

Saving Energy in Leased Space (The “SELS” Program)

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NJIT Center for Building Knowledge

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Scope

- **Develop Guidance**
 - No and low-cost actions that tenants in leased office space can take to reduce energy use, targeting the low hanging fruit of energy savings
- **Provide Information**
 - How more complex energy efficiency activities can be undertaken over time.
- **Create**
 - 90 minute, direct to tenant training program, a tenant retrofit guide and tools and strategies for addressing split incentives in lease language.

Audience

- **Tenants and Owners/Property Managers**
 - Commercial office space.
 - Not owner-occupied

EE Opportunities

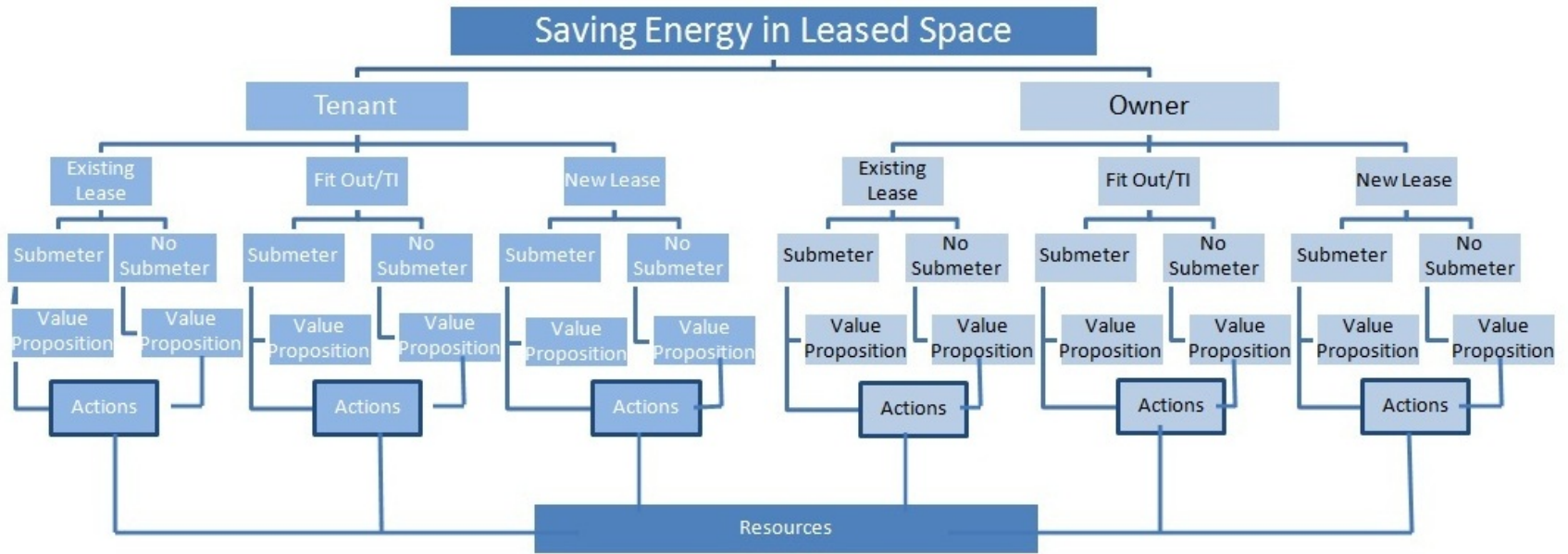
- **3 Conditions**
 - Existing lease
 - Tenant improvement (“fit-out”)
 - New lease

Limitations

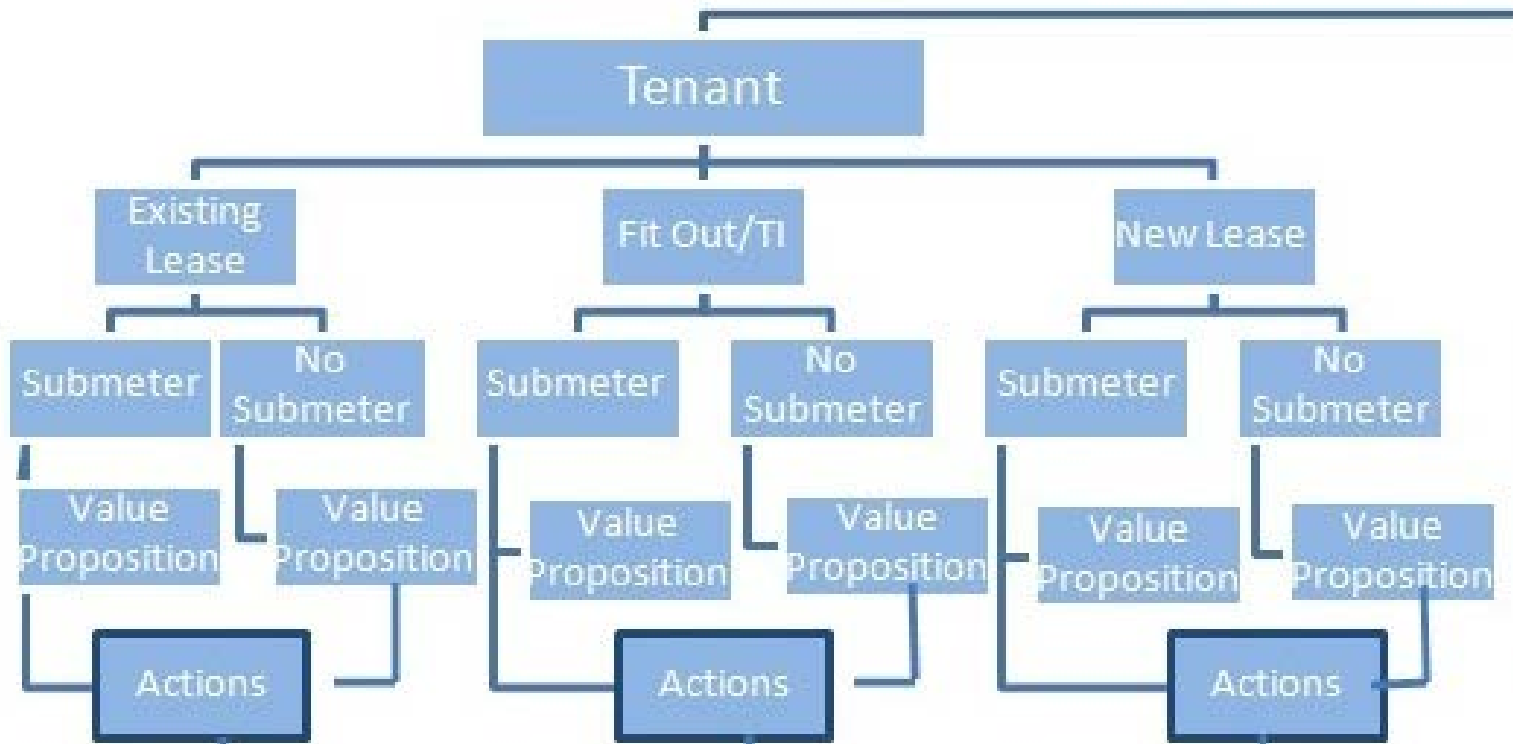
- Electricity Only
- Not Focused on Overall Building Operations
 - Only Tenant and Tenant/Owner Interface
- Not Focused on Technologies



