ENERGY USE and MANAGEMENT

– URBANA CAMPUS -

College of Veterinary Medicine

Aug 19, 2008

Terry Ruprecht

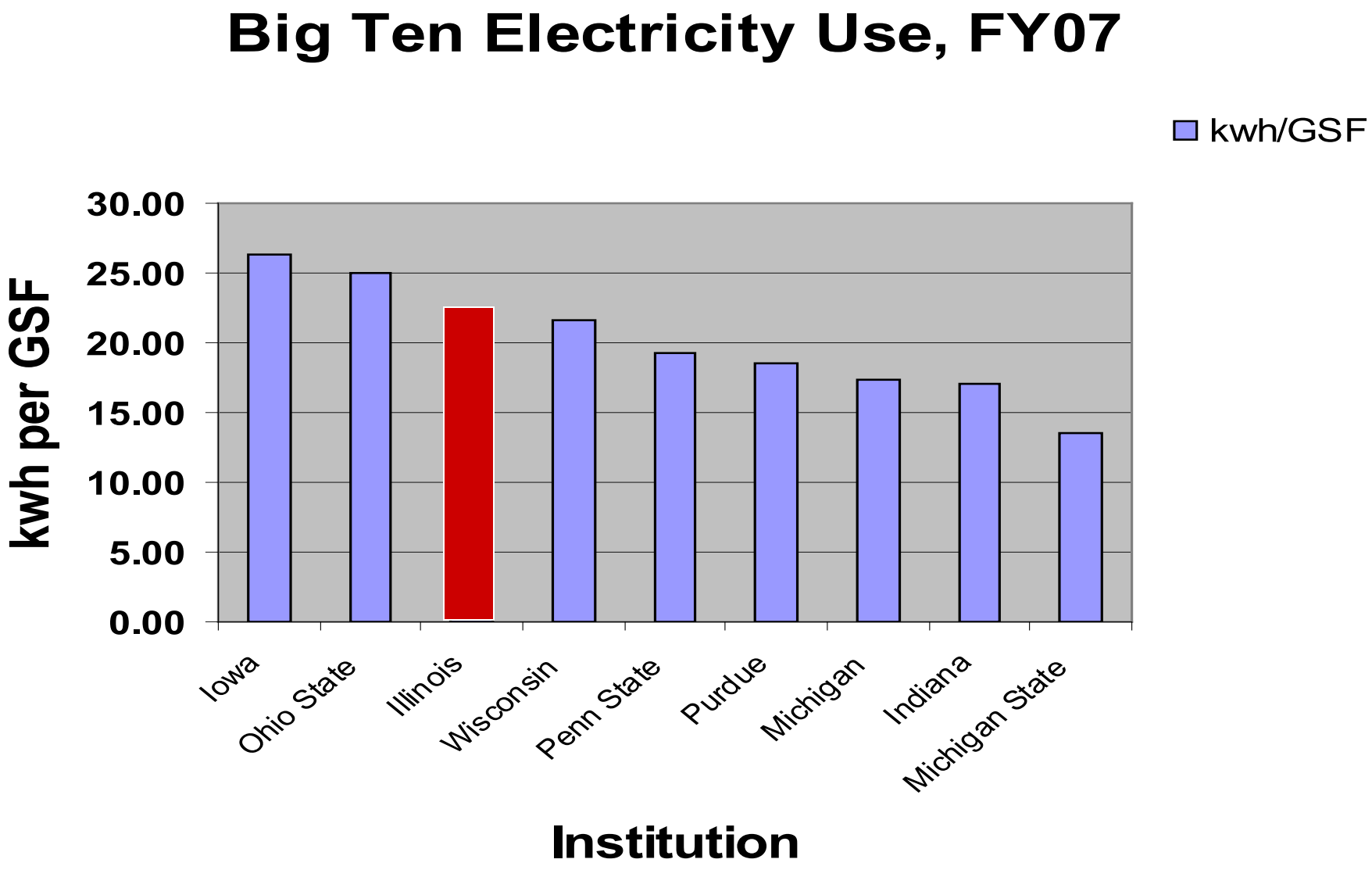
Today:

1. Where have we been?
2. What have we accomplished?
3. Where are we going?
4. Special need areas

Urbana Campus Energy Costs:

FY 2003:	*$26,612,000*	
FY 2004:	*$35,684,000*	*(+34%)*
FY 2005:	*$52,282,000*	*(+47%)*
FY 2006:	*$70,778,000*	*(+35%)*
FY2007:	*$58,830,000*	*(-17%)*
FY2008:	*~$70,000,000*	*(+19%)*

How do we compare?



