

Taking Charge of Your Energy Bills

**Lindsay Audin, president
Energywiz, Inc.**

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What Is Energywiz?

A consulting firm serving the competitive energy market: large end users, power marketers, government agencies, consultants, & trade organizations.



Our customers have included Merrill Lynch, St. John's Univ., Enron, Consumers Union, E-Source, US EPA, govts. of New Zealand and Australia, McGraw-Hill Energy, and others.

We help our clients realize the best from both energy efficiency and commodity options.

Problems And Demands

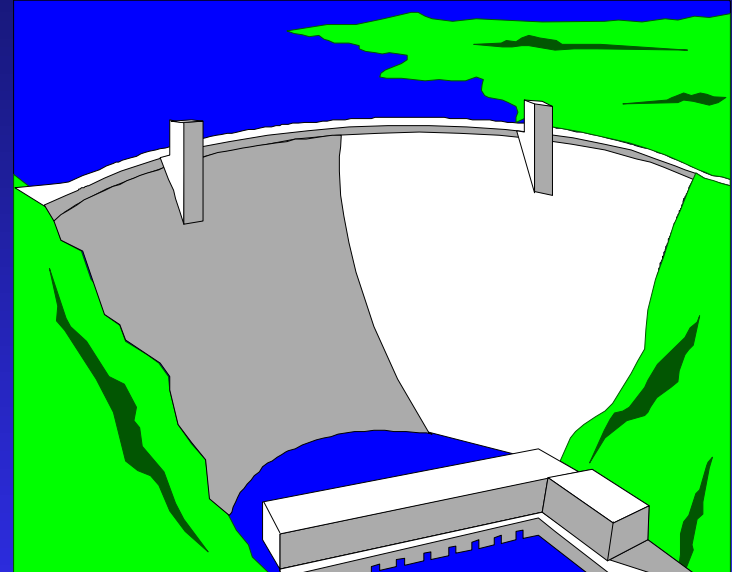
Everyday energy customers are confronted by new challenges:

- ❑ budgetary constraints
- ❑ environmental issues
- ❑ new technology options
- ❑ new energy providers (e.g. deregulation)
- ❑ shifting supply/demand patterns (e.g., drought, load growth) that impact price



Dependence on Hydropower

- ❑ excellent source, but limited in capacity
- ❑ sensitive to weather
- ❑ low cost may create false expectations that power will always remain cheap
- ❑ building/HVAC design and local industry is often shaped by such pricing

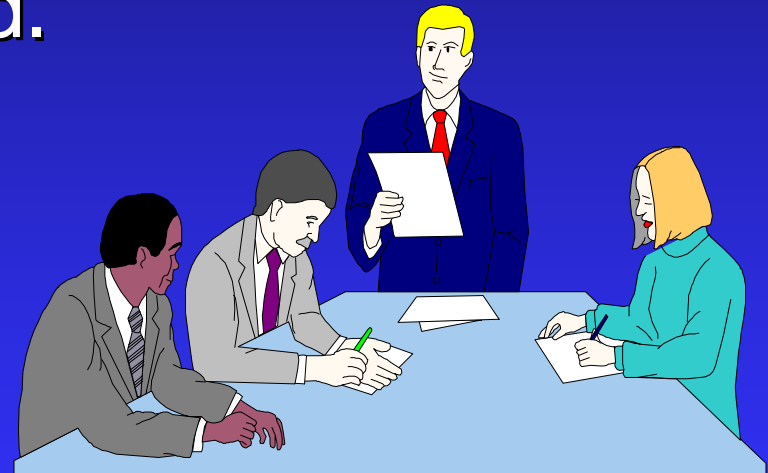


Get Firm's "Act" Together

Controlling energy costs involves more than just facility managers. Form a task group focused on that goal. Find the authority and resources for it to succeed.

Secure "buy in" by upper management.

Develop an energy master plan; consultants and engineers can help create such plans.



Upgrade Your Facility's Specs

One of that group's first tasks is to start designing for the future, instead of the past.

Set standards for all new energy-related systems, whether or not part of an upgrade.

Performance first, prescriptive second: be open to new ideas.

Build better O&M into designs (e.g., lamp choices, metering, documentation, control points).



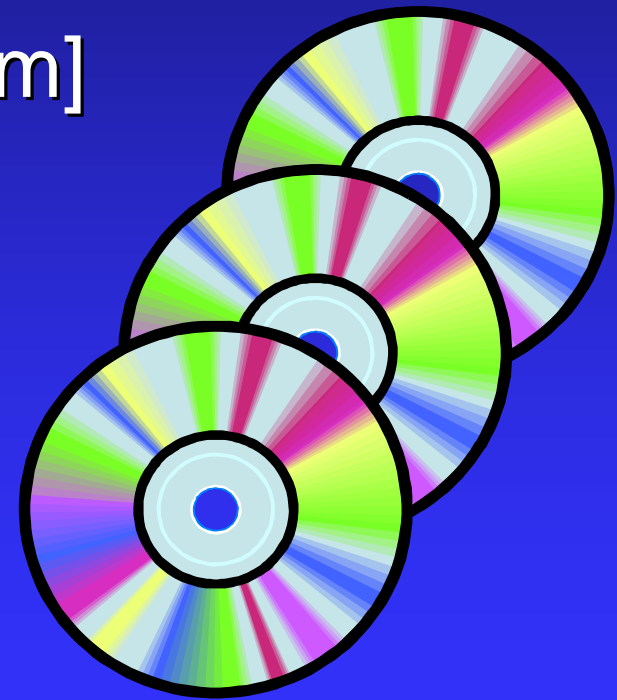
Use Energy Accounting Software

FASER [www.eeis.ees.enron.com]

