

# Beating the Peak

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**MIVEC**

*Minnesota Valley Electric Cooperative*

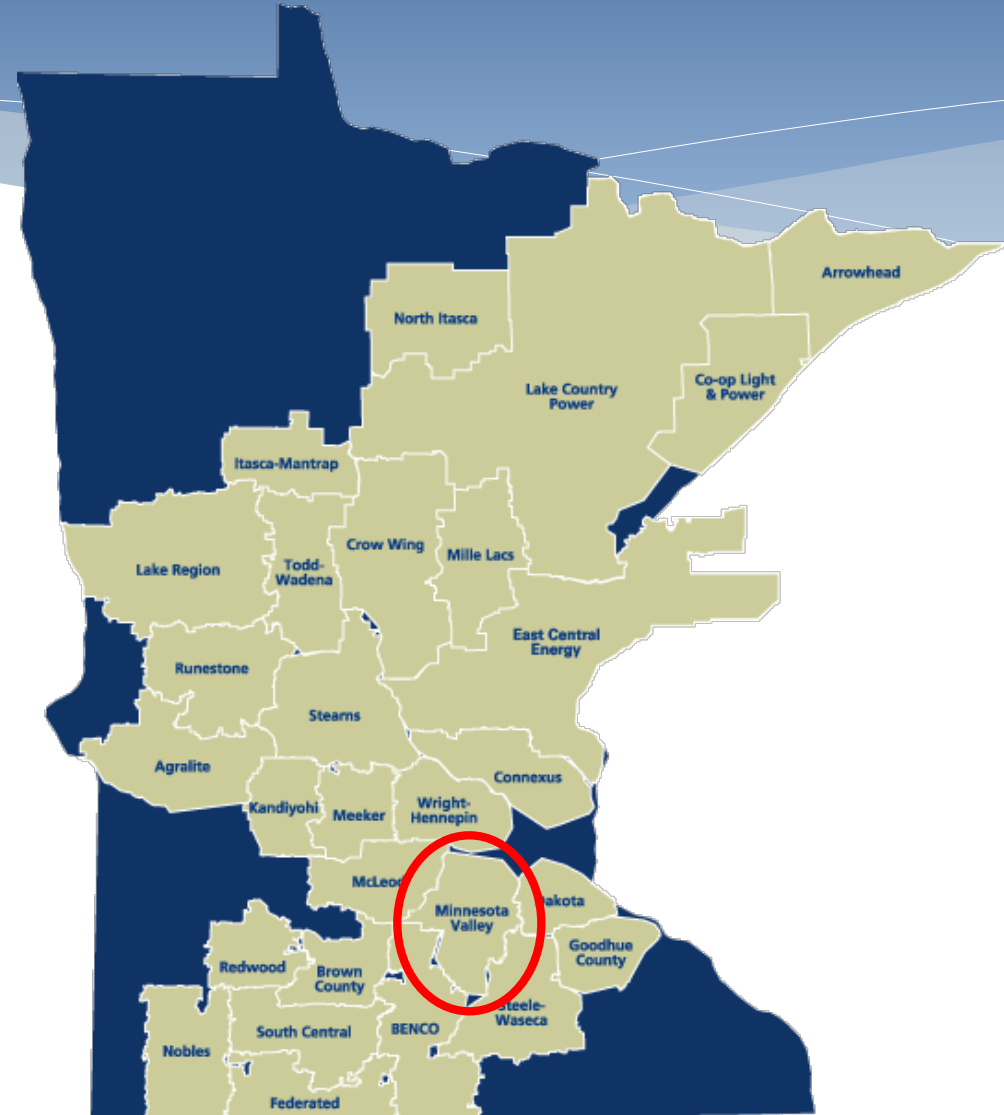
Your Touchstone Energy® Cooperative 

# Presentation Overview

- \* MVEC overview
- \* Peak types and their importance to DR program value
- \* Programs – Tools in the toolbox
  - \* Capabilities
  - \* Constraints
- \* Managing load
- \* Summary of concepts and value drivers

# MVEC Overview

- \* Distribution Cooperative
- \* Based in Jordan, Minnesota
- \* 90 employees
- \* 42,000 member-owners
- \* ACSI score of 89
- \* 900 sq mile service territory
- \* 10 consumers per mile
- \* 3 wholesale power suppliers
- \* \$6M in DR savings annually

