

Improving Programmable Thermostats with Less Aggressive Default Setbacks

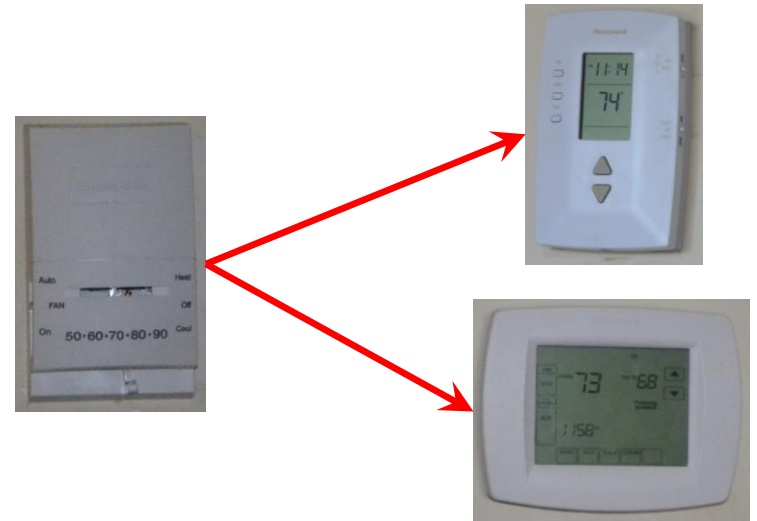
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Sacramento, CA*



Test Building: Multifamily Apartment Near Boston

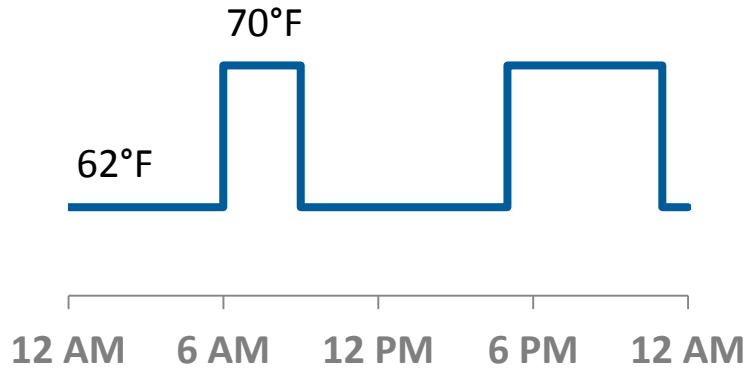


Handwritten: *Thursday*

THERMOSTATS	APTS
THURSDAY NOVEMBER 1, 2012 - 4th Floor	
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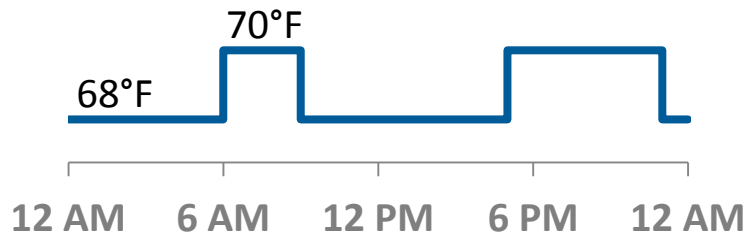


Default Schedules of Programmable Thermostats



Too Aggressive?

Users abandon energy saving schedules.



More Comfortable?

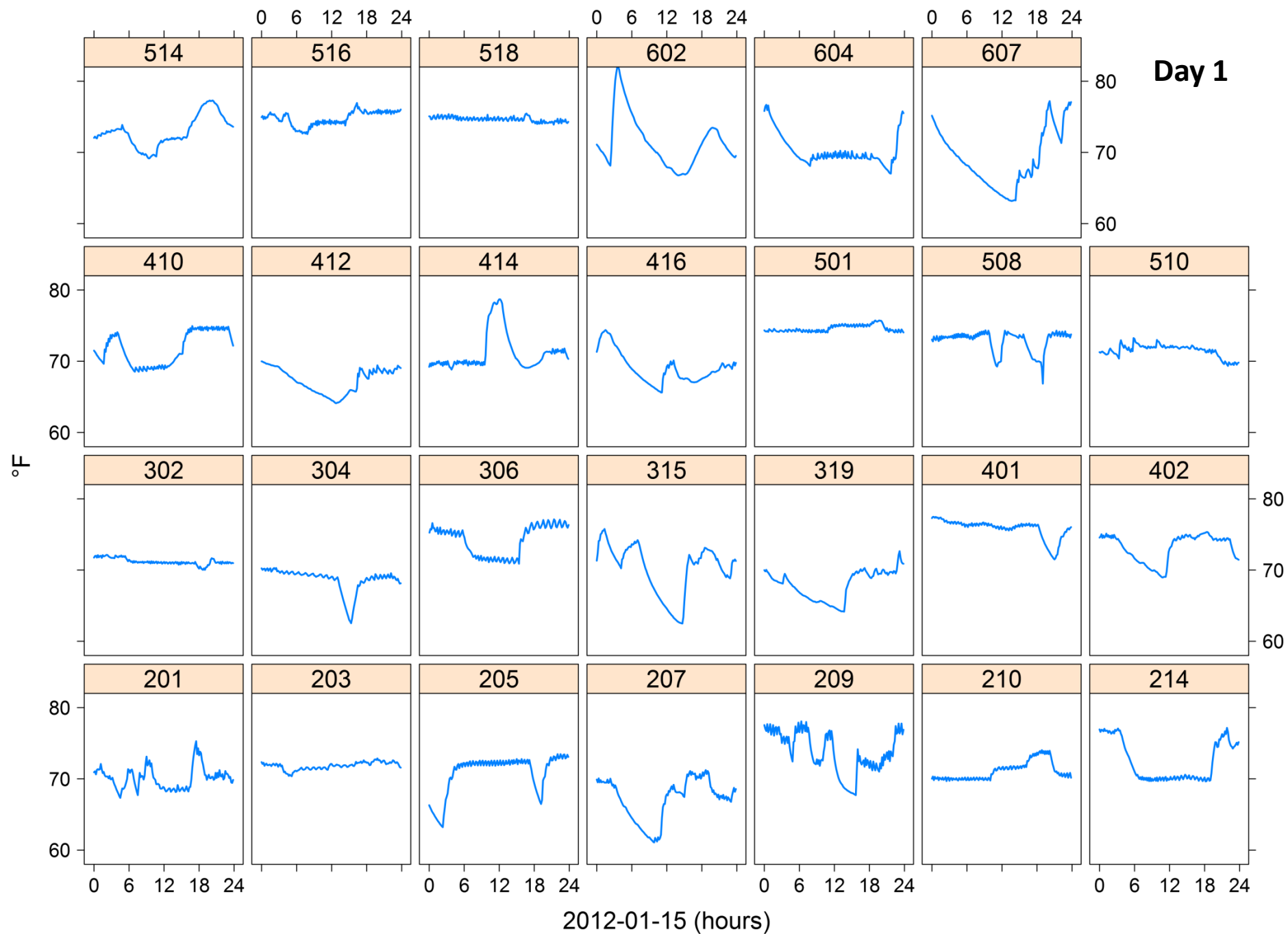
Users may be more tolerant of settings.

