

# Innovating the Business of Facilities Operations

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Interval Data Systems



# Overview

- Why innovate?
- How to innovate
- Operations & maintenance
  - Comfort
  - Cost-based optimization
- Management & leadership
  - Productivity
  - Accountability
  - Credibility
- Engineering (re)design & construction
- Cost allocation & utility billing
- Conclusions

# Facilities is a Business

- Provide products & services
- Financial performance measurements
- Customer service
- Decisions should not be a coin flip



# Why Innovate the Business of Facilities Operations?

## ■ Increasing business pressures

- More space
- Higher energy cost
- Limited headcount
- Higher labor rates
- Comfort complaints
- Under-funded maintenance
- New initiatives (i.e. LEED)
- Changing customer needs

## ■ Without innovation, the pressure will crush you



# Why Innovate?

(continued)

- How your organization sees/perceives you
  - Credibility
    - Customers, management, finance
  - Accountability
    - Internal personnel, external contractors
  - Communications
    - Employees, customers, management
  - Culture change
    - Information, knowledge, accountability
- Status quo will bury you



# Why Innovate?

(continued)

- It's the only way to get ahead of the wave
  - Incremental improvements won't keep you afloat
- Quantum improvements
  - Productivity
  - Operational efficiency
  - Customer service/responsiveness
  - Design engineering quality & construction budgets
  - Accountability & credibility
- Leadership that gets you promoted

