Energy Intensity of Utah Water Utilities

Results of a 2015 Study

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IntermountainSection

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Disclaimer

The results of this study should be cited with caution. Being a volunteer effort and the first of its kind, there is some uncertainty about the provenance and quality of the data, as well as in the computational methods used. Indeed, one major benefit of the study was its identification of the many data concerns that should be resolved in further work.

Still, the results provide a decent snapshot of water and energy issues in the state to promote awareness, discussion, and further inquiry.

This file contains the visual aids used during the original 45-minute presentation and unfortunately lacks the accompanying oral explanation. Comments and questions are therefore welcomed. Thank you for your interest.

Why Care about Energy?

"Energy as a percent of operating costs for drinking water systems **can reach 40 percent** and is expected to increase 20 percent in the next 15 years due to population growth and tightening drinking water regulations."

"Energy [represents] the **largest controllable cost** of providing water and wastewater services."

"Drinking water and wastewater plants are typically the **largest energy consumers of municipal governments**, accounting for 30–40 percent of total energy consumed."

"Improving energy efficiency is at the core of measures to **reduce operational cost** at water and wastewater utilities."

Sources: EPA, "Energy Efficiency for Water and Wastewater Utilities"; World Bank, "A Primer on Energy Efficiency for Municipal Water and Wastewater Utilities"

NASA, "The Blue Marble" (West)

