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Improving Energy Recovery in Minnesota C&I Buildings

Center for Energy and Environment

Conservation and Applied Research & Development (CARD) Grant

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CEE's Nonprofit Mission

The Center for Energy and Environment (CEE) is a nonprofit organization that promotes energy efficiency to strengthen the economy while improving the environment

- We conduct research and develop programs so that:
 - Businesses operate more efficiently and profitably;
 - Government agencies and nonprofits spend less on facilities and functions;
 - Utilities achieve their energy-efficiency goals at least-cost; and
 - Households save money and improve comfort.

• • • What we do

- Program Design and Delivery
- Lending Center
- Engineering Services
- Innovation Exchange
- Public Policy

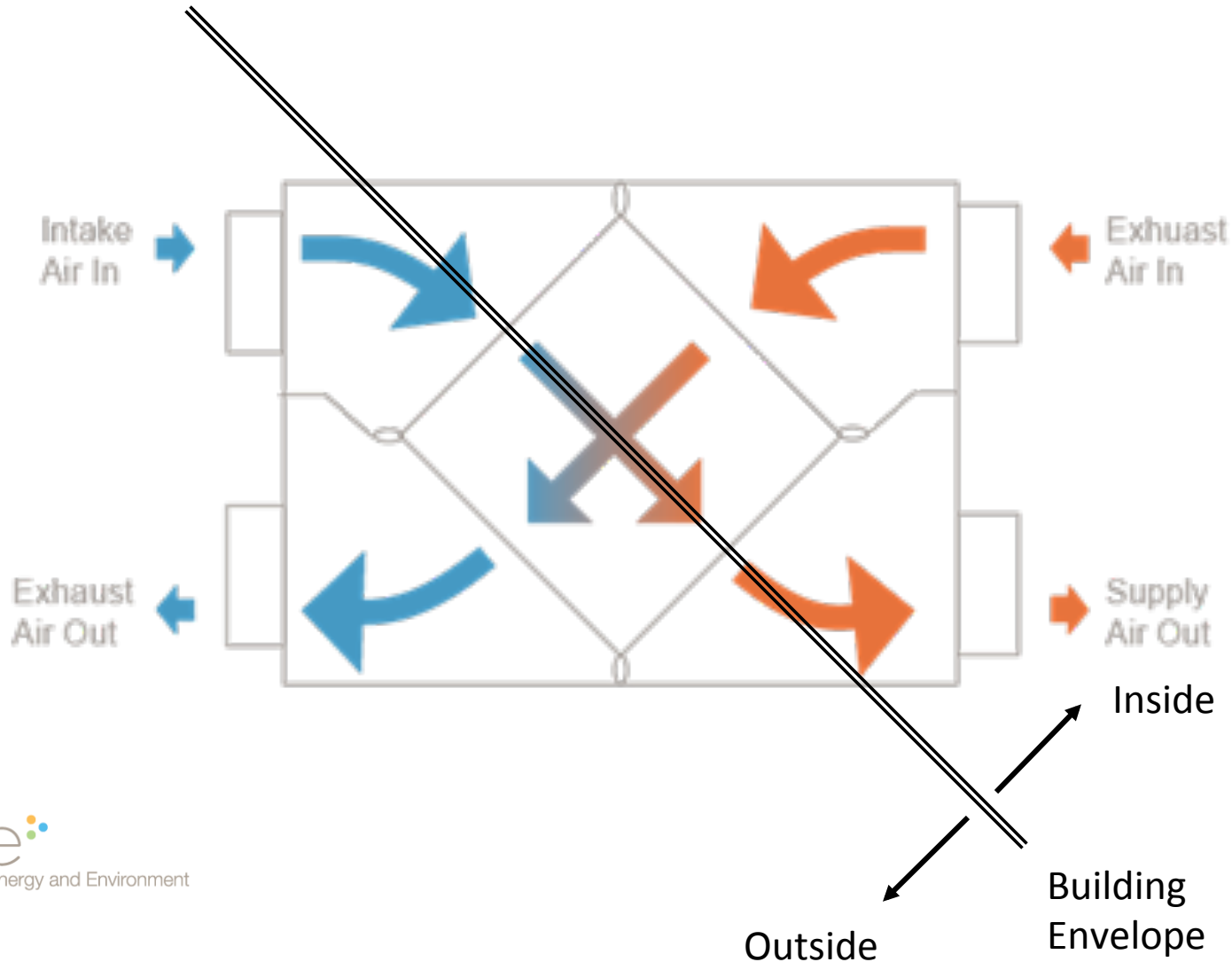


Energy Recovery Agenda

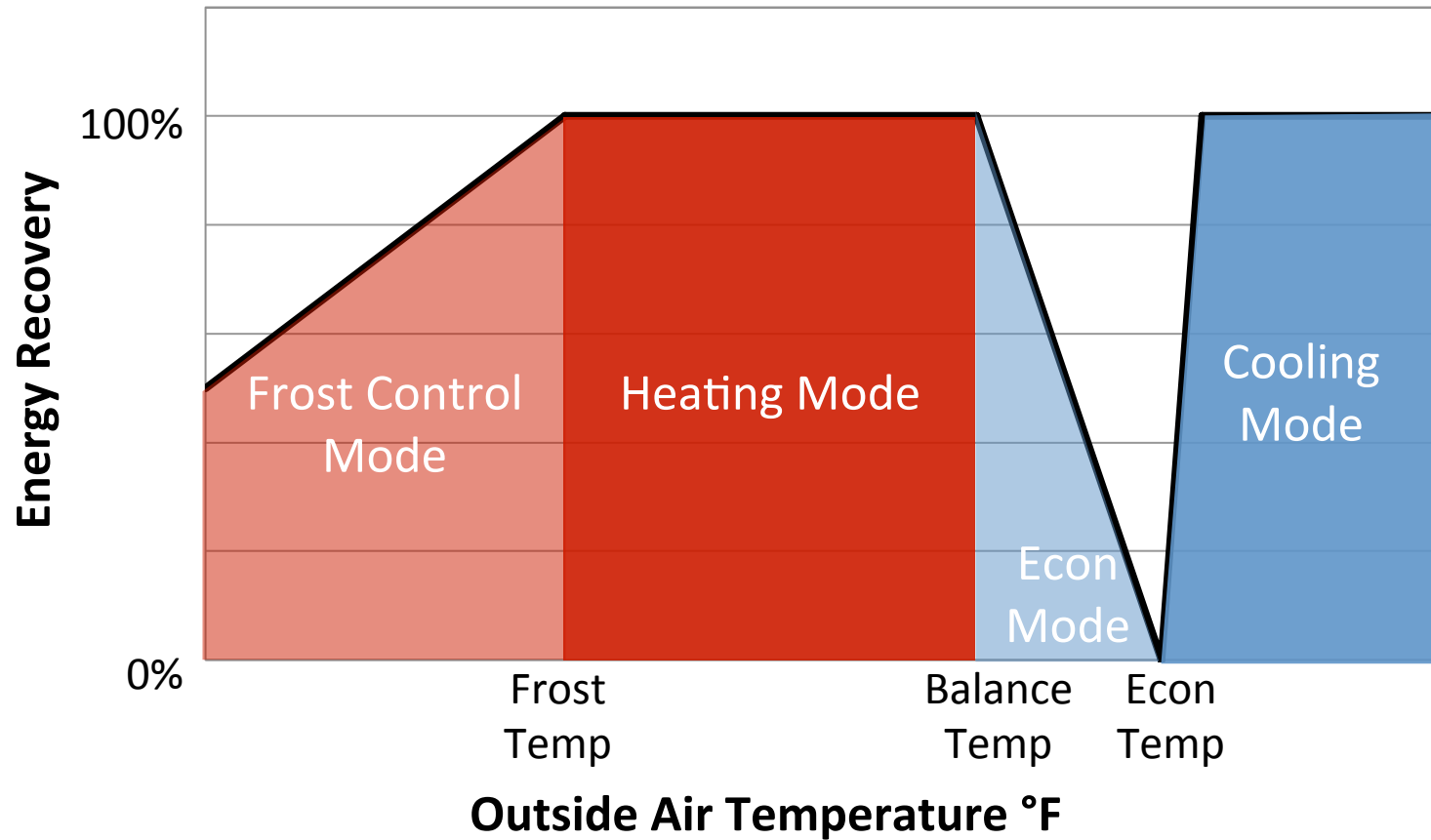
- What is energy recovery?
- Types of energy recovery in MN C&I buildings
- When energy recovery goes wrong
 - Why do ERVs underperform?
 - Common problems with energy recovery systems




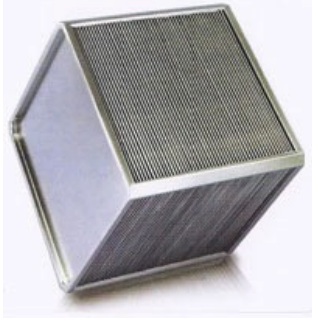


What is Energy Recovery?