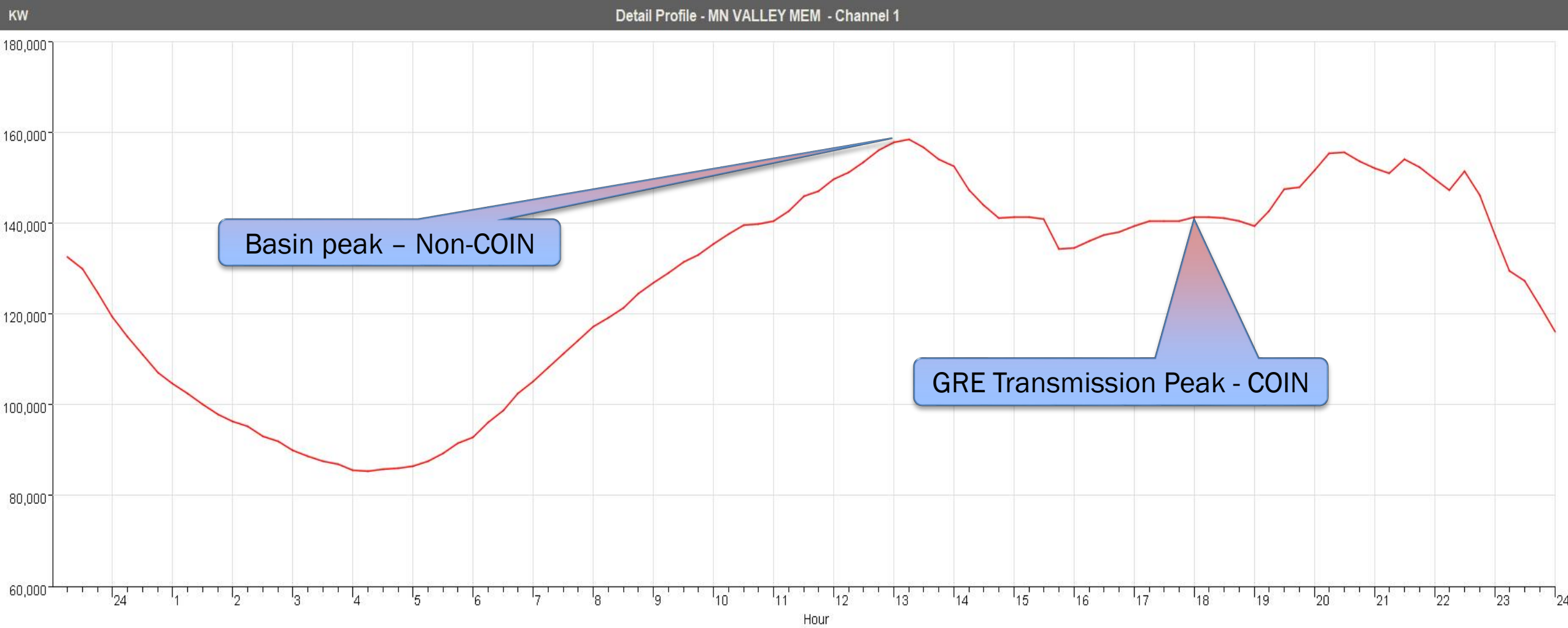


# Wholesale Power Suppliers

- \* Wholesale Power agreements:
  - \* Great River Energy
  - \* Basin Electric
  - \* Alliant Energy
- \* Billed for demand and transmission based upon monthly system peaks
- \* All MISO market participants
- \* Each G&T has a different peak



# Two Peak Types



# Demand Response Programs

## Commercial and Industrial Interruptible loads

- \* With generator
- \* Without generator

## Air conditioning

- \* Cycled
- \* Wi-Fi thermostats

## Water heaters

- \* Peak shave
- \* Storage

## Interruptible heating

- \* Peak shave
- \* Storage

## Electric vehicles

- \* Peak shave
- \* Storage
- \* Time-of-use

**Beat the peak energy challenge**



# Program Participation and Shed

Program	Participants	Technology used	Groups	MW of controllable load
<b>Commercial and Industrial Interruptible Loads</b>	130	Direct load control (DLC)	8	<b>20 MW</b>
<b>Air Conditioning</b>	14,000	DLC Nest and Honeywell thermostats	4	<b>7 MW</b>
<b>Peak Shave Water heaters</b>	4,000	DLC	4	<b>6 MW</b>
<b>Storage Water heaters</b>	1,500	DLC	1	<b>1 MW</b>
<b>Interruptible Dual Heat</b>	7,500	DLC	4	<b>10 MW</b>
<b>Electric Vehicles - Interruptible</b>	65	DLC	1	<b>150 kW</b>
<b>Electric Vehicles - TOU</b>	20	DLC	1	<b>30 kW</b>
<b>Beat the Peak Energy Challenge</b>	2,500	Notifications – Email, Phone	1	<b>1.2 MW</b>