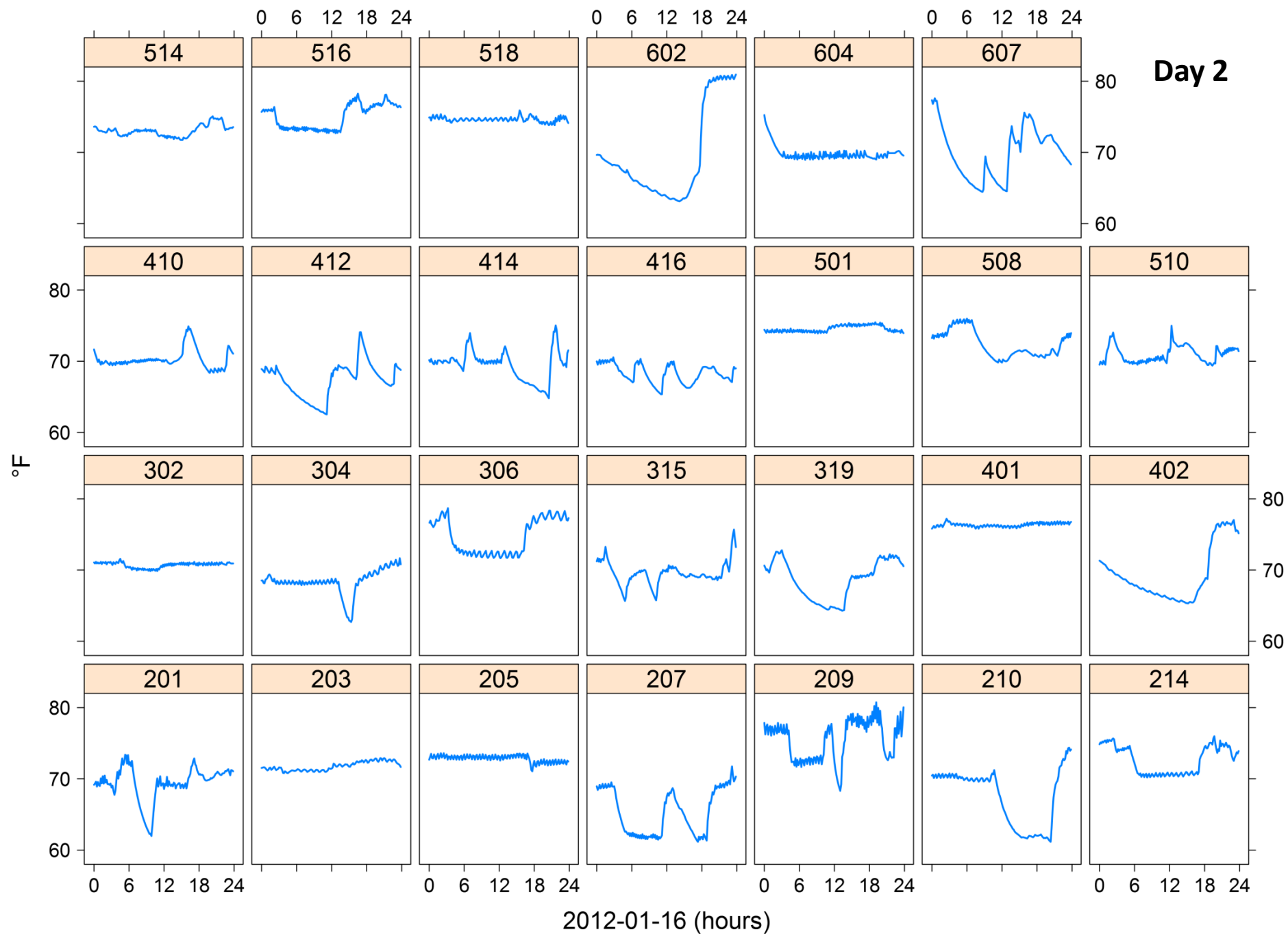
Readings from Thermostats at End of Each Experiment

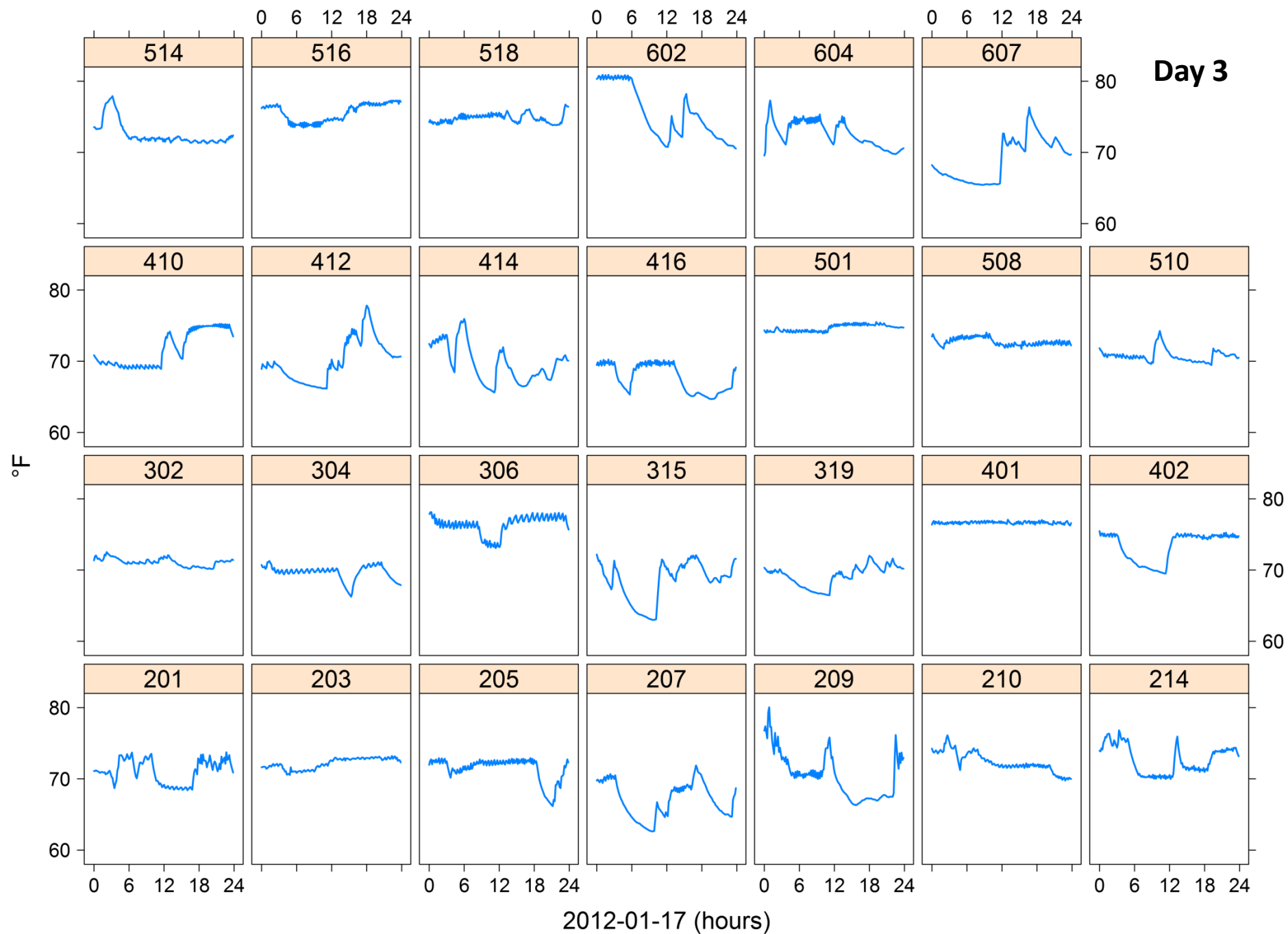
	Year 1	Year 2
	Aggressive Setbacks	Gentle Setbacks
Kept Default Schedules	4	11
Reprogrammed Schedules	24	17
Impossible Schedules	6	1
Mean Setup Temp	73 °F	71 °F
Mean Setback Temp (°F)	70 °F	69 °F

