Time for a “Tune up” of your buildings HVAC systems?

Hello!

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Energy Logix...

Mission Critical HVAC contractor for industrial and commercial applications.

“From central plants to thermostats and everything in-between.”

Chillers

Packaged Units

Boilers

Generators

Facility Solutions

Preventive Maintenance

1. Retrocommissioning –vs- Recommissioning

Retro-commissioning

- Evaluating HVAC system
- Identifying best sequence and pertinent design for the use of the building
- Re-Engineering based on actual usage
- Goal is to improve performance and maximize life-cycles of equipment
- Much more involved

Recommissioning

- Bringing it back to original design criteria
- Follows commissioning report.
- Useful if no changes have been made to design of building.
- Pushing the reset button

Questions on Retrocommissioning or Recommissioning-

- Why?
- Who?
- When?
- How?

Retrocommissioning is a process that seeks to improve how a building's equipment and systems function together. Depending on the age of the building, retrocommissioning can often resolve problems that occurred during design and construction, or address problems that have developed throughout the building's life. Retrocommissioning involves a total building envelope evaluation to improve energy efficiency.

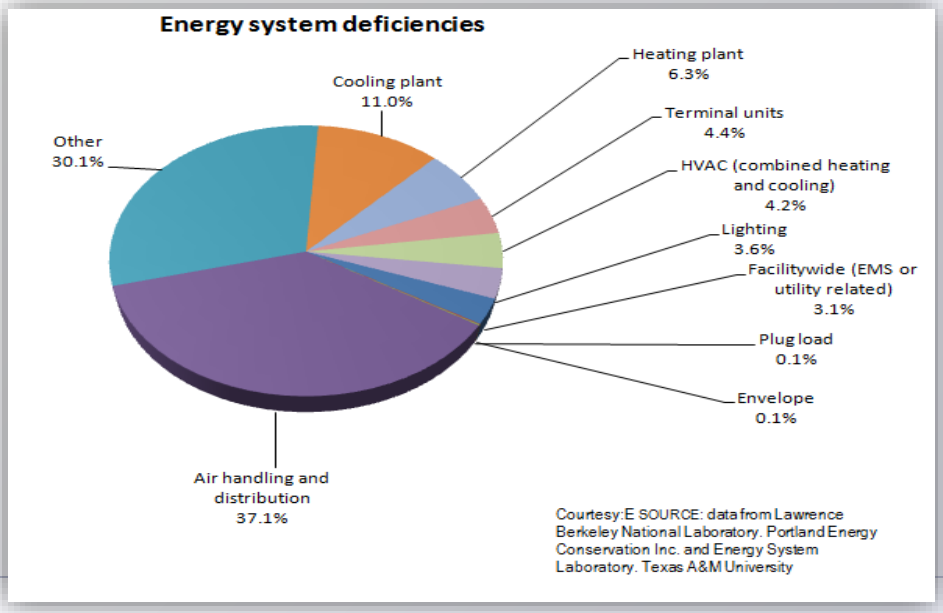
Why?

Going beyond the obvious

- Customer / Tenant satisfaction through improved comfort
- Reduction in unscheduled shutdowns and repairs
- Improved building performance and indoor air quality

Why?

63% of energy deficiencies are related to HVAC



Why?

- Retrocommissioning an existing building has shown a median cost of $0.27 per sqft.
- Energy Savings >15%
- Simple payback in as little as 0.7 years (255.5 days)

Who and When?

- Whenever significant changes occur in building occupancy, space utilization, equipment configuration or maintenance practices.
- When energy-use trending reveals an increase over time
- An older building where no commissioning data exists
- The more complex the building, the more important the RCx process.

How?

Retrocommissioning is a 4-step process

How?

- Building Assessment
- Gather Data (Original Plans/Specs, test and balance reports, utility history, maintenance and repairs)

More homework upfront saves time and money

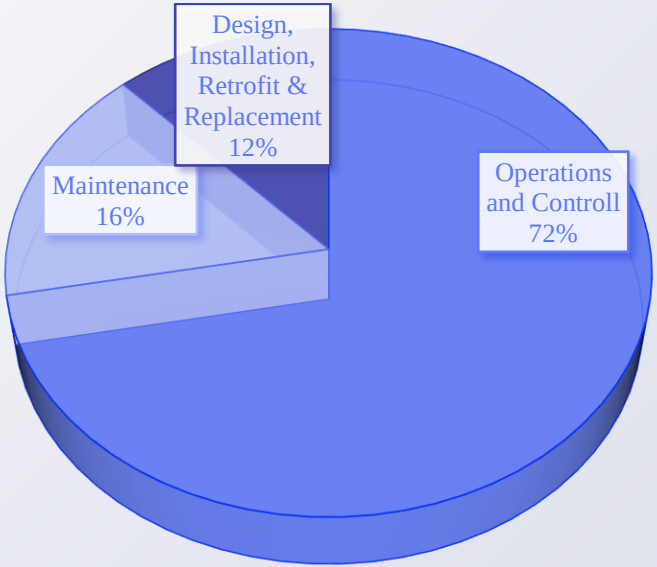


*Figure data source: Mills, E. “Building Commissioning A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions”

How?