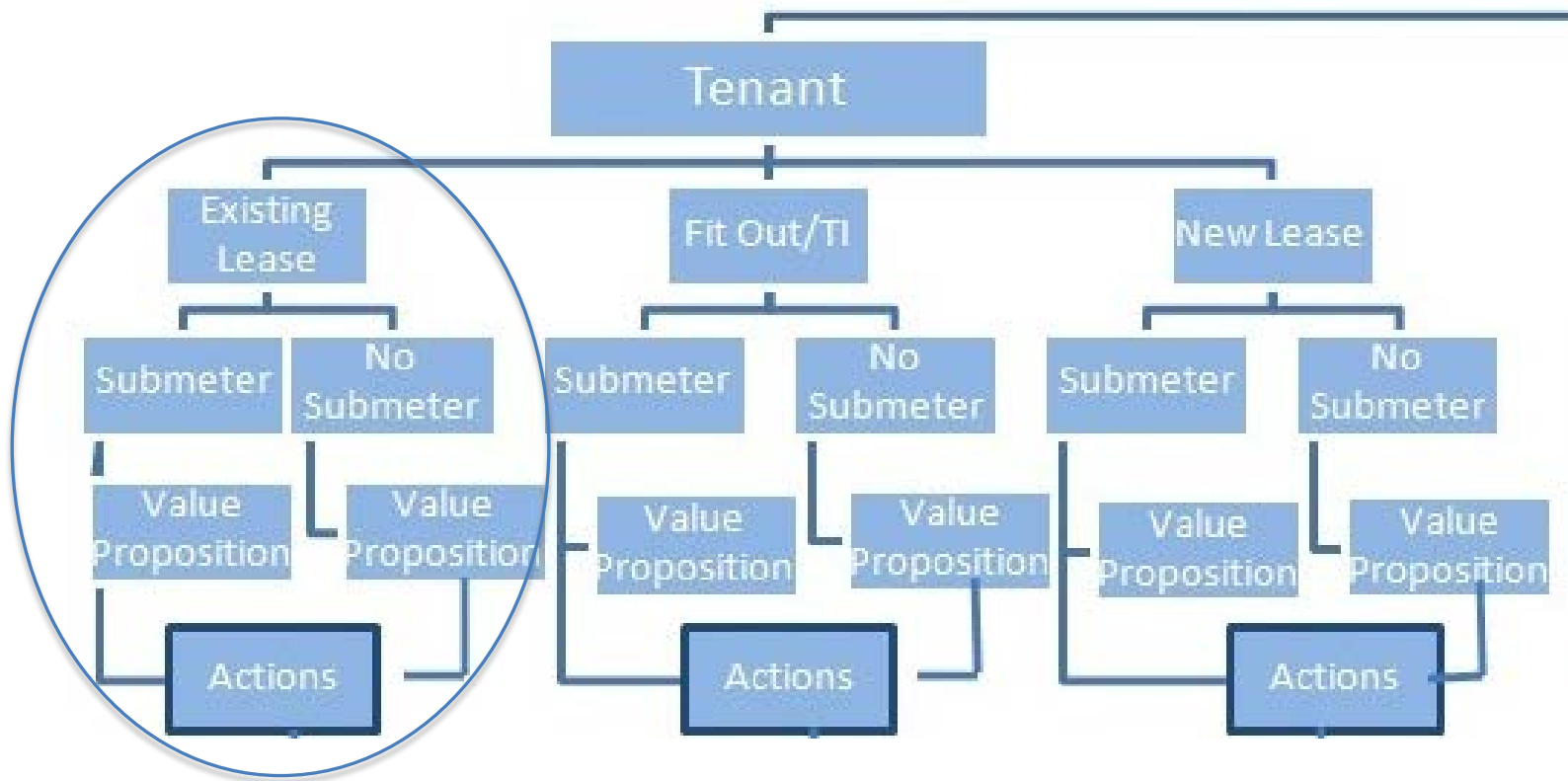
Conceptual Flow Chart



Tenants



Tenants



Tenants

Existing Lease Value Propositions: “Why Should I Do This?”