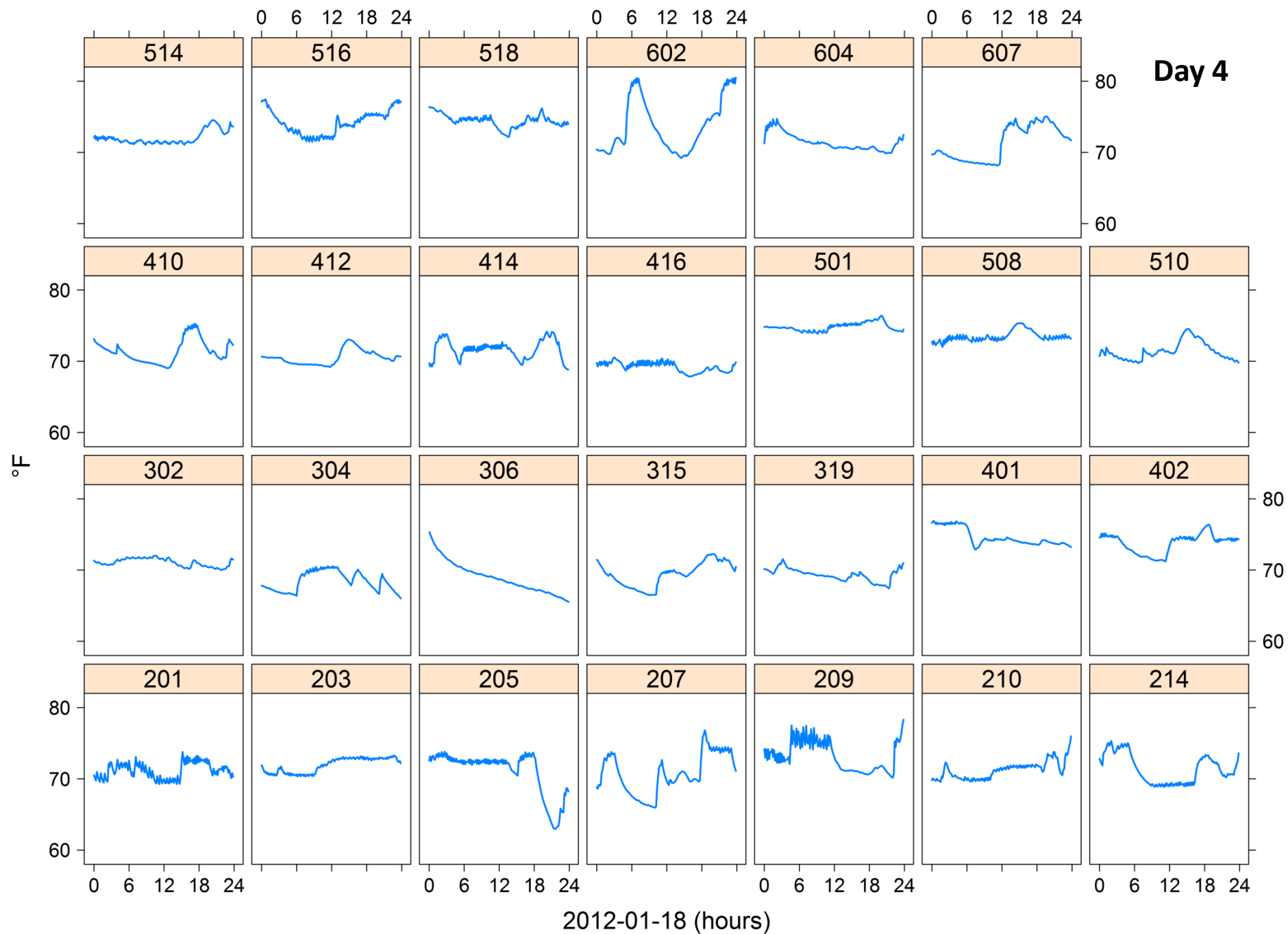
Lesson #1: Lots of Variability

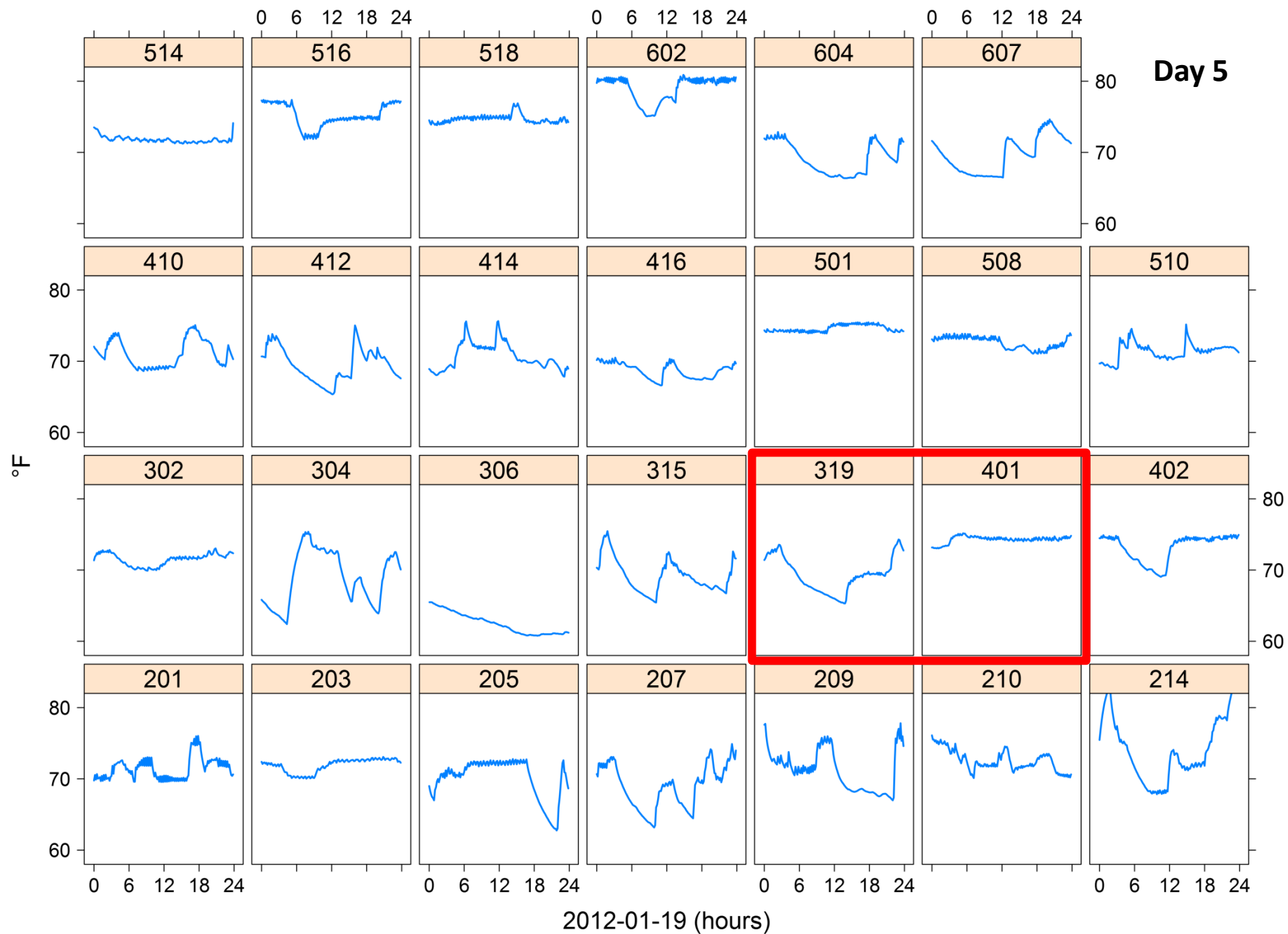
(look at the data and ignore basic statistics)