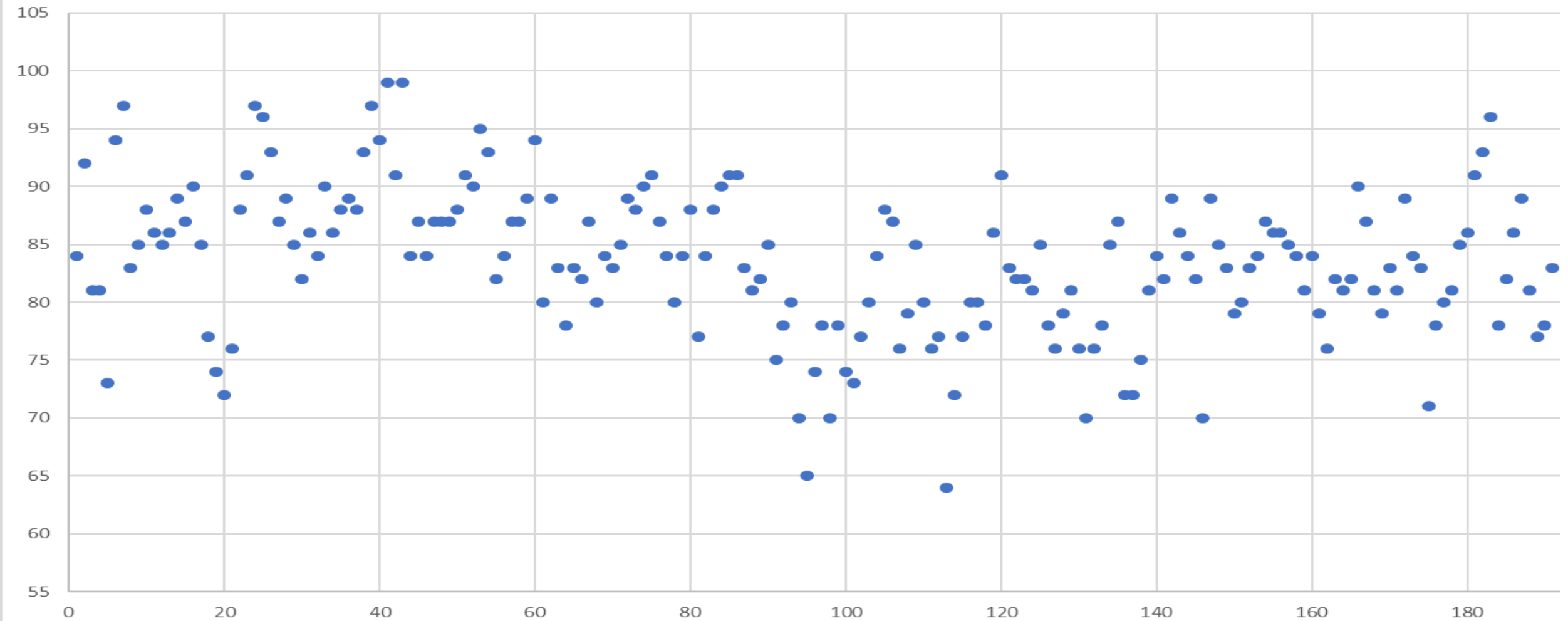
# Program Operating Characteristics

Program	Season				Member Impact	Rebound concerns	Annual hours	Max daily control	Primary value
	Winter	Spring	Summer	Fall					
Water heating	X	X	X	X	Low	Yes	400-500	8 hours	Control
Air Conditioning			X		High	Yes	80-150	6 hours	Control
Heating	X	X		X	Low	Yes	40-60	6 hours	Credits
Interruptible C&I	X	X	X	X	Medium	No	100-200	12 hours	Mixed
Thermostats			X		High	Medium	50	4 hours	Control
Beat The Peak Competition			X		Medium	No	50	4 hours	Control