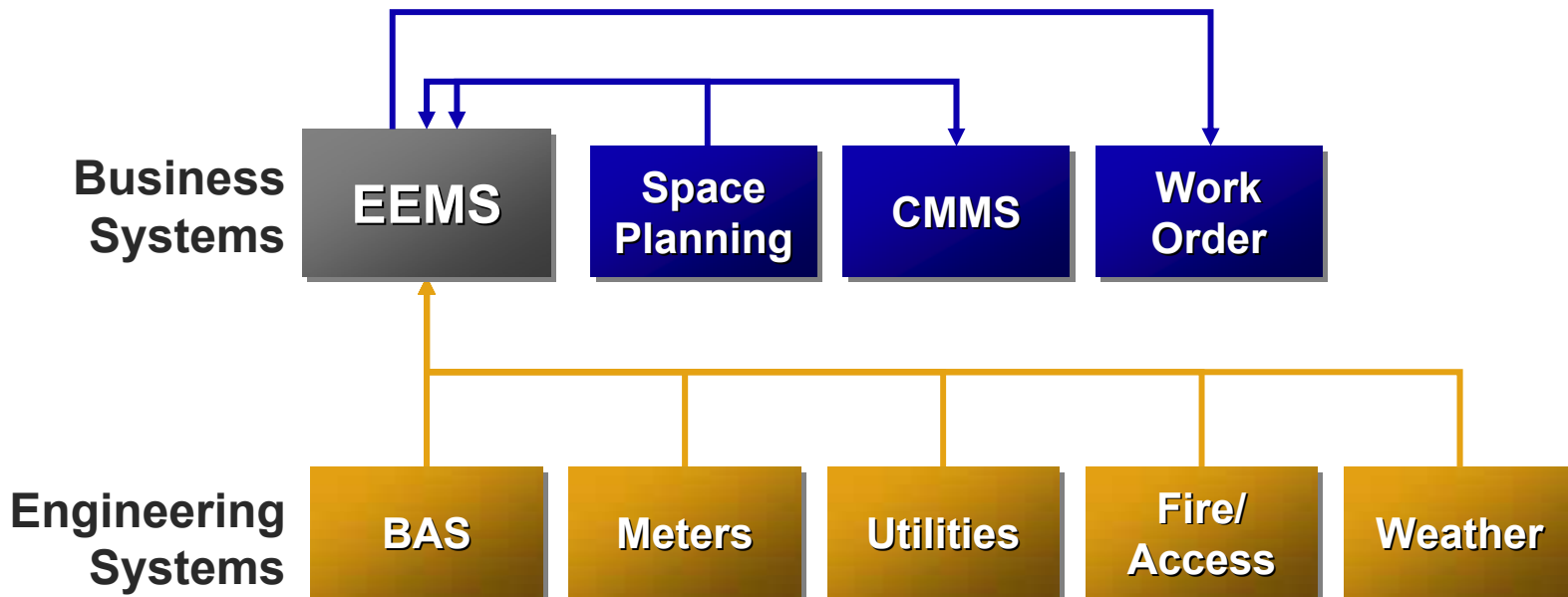


# How Do You Innovate?

**Step 1:** Collect all operational data

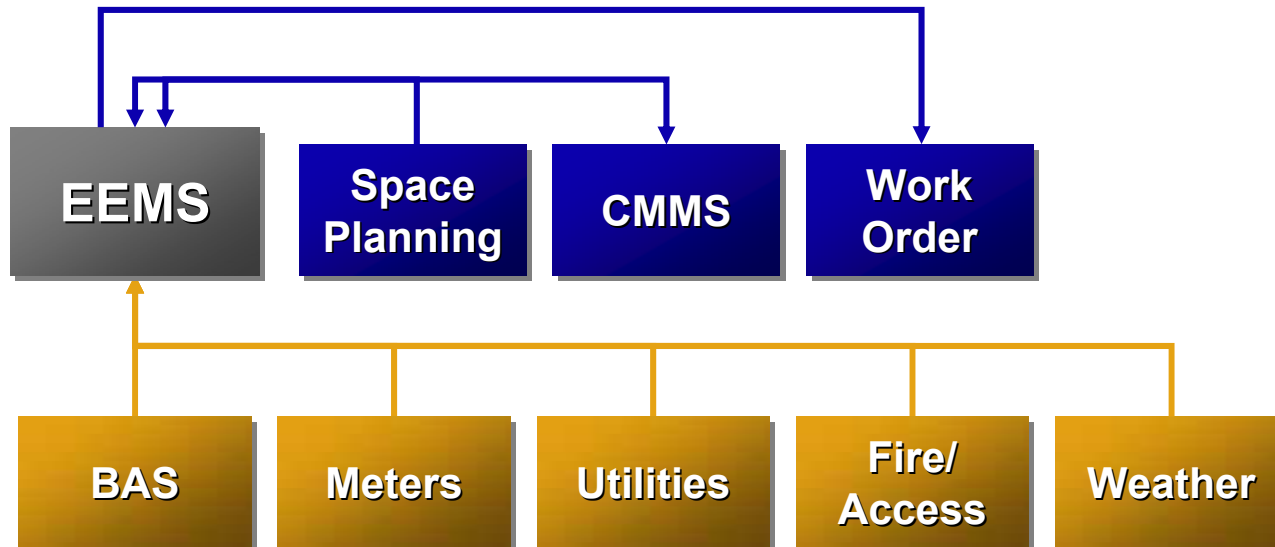
**Step 2:** Provide tools to get information out

**Step 3:** Information-enable everyone



# How Do You Innovate? Collect All Operational Data

- All sources—BAS, meters, utilities, fire/access, weather
- All points—analogue, binary, control, monitoring
- All the time—15 minute intervals, forever
- Calculations—engineering equations leverage data asset