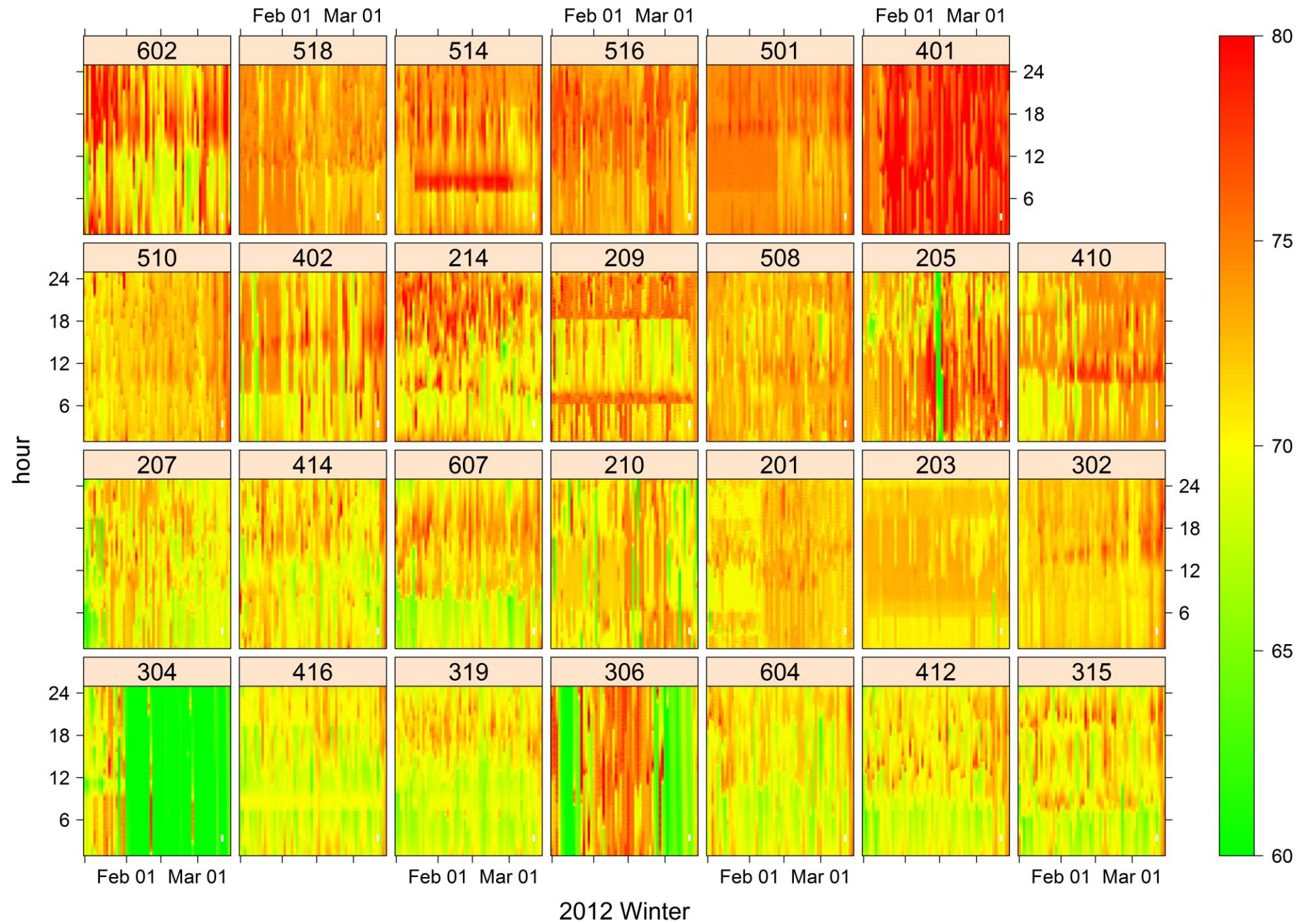


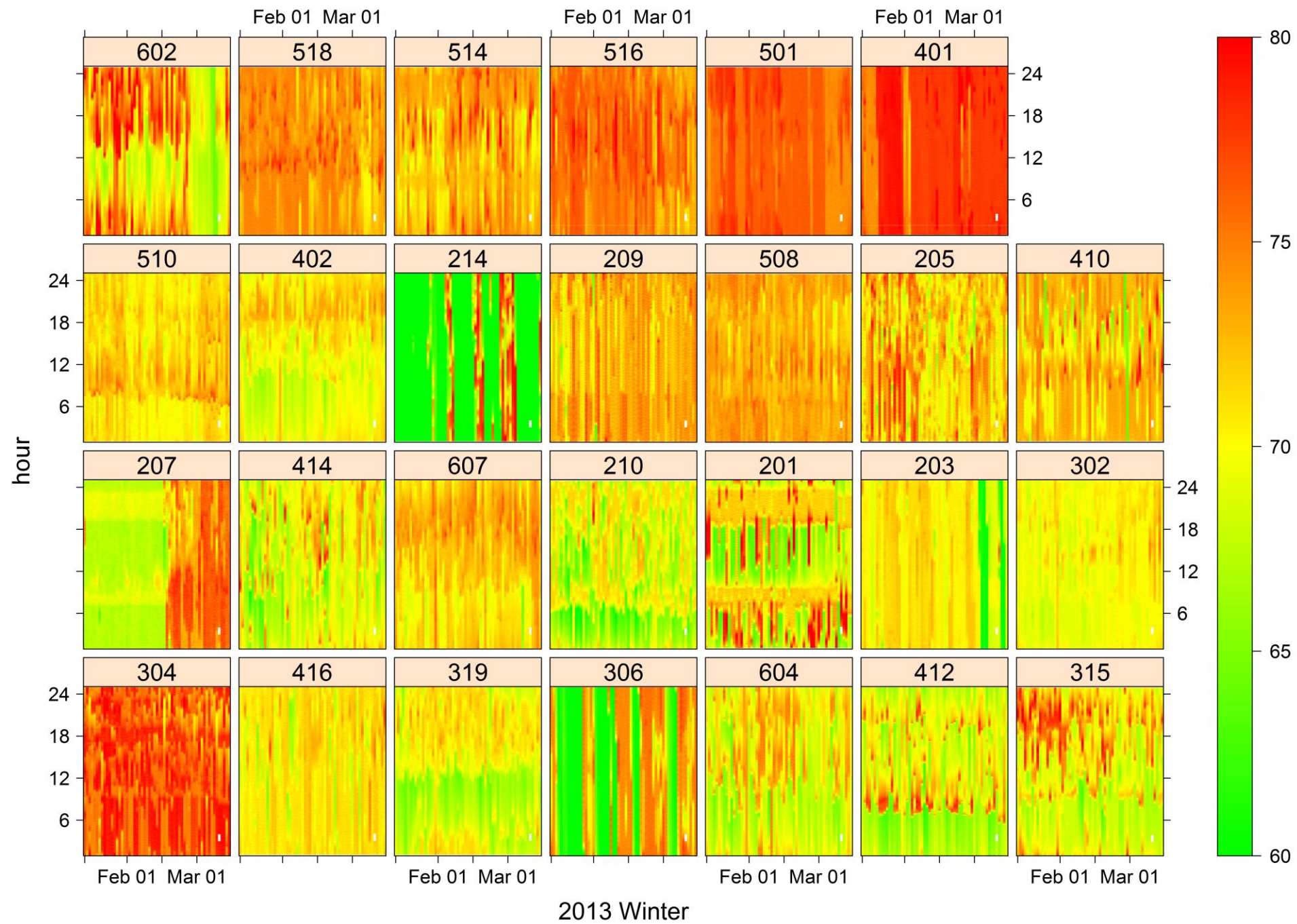






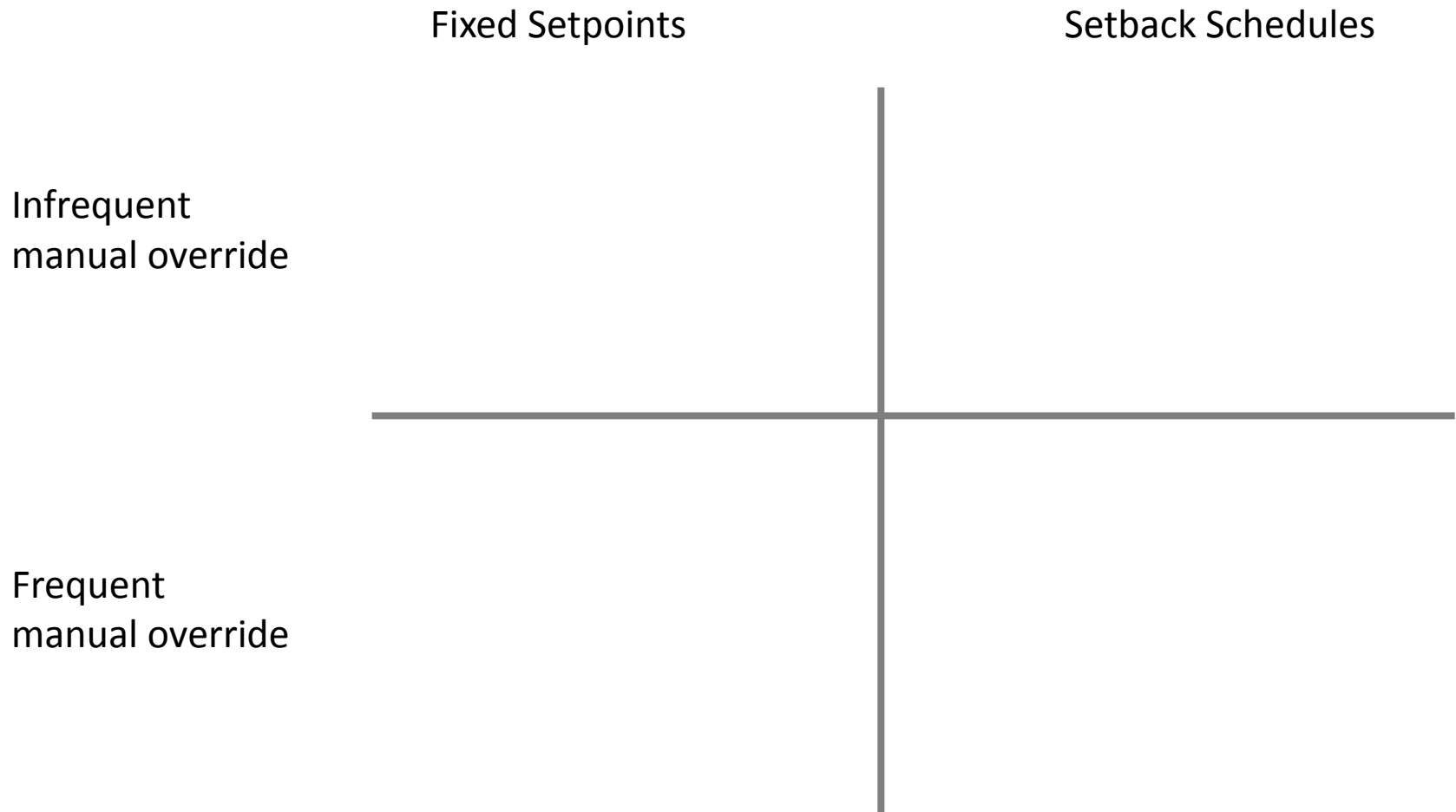




