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Seminar 18 - Bridging the Information Gaps to Operation Management

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Building Re-tuning with Automated Data Loggers



Learning Objectives

1. Provide a list of documents that are critical to the turn-over process from Design/Construction/Commissioning to Operations and how they should be provided
2. Describe the fundamental concept behind Building Re-tuning as well as the benefits it brings to building operators
3. Define categories and specific types of information that are key to the Operational staff
4. Explain the value of using a cloud-based format for commissioning procedures, tests, and results

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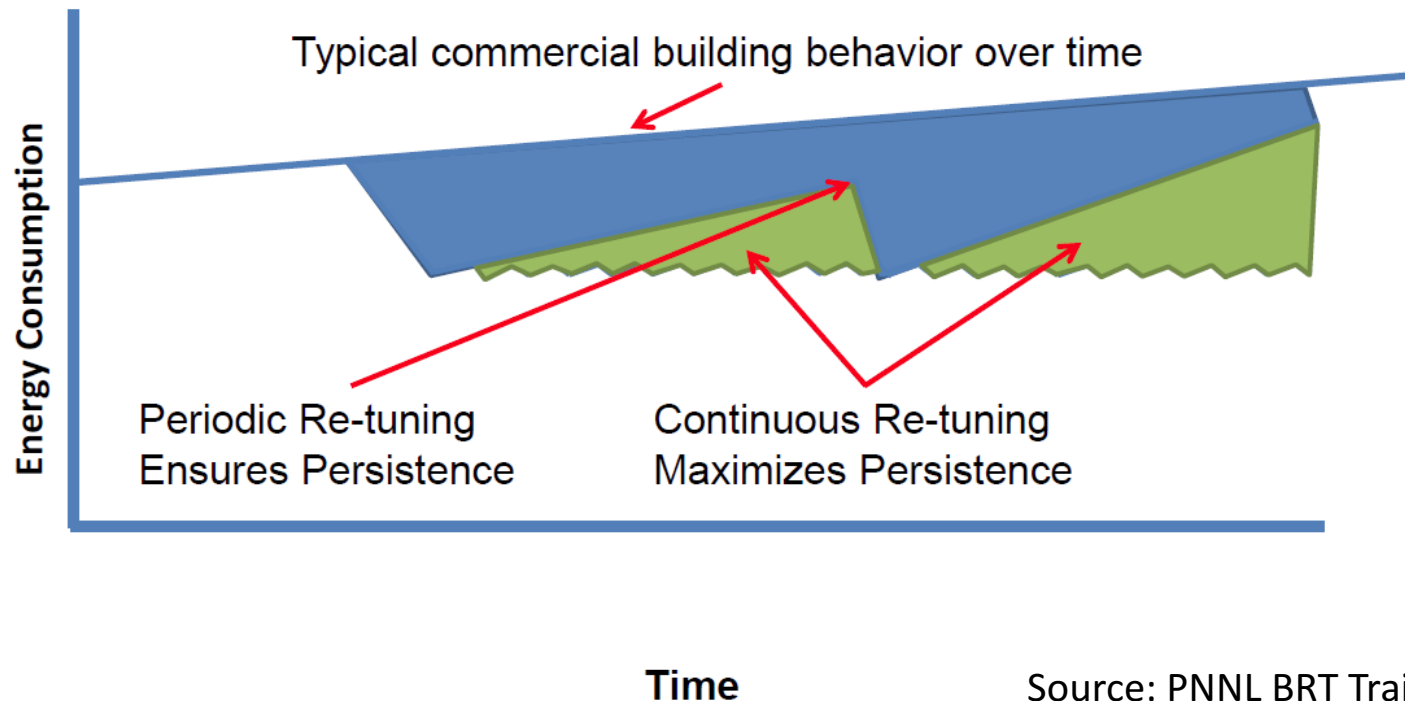
Acknowledgements

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The Opportunity

- Tightening building operations can yield 10 – 25% energy savings for little or no cost
- Without constant vigilance, building systems go out of tune