Tenants in an Existing Lease – Value Proposition Space is Sub-Metered

- **Save Money by Saving Energy**
 - Energy = 30% of typical office building energy use
 - No-cost/low-cost improvements can save 30% of this
 - Deeper improvements even more
- **Improve Employee Comfort**
 - Some interventions enhance productivity and comfort
 - Better lighting
 - Controlled daylighting
 - Temperature controls
- **Improve Employee Morale**
 - Going green feels good
- **Improve Company Image**
 - Going green makes the company look good
- **Help the Environment**
 - “Green” starts with energy
 - Energy saved = carbon emissions reduced

Tenant Savings	
Office Space	20,000 square feet
Lease Term	5 years
Energy Savings	30%
Reduces Costs	\$0.60/sq.ft. annually
Savings	\$12,000
Lease-Term Savings	\$60,000
Energy Consumption Avoided	600,000 kWh
Greenhouse Gas Emissions Avoided	379 metric tons of CO ₂

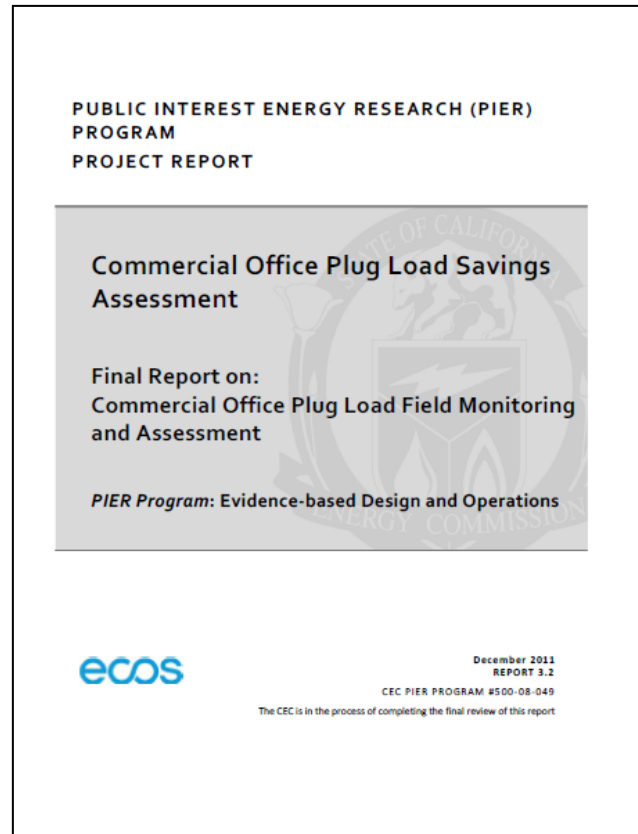
Case Study



Case Study

Commercial Office Plug Load Savings Assessment

- **No-Cost/Low-Cost Energy Savings Strategies**
 - 5,180 KWh at a small office
 - 40% of plug load energy use



Tenants in an Existing Lease – Value Proposition Space is Not Sub-Metered

- **Improve Employee Comfort**
 - Some interventions enhance productivity and comfort
 - Better lighting
 - Controlled daylighting
 - Temperature controls
- **Improve Employee Morale**
 - Going green feels good
- **Improve Company Image**
 - Going green makes the company look good
- **Help the Environment**
 - “Green” starts with energy
 - Energy saved = carbon emissions reduced
- **Open Discussion of EE Opportunities with Landlord**
 - Understanding of EE potential may allow informed discussions/negotiations with landlord



Tenants

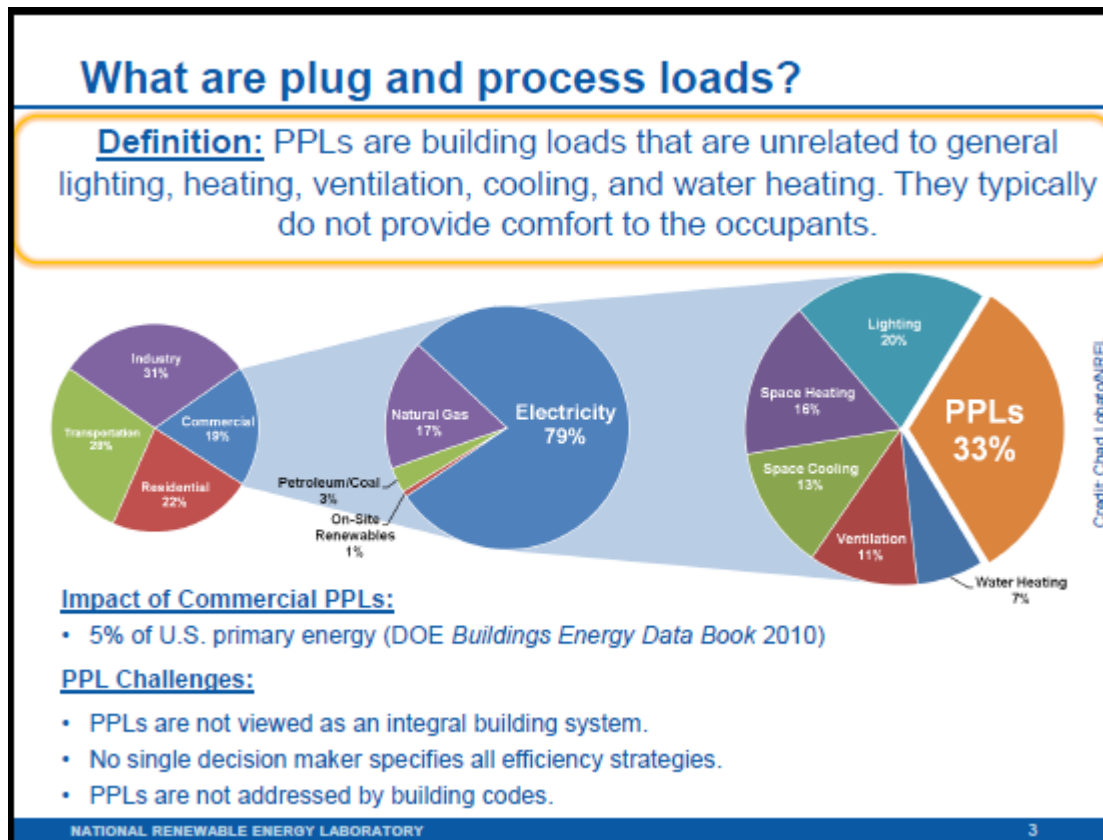
Existing Lease Technical Actions: “What Can I Do?”