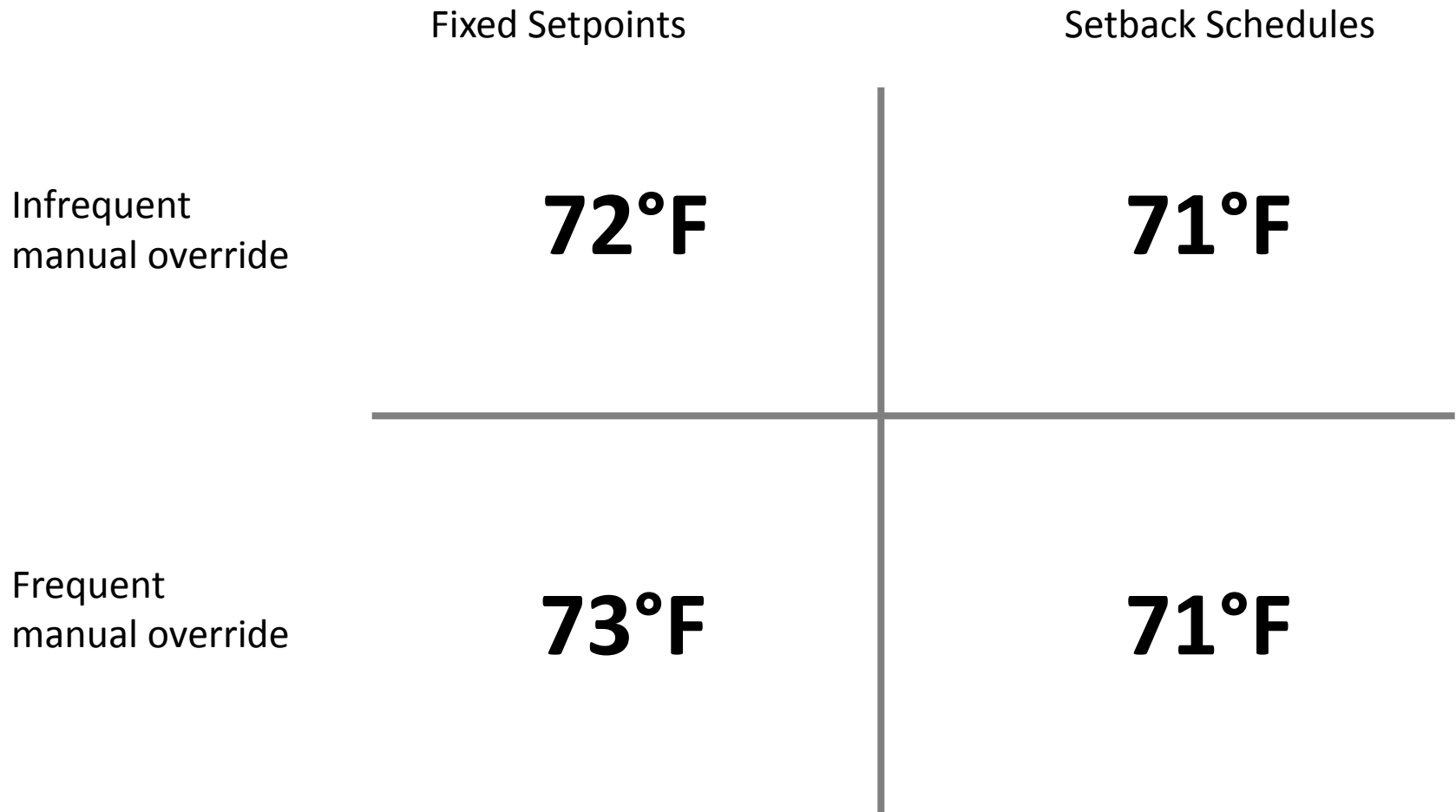


Lesson #2: Look for Similarities in Variability