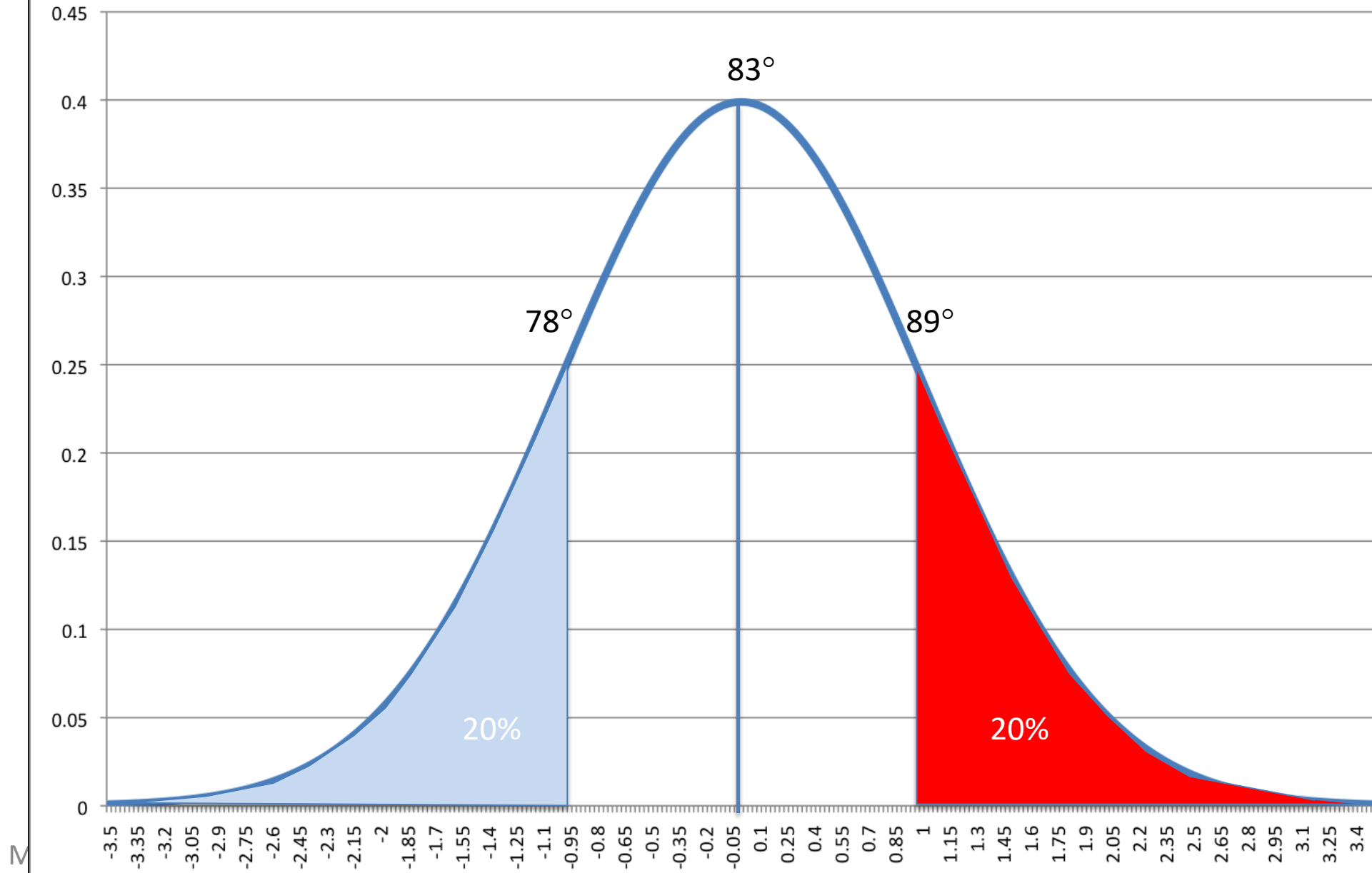


# What is control for?

July High Temperatures

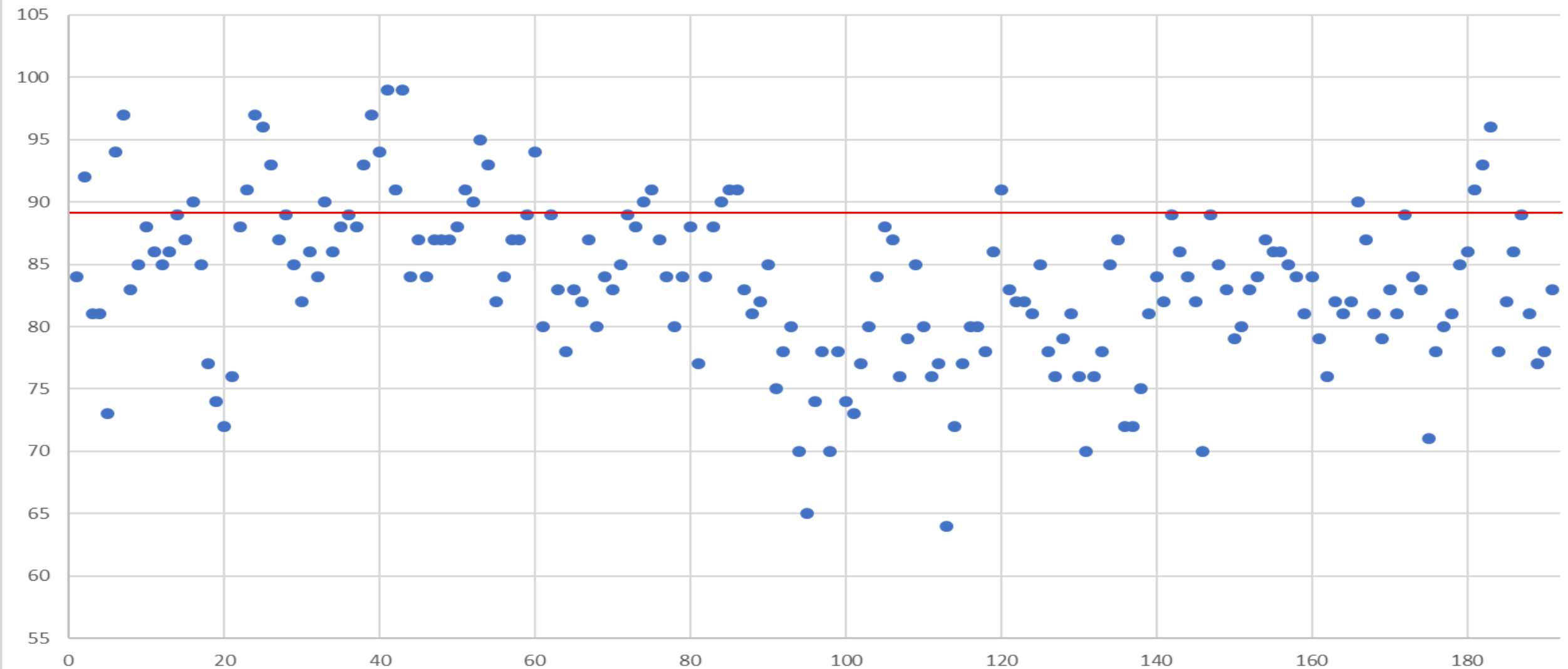


# Normal distribution of 10 years of July High temperatures

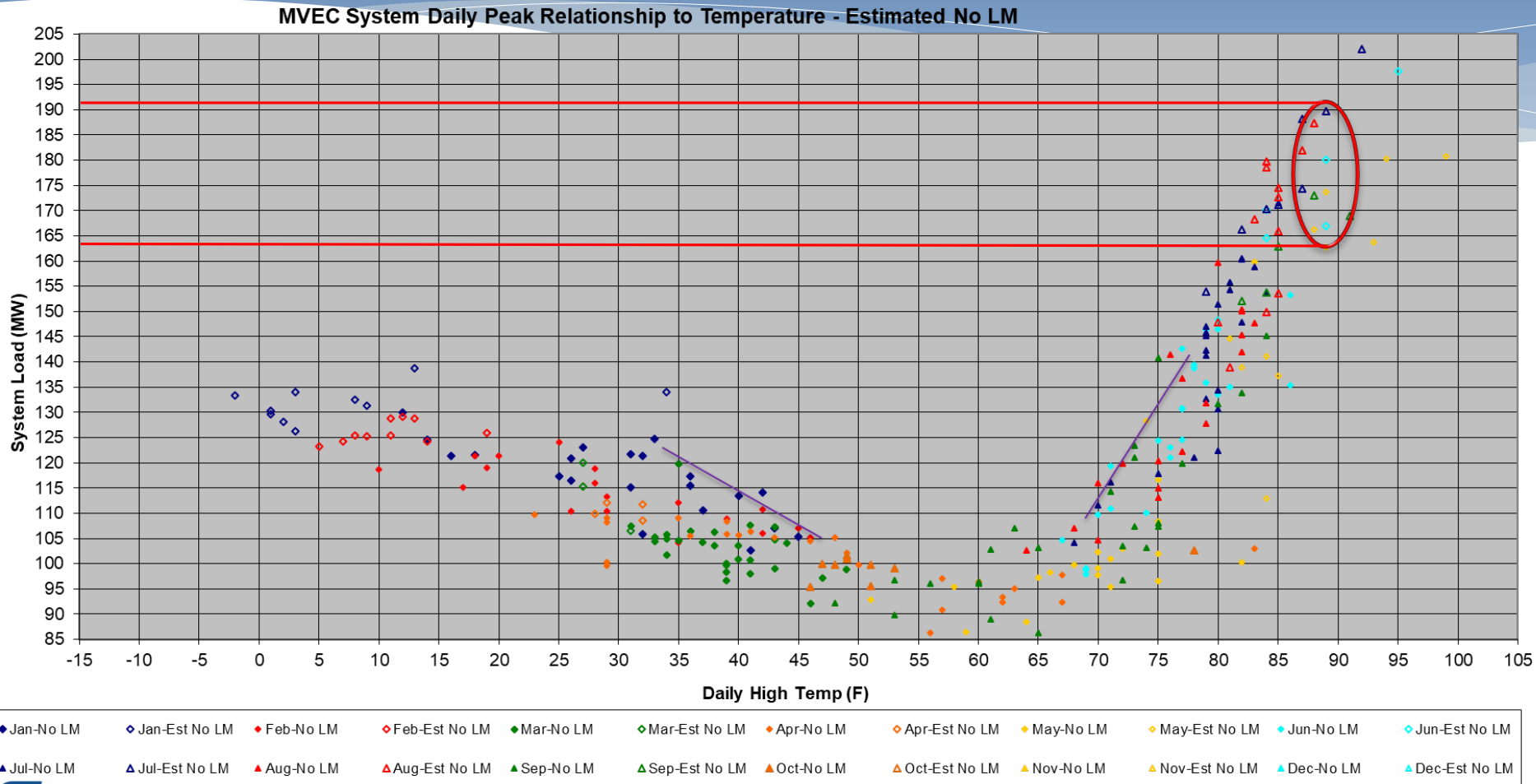


# Eliminating Extremes

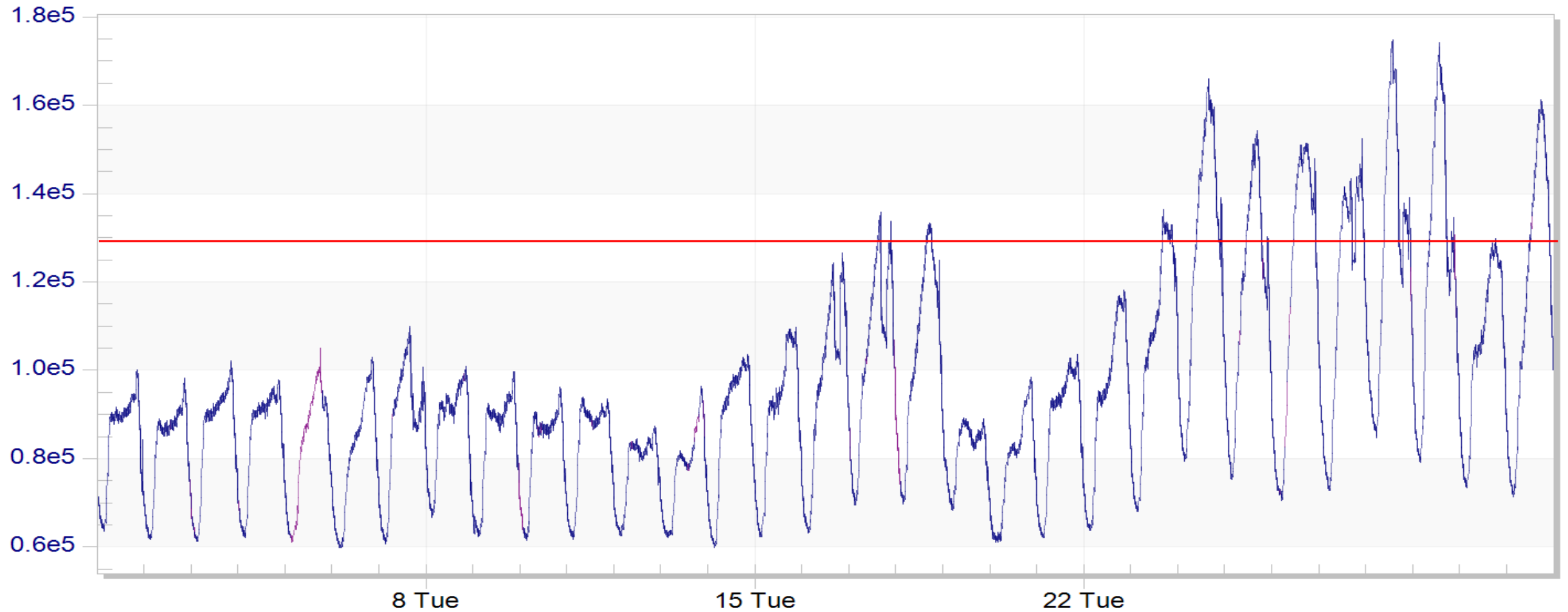
July High Temperatures



# Load vs Temperature Relationship













# When to Control?










May 2018

July 2018 | August 2018 | September 2018

<b>SUN 7/29</b>	<b>MON 7/30</b>	<b>YESTERDAY</b>	<b>TODAY 8/1</b>	<b>THU 8/2</b>	<b>FRI 8/3</b>	<b>SAT 8/4</b>
Actual Temp <b>83°</b> /58°	Actual Temp <b>84°</b> /59°	Actual Temp <b>85°</b> /61°	 <b>76°</b> /52° A thunderstorm; not as warm	 <b>75°</b> /59° Partly sunny; nice	 <b>88°</b> /71° Sunshine; pleasant and warmer	 <b>81°</b> /68° A shower and t-storm around
Hist. Avg. 83°/63°	Hist. Avg. 83°/63°	Hist. Avg. 83°/63°	Hist. Avg. 82°/63°	Hist. Avg. 82°/63°	Hist. Avg. 82°/63°	Hist. Avg. 82°/63°