# How Do You Innovate? Tools for Highly Accessible Information

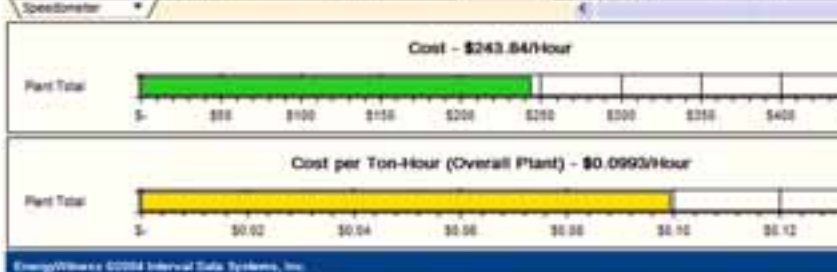
## Chilled Water Plant Cost Speedometer

Interval

Tuesday, May 17, 2005 17:15

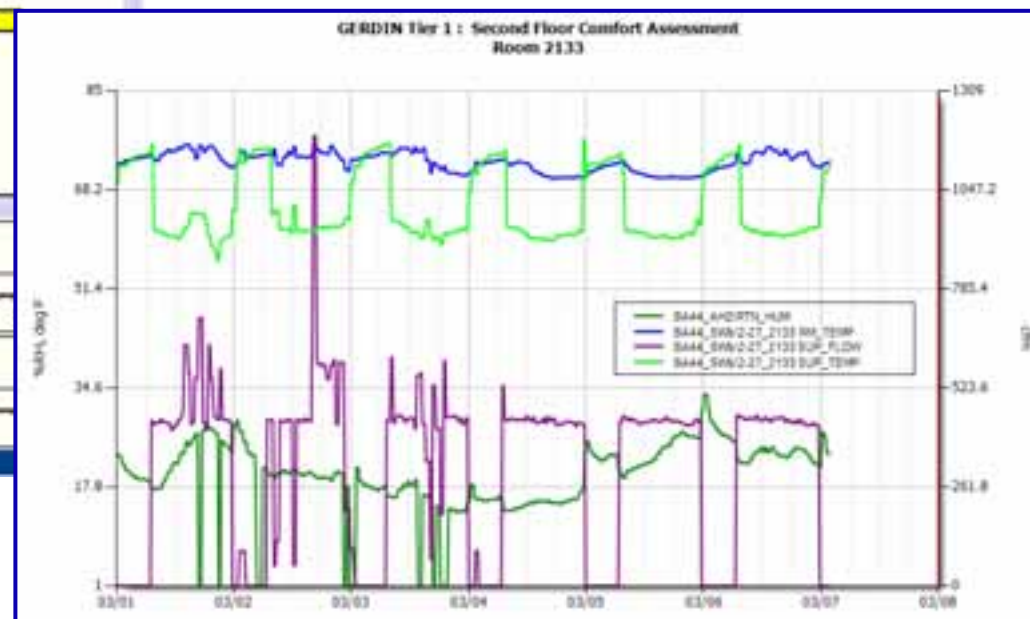
	\$/Hr Total	\$/Hr Chiller	\$/Hr Aux	kWh/Ton	kWh	Tons	\$/Ton-Hr
Chiller 1 - 800 Ton Y-CAT	\$ 44.34	\$ 37.85	\$ 6.49	6.192		798	\$ 0.0556
Chiller 2 - 1500 Ton Elec.	\$ -	\$ -	\$ -	-	-	-	-
Chiller 3 - 1500 Ton Elec.	\$ 119.44	\$ 105.03	\$ 14.42	0.672	969	1,434	\$ 0.0833
Chiller 4 - 1500 Ton Elec.	\$ -	\$ -	\$ -	-	-	-	-
Chiller 5 - (future)							
Chiller 6 - 400 Ton Absorber	\$ 34.72	\$ 27.48	\$ 7.24	10.210		224	\$ 0.1548
Chiller Cooling Towers	\$ 4.66		\$ 4.66	0.024	34	2,561	\$ 0.0018
Absorber Cooling Towers	\$ 6.13		\$ 6.13	0.043	41	972	\$ 0.0053
Secondary Pumping	\$ 35.55		\$ 35.55	0.106	287	2,711	\$ 0.0131
<b>Plant Total</b>	<b>\$ 243.84</b>	<b>\$ 170.36</b>	<b>\$ 73.48</b>			<b>2,456</b>	<b>\$ 0.0993</b>