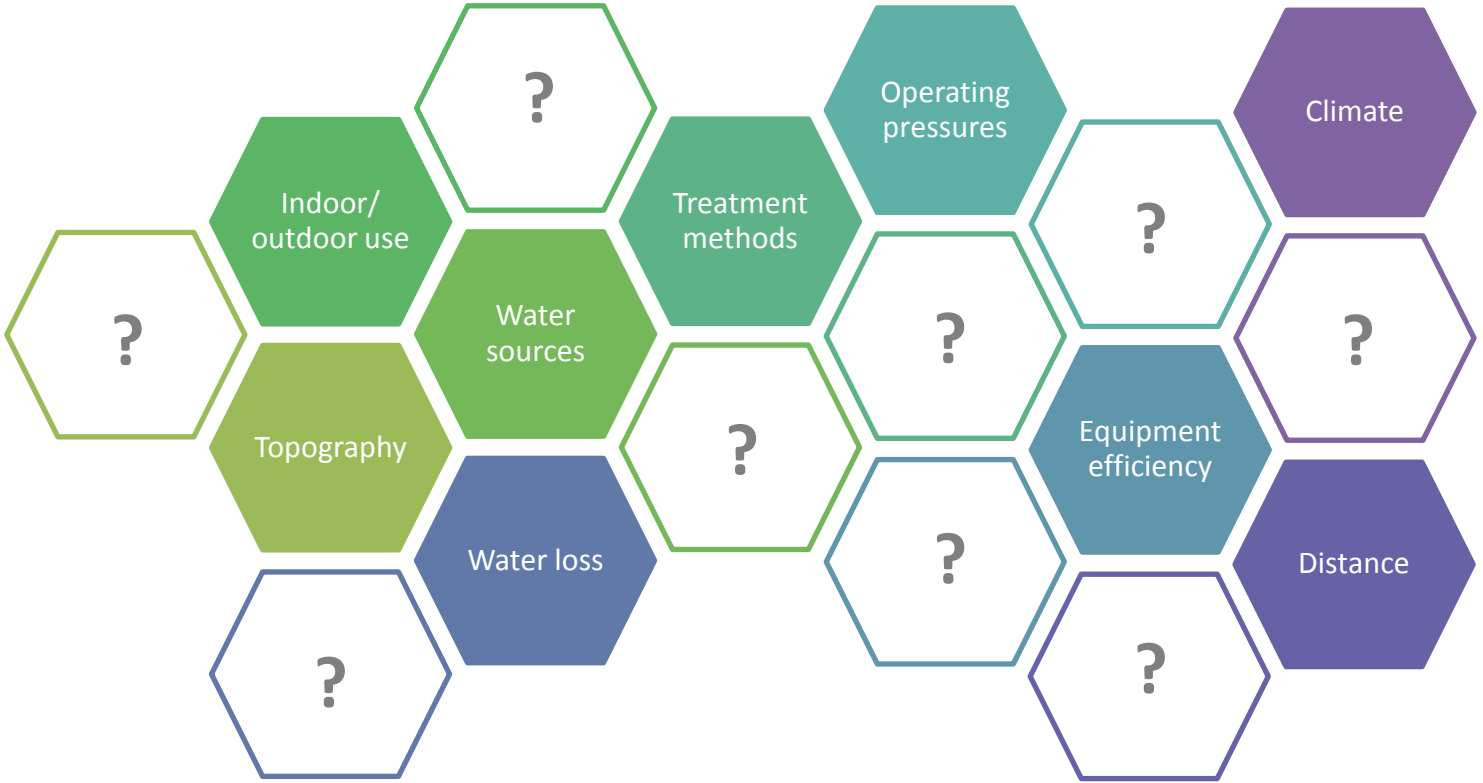
Energy Intensity

- A measure of unit energy consumption

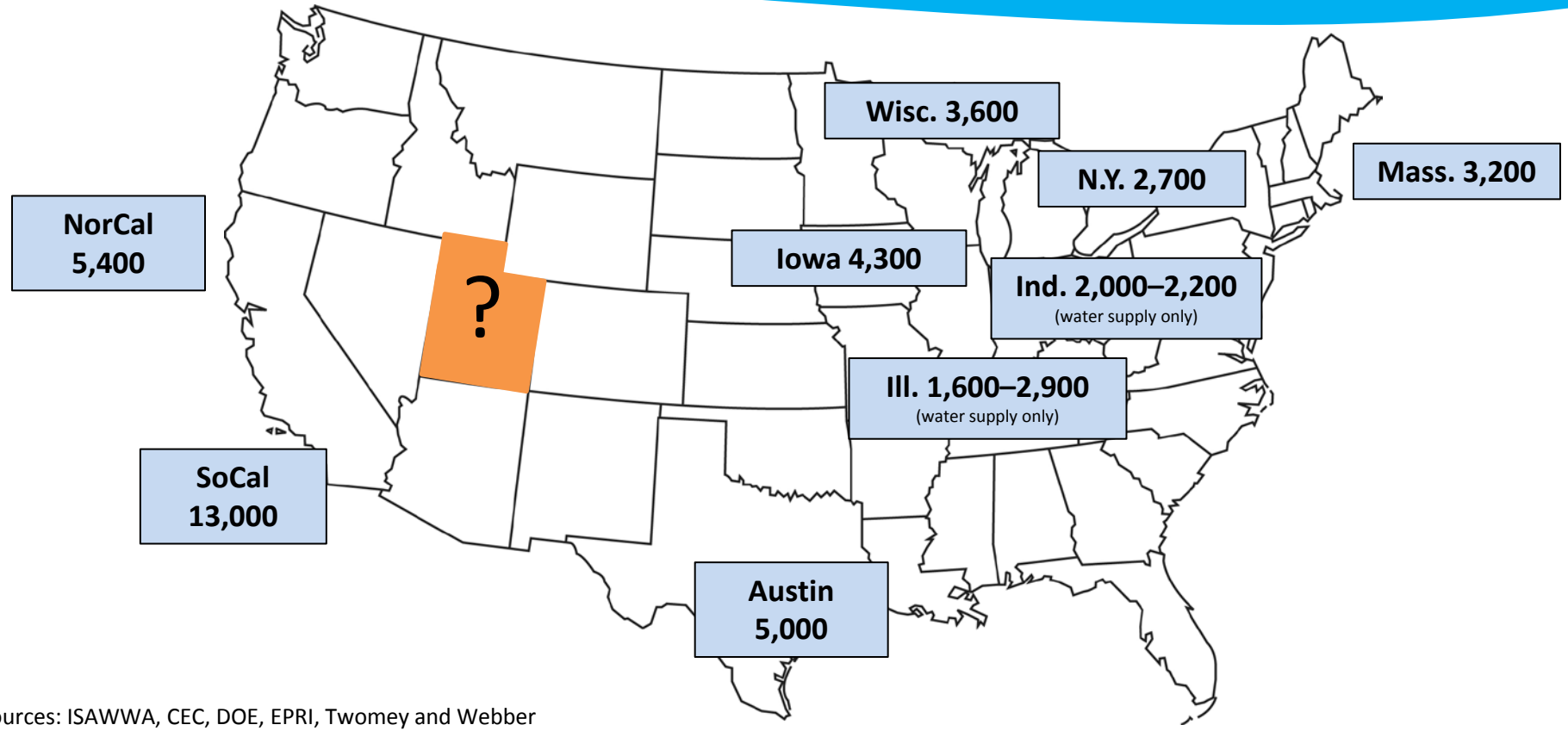
- Express energy as electricity and normalize by water volume: **kWh/MG**

