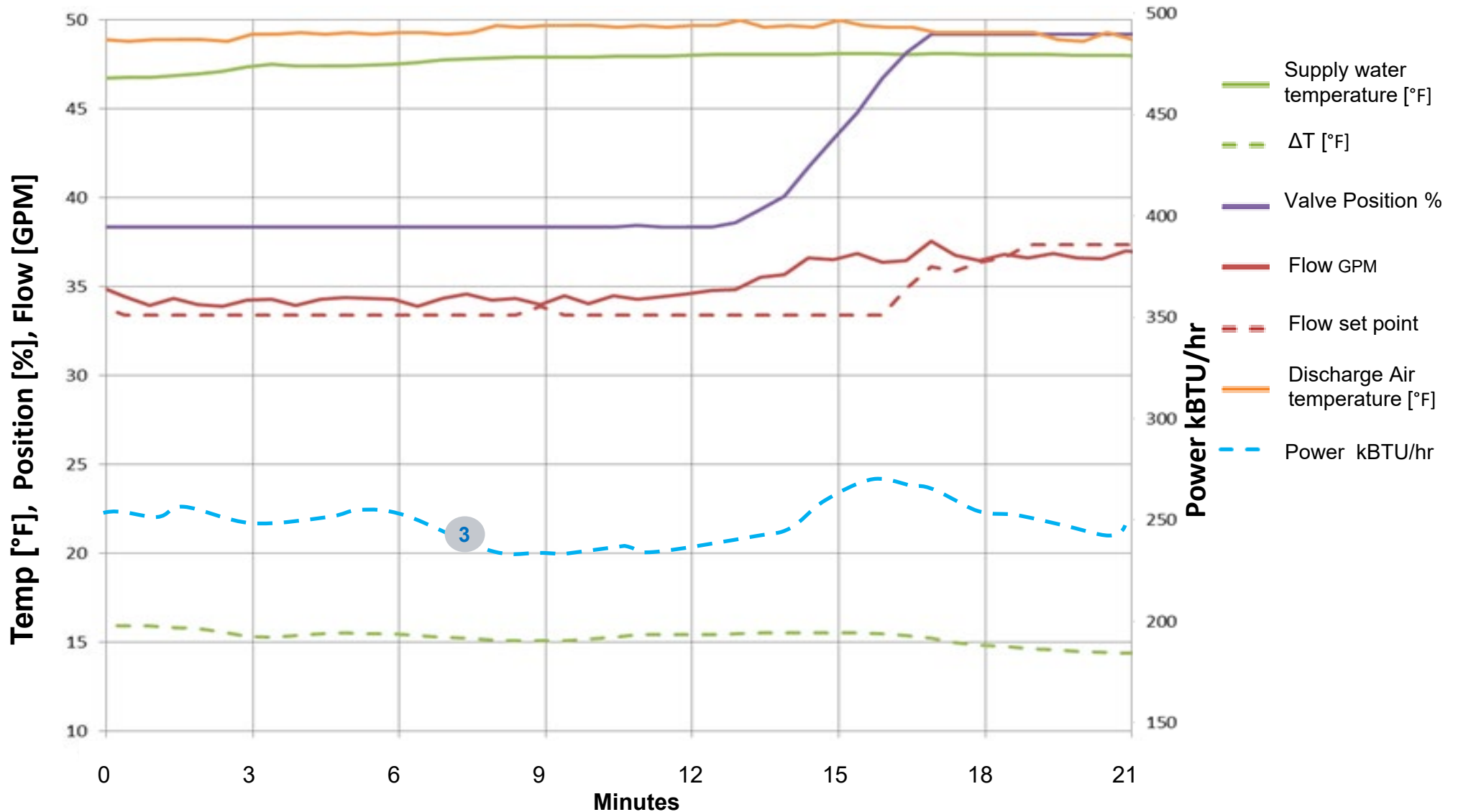


2. Discharge Air Temperature (DAT) increases by 2°F