CHW Bypass Flow		Current Cost of Energy	
Bypass Flow Direction FORWARD To Plant			
Bypass Flow	302 GPM	WH - Oil Peak	\$ 0.1340 \$/Wh
Primary CHWS Temp	43.2 °F	WH - Oil Peak	\$ 0.0030 \$/Wh
Secondary CHWS Temp	52.4 °F	Natural Gas	\$ 0.45 \$/Therm
Weather		#2 Fuel Oil	\$/Gal
Outside Temperature	75.3 °F	Diesel Fuel	\$/Gal
Relative Humidity	67.7 %RH	Steam	\$/Lbs
Outside Wet Bulb	72.4 °F	Water Charge	\$/Gal
		Sewer Charge	\$/Gal

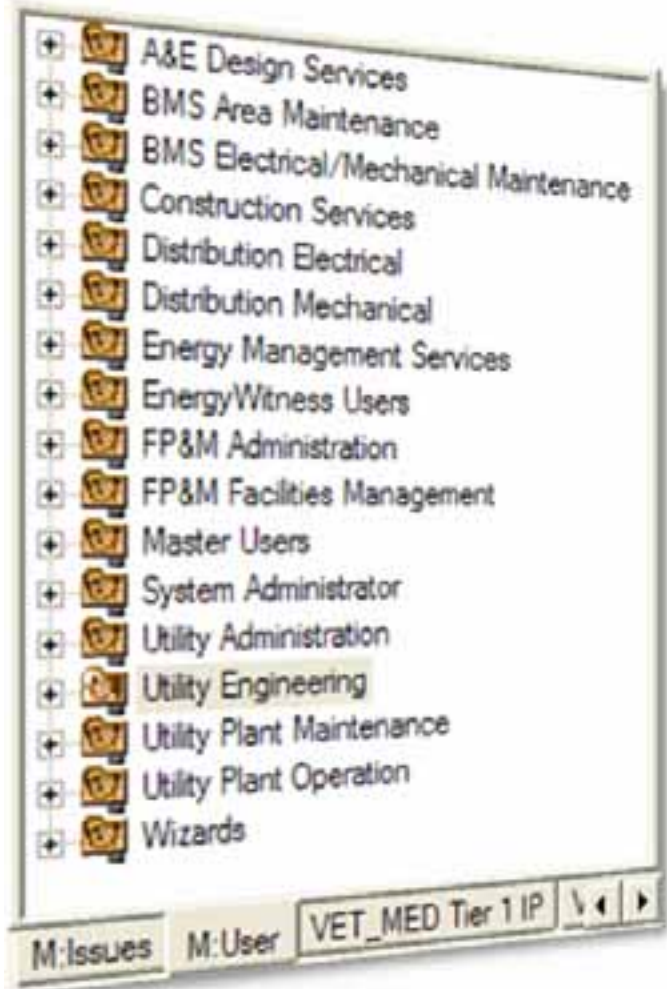


EnergyWitness ©2004 Interval Data Systems, Inc.