Utility Manager [www.theutilitymanager.com]

Metrix [www.siliconenergy.com]

All can help organize energy bills into useful information, are Windows-based, \$1K - \$4K, depending on features.

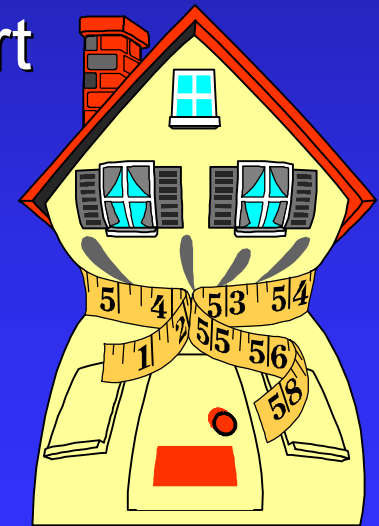


Benchmarking Building Usage

One way to check how efficiently a building is using energy is to benchmark it against others like it in the same geographic area:

- ❑ US DOE CBECS Report
- ❑ BOMA Experience Exchange Report
- ❑ EEI Typical Bills and Ave. Rates

Each may be helpful, but only a good energy audit will reveal how well a building is operating.



Execute Good Energy Audits

This is the first real step to cutting costs.

Both the audits and proposed upgrades should follow your updated specs.

Many good energy auditing services are available.

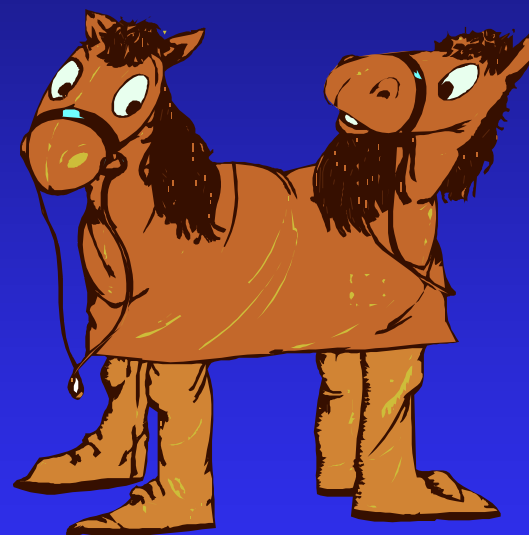
Funding may also be available from some state agencies to support this effort.