BIG TEN ELECTRICITY USE, FY2007

(kilowatt-hours per gross square foot)

	kwh/GSF
Iowa	26.3
Ohio state	25.0
Illinois	22.1
Wisconsin	21.6
Penn State	19.3
Purdue	18.6
Michigan	17.4
Indiana	17.0
Mich. State	13.6

Mean, excluding UIUC = 19.9

Urbana Campus Carbon Footprint, FY07

Abbott PP, nat. gas	*198,341 tons*	***37.5 %***
Abbott PP, coal	*204,126 tons*	***38.6 %***
Abbott PP, oil	*118 tons*	***0.0 %***
Other campus burn	*10,472 tons*	***2.0 %***
Purchased Electricity	*96,635 tons*	***18.3 %***
	Stationary sources	***96.4 %***
All UIUC vehicle emissions	*5,319 tons*	***1.0%***
Employee Commuting	*14,015 tons*	***2.6%***
Annual Air Travel	*na*	*?*
TOTAL	***529,027 tons***	

12 Highest Energy Consumers, FY08

1.	Roger Adams Lab	126,441 MMBtu
2.	Advanced Computation	126,321
3.	Beckman Institute	109,224
4.	Vet Med/Basic Science	107,520
5.	Veterinary Tch'g Hosp.	107,360
6.	Micro/Nano-electronics	105,541
7.	Institute for Genomic Biology	98,803
8.	Siebel Ctr for Comp.Sci.	91,974
9.	Chem/Life Sciences	84,128
10.	Madigan Laboratory	83,228
11.	Digital Computer Lab	70,370
12.	Illini Union	68,684

30% of campus consumption

Reduced consumption nets huge benefits…

Each 1% reduction is worth $500,000+ and 5,200 tons of annual carbon emissions

8.2% energy reduction returns CO2 emissions to 2000 levels

19.7% energy reduction returns emissions to 1990 levels

PROGRESS TO DATE …

- ✓ Developed a campus Energy Use Policy
- ✓ Installed new steam and/or chilled water meters in 80+ buildings (80/90%)
- ✓ Developed detailed energy statements for colleges and admin units showing their utility usage in the “Big Eighty”
- ✓ Implemented a retro-commissioning program *(averaged 21% reduction in 900,000GSF in FY08)*
- ✓ Began a major lighting retrofit/upgrade program

MORE …

- ✓ Implemented comprehensive steam trap maintenance program

  (Campus steam use reduced 12%+ FY06 to FY08)
- ✓ Adopted LEED standards for all major construction
- ✓ Approved wind generator for the South Farms
- ✓ Developed RFP for Performance Contracting (ESCOs)
- ✓ USEPA “Energy Star” partner
- ✓ Joined the Presidents’ Climate Commitment

Krannert Center Retro-commissioning

- Work done November- December 2007
- Presently seven months of metered results
  - Electricity reduction – 18%
  - Chilled water reduction – 19%
  - Steam reduction – 50%
- Annual Savings - $380,000
- Retro-commissioning cost - $188,000
- Simple Payback – 6 months

Photo by Dan O'Brien

Ten Year Energy Goals:

- Reduce energy consumption from FY07 levels by 10% over the next 3 years
- Reduce energy consumption from FY11 levels by 15% over the following 2 to 6 yrs

The ten year plan, in simplest form …

- Improve systems
- Control growth
- Create incentives
- Facilitate behavioral change
- Stimulate investment

Energy Program must address three key areas:

I Building/System Modifications & Upgrades

II Campus Culture shift

- Information and Awareness
- Incentives
- Policy changes

III Improved Communication/Coordination

e.g. Generation vs Consumption

Areas in need of attention and/or incentives …

IT related

- Server rooms:
  - have proliferated … a major impediment to night shutdown
  - can be combined and/or concentrated
  - newest servers use as little as 1/10 energy of the machines they replace

Attention … Incentives …

- Server Rooms (contin.)

  - absent incentives, people tend to buy *lowest cost* replacements regardless of energy use

EXAMPLE:

CARLI Servers today	**CARLI Replacement Servers**
20 servers – 33.9 kw	**21 servers - 6.2 kwh**
Annual elect cost: $36,700	**Annual elect. Cost: $6,400**

Attention … Incentives …

Equipment Purchases

- **Millions of $$ of replacement equipment are purchased annually with first cost the only consideration**

Example:	*Cost*	*Electricity*
Reconditioned argon-ion Laser	*- $25,000 …*	*99,000 kwh/yr*
Diode-pumped solid-state Laser	*- $75,000 …*	*840 kwh/yr*

Payback on the $50,000 price premium …

5.8 yrs

Attention … Incentives …

Equipment Purchases (contin.)

- **Number of purchasers and equipment types too broad to legislate purchasing decisions or provide effective oversight.**

Incentives are the only likely solution

Next Steps - A Prescriptive Diet for UIUC Sustainability

Strategy #1

Adopt management protocols that foster the renovation/updating of existing space and inhibit the addition of new.

Strategy #2

Adopt a total-cost-of-ownership approach to campus planning/development. View first costs in full context of lifetime and recurring costs.

