

BAS Fiddling

Learning how customers use and replace EMS/BAS systems

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Agenda

Background

Methodology

Findings

Conclusions

Why are Energy Management Systems (EMS)* important?

- Great sources of potential energy savings
 - Useful for non-energy impacts (NEIs)
- Tools that most large/medium-sized facilities already have
- Yet consensus that benefits of EMS are underutilized

*Also commonly called Building Automation Systems (BAS)

- But despite their importance, little research has been done on how EMS systems are used
- Paper covers 2021 Massachusetts study of Industry Standard Practices (ISPs) for EMS

Key research questions

How are EMS systems used?

At what age do EMS systems typically fail?

How much energy can EMS systems save?

What company/building types are more likely to have a failed EMS system?

What percent of EMS systems are performing optimally?

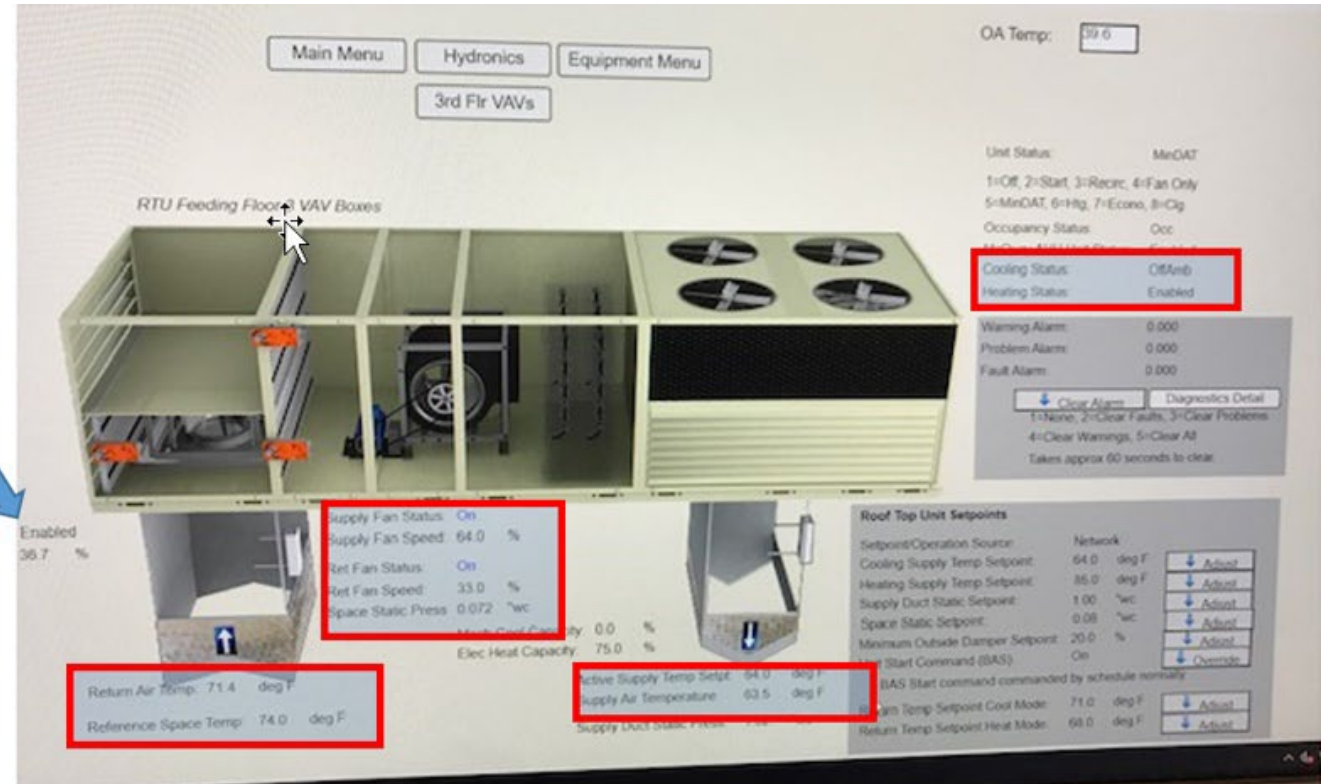
How frequently are EMS systems upgraded/replaced?

Methodology – information sources

17 in-depth
interviews
with
EMS/RCx
vendors

26 in-depth
interviews
with EMS end
users

OA-DPR is not at
minimum 20%
position.