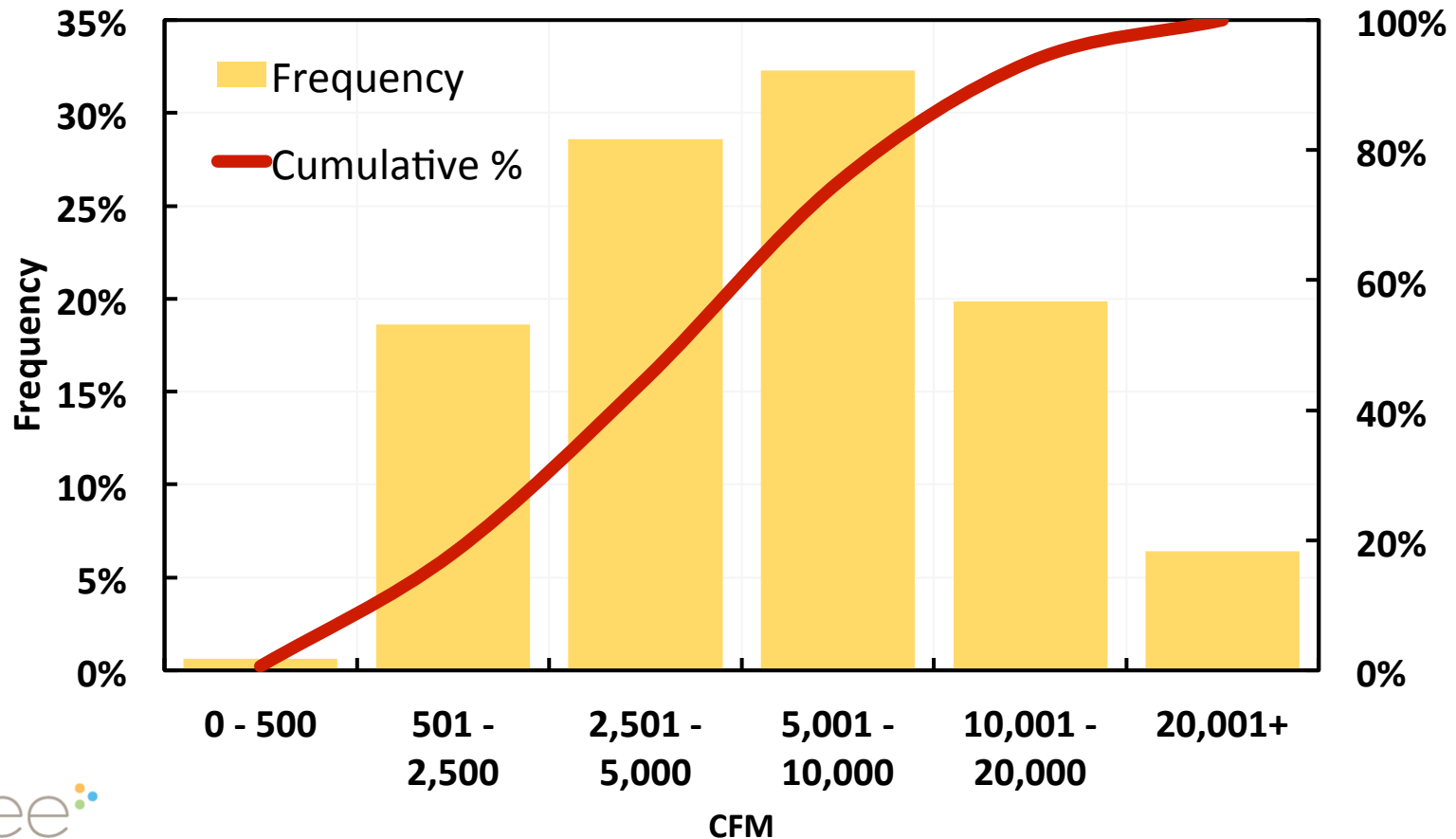
Energy Recovery in Practice



Types of Energy Recovery (MN)

		System	
		Wheel	Plate
Energy Recovery	Heat (sensible)		
	Moisture (latent)		

Size Distribution of C&I ERVs in Minnesota



Energy code (ASHRAE 90.1-2010)

- Energy Recovery requirement based on:

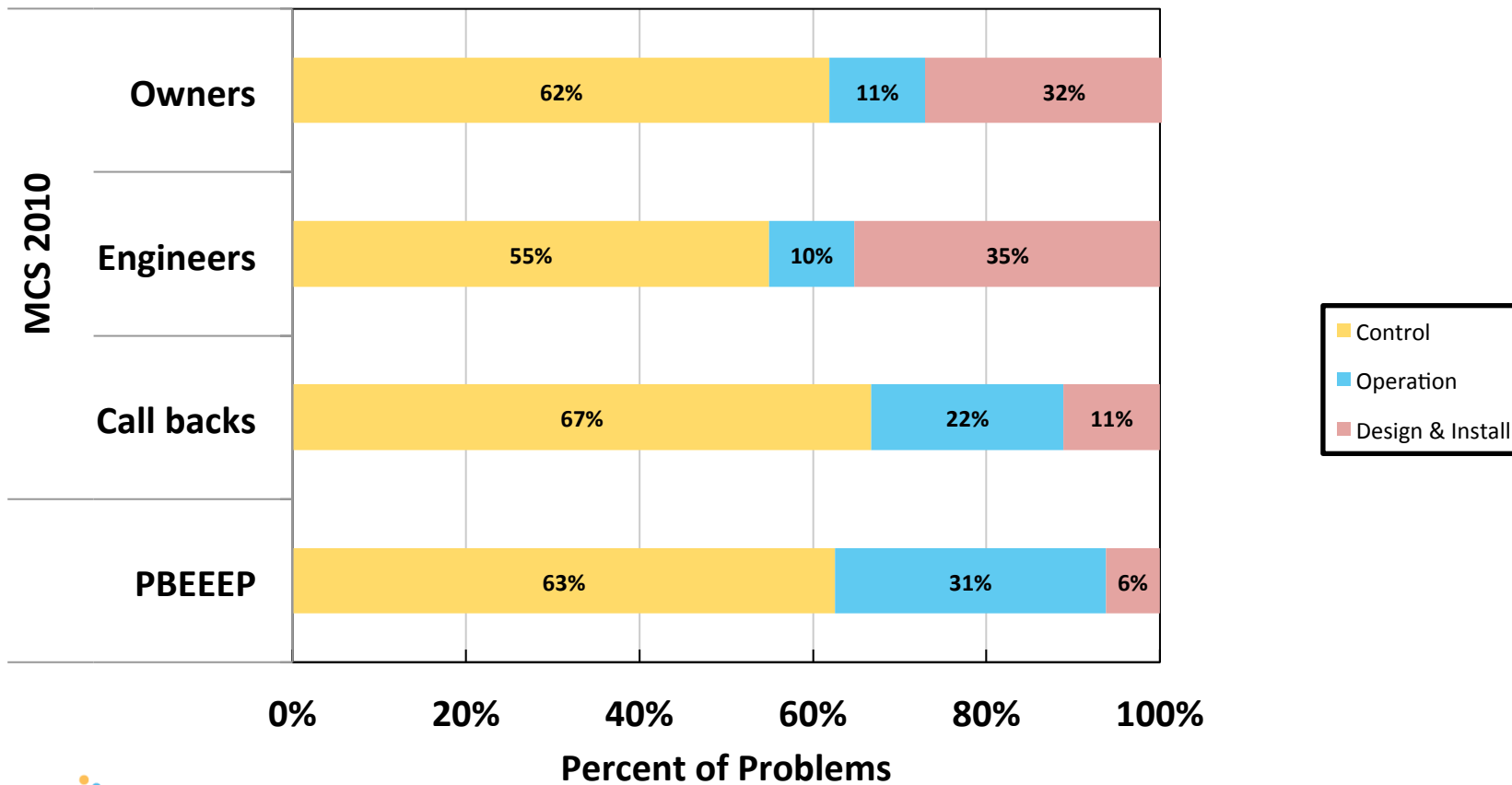
- Climate zone
- Outside air %
- Design outside air flow