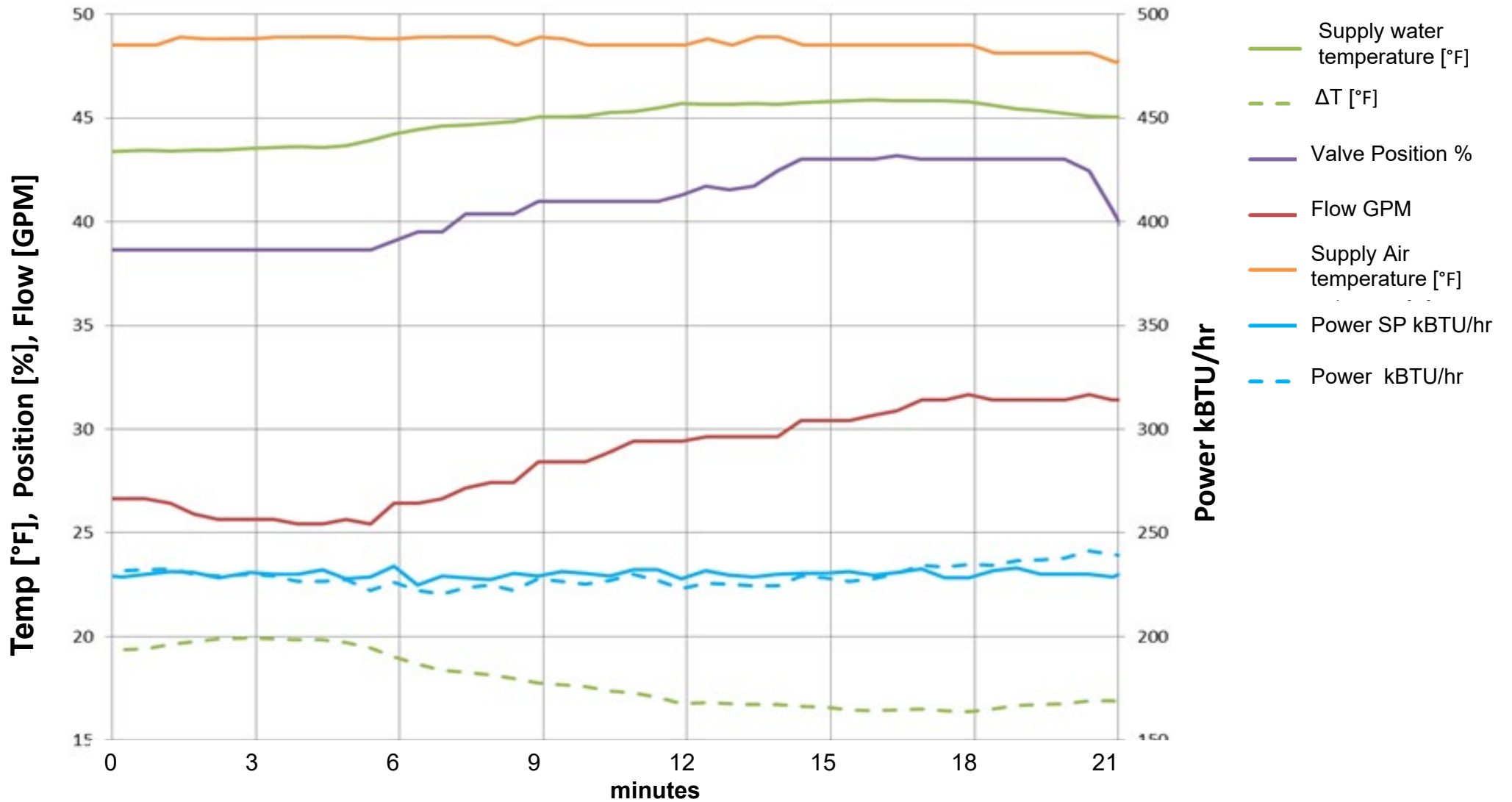


Bush Garden Test – Without Power Control

3. Power output fluctuates