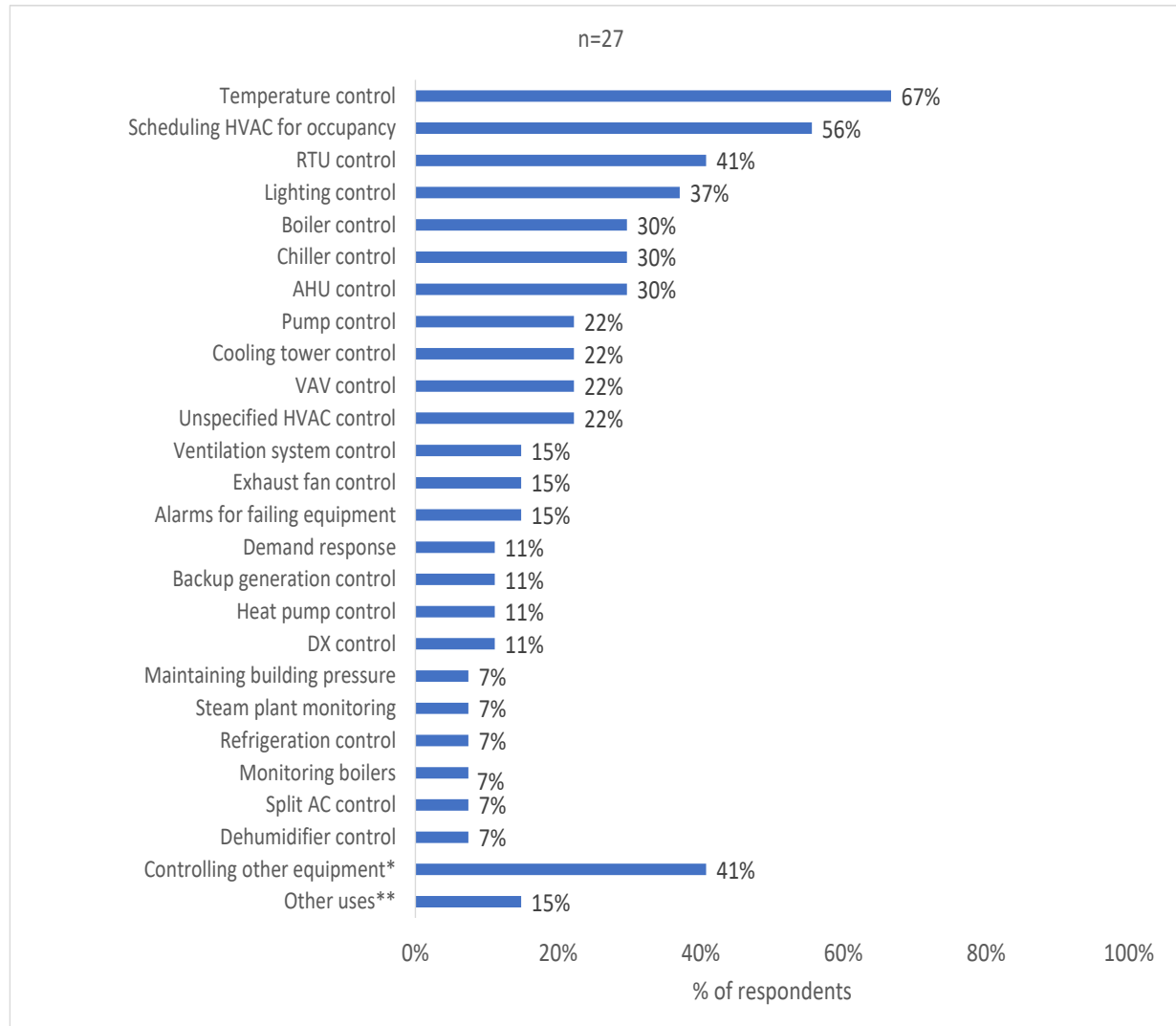


Analysis of EMS frontend screenshots

Methodology – EMS end user sample

End user building type	# of end user interviews completed
Campuses	3
Education	4
Food Sales/Service	2
Lodging	1
Manufacturing/Industrial	5
Office	7
Public Assembly	3
Retail	1
Total	26

What are EMS systems used for?