Tenants in an Existing Lease – Technical Actions

- **Technical Actions – “What Can I Do?”**
 - Plug and Process Loads
 - Lighting
 - HVAC
- **Level of Intervention**
 - No-Cost/Low-Cost (no landlord involvement)
 - Some Cost (potential landlord involvement)

Tenants in an Existing Lease – Technical Actions: Plug and Process Loads

- Overview : What PPL's Are and Why They Matter



Learn More

Tenants in an Existing Lease – Technical Actions: Plug and Process Loads


- Learn More

GSA Public Building Service

GSA

FINDINGS, SEPTEMBER 2012

PLUG LOAD CONTROL



Advanced Power Strips Decrease Energy Consumption

Desk-based technologies and other electronics that plug into office building receptacles draw a considerable amount of power, some of it 24/7. In fact, "plug loads" account for roughly 25% of total electricity consumed within office buildings. GSA currently owns and leases more than 370 million square feet of building space in some 9,000 buildings nationwide. The size of this real estate portfolio alone suggests the possibility of enormous energy savings, if plug loads can be reduced. With this in mind, GSA's Green Proving Ground (GPG) program recently assessed the effectiveness of advanced power strips (APS) in managing plug-load energy consumption in eight of its buildings. Three types of plug-load reduction strategies were evaluated: schedule timer control, which allows the user to set the day and time when a circuit will be energized and de-energized; load-sensing control, which monitors a specific device's (master) power state and de-energizes auxiliary devices (slaves) if the master's power consumption dips below a predetermined threshold; and a combination of the two. Results underscored the effectiveness of schedule-based functionality, which reduced plug loads at workstations by 26%, even though advanced computer power management was already in place, and nearly 50% in printer rooms and kitchens.

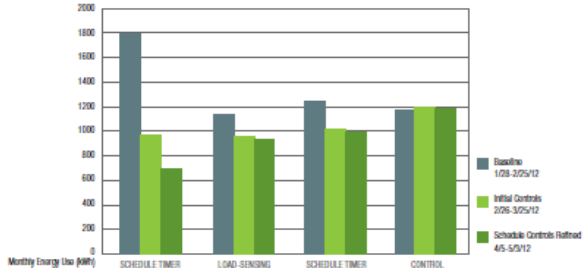
GPG The Green Proving Ground program leverages GSA's real estate portfolio to evaluate innovative sustainable building technologies. The program aims to drive innovation in environmental performance in federal buildings and help lead market transformation through deployment of new technologies.

FINDINGS

- SCHEDULE TIMER MOST EFFECTIVE** Use of the schedule timer control, which was the most successful of the three control strategies, resulted in an average energy savings of 48 percent. The largest savings were achieved when schedule timer controls were applied to devices that were powered 24/7. Printers and copiers were among those devices, as were kitchen appliances, such as coffee makers and water coolers.
- SHORT PAYBACK PERIOD** For the APS installed as part of this study, simple payback for the schedule timer was less than 8 years in all applications: kitchens, 0.7 years; printer rooms, 1.1 years; and miscellaneous devices, 4.1 years. Even in workstations, where power management was in place, payback was 7.8 years.
- SIMPLE CONTROL STRATEGIES ARE BEST** Occupant surveys revealed that the majority of users did not wish to have more control over their individual APSs. However, they were willing to program power strips to reflect their personal work schedules. Users also wanted an easily accessible manual override.
- JUSTIFICATION FOR WIDE DEPLOYMENT** Energy savings and low simple payback argue in favor of deployment of APS with schedule time control throughout GSA's portfolio.

Energy Reduction For Tested Control Strategies

Schedule timer controls resulted in an average-energy reduction of 48%



Control Strategy	Baseline (kWh)	Initial Controls (276-3/05/12)	Schedule Controls Rollout (45-5/12)	Other Strategy (120,000/12)
SCHEDULE TIMER	128,325	~95,000	~65,000	~100,000
LOAD-SENSING	128,325	~95,000	~90,000	~100,000
SCHEDULE TIMER + LOAD-SENSING	128,325	~100,000	~100,000	~100,000
CONTROL	128,325	~120,000	~120,000	~120,000

Green Proving Ground Program www.gsa.gov/gpg gpg@gsa.gov



Tenants in an Existing Lease – Technical Actions: Plug and Process Loads No Cost/Low Cost Strategies (limited landlord involvement)

General

- Unplug unused equipment
- Install smart power strips to control plug and process loads
- All new appliances = Energy Star

Refrigerators

- Replace inefficient refrigerators
- Check refrigerator door seals.
- Leave at least a couple of inches of open space behind your refrigerator and water cooler to ensure good airflow.
- Clean the condenser coils on your refrigerator and water cooler at least twice a year.
- Consolidate personal mini-refrigerators into a full-size shared refrigerator
- Replace glass front refrigerators with similarly sized solid-door refrigerators

Vending Machines

- Remove underused vending machines
- Replace aging, inefficient refrigerated vending machines
- Remove vending machine display lighting

Miscellaneous

- Upgrade equipment such as coffee pots, toasters, and microwaves
- Consider placing your water cooler and coffee pot on timers so that they only operate while employees are in the office.
- Remove or disconnect coolers from drinking fountains and bottled water coolers
- Replace aging drinking fountains and bottled water coolers