Pay Attention To System Design

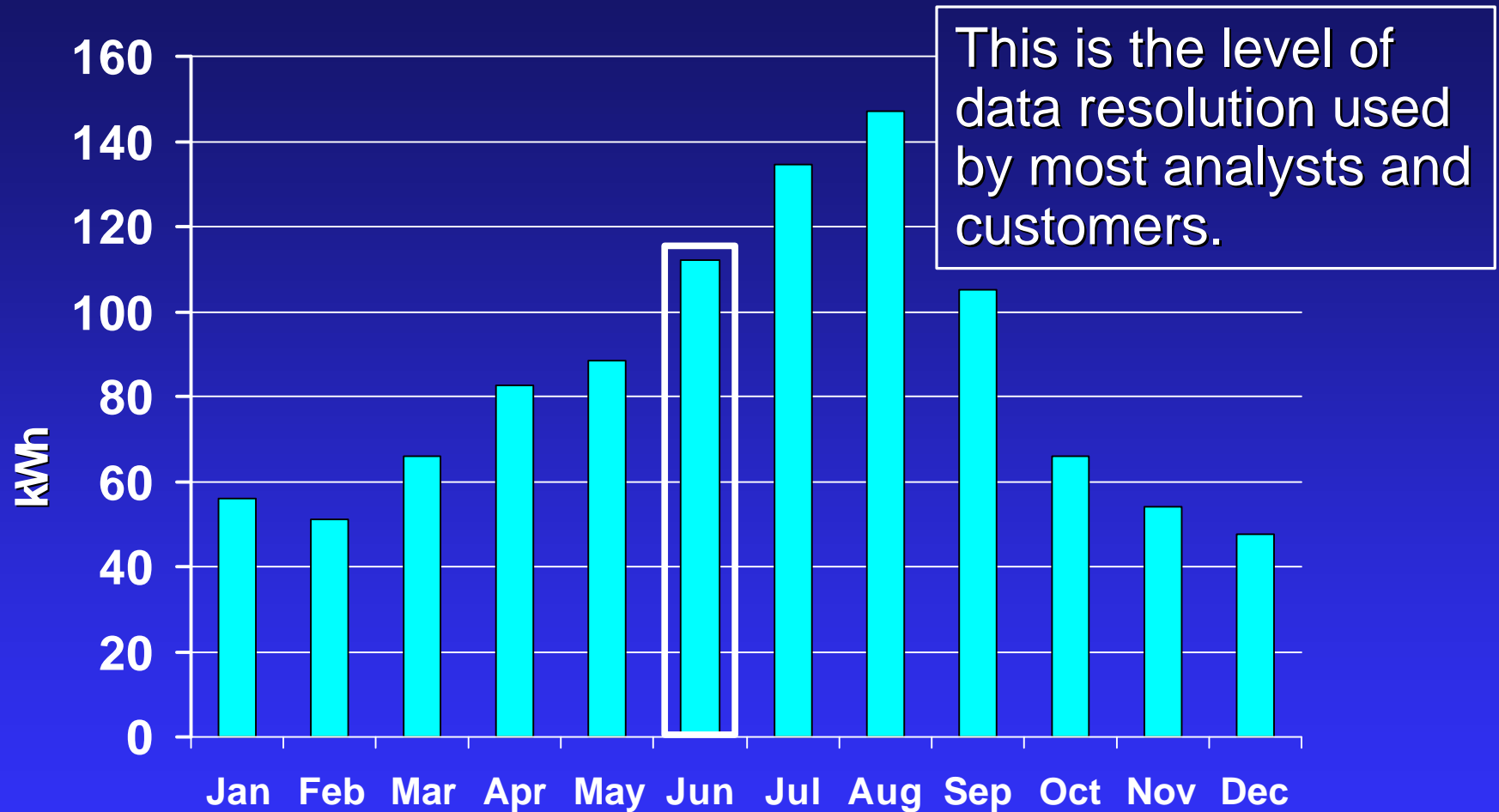
Don't just look at replacing components - consider re-designing some systems.

More savings are often found by fixing a poor design instead of simply changing its parts.



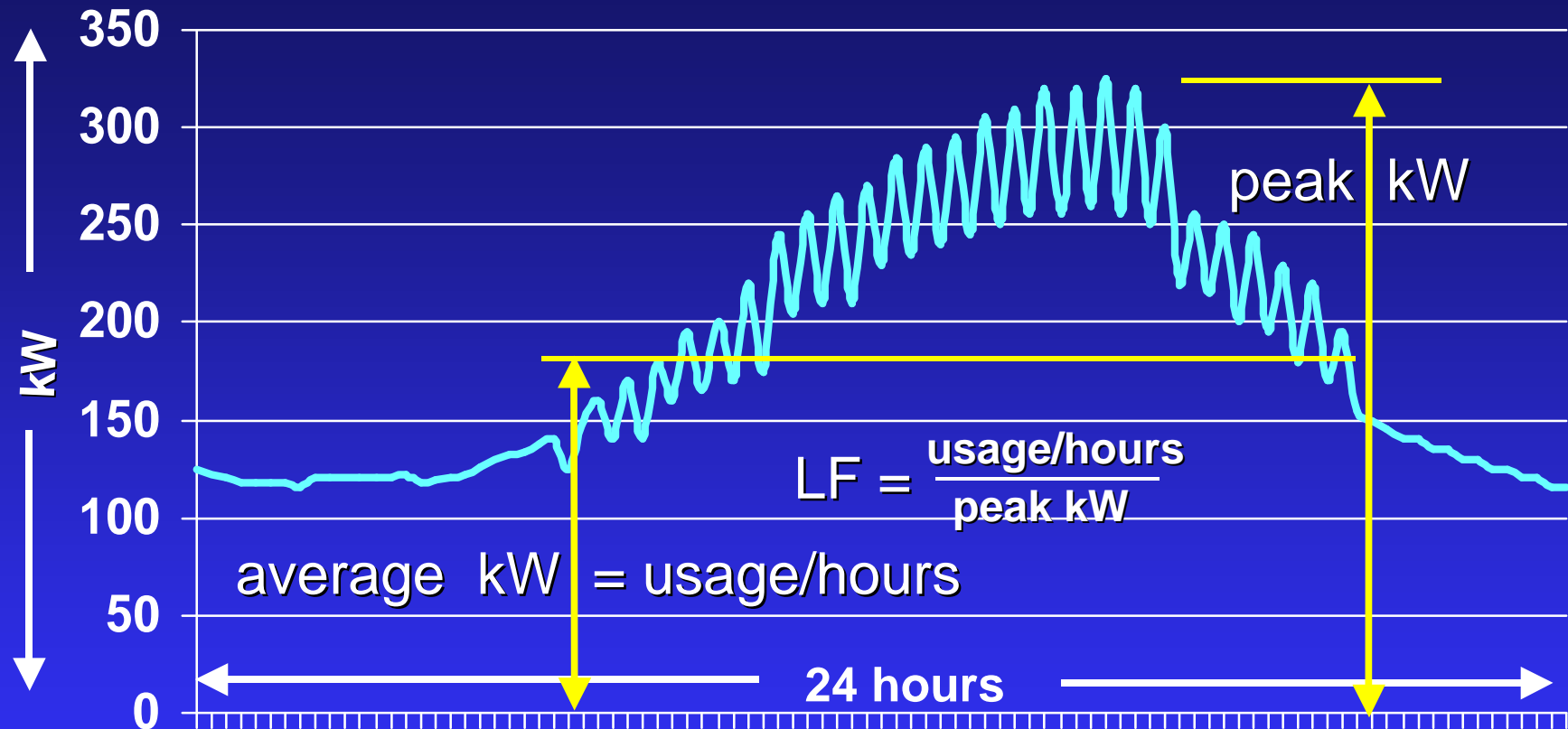
Correcting lighting levels, for example, may save more than changing lamps and ballasts.