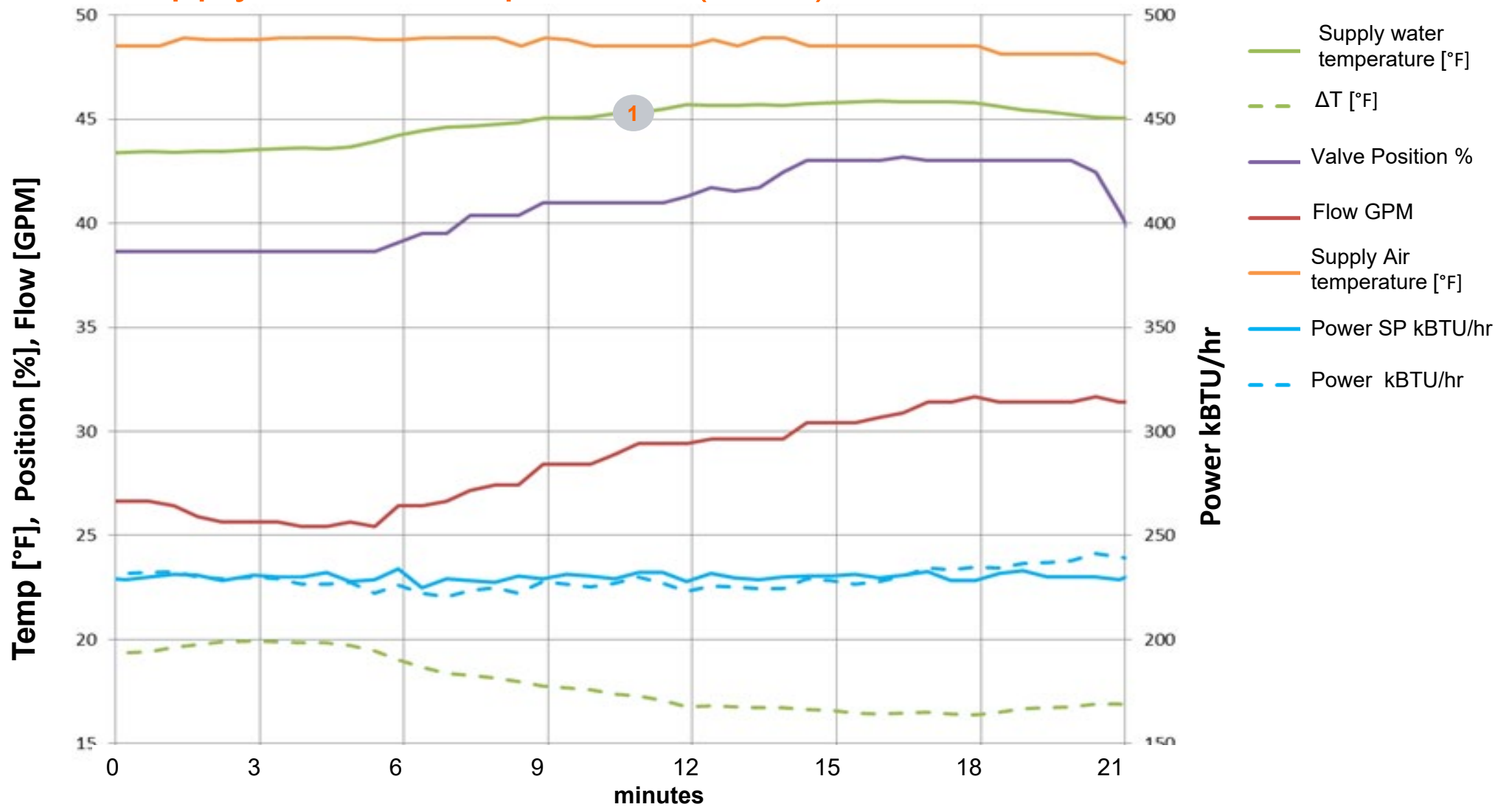
Bush Garden Test– with Power Control



Bush Garden Test– with