Tenants in an Existing Lease – Technical Actions: Plug and Process Loads No Cost/Low Cost Strategies(limited landlord involvement)

Computers

- Install and Enable Power Management Software on PCs
- Encourage Employees to Shut down Computers and Monitors at Night and on Weekends
- Disable computer screen savers and enable computer power management settings
- Select 80 PLUS Power Supplies for Desktop PCs and Servers
- Use Software to Turn Off Equipment Remotely

Monitors

- Dim the brightness control on monitors, or choose a monitor with automatic brightness controls

Task Lights

- Replace incandescent or fluorescent task lighting with 6-W LED task lighting

Phones

- Replace standard phones with 2-W max VoIP phones

Printers, Copiers, Scanners, Fax Machines

- Consolidate Printers
- Set double-sided printing and copying as the default for office equipment
- Turn off copy machines and printers during off-hours
- Enable the power option settings on multi-function devices to go into standby after 15 minutes of idle time 1

Tenants in an Existing Lease – Technical Actions: Plug and Process Loads Some Cost Strategies (potential landlord involvement)

Computers

- Replace standard desktop computers with 30-w maximum miniature desktop or laptop computers
- Use Desktop Virtualization and Thin Clients

Monitors

- Replace CRT monitors with 20-W maximum LED backlit LCD monitors
- Replace fluorescent backlit LCD monitors with 20-w maximum LED backlit monitors

Printers, Copiers, Scanners, Fax Machines

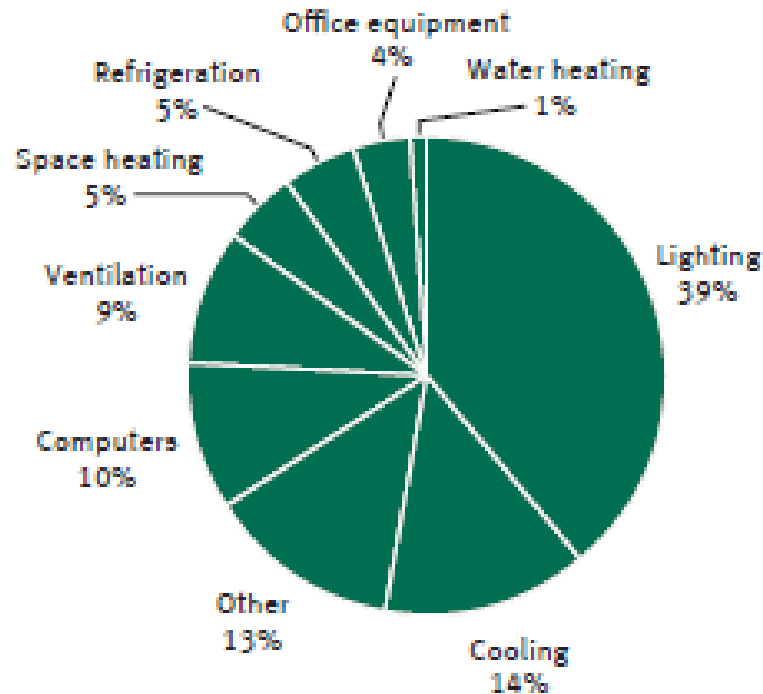
- Consolidate multiple personal devices into a single, shared multifunction device

Server Rooms

- Replace standard servers with blade servers
- Provide power to servers with efficient UPS and power distribution units
- Use virtualization on blade servers to increase energy savings
- Use a hot aisle and cold aisle containment cooling strategy

Tenants in an Existing Lease – Technical Actions: Lighting

- Overview :
- **Lighting – The Energy Use Elephant in the Room**
 - **Improving Lighting can Improve Comfort and Productivity**



Tenants in an Existing Lease – Technical Actions: Lighting No Cost/Low Cost Strategies (limited landlord involvement)

- Turn Off Lights When Not In Use
- Reduce ambient light levels and use task lighting
- Check overall light levels – ensure space is not over lit
- Label Light Switches
- Use LEDs for Exit Signs
- Switch to LED Holiday Lights
- Clean and Inspect Lighting Systems Regularly
- Install Motion Detectors
- Contract for Janitorial Services during Work Hours
- Only Light Occupied Areas during Cleaning
- Use Compact Fluorescent Lights (CFLs)
- Harvest Daylight

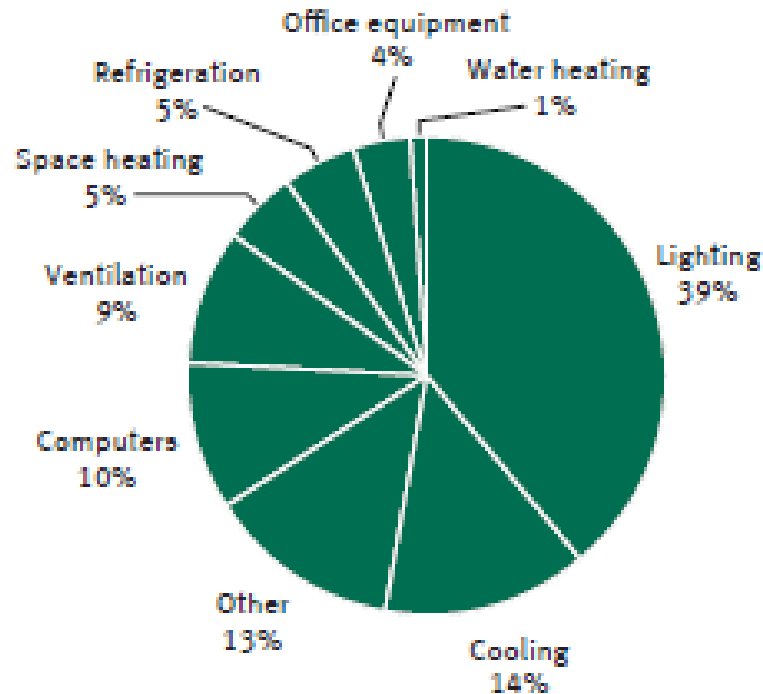
Tenants in an Existing Lease – Technical Actions: Lighting