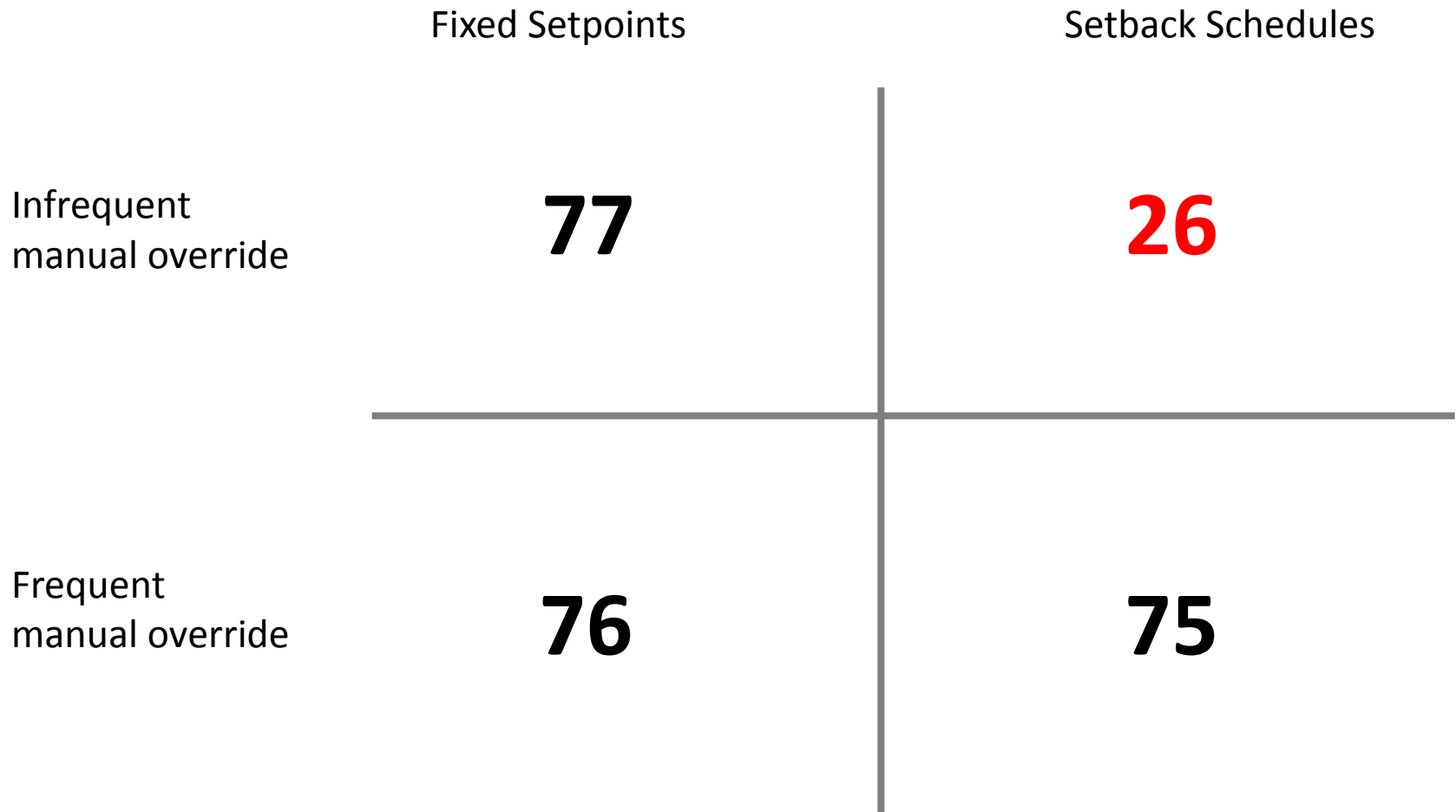
Clustering Rooms by Thermostat Behavior



Avg. Temperature by Thermostat Behavior