- Depends on several factors

Factors Influencing Energy Intensity



United States (kWh/MG)



Sources: ISAWWA, CEC, DOE, EPRI, Twomey and Webber

The Study

Calvin Clark
Cody Hamblin
Sam Mineer
Trevor Jones
Stephen Duncan
Jim Nelson (faculty)

BYU Civil Engineering Capstone

Hansen, Allen & Luce

Gordon Jones
Steve Jones
Rob Sowby

27 Water Utilities

11 Wastewater Utilities

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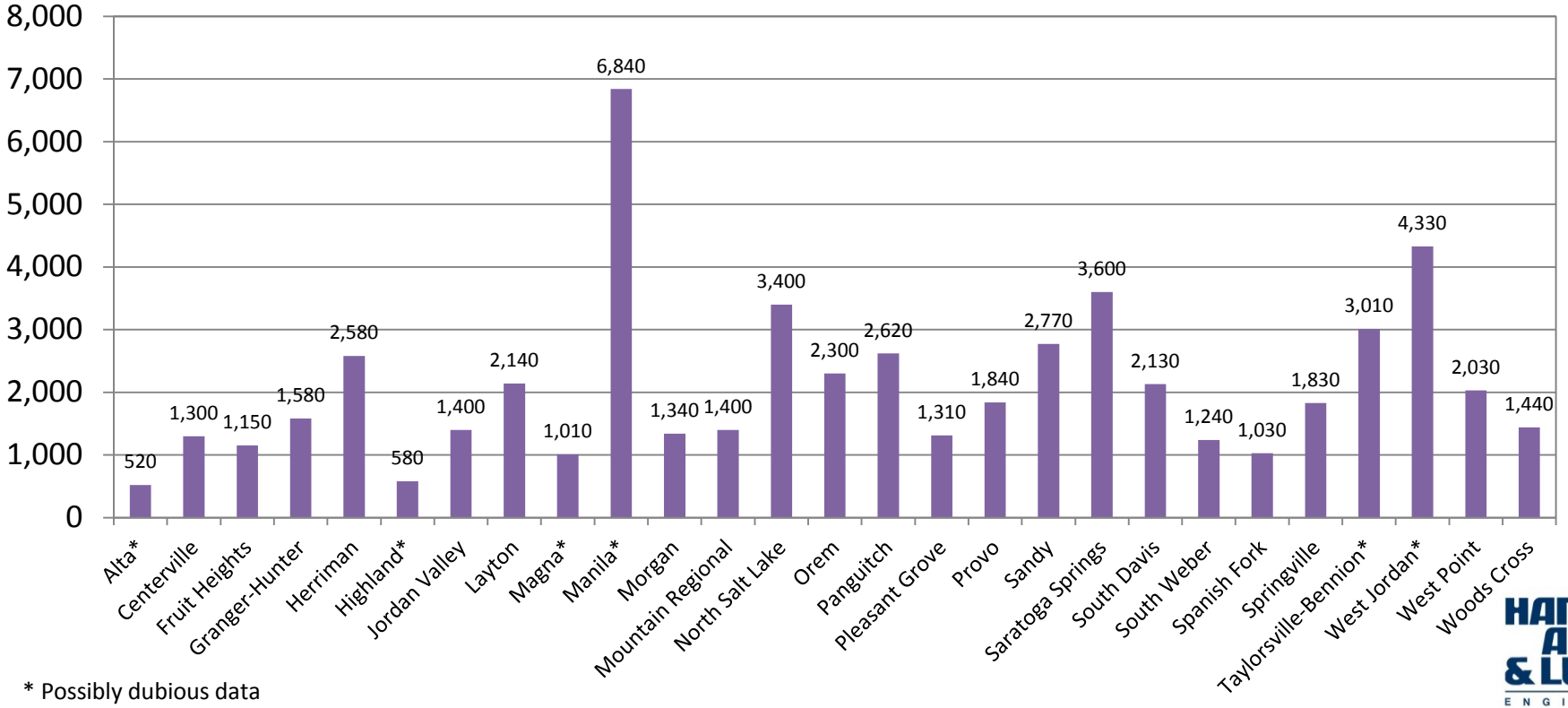
Water—Average 1,500 kWh/MG