- Strategies: What to Do to Reduce Lighting Energy Use
Some Cost (potential landlord involvement)
 - Install Daylight Sensors (Photocells)
 - Install Dual Switches and Dimmers
 - Use Timers or Photocells for Outdoor Security and Parking Area Lighting
 - Use High Pressure Sodium or Metal Halide Lamps for Exterior Lighting
 - Improve Interior Surfaces' Reflectance
 - Retrofit Lighting System – T-12's to T-8's or even T-5's



Tenants in an Existing Lease – Technical Actions: HVAC

- Overview :
- HVAC not as Important as Lighting ...but Still Significant
 - And...Improving HVAC Performance can also Improve Comfort and Productivity



Tenants in an Existing Lease – Technical Actions: HVAC No Cost/Low Cost Strategies(limited landlord involvement)

- Close blinds and curtains to keep summer sun out
- Open blinds and curtains to let the winter sunshine in
- Keep the Thermostat Set at an Appropriate Temperature
 - Set cooling to 74 degrees
 - Set heating to 68 degrees
- Clear the areas near vents of furniture, file cabinets and stacks of paper.
- Don't use space heaters
- Keep Exterior Doors Closed While AC is on
- Move Copiers and Servers Away from Thermostat
- Use Fans to Reduce the Need for Air Conditioning
- Only Heat and Cool Spaces Where Necessary
- Keep All HVAC Components Clean
- Use Window Coverings Effectively

Tenants in an Existing Lease – Technical Actions: HVAC

Some Cost Strategies(potential landlord involvement)

- Install programmable thermostats
- Get an AC Tune-up
- Consider an Energy Management System
- Weatherstrip around Windows and Doors

Tenants

Existing Lease Procedural Actions: “How Do I Do It?”

Tenants in an Existing Lease – Procedural Actions

- **Establish Vision**
 - Create charter document
 - Identify EE “champion”
 - Identify participants
 - Communicate vision and value to all stakeholders
 - Get an AC Tune-up
- **Create EE Team**
 - Outline team structure
 - Identify team members
 - Obtain commitments
 - Assemble team kick-off meeting
- **Set Goals and Identify Actions**
 - Conduct inventory
 - Analyze
 - Identify most promising EE opportunities

Tenants in an Existing Lease – Procedural Actions

- **Develop Action Plan**
 - Develop strategies for addressing the most promising EE opportunities
 - No Cost/Low Cost; Some Cost
 - Organize strategies into a step-by-step plan
- **Implement Plan**
 - Execute plan
 - Communicate progress
 - Engage employees
 - Track progress
- **Assess**
 - Collect data
 - Gather input from employees
 - Identify successes and areas for improvement
 - Communicate results

Example

- Conduct Inventory –

	A	B	C	D	E
37	Workstations	Desktop Computers			
38		UPS Units			
39		Laptop Computers			
40		Computer Monitors			
41		Task Lighting			
42		Decorative Lighting			
43		Phones			
44		Peripherals			
45		Personal Printers			
46		Personal Scanners/Copiers			
47		Personal Fax Machines			
48		Paper Shredders			
49		Space Heaters			
50		Fans			
51		Radios			
52		Electric Pencil Sharpeners			
53		Electric Staplers			
54		Electric Hole Punchers			
55		Label Makers/Printers			
56		Digital Photo Frames			
57	Cell Phone Battery Chargers				
58	Mini-Refrigerators				
59	Coffee Makers				
60					

Example

- Identify Opportunities

	A	B	C	D	E
37		Desktop Computers			
38		UPS Units			
39		Laptop Computers			
40		Computer Monitors			
41		Task Lighting			
42		Decorative Lighting			
43		Phones			
44		Peripherals			

Example

- **Identify Strategies**

No Cost/Low Cost

- Dim the brightness control on monitors, or choose a monitor with automatic brightness control

Some Cost

- Replace CRT monitors with 20-W maximum LED backlit LCD monitors
- Replace fluorescent backlit LCD monitors with 20-w maximum LED backlit monitors

- **Develop Action Plan**

Year 1

- Replace 50% of CRT monitors with 20-W maximum LED backlit LCD monitors

Year 2

- Replace remaining 50% of CRT monitors with 20-W maximum LED backlit LCD monitors