The Reality

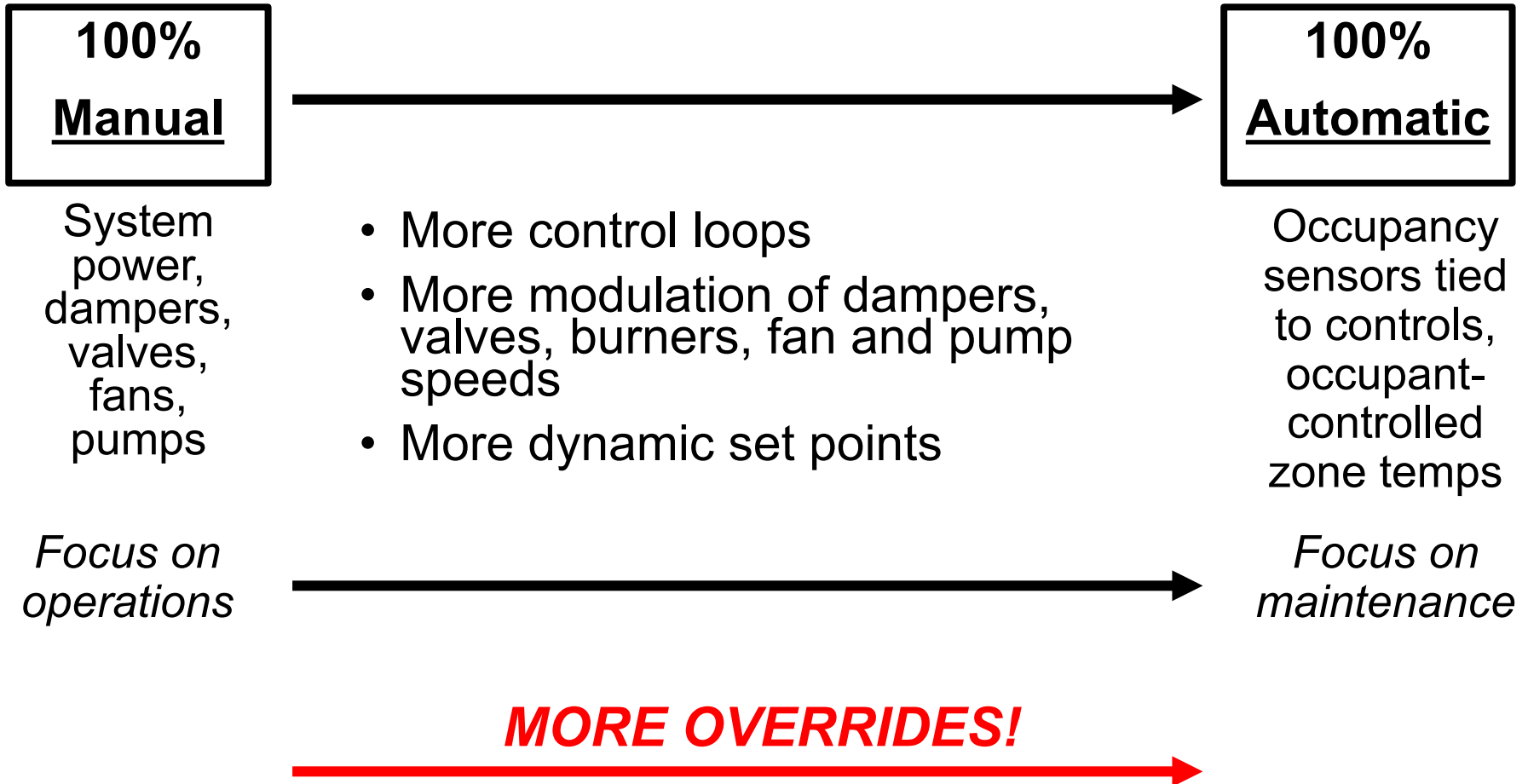
- Building operators focus on comfort, preventive maintenance, repairs and upgrades
- Operators often don't have the motivation, time and/or ability to optimize energy efficiency
- More prevalent trend in class B, C buildings, municipal buildings, schools, and multi-family residential



Hot and
cold calls



Operators and Automation



Principles and Assumptions for a Solution

Building operators:

- Best if they're engaged in operations optimization – otherwise tuning may only happens during, e.g., commissioning
- Need some degree of control
- Will seize control / override, if necessary

But will they routinely make energy-saving changes to operations?