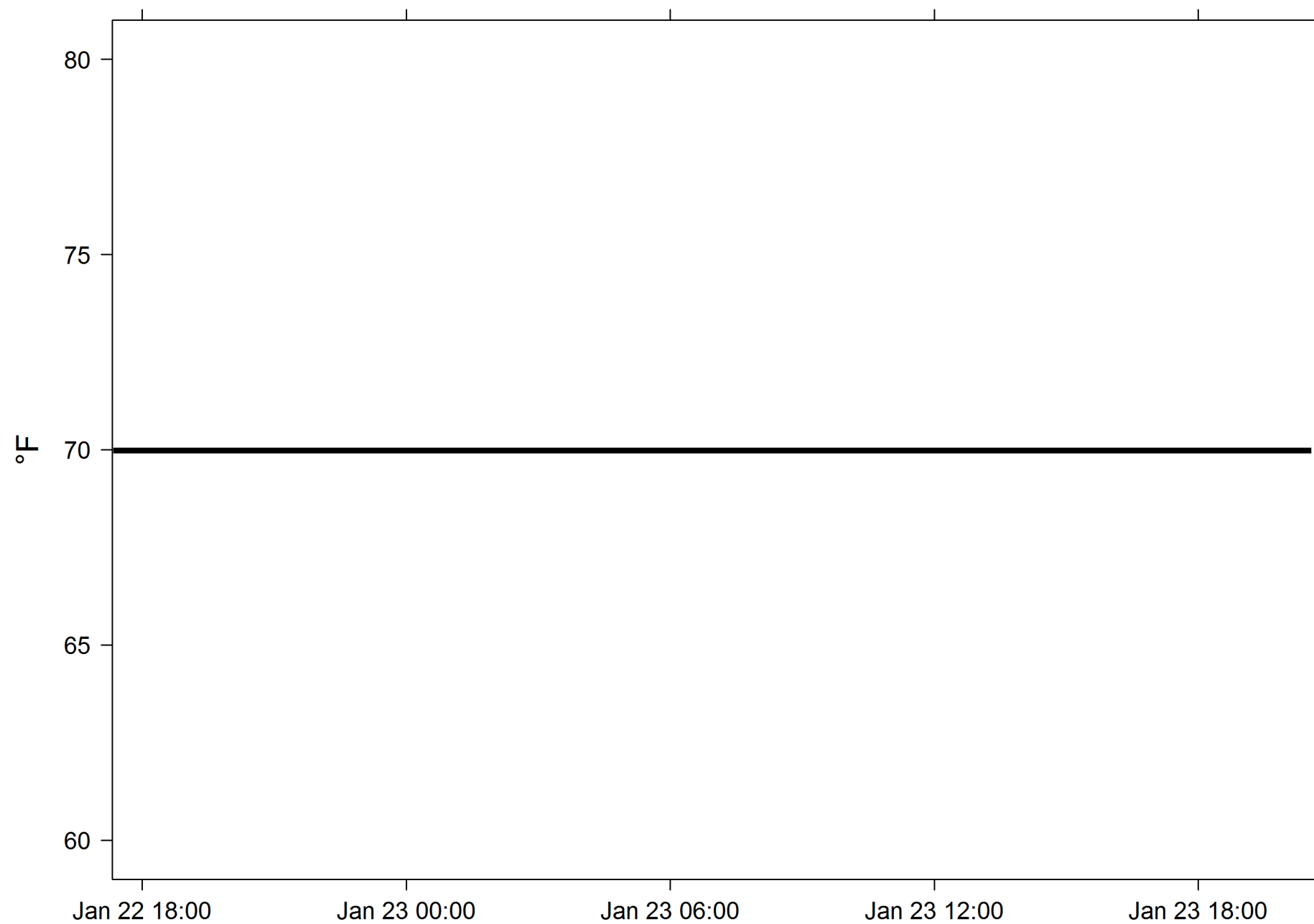


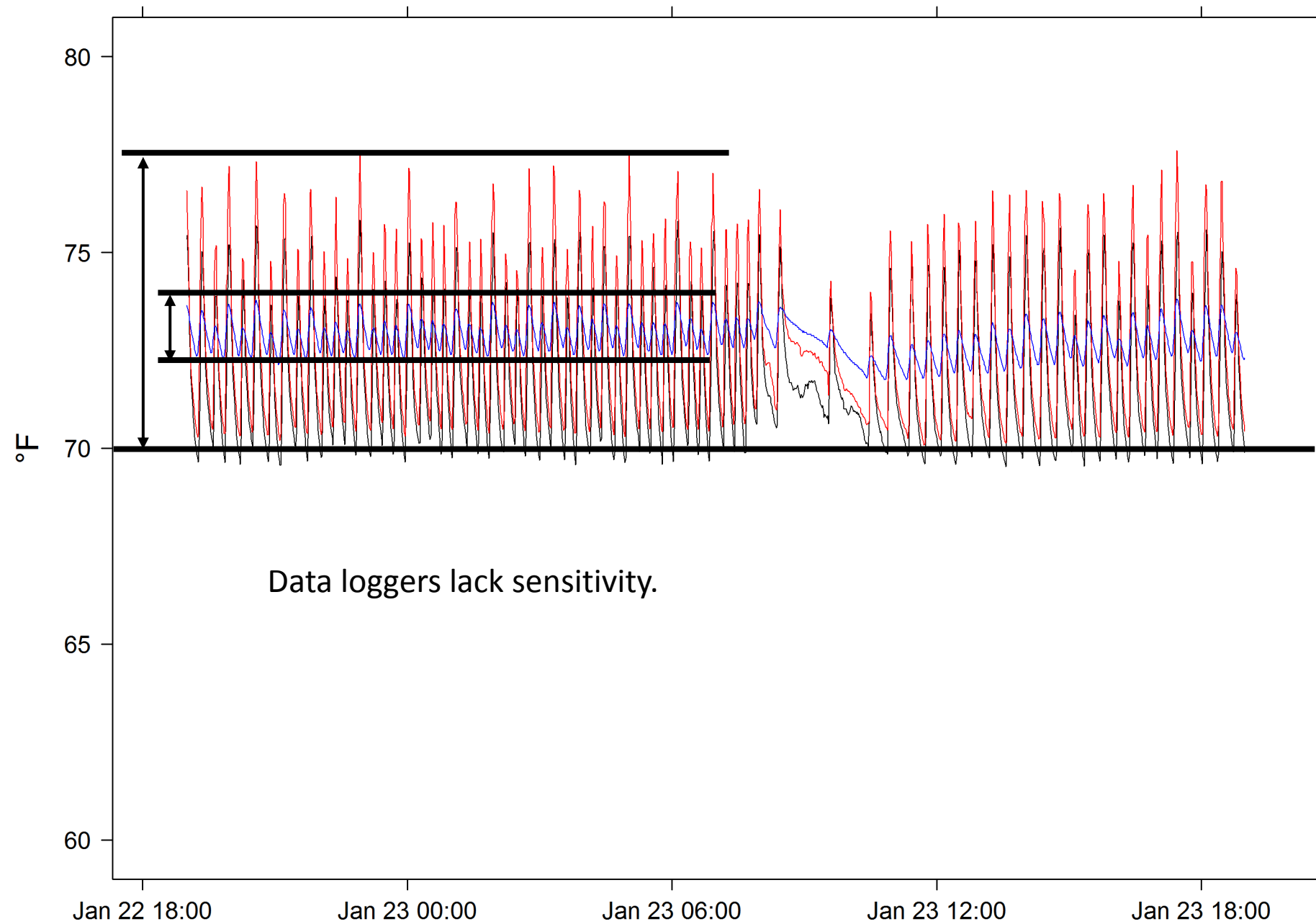
Avg. Heating Energy Use (therms) by Thermostat Behavior