Profiling Power Usage



Annual load profile may be derived from monthly bills.

Understand Your Load Profile



Using utility (or your own) metering, capture power demands every 15 minutes (or less) to see how power is used over time.

Advanced Power Metering

In years past, we had to depend on utility meters as our main source of energy use data.

Today, sophisticated metering is available to control energy costs.

New meters are read automatically through wireless/modem-based methods, in 15-minute (or shorter) intervals that allow market-based and/or real-time power pricing. Users then download data via secure Internet connections.



New Software Tools



Computerized building load analyses (such as EnterpriseOne, Energy Profiler and Curtailment Manager) take on new prominence as tools for showing/predicting load profiles and energy use.

Each of these programs analyzes 1/4 hr. interval data to find ways to cut energy costs.

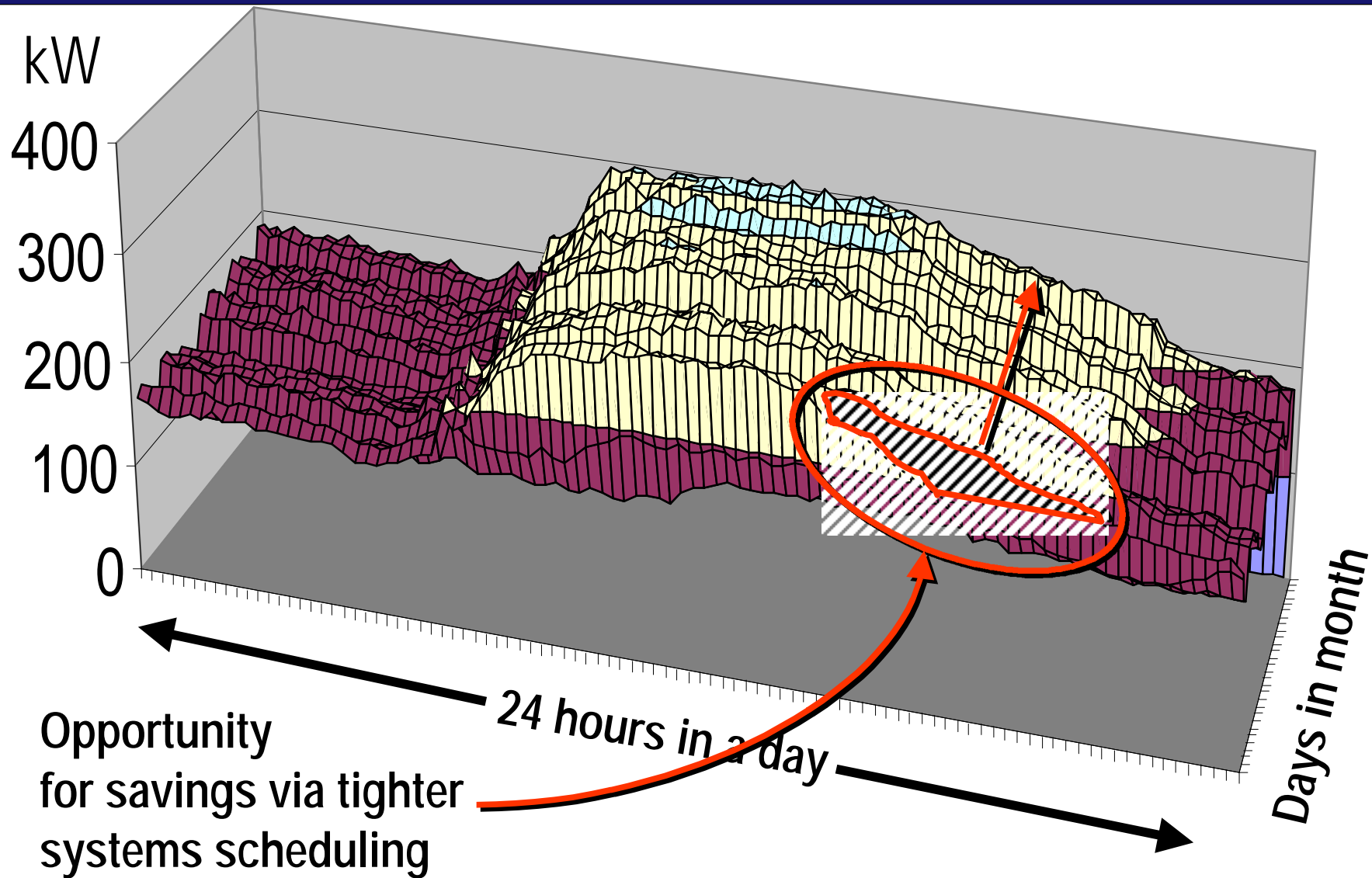
What Will That Tell Me?