Power Control



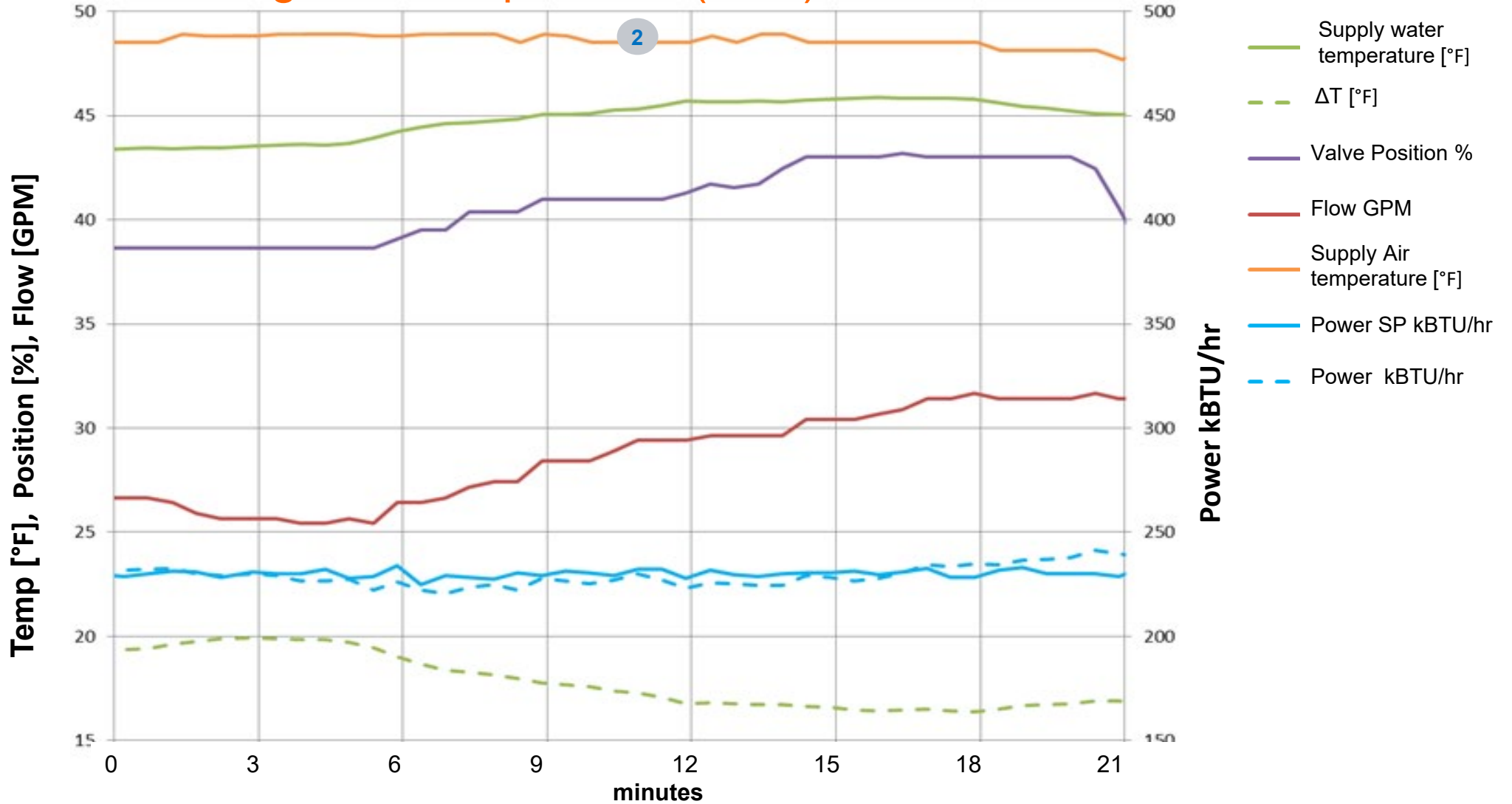
1. Supply Water Temperature (SWT) increases