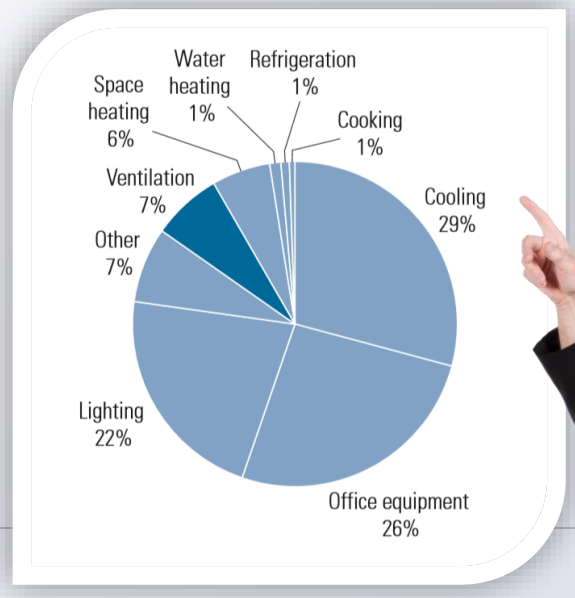
Understand the building Energy Use Profile and identify the largest energy consuming equipment

- Obtain copies of the most recent utility bills for the building, preferably going back at least 2 years.
- Determine the facilities consumption and usage based on the building's current needs, comparing to facilities of similar size and use.
- Talk about the building’s future, are the needs expected to change?

How?

Understand the building Energy Use Profile and identify the largest energy consuming equipment

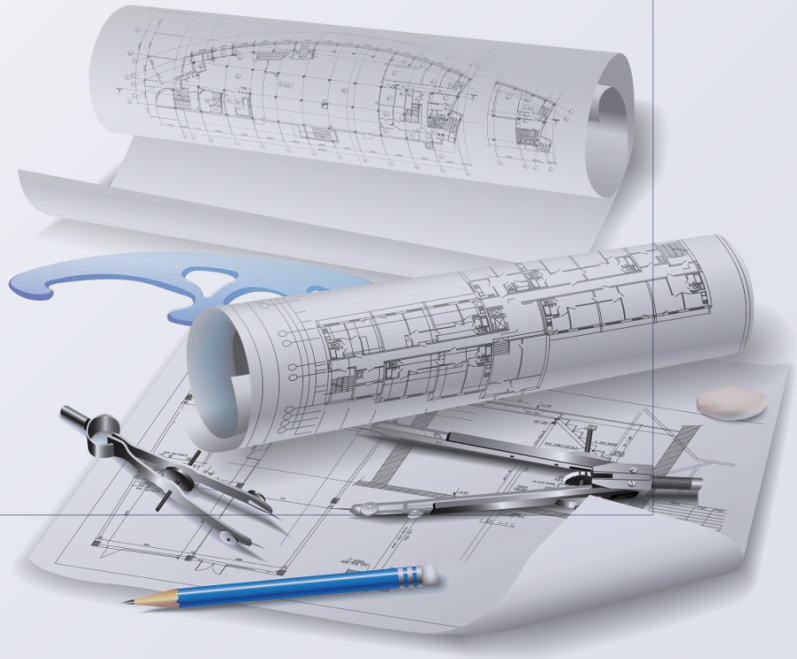
Cooling, Heating and Ventilation make up 44% of your building's energy consumption



How?

Understand the building equipment and systems

- Review documents, such as “as-built drawings”, plans/specs, controls sequence of operations, equipment schedules, etc..
- Talk to the people that matter, to obtain information about the HVAC systems history and current condition
- Perform a building walk through and develop an informal assessment



Common Tasks in Controls RCx

- Optimize zone temperature requirements
- Verify actual zone conditions vs design zone conditions
- Review schedule of operations for suitable improvement

Sample findings after conducting these tasks:

- Controls sequence was functioning incorrectly
- Valves, dampers, etc.. Were inoperable, in bypass, or manually manipulated.