Analyzing your daily, weekly, and annual load profiles can provide clues regarding:

- ❑ what is causing peak loads
- ❑ how much can be saved from load control
- ❑ when power purchases can be minimized
- ❑ where purchasing risk may exist

In a competitive power market, flatter profiles provide access to cheaper power.

Visualizing Interval Data



To Summarize... Power Pricing is Time-sensitive

The shapes of price curves and load profiles can influence power pricing and the total electric bill.

Cutting or shifting peak demand, and grasping the impacts it has on power pricing, will help reduce a customer's electric bills.



Typical DSM Techniques

Demand-side management (DSM) options have been around for over 20 years. Each can improve your load factor and energy efficiency:

- ❑ lighting upgrades
- ❑ high efficiency motors
- ❑ variable speed drives
- ❑ chilled water options

As pricing & technology change, more sophisticated options are becoming cost effective. Beyond simple efficiency, many of them can reshape a load profile.



Thermal Energy Storage

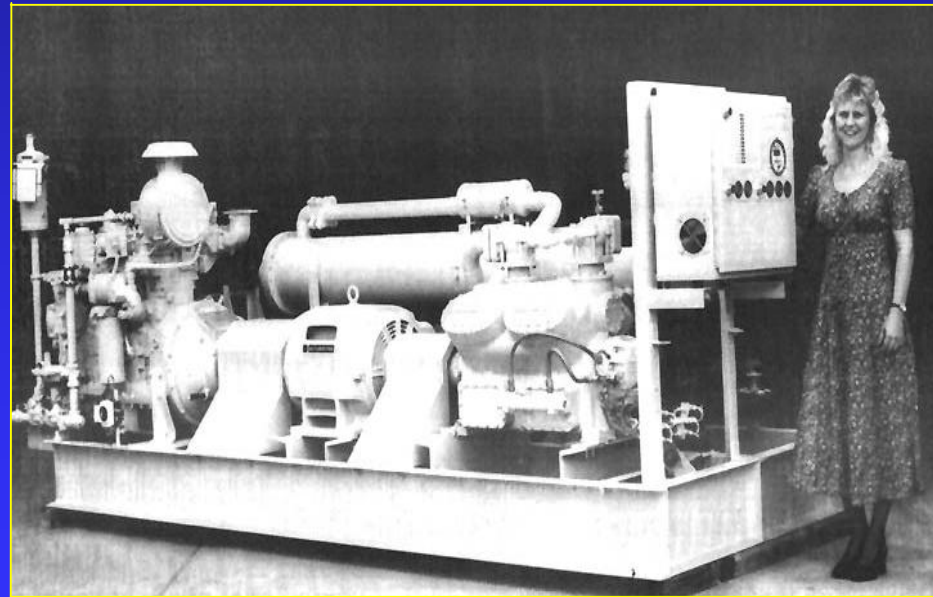


When prices differ for on and off-peak power, making ice at night for later use in chilled water systems may be cost-effective. Production

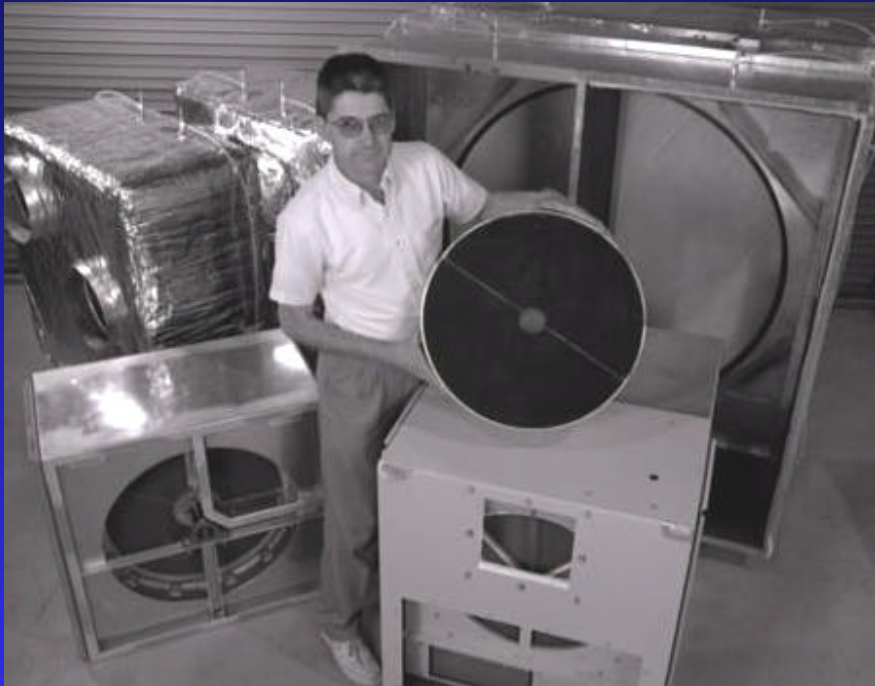
occurs when demand charges are low and there are no transmission constraints. Peak cooling plant capacity is also increased. Modular storage tanks simplify installation.