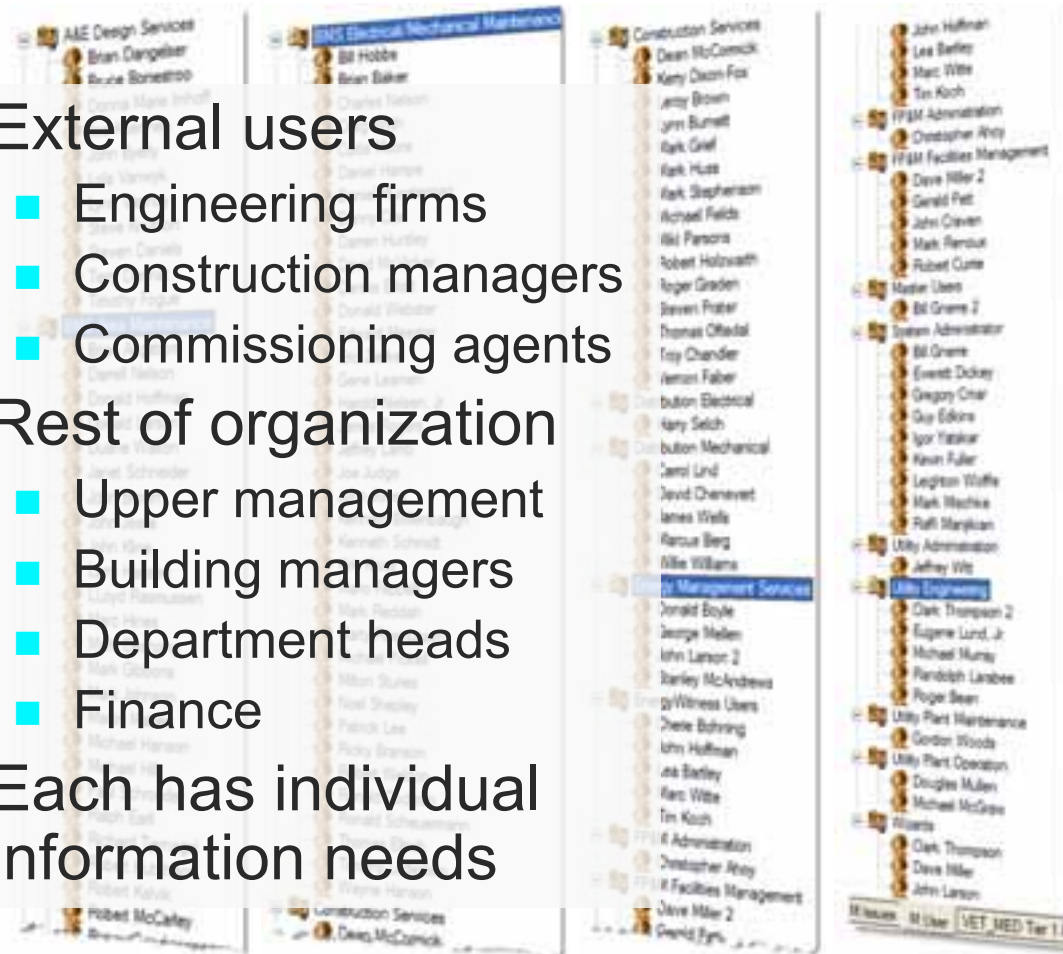
- Highly interactive
- Well organized
- Actionable information
- Extremely fast



# How Do You Innovate? Information-Enable Everyone



- External users
  - Engineering firms
  - Construction managers
  - Commissioning agents
- Rest of organization
  - Upper management
  - Building managers
  - Department heads
  - Finance
- Each has individual information needs



Affects ≈2 people for each \$1M non-utilities operating budget

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# Operations & Maintenance

- Who cares about comfort?

## Customers



- Who pays the bills?

## Finance



# Cost versus Comfort

online presentation

# Operational Data Myths

5. We don't have time to look at the data
6. Existing systems already use a database, so we have everything we need
7. You can't collect data on everything without hurting control performance
8. Metering solves all data needs