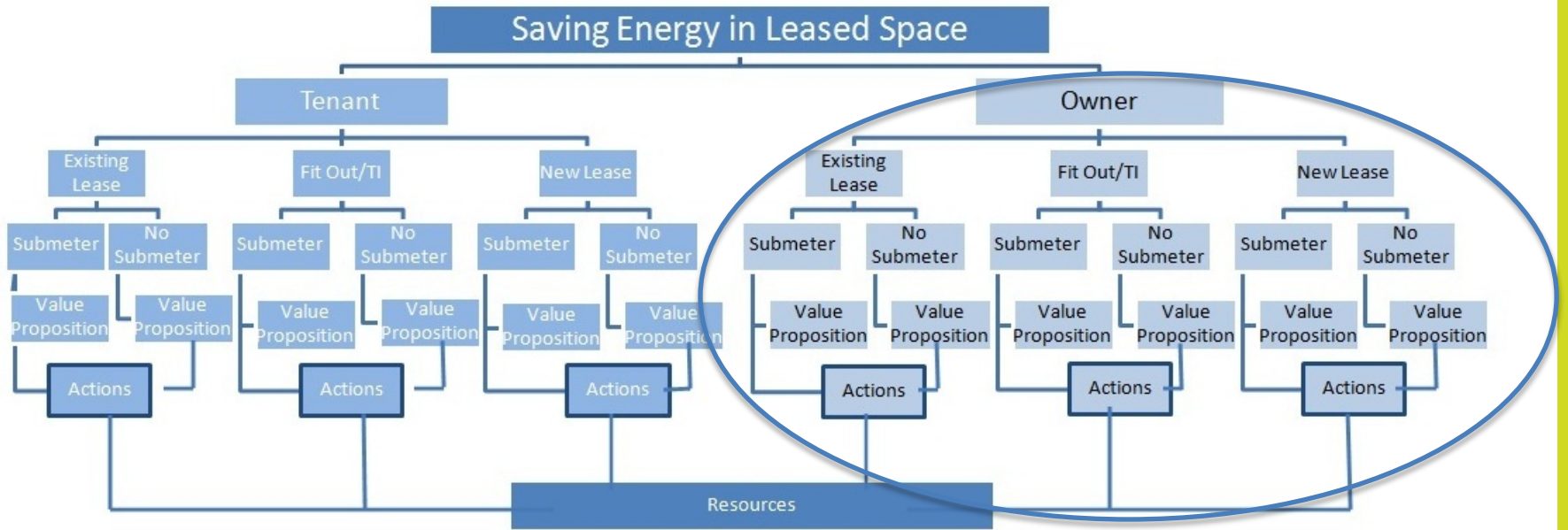
How To

Example

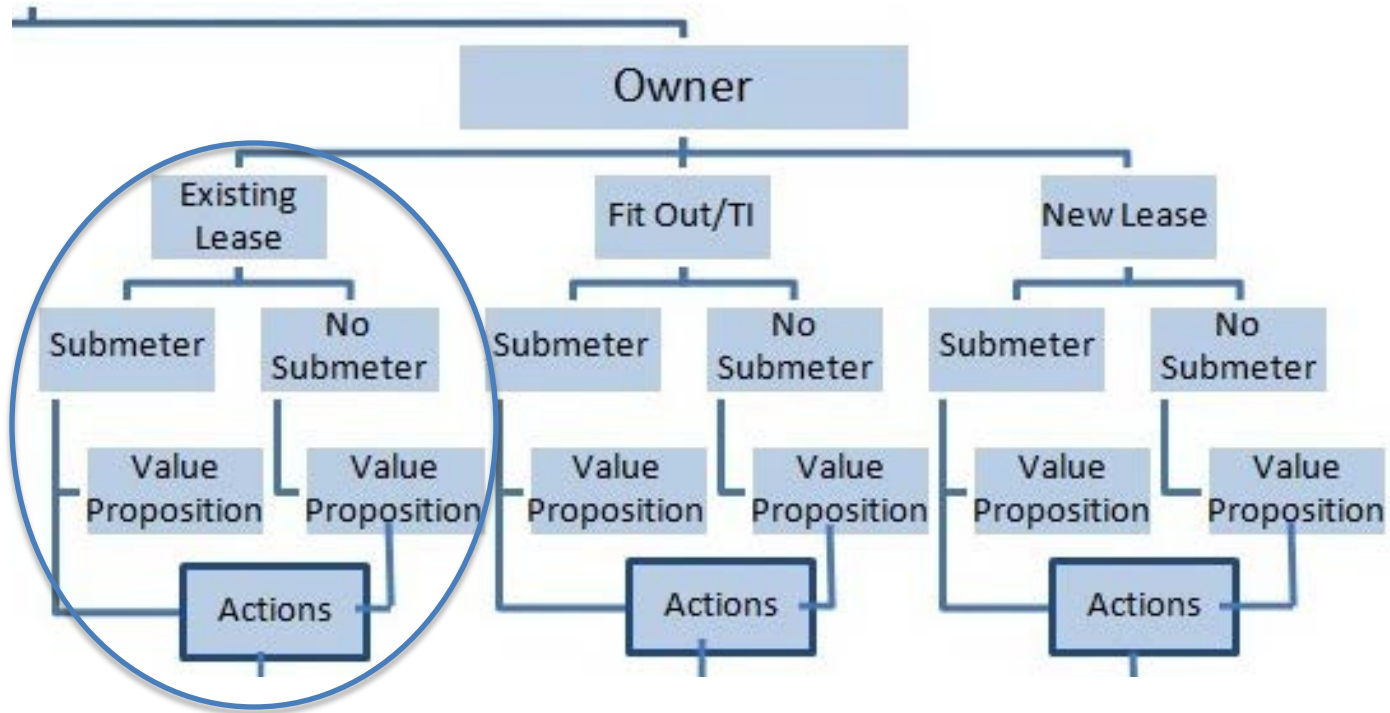
- “How To” Advice and Instruction



Conceptual Flow Chart



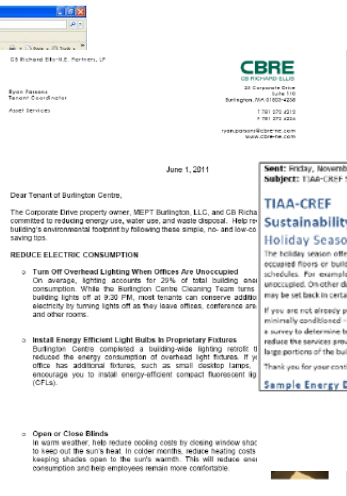
Owners



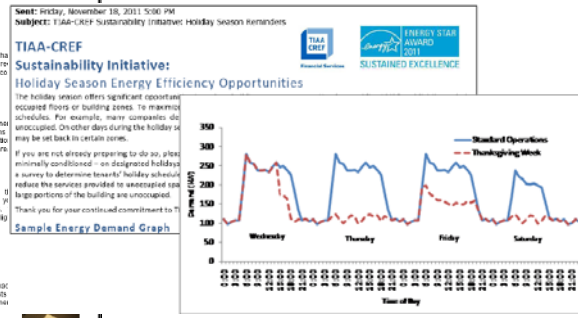
Owners/Property Managers Existing Lease Value Proposition “Why Should I Do This?”