Dual-Drive Chillers

Some new chillers operate on both natural gas and electricity. Powered by both a gas engine and an electric motor, such units can switch between energy sources, based on tariff, market or real-time pricing data. Three firms are now offering units, sized at 80 to 2000 tons.



Gas-Based Humidity Control



Chemical desiccant systems can cut chiller loads by using natural gas to dehumidify incoming fresh air. This method is already common in

new buildings with large fresh air loads (e.g., hospitals, factories, supermarkets). Natural gas humidifiers may also replace electric resistance units.

Gas-Powered Motor Drives

Natural gas-driven devices, such as this gas engine air compressor, have replaced electric motor-driven units in industrial plants, cutting their peak demand. Gas-driven chillers are also available in many configurations and sizes.



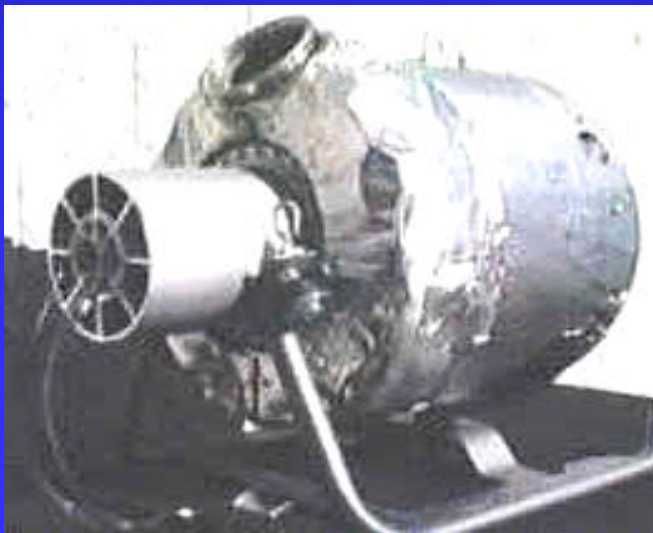
Automated Dimming/Daylighting

In common areas and perimeter offices, electric lighting may be dimmed to take advantage of natural light through gradual dimming that imperceptibly adjusts electric light levels. The same system, when controlled in conjunction with overall building peak demand, may be used for peak shaving and (where available) capacity trading through the local ISO or utility.



Distributed Generation

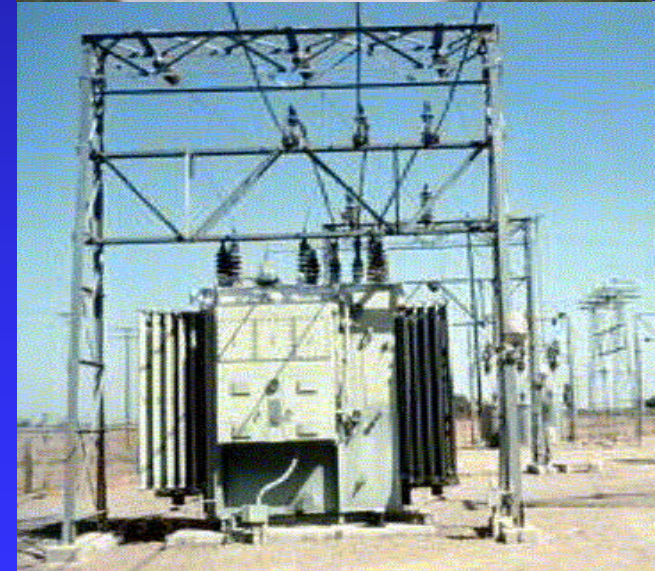
DG is becoming more practical as a way to trim peak loads, and to take advantage of demand response and/or capacity trading programs.



Emissions and noise levels are reduced, especially for new technologies such as microturbines and fuel cells. Pricing is high, but should drop in the next few years.