Bush Garden Test– with Power Control



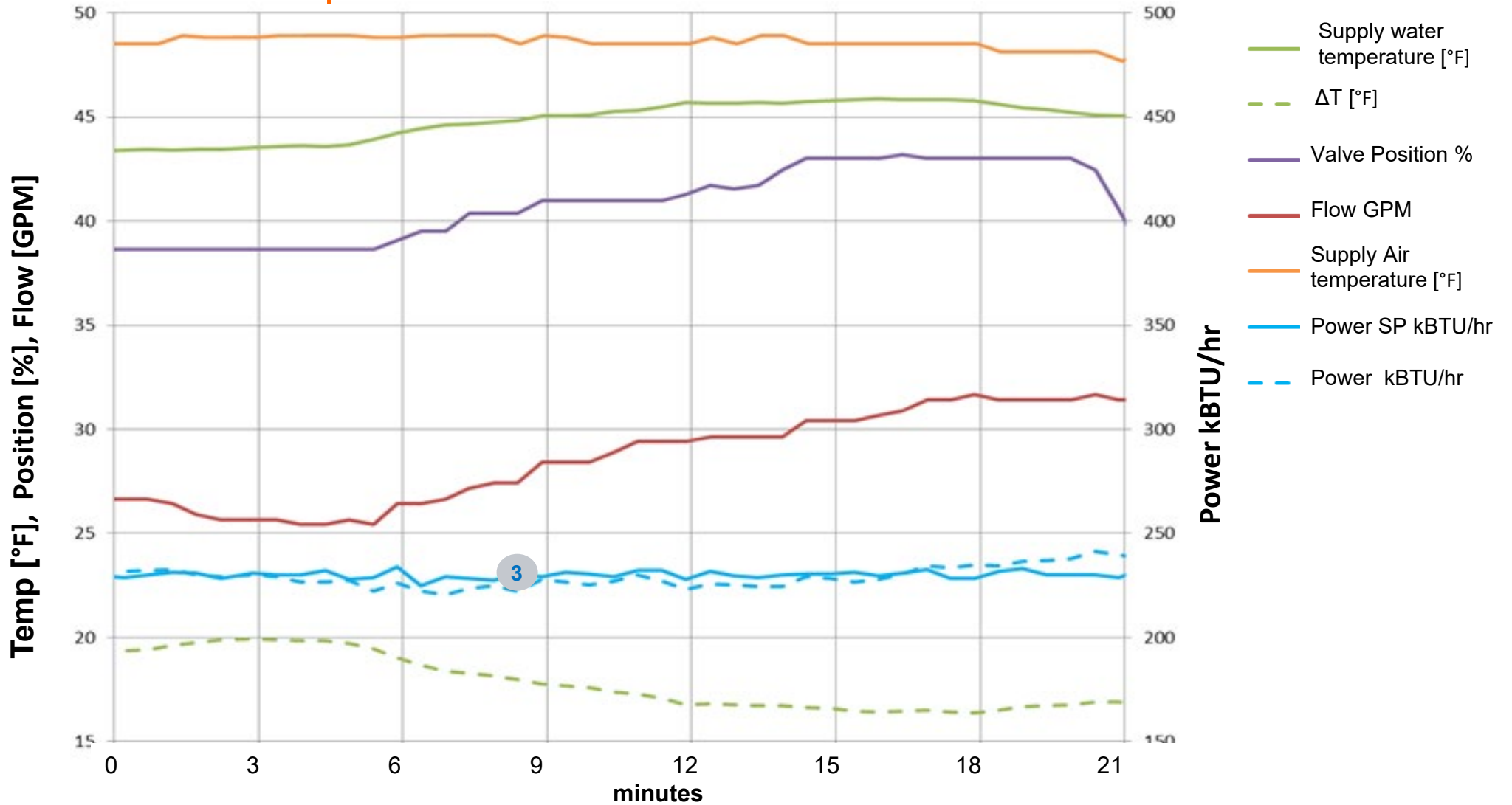
2. Discharge Air Temperature (DAT) remains constant