Principles and Assumptions for a Solution

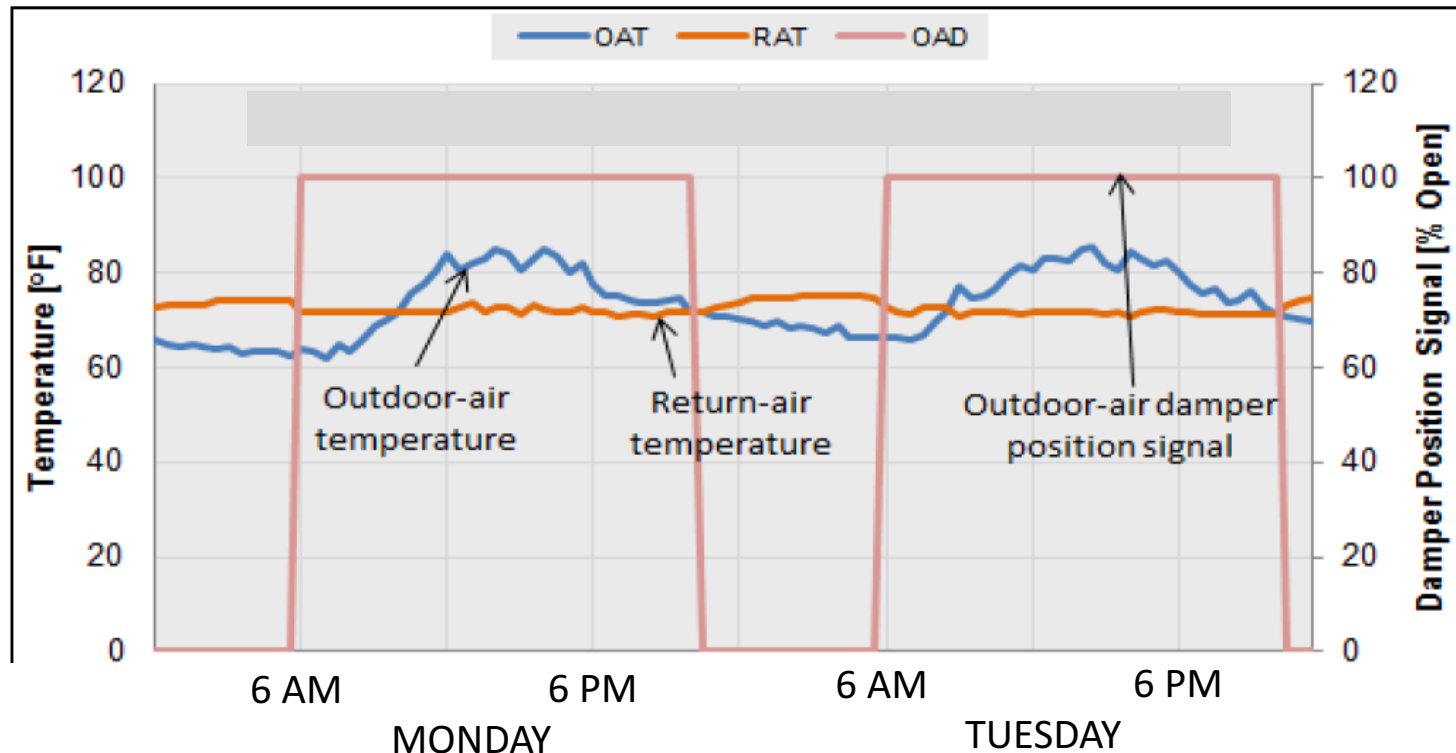
Most of the time, building operators are happy to make energy-saving changes to operations IF:

- Recommended changes don't take a lot of time to unscramble, and
- They are convinced it will work

NEEDED: Clear, concise recommendations and convincing evidence that shows why it should be done

BRT: A Tried and True Solution

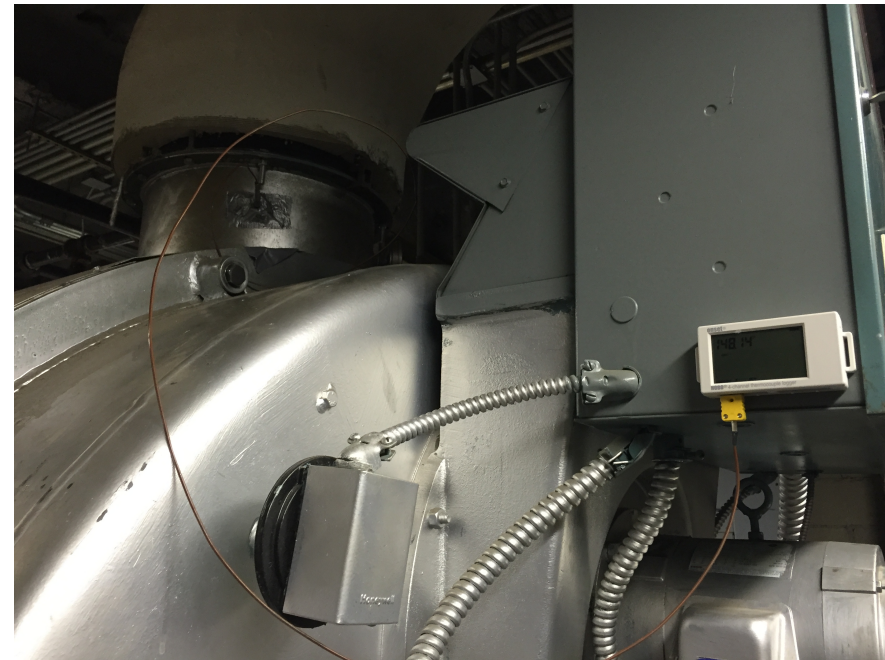
- “Building Re-tuning” addresses scheduling, air control, simultaneous heating and cooling, etc., e.g.:



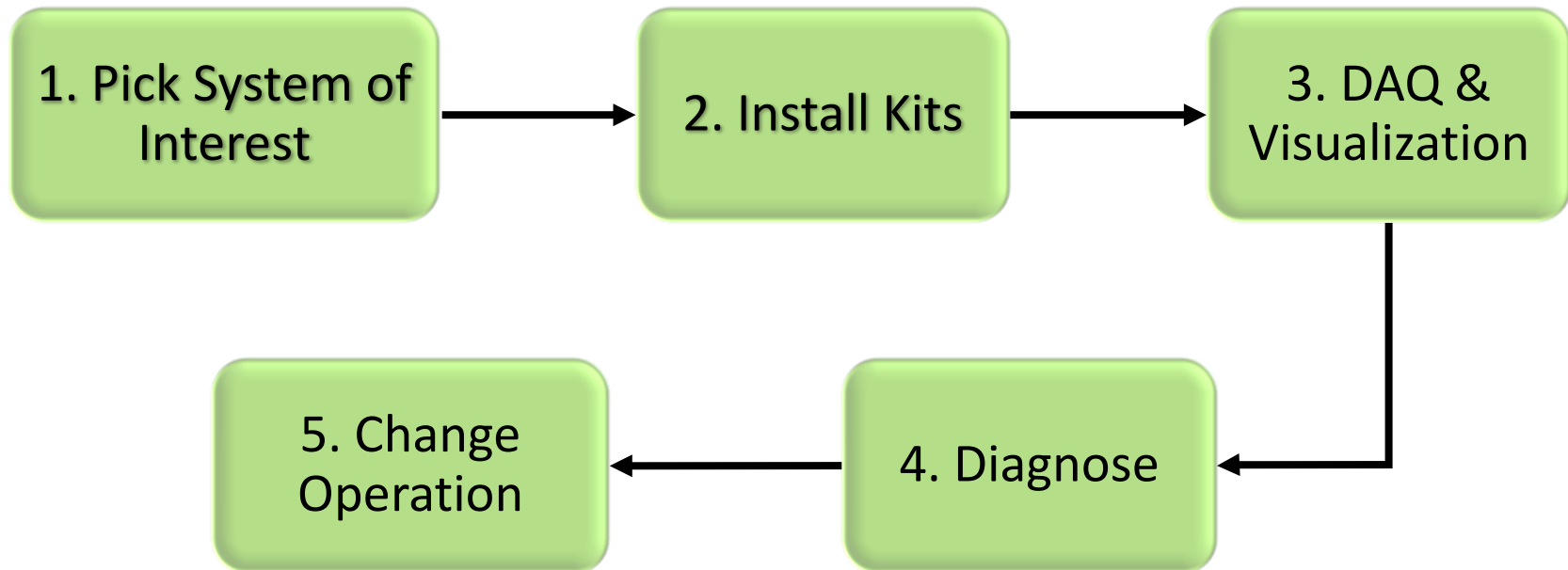
- PROBLEM: Damper fully open when $OAT > RAT$

Extending the Concept

- Building Re-tuning relies on trended data from a BAS
- Many buildings don't have a BAS with good trending and visualization
- CUNY BPL developed “noBAS BRT”, with standardized “measures”, using sensors and loggers