Common Tasks in central plant RCx

- Evaluate chilled water set point, flow GPM and tune with requirements
- Evaluate condition of Chillers, pumps, and cooling tower by comparing design parameters with actual parameters
- Check pressure drops against evaporator, condenser & pumps for suitable improvements
- Check for short cycling in water or air circuits

Sample findings after conducting these tasks:

- Variable Frequency Drives that operate at unnecessarily high speed or that operate at a constant speed with a variable load. Operating in bypass.

Common Tasks in air side RCx

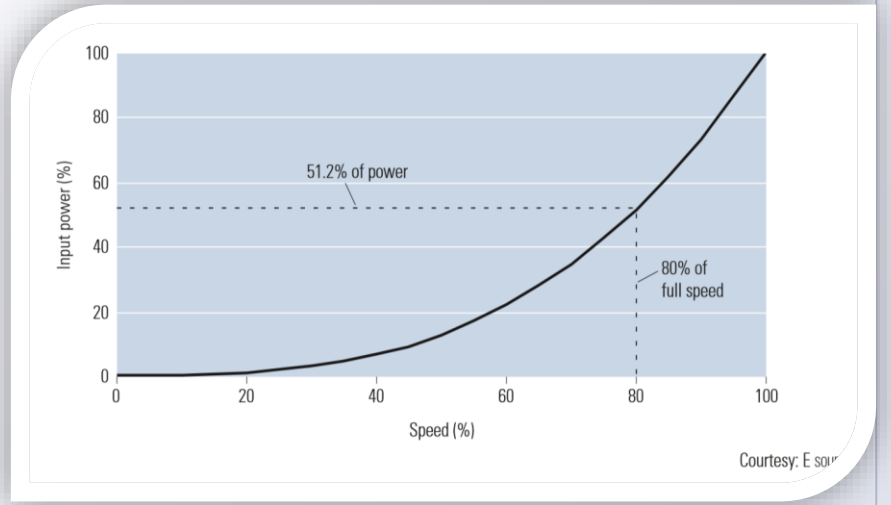
- Evaluate AHU's including Maintenance components and valves
- Verify design vs actual operating conditions on AHU/VAV/FCU
- Evaluate all air side VFD's
- Check all FCU's including valves, actuators comparing design to actual.
- Check operation of variable air volume (VAV's)
- Check duct layout, VAV, Diffusers, grills condition/location
- Identify hot/cold spots
- Check return air path, fresh air provided and duct insulation condition
- Static pressure drops verses design

Sample findings after conducting these tasks:

- Dampers and valves are not functioning properly
- Impacted coils and leaking ductwork.

Common Tasks in Air Side RCx

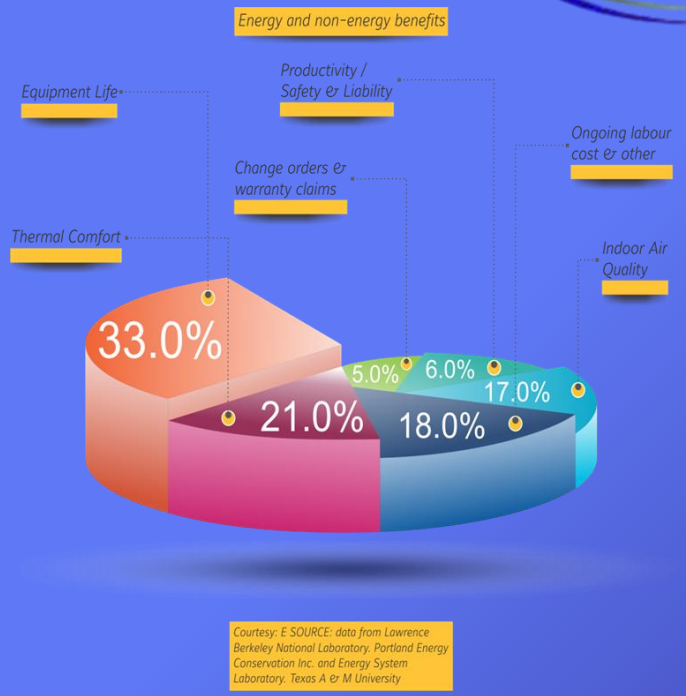
Fan power Input vs Speed:
The load on a fan motor increases as the cube of its speed. Therefore, using a variable frequency drive (VFD) to reduce speed to 80 percent of full speed reduces power consumption to > 51% of its original load. The VFD itself does consume some power, so careful assessment is necessary for any application where average fan speed will exceed 90 percent of full speed