* Possibly dubious data

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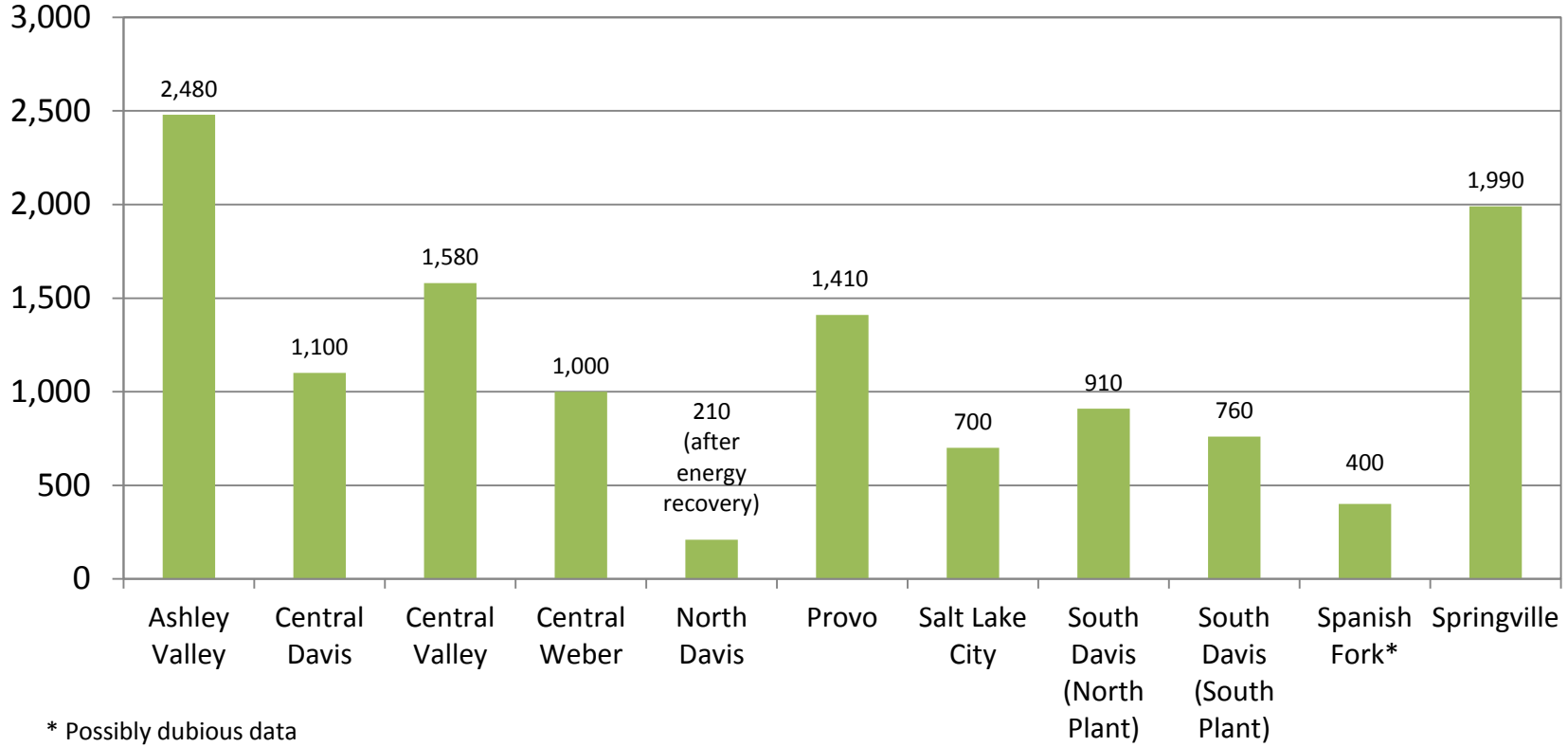
Wastewater—Average 1,100 kWh/MG