Owner Dealing with Tenants in an Existing Lease – Value Proposition

- **Save Money by Helping Tenants Saving Energy**
 - Energy = 30% of typical office building energy use
 - No-cost/low-cost improvements can save 30% of this
 - Deeper improvements even more
- **Improve Corporate Image**
 - Increase favorable impression as the “right thing to do” in the community
- **Improve Corporate Competitiveness**
 - Relative to competitors who are not implementing an EE program in their properties
 - Increase favorable impression as the “right thing to do” in the community
- **Emulate the “Big Boys”**
 - National real property thought leaders are already moving in this direction

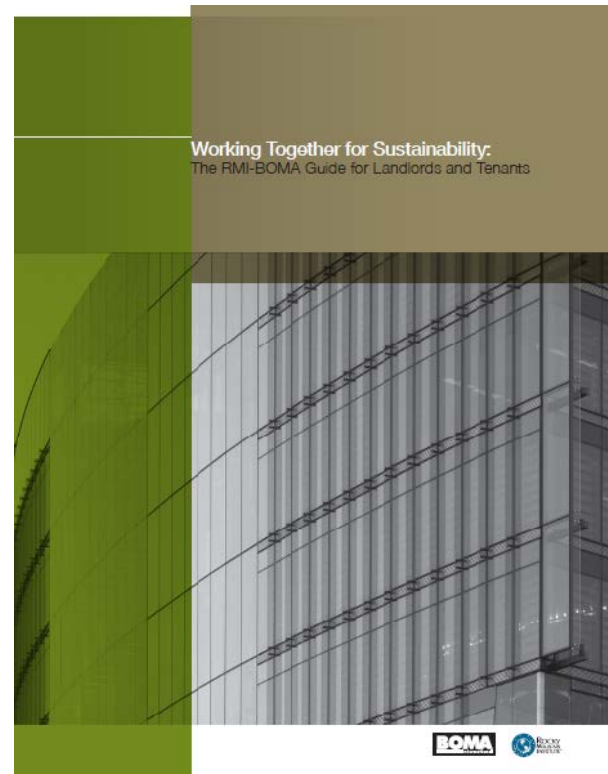


Learn More



Owner Dealing with Tenants in an Existing Lease – Value Proposition

- **Learn More**
- **Example – BOMA/RMI Guide**
 - Make Energy Use and Costs More Transparent
 - Engage Building Occupants in Saving Energy
 - Incorporate Energy Efficiency in Tenant Fit-Outs
 - Plan Ahead for Deep Energy Retrofits
 - Structure Agreements to Benefit Both Parties



Owners/Property Managers Existing Lease Technical Actions: “What Can I Do?”

Owner Dealing with Tenants in an Existing Lease– Technical Actions

- **Encourage Tenants To Implement No-Cost/Low-Cost Measures**

- Plug and Process Loads
- Lighting
- HVAC



- **Participate with Tenants to Implement Deeper Measures**

- Lighting System Upgrades
- Advanced HVAC
- Ventilation Upgrades




- **Explore Sub-Metering**

[Learn More](#)

Explore Sub-Metering – Learn More

BUILDING TECHNOLOGIES PROGRAM
ENERGY Energy Efficiency & Renewable Energy



Webinar Objectives

- Benefits of Tenant Submetering
- Business Case for Tenant Submetering
- General overview of meter types
- Tenant Submetering Strategies - Design considerations
- Tenant Submetering Strategies - Implementation
- Industry Resources
- Q&A
- Reference links

ENERGY Energy Efficiency & Renewable Energy

Tenant sub-metering is a broad term applied to the use of hardware and software to bill tenants in commercial facilities for their actual usage of energy. The goals of tenant sub-metering are: 1) to ensure that the owner recovers the cost of energy from tenants, and 2) to make sure that tenants with high energy usage are not subsidized

ENERGY Energy Efficiency & Renewable Energy

General Overview of Meter Types

- Meter Types
 - Feed-through meter (utility), Current-transformer meter, Electronic Non-socket meter (clamp-on CT)
- Communication enabled meters
 - Utility or sub metering device that uses hardwired, wireless or optical energy use data
- Most utilities are equipping commercial buildings with this type of meter based data presentation software



ENERGY Energy Efficiency & Renewable Energy

EIS Definition

- EIS provide
 - Web-accessible hourly whole-building electric data
 - Graphical/Visualization capabilities
 - Automated building energy analyses
- EIS are NOT
 - Most Energy Management and Control Systems (EMCS)
 - Equipment fault detection and diagnostic (FDD)
 - Energy information dashboards
 - Greenhouse gas (GHG) footprint calculators
- Vendors
 - Pulse Energy, Northwrite, McKinstry EEM Suite, Serious Energy, Emergent, EFT Energy Manager, Automated Energy, Energy ICT, Noveda, Schneider ION EEM, Interval Data Systems Energy Witness, DGLogik, FactoryIQ, Johnson Sustainability



Side content from: Jessica Granderson, LBNL

commercialbuildings.energy.gov

Owners/Property Managers Existing Lease Procedural Actions: “How Do I Do It?”

Owner Dealing with Tenants in an Existing Lease— Procedural Actions Establish a Tenant EE Engagement Program Energy Star Model (Among Others):



8 Great Strategies to Engage Tenants on Energy Efficiency



Learn more at [ene](#)

Recap

- 
- 1 Be Transparent & Open
 - 2 Leverage ENERGY STAR
 - 3 Raise Awareness & Educate
 - 4 Assess Current Practices & Identify Opportunities
 - 5 Partner & Empower
 - 6 Incentivize
 - 7 Host a Competition
 - 8 Communicate



Saving Energy in Leased Space Questions??

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