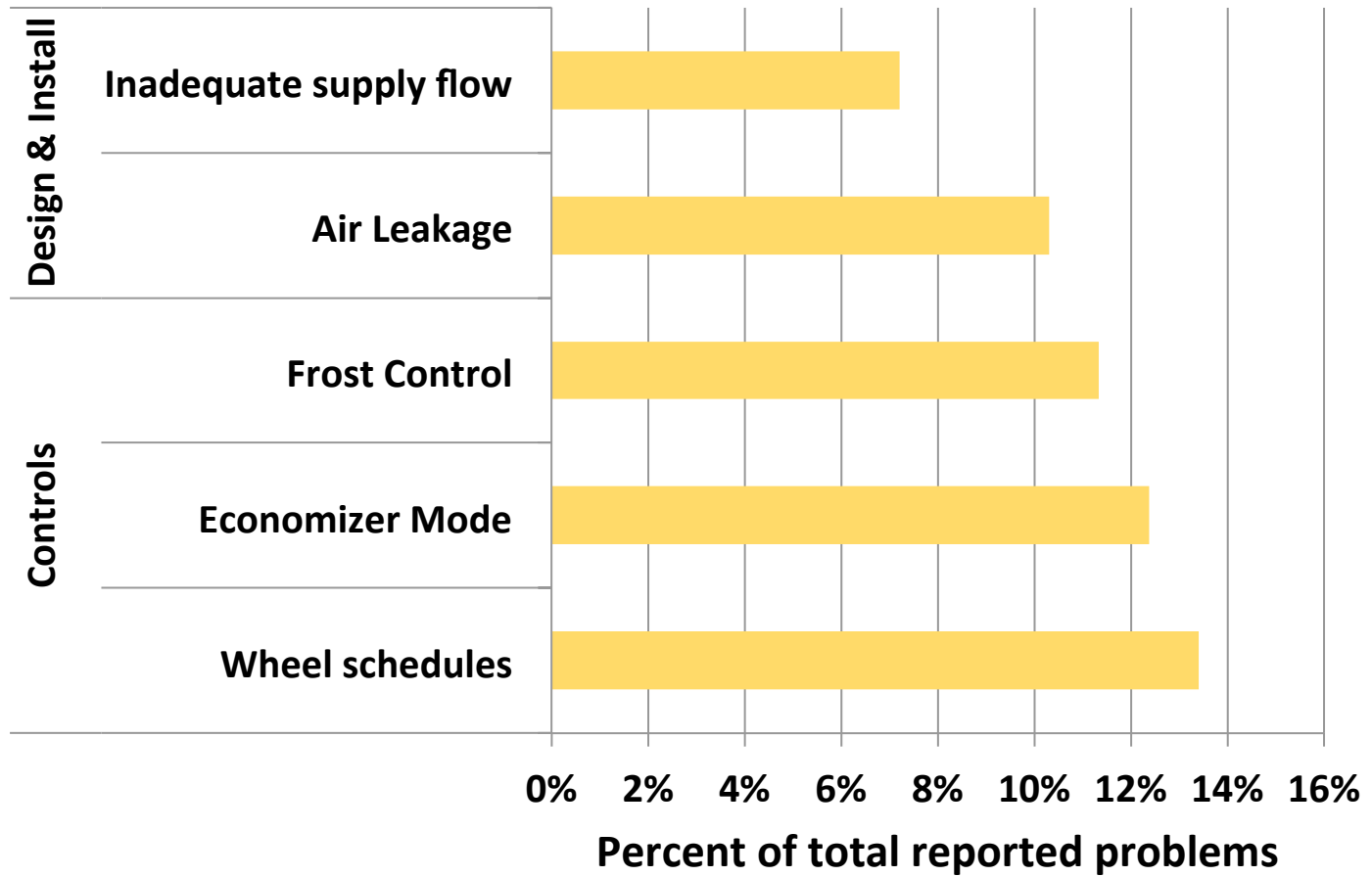
Performance:

- 50% Effectiveness
- Economizer mode

Zone	Rate	<80%	&	≥ 80%
3-5B, 3-4C	NR	≥ 5000		≥ 5000
1-2B, 5		≥ 5000	≥ 1000	≥ 5000
6B	NR	≥ 500	≥ 500	≥ 4500
1-6A	NR	≥ 5500	≥ 4500	≥ 3500
7, 8	NR	≥ 2500	≥ 1000	> 0

Pitfalls of Energy Recovery









In conclusion

- On paper ERVs make a lot of sense
 - Save energy
 - Cost effective
- In practice a lot must go right for energy recovery to work
 - Design engineers & Mfgs have to be realistic with designs
 - Mech. & Controls contractors need to follow specification and pushback on engineers for complete specification
 - Owners & operators need to understand functionality
 - Diagnose incorrect operation
 - Understand necessity and practice req. maintenance

THANK
you!

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