Benefits

RCx benefits many stakeholders of the building

- **Building owners-** Reduced operating costs, better equipment performance, open budget for other needs, increase building value
- **Building Occupants-** More comfortable operating environment
- **Building Managers-** Fewer occupant complaints, healthy building systems
- RCx not only helps to improve building energy performance, but can improve occupancy levels, lease rates, and sales price relative to less-efficient properties
- Brand value of the building increases



Cost benefit analysis of conducting RCx

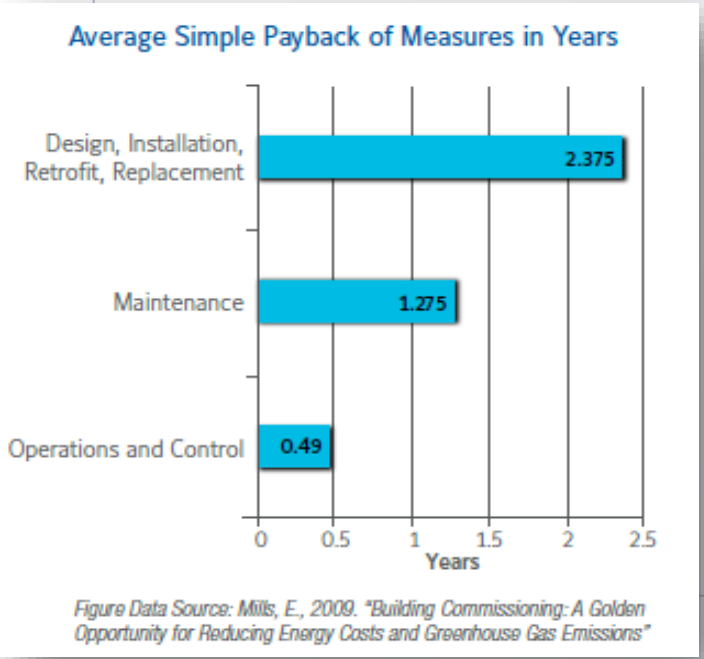
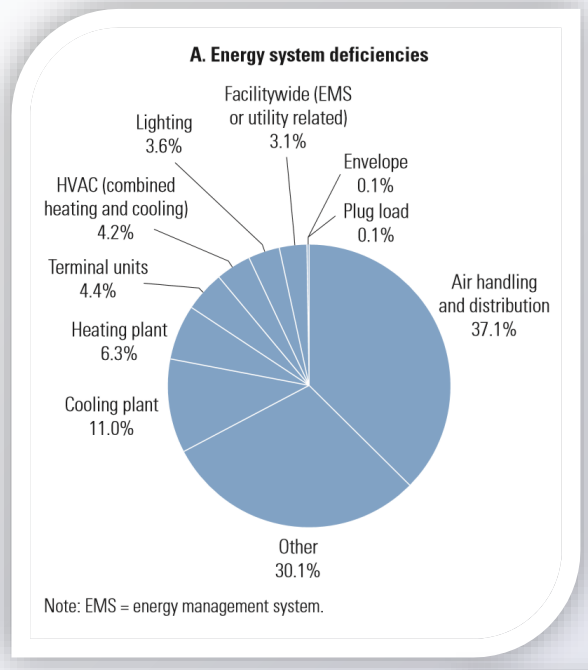


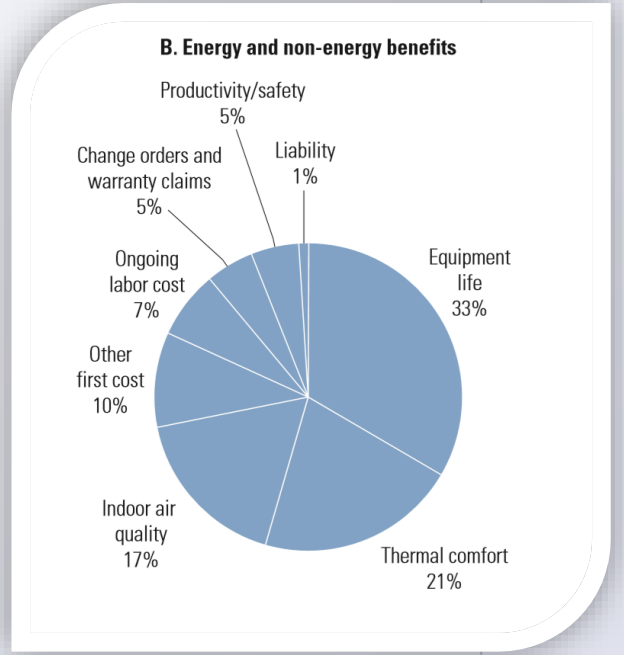
Figure Data Source: Mills, E., 2009. "Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions"