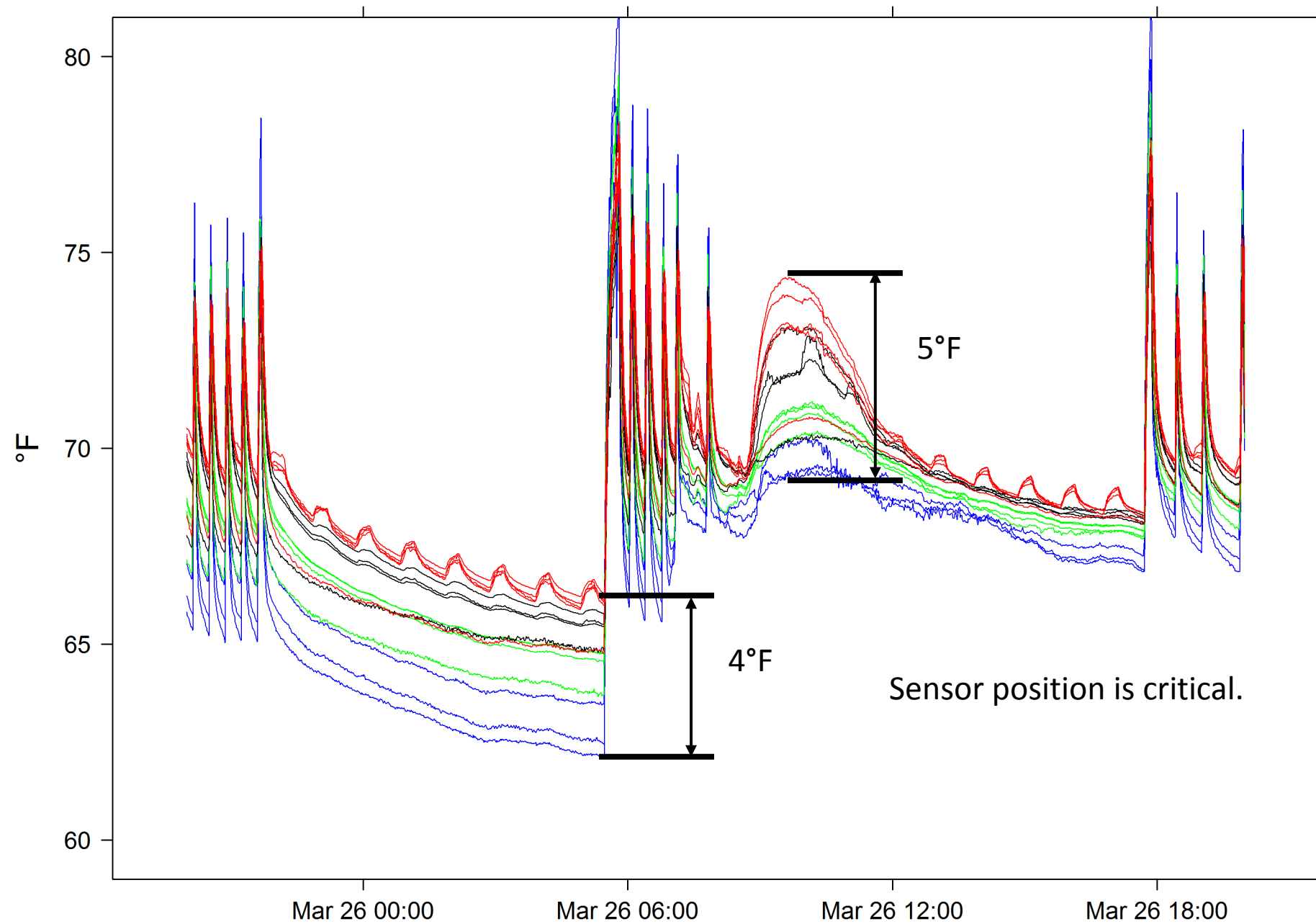


Lesson #3: Don't Trust Your Sensors (or your test subjects)



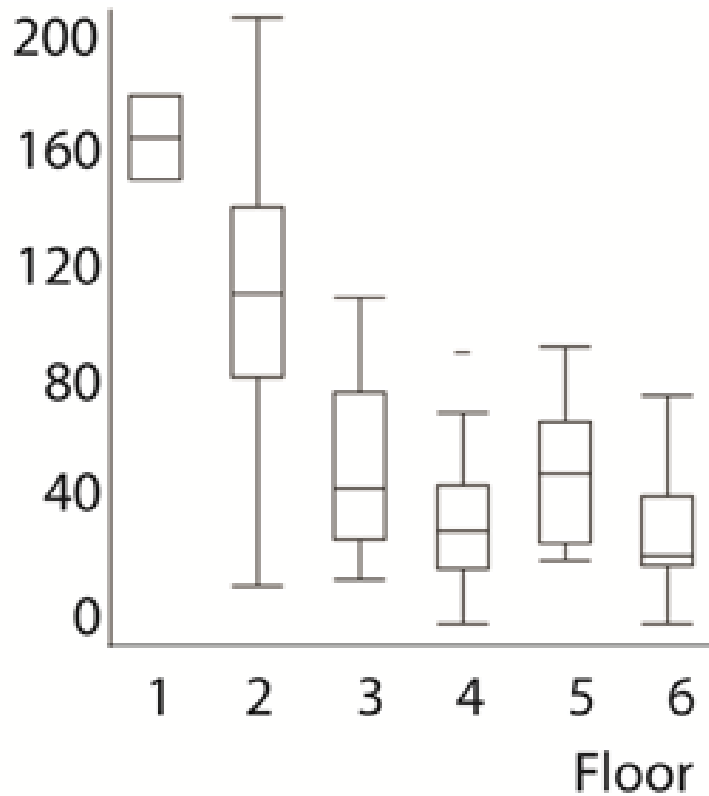






Why Does This Matter?

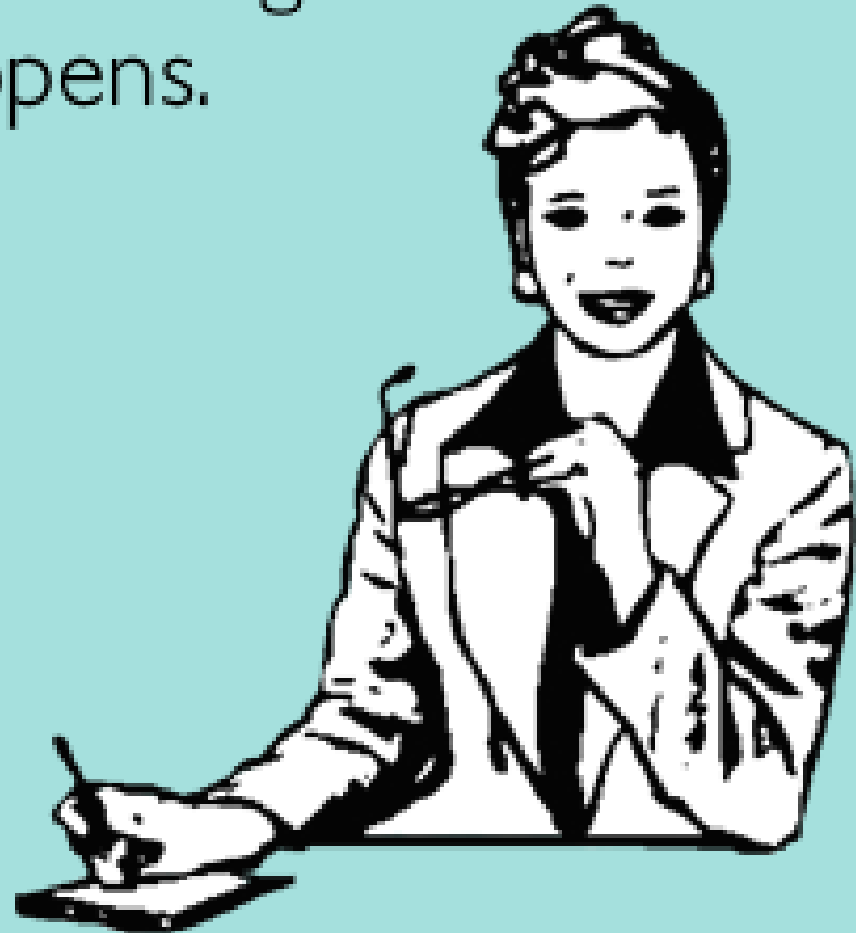
Observed Energy (therms)



10x

variation in heating energy
consumption from the lowest to the
highest consuming apartments

Touch the thermostat again
and see what happens.



your  cards
someecards.com

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