Temperature control and scheduling HVAC for occupancy are most common uses

But operators use EMS systems to control a wide variety of equipment – > 30 different functions mentioned

7 different functions were reported by at least 30% of the building operators

How much energy can EMS systems save?

n=17

Avg. Energy Savings

14%

12%

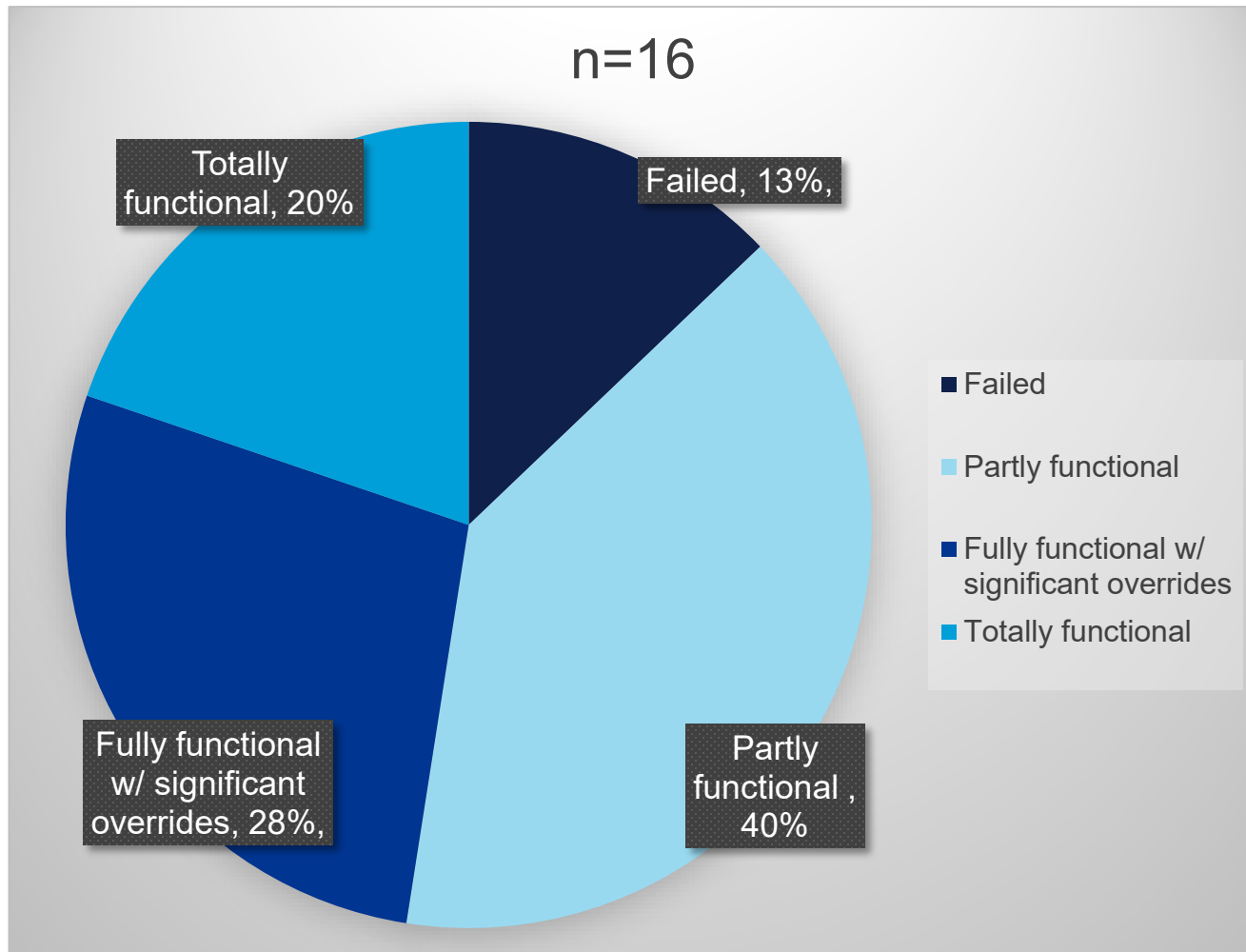
13%

NEW EMS SYSTEMS

EMS SYSTEM UPGRADES

RETROCOMMISSIONING

What percentage of EMS systems are performing optimally?