- Overall energy savings can reach 15-20%
- Payback period ranges from 0.2 to 2.1 years

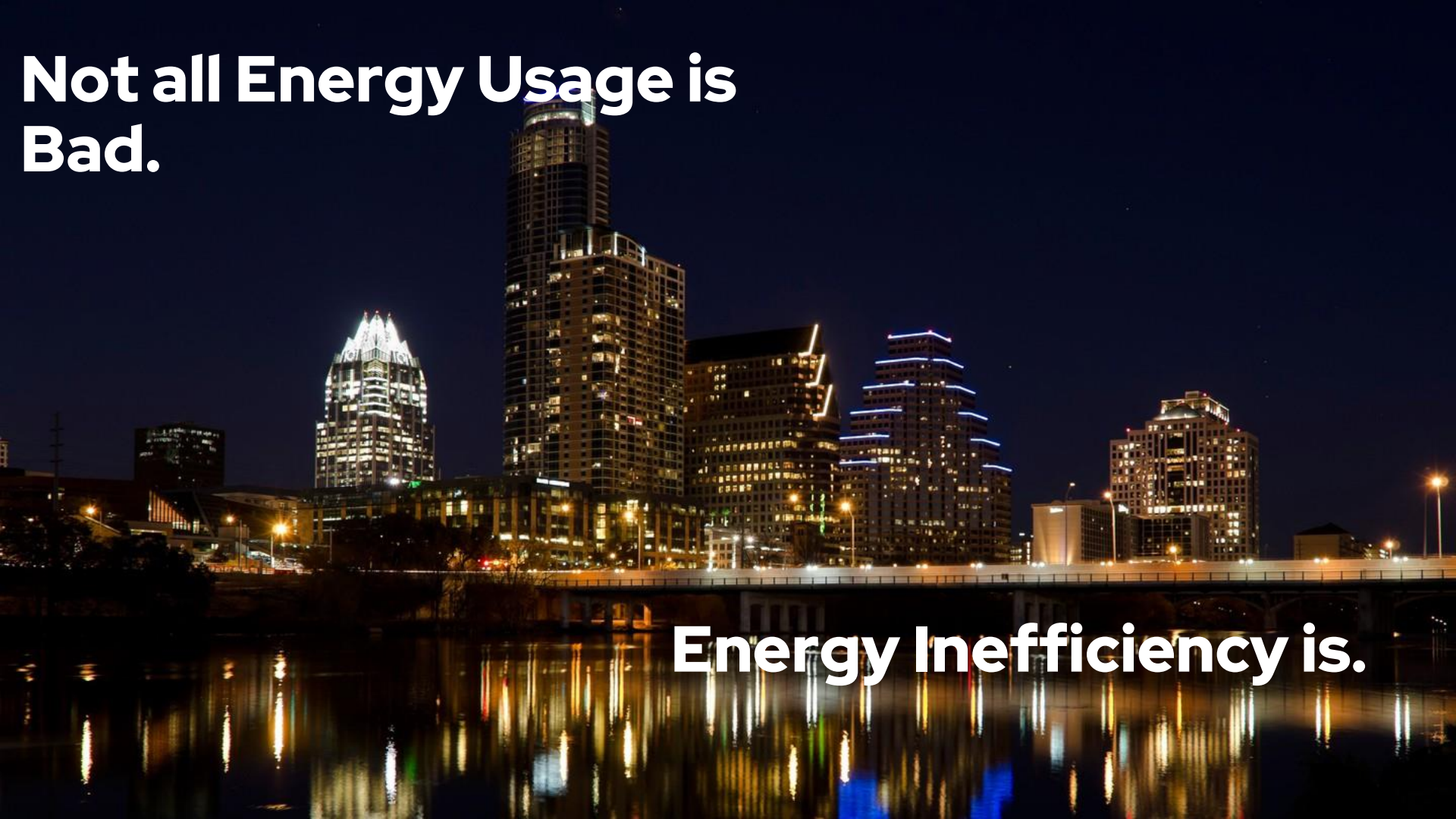
Solutions in Operations and Controls give faster ROI as compared to the others

RCx Results





Courtesy: E SOURCE; data from Lawrence Berkeley National Laboratory, Portland Energy Conservation Inc., and Energy Systems Laboratory, Texas A&M University


Not all Energy Usage is Bad.
Energy Inefficiency is.

Thanks!

Any questions?

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