Bush Garden Test– with Power Control



3. Power output remains constant



Faster Response - No Loss of Occupant Comfort

Power Control



Agenda

- Power Control
- **Maximum Power (P'_{max})**
- Applications

Maximum Power (P'max)

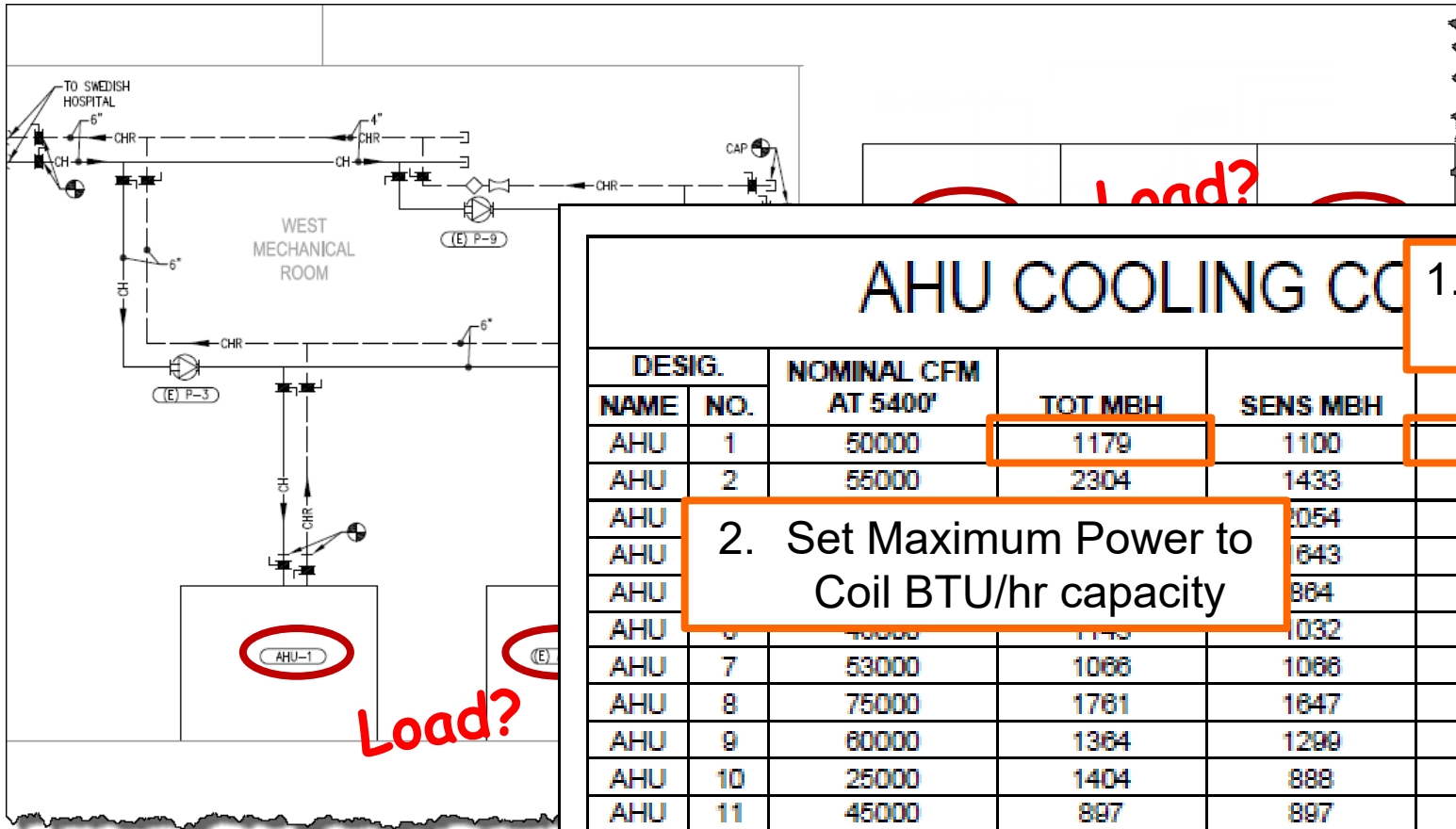
- Energy Valve can be reprogrammed to a specific load.