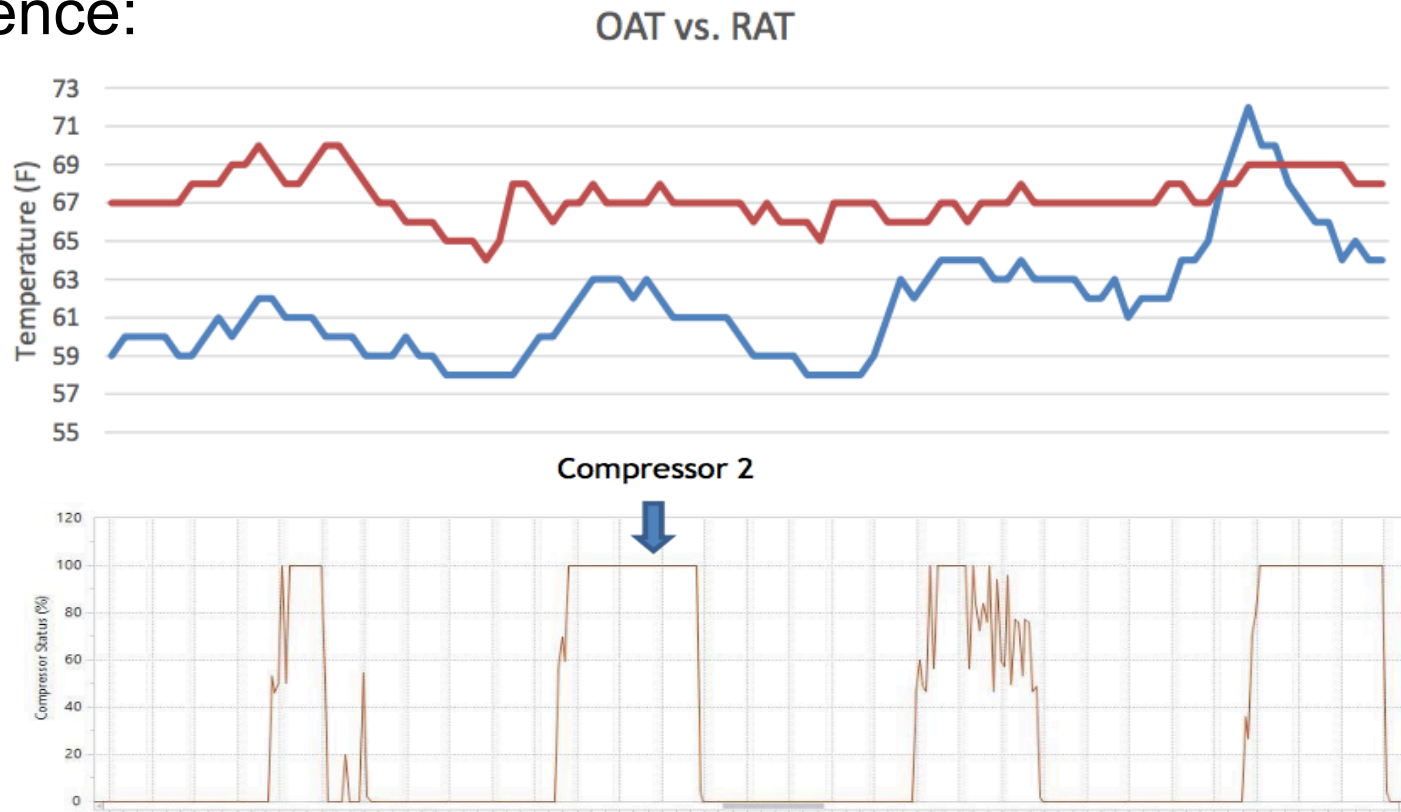
noBAS BRT Process



Recommendation and Evidence

Recommendation: Enable air-side economizing

Evidence:



OAT < RAT and compressor's running

— OAT — RAT

Field Trials

- Finding thus far over ~20 buildings include recommendations regarding:
 - Minimum OA damper position
 - Boiler cycling, stack temp
 - Economizing
 - Condensate temperature
 - Hot water reset monitoring
 - Fan scheduling
 - DAT hunting
 - Compressor cycling
- Trials continue in medium and large buildings

Next Steps

- Develop more measures - include them in trails
- Train operators in process execution
- Automate, automate, automate – the less work for operators, the more likely they are to use it; just give them recommendations and evidence

Conclusions

- The opportunity for low cost / no cost energy efficiency is huge
- Engaging the operator is key for keeping the building in tune
- Operators show great interest in these techniques; they are short on time, but are willing to act on convincing evidence
- The key takeaway is the focus on automation to reach recommendations, akin to AFDD, not more automation of building systems

Bibliography

- Pacific Northwest National Laboratory, “Building Re-tuning Training Guide: Air-Side Economizer Operation, PNNL-SA-86706”

QUESTIONS?

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