Next Steps …

Strategy #3

Fully engage all campus citizens in reducing energy consumption. Develop a sustained information campaign regarding campus energy use, cost, and conservation progress.

Strategy #4

Implement an incentive-based budgeting structure to spur college and department commitment and investment in improved energy efficiency

Strategy #5

Transform the campus culture to one that views wasting energy as politically incorrect

A Prescriptive Diet … .

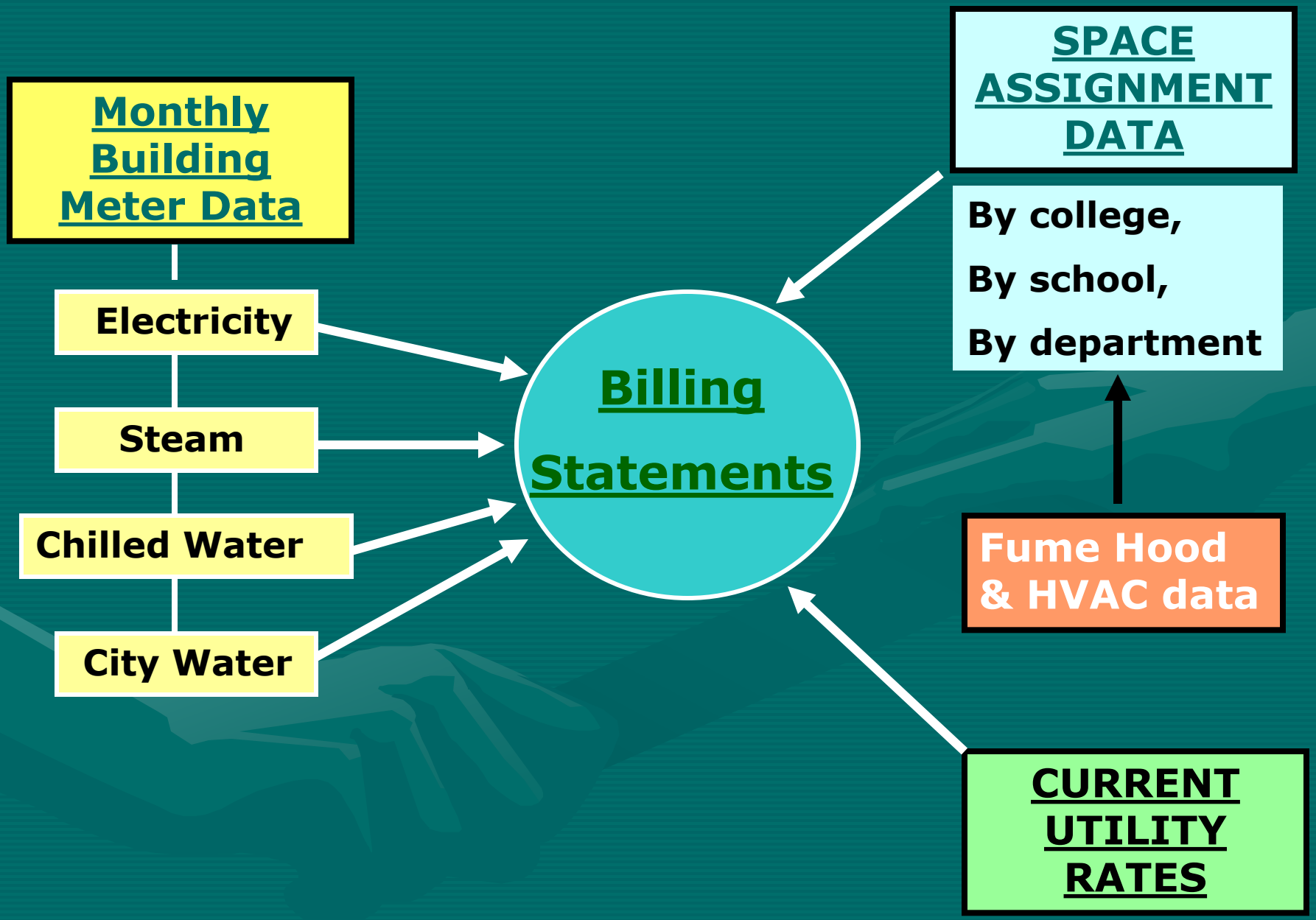
Strategy #6

Through **advanced coal technologies** and **carbon reduction strategies,** exploit the advantages of Illinois coal at Abbott Power Plant

Strategy #7

Integrate building/system reinvestment to accommodate multiple drivers … capital renewal, energy reduction, and programmatic upgrade

DISCUSSION


Monthly Building Meter Data
Electricity
Steam
Chilled Water
City Water
Billing Statements
SPACE ASSIGNMENT DATA
By college,
By school,
By department
Fume Hood & HVAC data
CURRENT UTILITY RATES