<b>SUN 8/5</b>	<b>MON 8/6</b>	<b>TUE 8/7</b>	<b>WED 8/8</b>	<b>THU 8/9</b>	<b>FRI 8/10</b>	<b>SAT 8/11</b>
 <b>86°</b> /65° A shower or t-storm in spots	 <b>82°</b> /63° Some sun, t-storms possible	 <b>83°</b> /65° Mostly sunny	 <b>87°</b> /67° Mostly sunny	 <b>90°</b> /68° Clouds and sun; humid	 <b>91°</b> /71° A thunderstorm possible	 <b>90°</b> /63° Partial sunshine
Hist. Avg. 82°/63°	Hist. Avg. 82°/63°	Hist. Avg. 82°/62°	Hist. Avg. 82°/62°	Hist. Avg. 82°/62°	Hist. Avg. 82°/62°	Hist. Avg. 82°/62°

<b>SUN 8/12</b>	<b>MON 8/13</b>	<b>TUE 8/14</b>	<b>WED 8/15</b>	<b>THU 8/16</b>	<b>FRI 8/17</b>	<b>SAT 8/18</b>
 <b>86°</b> /58° Sun and some clouds; humid	 <b>84°</b> /63° A chance for showers	 <b>79°</b> /59° Sunny; humid	 <b>81°</b> /59° Sunny	 <b>79°</b> /61° Mostly sunny; humid	 <b>85°</b> /64° A p.m. shower or thunderstorm	 <b>85°</b> /60° Cloudy; less humid
Hist. Avg. 82°/62°	Hist. Avg. 81°/62°	Hist. Avg. 81°/62°	Hist. Avg. 81°/62°	Hist. Avg. 81°/62°	Hist. Avg. 81°/61°	Hist. Avg. 81°/61°

SUN 8/19 | MON 8/20 | TUE 8/21 | WED 8/22 | THU 8/23 | FRI 8/24 | SAT 8/25

**STUNNING VANITY STYLE**



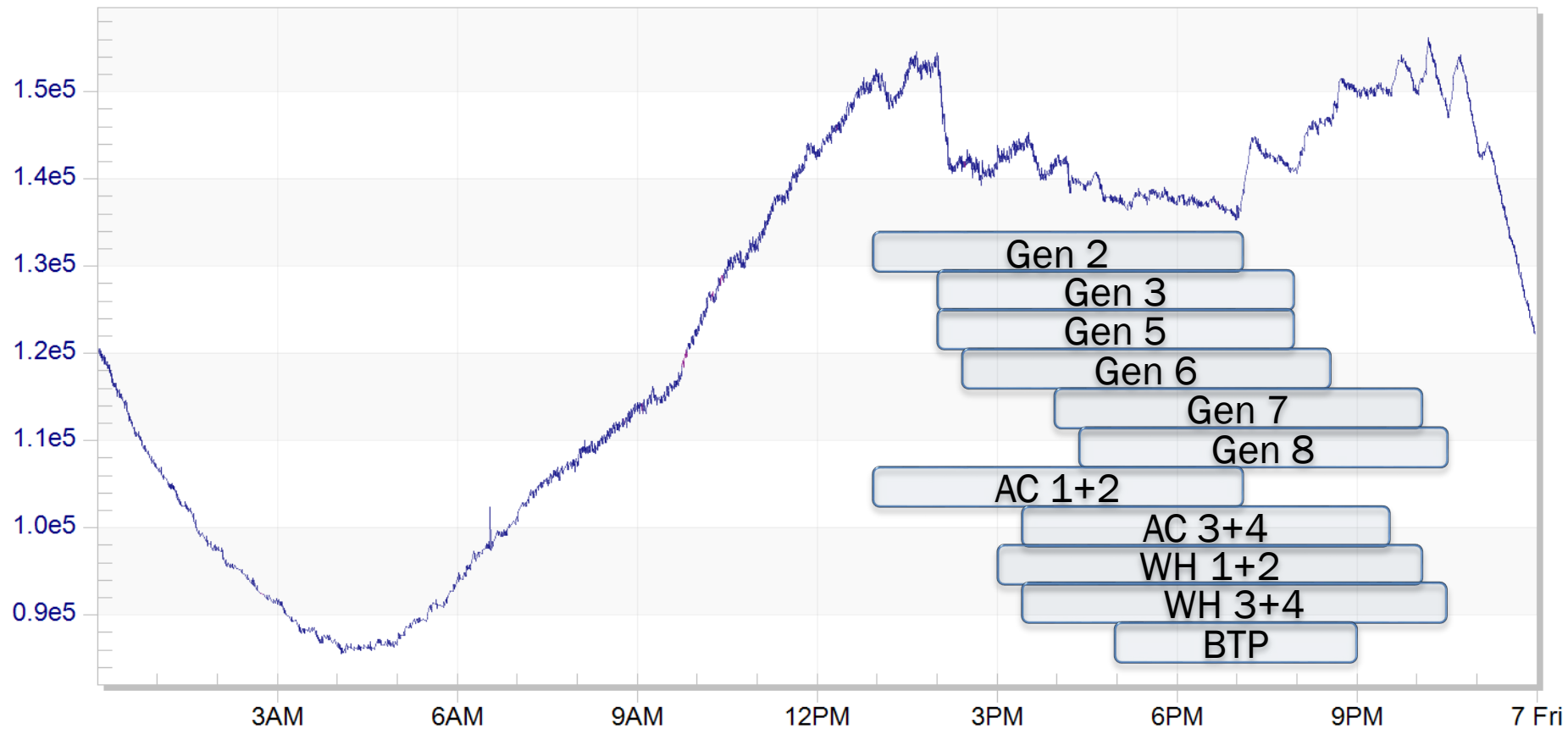
**THE HOME DEPOT**  
More saving. More doing.