Belimo Energy Valve (TM) Settings

<p>Application</p> <p>Valve Size</p> <p>DN 100</p> <p>V'nom 317.0 GPM</p> <p>P'nom 5805.8 kBTU/h</p> <p>Installation Position</p> <p>Valve in return flow</p> <p>Media</p> <p>Water</p> <p>Cable length remote temp. sensor</p> <p>1.5m</p>	<p>Configuration control funct.</p> <p>Control mode</p> <p>Power control</p> <p>Range control signal</p> <p>0.5 - 10 V</p> <p>Invert control signal</p> <p>yes</p>	<p>Configuration flow</p> <p>Maximum flow V'max</p> <p>GPM = 60.0 %</p> <p>Range 95.1 - 317.0 60.0</p> <p>Configuration power</p> <p>Maximum power P'max</p> <p>5000.0 kBTU/h = 86.1 %</p> <p>Range 58.1 - 5805.8 5000.0</p>
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Simple, Programmable Maximum Power

Simple Load Application



AHU COOLING COIL

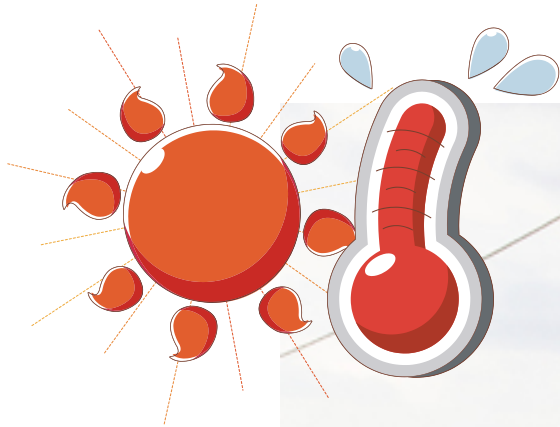
1. Select the Valve Flow
2. Set Maximum Power to Coil BTU/hr capacity

DESIG.	NOMINAL CFM	TOT MBH	SENS MBH	GPM	MAX FV	ROW
NAME	NO.	AT 5400'				
AHU	1	50000	1179	1100	195	500
AHU	2	55000	2304	1433	383	500
AHU	3	60000	3429	1766	471	500
AHU	4	65000	4554	2100	559	500
AHU	5	70000	5679	2433	647	500
AHU	6	75000	6804	2766	735	500
AHU	7	80000	7929	3100	823	500
AHU	8	85000	9054	3433	911	500
AHU	9	90000	10179	3766	999	500
AHU	10	95000	11304	4100	1087	500
AHU	11	100000	12429	4433	1175	500
AHU	12	105000	13554	4766	1263	500
AHU	13	110000	14679	5100	1351	500
AHU	14	115000	15804	5433	1439	500
AHU	15	120000	16929	5766	1527	500
AHU	16	125000	18054	6100	1615	500
AHU	17	130000	19179	6433	1703	500

Simplify Valve Selection - Simplify Implementation

Maximum Power Control

- **During high demand days, the utility companies may call for a reduction in energy consumption (Load Shedding).**



Power Control



Agenda

- Power Control
- Maximum Power (P'_{max})
- **Applications**

Power Control Applications

- **Temperature Sensitive Applications**

Provide Precise control in Temperature and Pressure independent operation

- **Simple Load Application**

Simplify Valve Selection
Simplify Design Implementation

- **Load Shedding**

Simple, Programmable & Repeatable Load Reduction