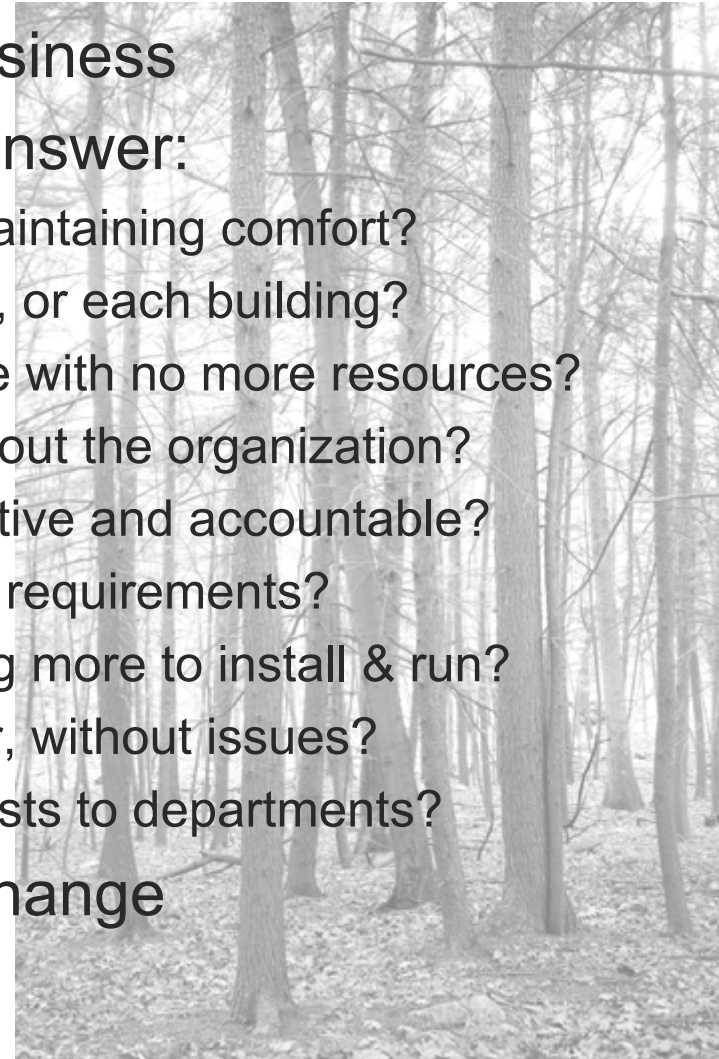


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# Management & Leadership

- You're running a \$10 – 100M business
- Need an information system to answer:
  - How do I lower energy costs while maintaining comfort?
  - What is the cost/hour to run the plant, or each building?
  - What can I do to manage more space with no more resources?
  - How can I improve credibility throughout the organization?
  - What will make my staff more productive and accountable?
  - Can I meet these new environmental requirements?
  - Are engineers over-designing, costing more to install & run?
  - Can we occupy new buildings sooner, without issues?
  - How do I accurately allocate utility costs to departments?
- The answers exist, but require change

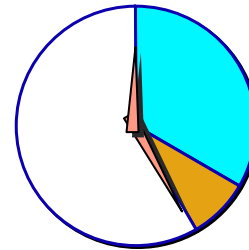


# Management & Leadership Productivity

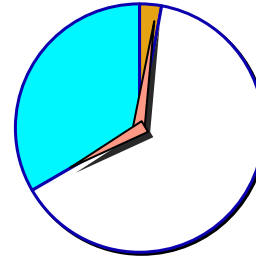
## Stop wasting time

- Engineers / technicians spend 5X – 10X more time collecting data than doing actual engineering
- Accepted as “part of the job”
- Affects internal staff & external firms

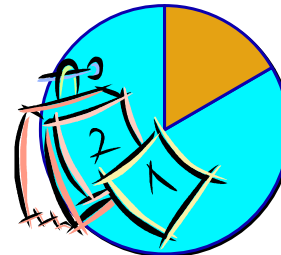
**Most people are not aware of all the time they waste!**



← Data collection: 20 min  
Engineering: 5 min  
Ratio: 4:1



← Data collection: 4 hrs  
Engineering: 20 min  
Ratio: 12:1



← Data collection: 2 days  
Engineering: 2 hrs  
Ratio: 7:1

# Productivity Gains from Highly Accessible Information



# Management & Leadership Accountability & Credibility

This is a little harsh, but...