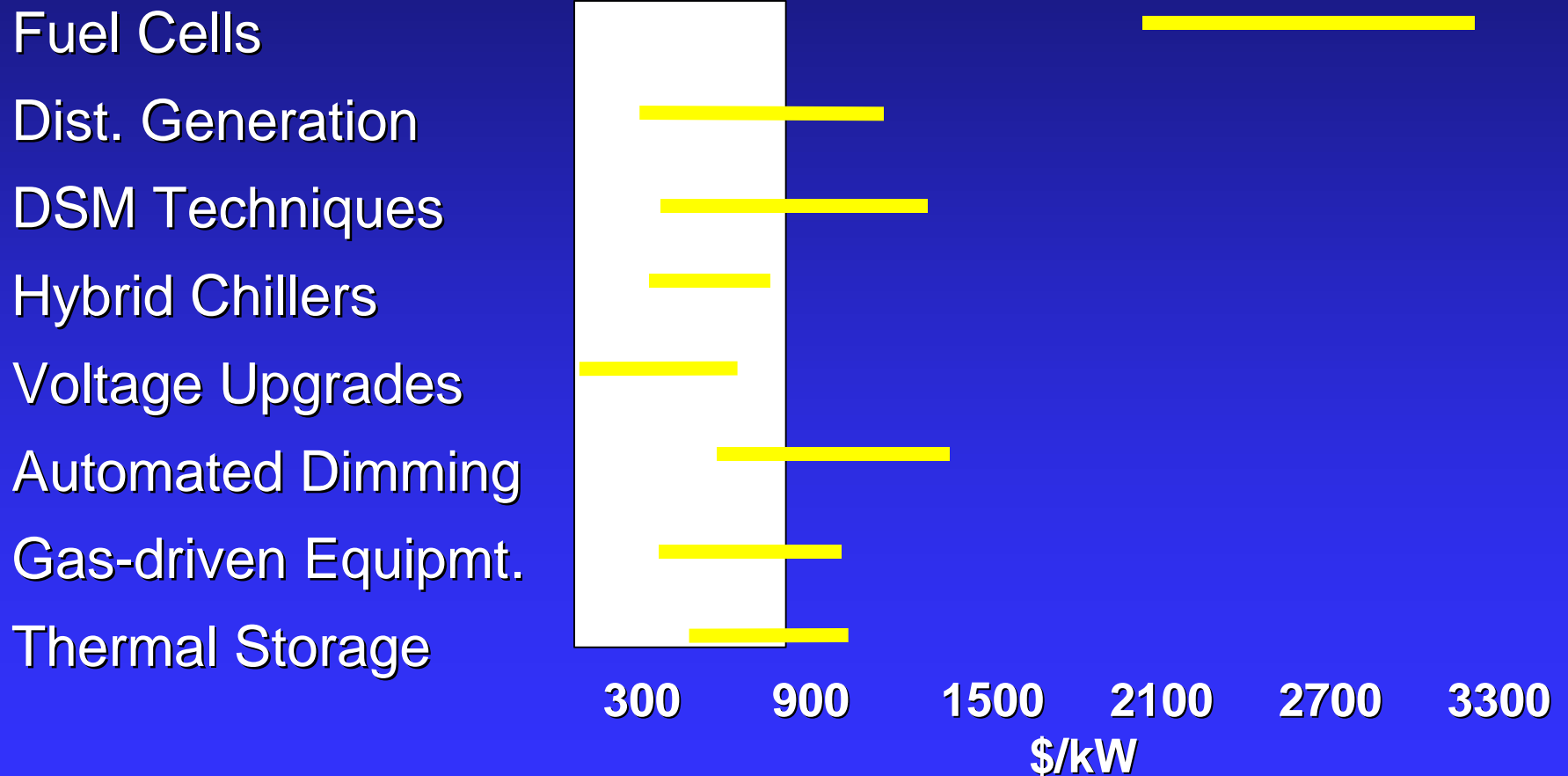
Voltage Upgrade Options

Power is often cheaper when purchased at a higher voltage. Do so by acquiring/replacing the distribution transformer and/or substation serving your facility. Most savings are due to the price differential between tariffs for primary and secondary distribution service, but some new units are also more energy efficient than existing transformers.



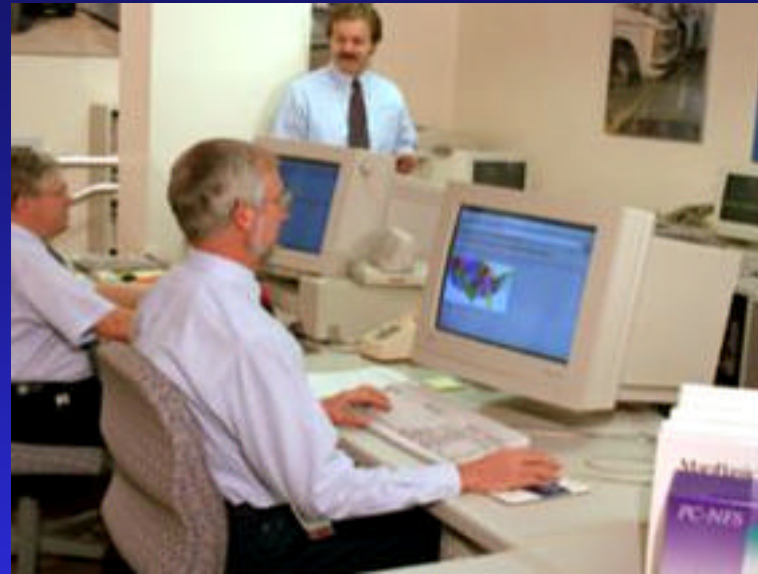
Let's Compare These Options

The common denominator is \$/kW installed cost for avoided or generated power:



Online Energy Procurement

By offering one's load for bidding by several suppliers through a web-based intermediary service, a deal is struck with the supplier giving the best price that meets contractual needs. In effect, this is a "dating service" for customers looking for suppliers, and vice versa. (see www.energybuyer.org). Even peak demand alone is now web-traded.