**HARRY'S**

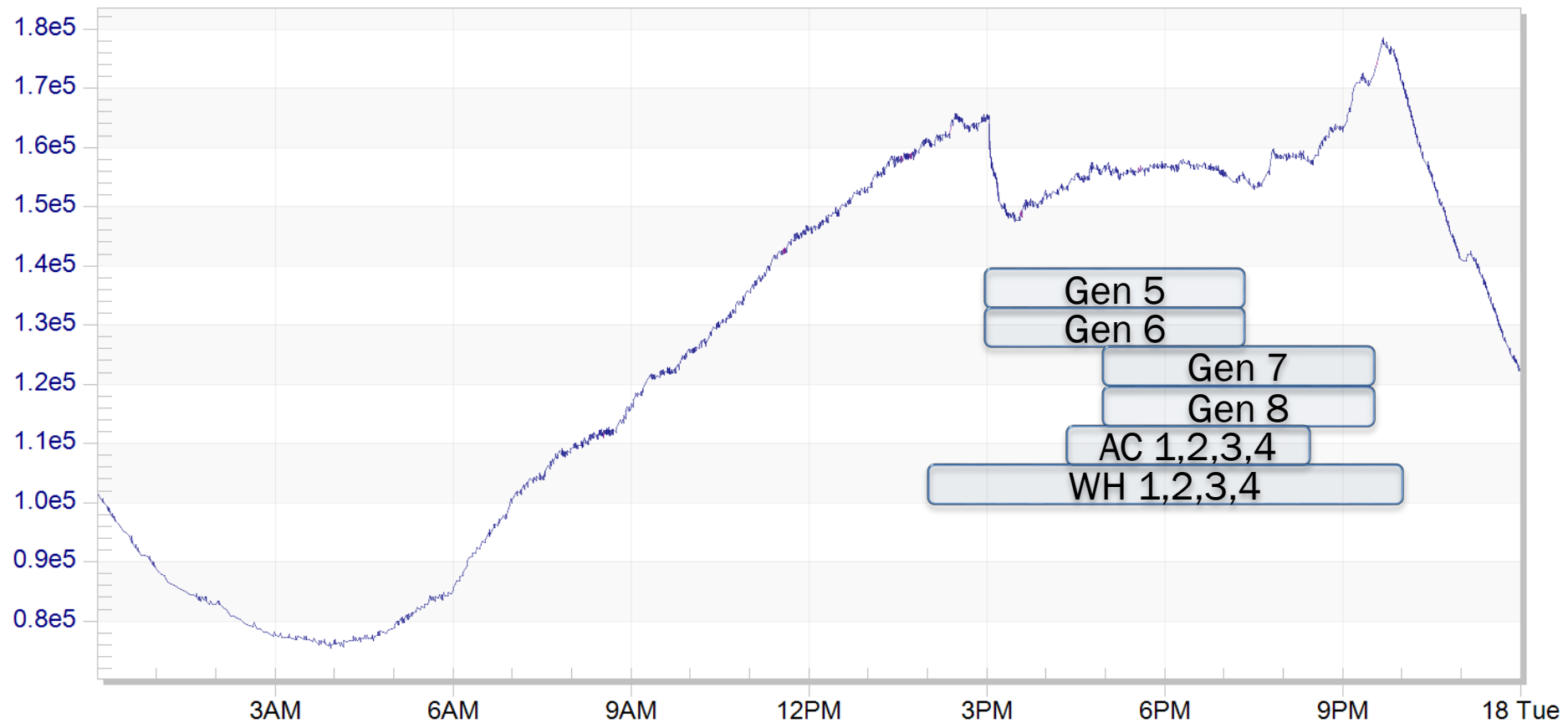
FIVE GERMAN BLADES  
ZERO UPCHARGING



# Non-COIN Control – Done Well

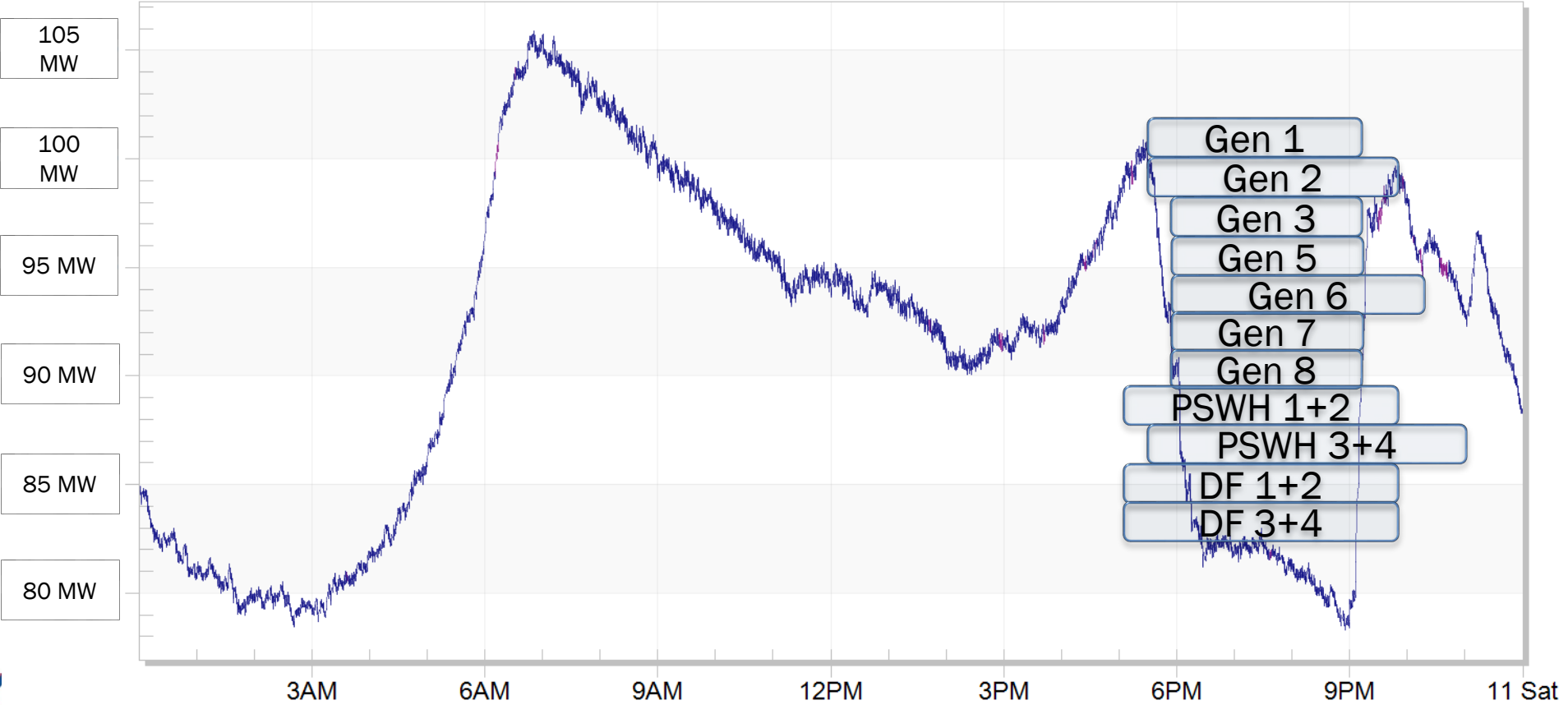


# Non-COIN Control – Done Poorly

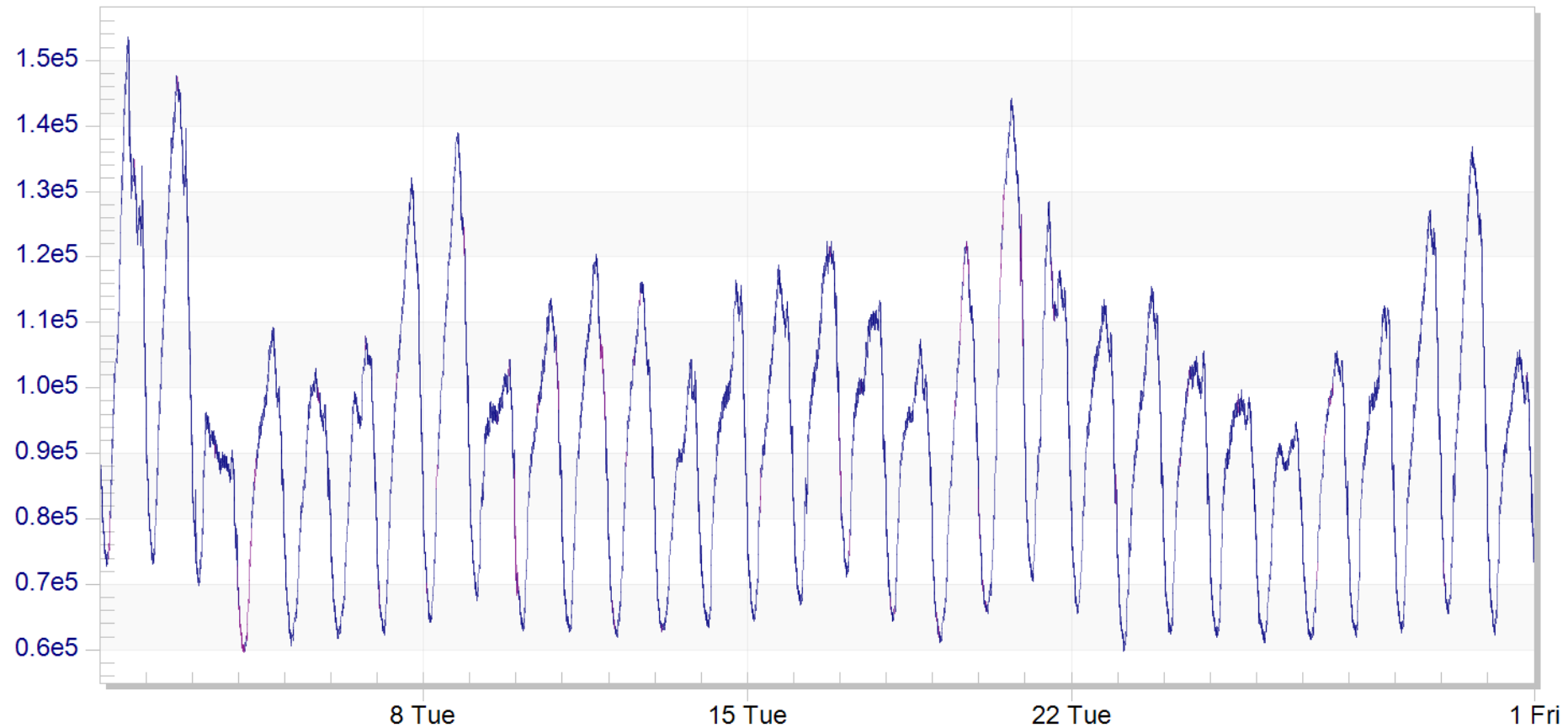




# COIN Control



# 31 Days of Weather to Manage!



Aug 2017

# Think about...

- \* Managing the resources and technologies
  - \* Dispatch – How many systems?
  - \* Notification – How many groups?
  - \* Analysis
    - \* Baselines – How many MW
    - \* ROI – Red or black?
    - \* Failure identification – Am I getting what I pay for?
- \* The business case for load control, under changing circumstances
  - \* RTO rules, G&T rates/incentives, **coincident vs non-coincident peaks**

# Discussion?

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