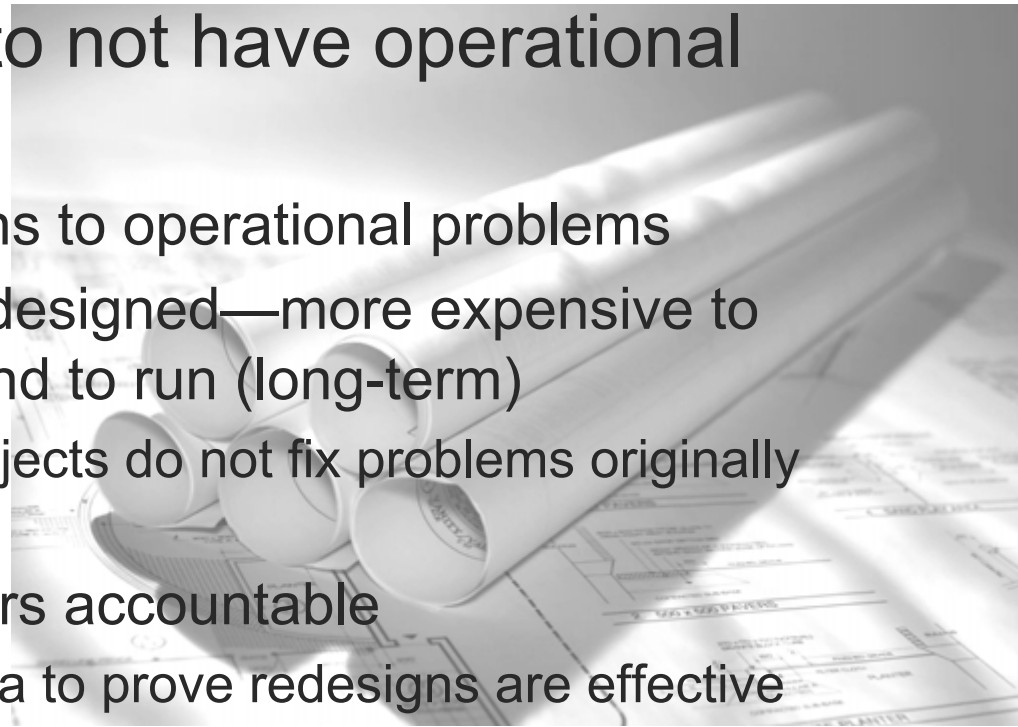
- Facilities groups lack credibility
  - Can't provide facts to executives / finance
  - Customers see a reactive, not proactive, organization
- There is little accountability
  - Facilities leaders don't hold themselves / staff accountable
  - Don't hold external contractors accountable
- Factual data is a key to changing this
  - Change relationship with customers
  - Change relationship with CFO—be in control of operations finances instead of being controlled by them

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# Engineering Design & Construction

- Design engineers to not have operational information
  - Construction solutions to operational problems
  - Systems often over designed—more expensive to install (short-term) and to run (long-term)
    - Half of redesign projects do not fix problems originally targeted
  - Hold design engineers accountable
    - Use operational data to prove redesigns are effective



# Engineering Design & Construction

- Construction focused on first cost, not lifetime cost
  - Commissioning is expensive & time consuming
  - Pressure to occupy buildings before ready
  - Hold general contractor / controls contractor accountable
    - Use data to prove proper operations of HVAC system



# Operational Data Myths

1. We already have all the data
2. BAS trend logs are sufficient
3. Many of the BAS points are not important
4. There is too much information to look at



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# Cost Allocation & Utility Billing

- Create culture of accountability & responsibility for energy use by customers
  - Behavioral changes are difficult, slow, long-term
  - Provide information to give users capability to act — data driven
  - Help users change
    - Assist in identifying energy waste
    - Define strategies to lower demand
  - Tie utility billing to operational data for information

# Cost Allocation & Utility Billing

online presentation

# Conclusions

- Business issues should drive facilities
- Business climate is the most difficult it has ever been
  - More demands, more space to manage, less staff, rising costs
- Businesses run on information systems
- Embrace accountability—create credibility

**Innovate or be left behind**

**Facilities is a business—run it like one**



For Additional Information

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