What If I Stay With My Utility?

If you choose to buy only from your utility, treat it like any other supplier - negotiate with it!

- ❑ best time is before divestiture
- ❑ propose, don't demand
- ❑ a rate consultant should be used to support the proposal
- ❑ be prepared with data from utility's rate filings



A variety of possible benefits may result; e.g. aggregated/conjunctive billing, a “customized” rate, financing for demand curtailment options, etc.

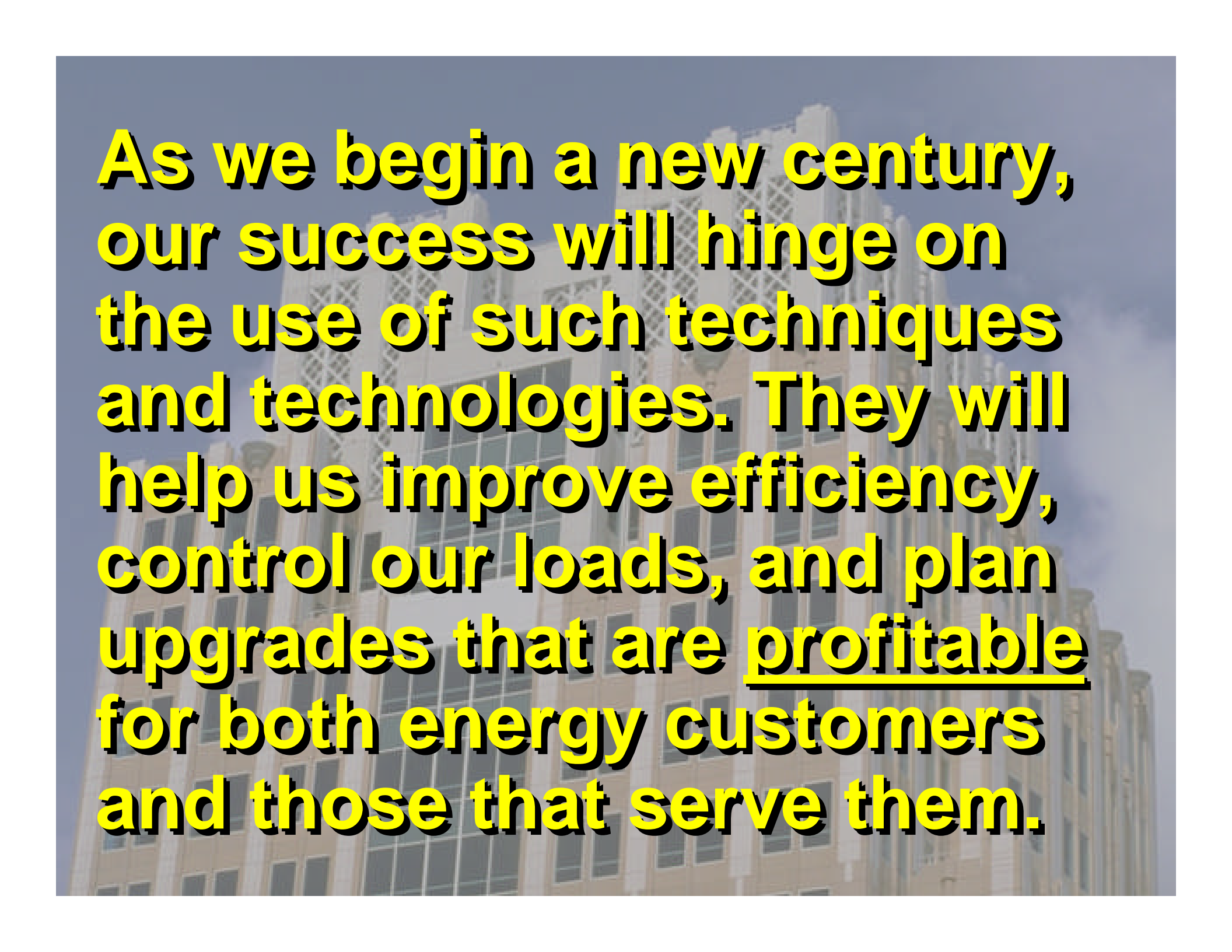
Capture The Savings

Set up a “utility efficiency account” to show (and hold onto) the savings you claim.

Use these funds to provide capital for future upgrades.

Use Measurement and Verification (M&V) methods to prove the savings. Go to: www.ipmvp.org to get started.





As we begin a new century, our success will hinge on the use of such techniques and technologies. They will help us improve efficiency, control our loads, and plan upgrades that are profitable for both energy customers and those that serve them.

*Thank you for your
time and attention.*