* Possibly dubious data

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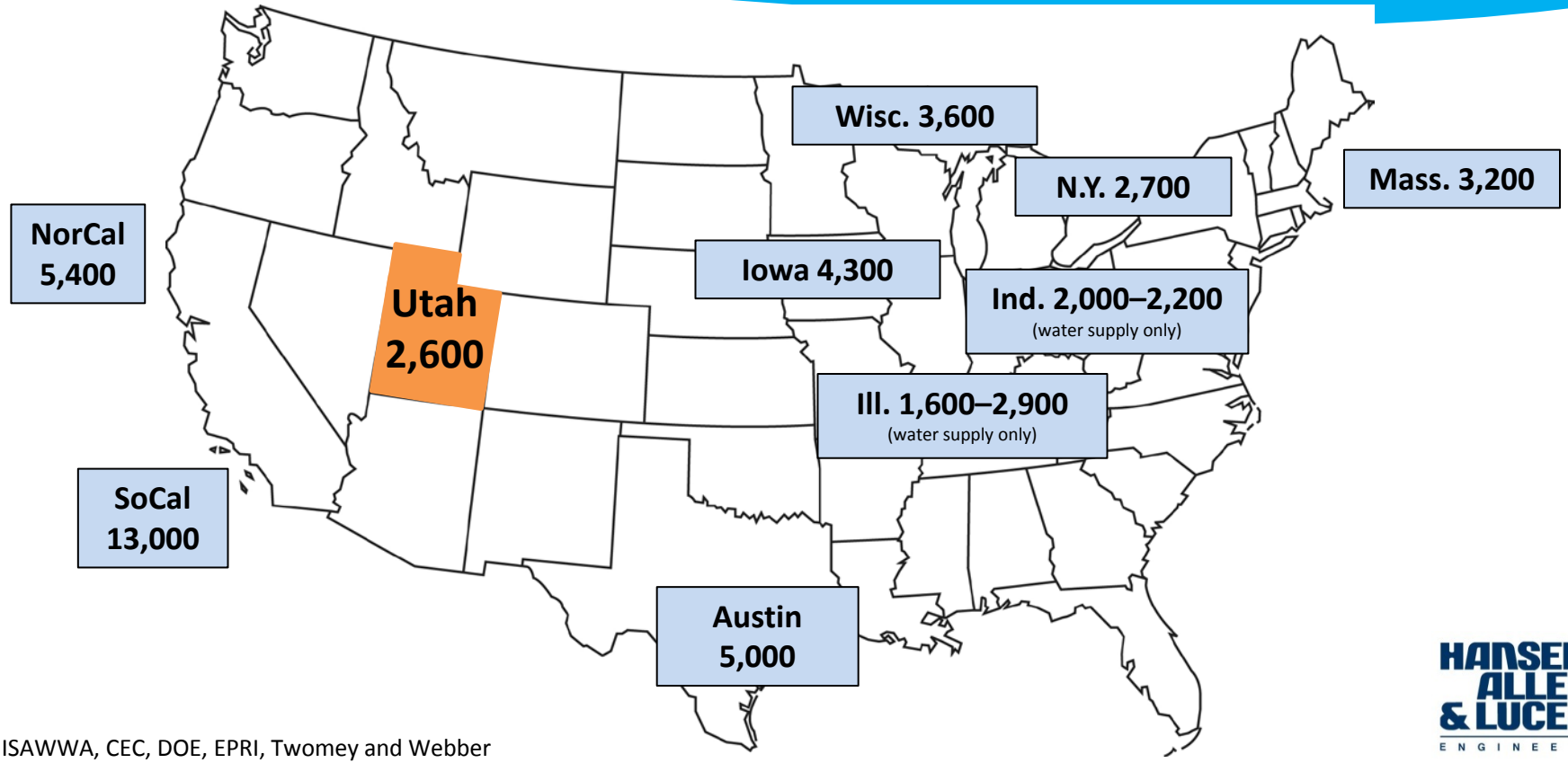
Water + Wastewater Energy Intensity (kWh/MG)



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Data Concerns

- Public data vs. self-reporting
- Energy and price assumptions
- Wholesale effects
- Energy recovery effects
- Water produced vs. delivered
- Seasonal variation
- Unmetered water use
- Secondary water effects

Conclusions

- Utah compares favorably
- Reliable data needed
- Energy Aware = Energy Efficient
- Further efficiency possible

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Toward Efficiency

- 5%–50% savings possible
- Any size, any type
- Cost-effective; short payback
- Sustainability opportunity
- Synergies, not tradeoffs

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