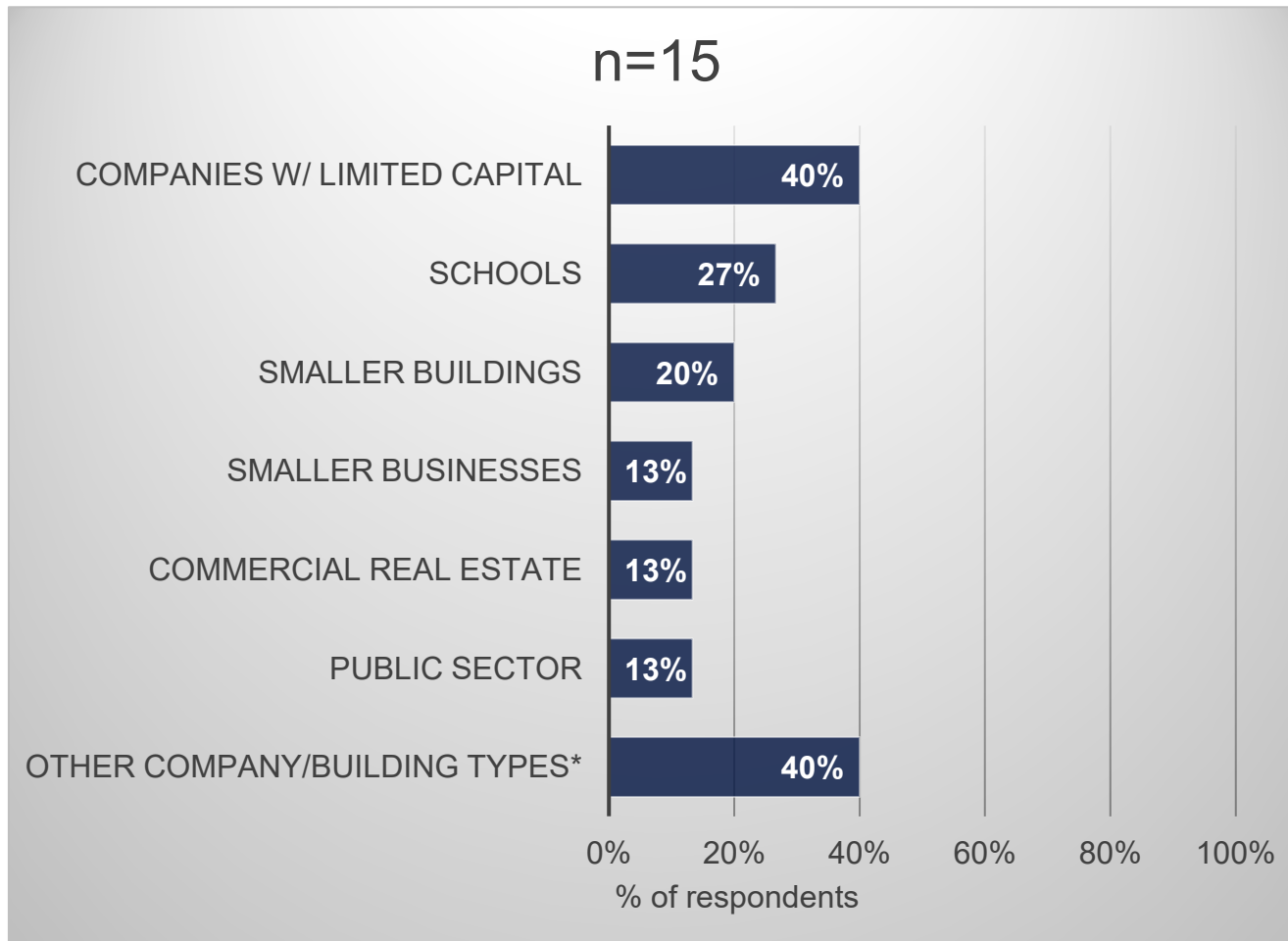
79% of end users reported EMS controls overridden

Due to COVID-19 pandemic, several had overridden controls on outside air intake

Why do operators let systems fail?

- 65% of vendors mentioned cost barriers
- 24% mentioned loss of trained maintenance staff

What company/building types are more likely to have a failed EMS system?



Vendors said avg.
age of failed EMS
system was 15 years

But well-maintained
systems can last
much longer

How frequently are EMS systems upgraded/replaced?

60% of building operators reported a recent EMS upgrade/replacement

- 80% of these were EMS expansions due to new equipment or building expansions
- 40% were software upgrades

64% of building operators considering EMS upgrades/replacements

- But most of these were to accommodate new equipment or building expansions
- 44% of operators concerned about software becoming obsolete

Very few operators had plans for replacement of current system

- Most preferred to “limp along” with older EMS systems (avg. age 13 years)

Conclusions

There are energy savings opportunities with existing EMS systems

- Many old, failed, and poorly functioning systems
- Vendors estimate 12% avg. energy savings for system upgrades, 13% for retrocommissioning

However, challenges to replacing these ailing systems

- Ignorance is bliss – Most operators don't know their systems are suboptimal
- Cost barriers – Many operators choose to “limp along” with old systems
- Evaluation challenges – Baseline EMS operation is often difficult to establish

WHEN TRUST MATTERS

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