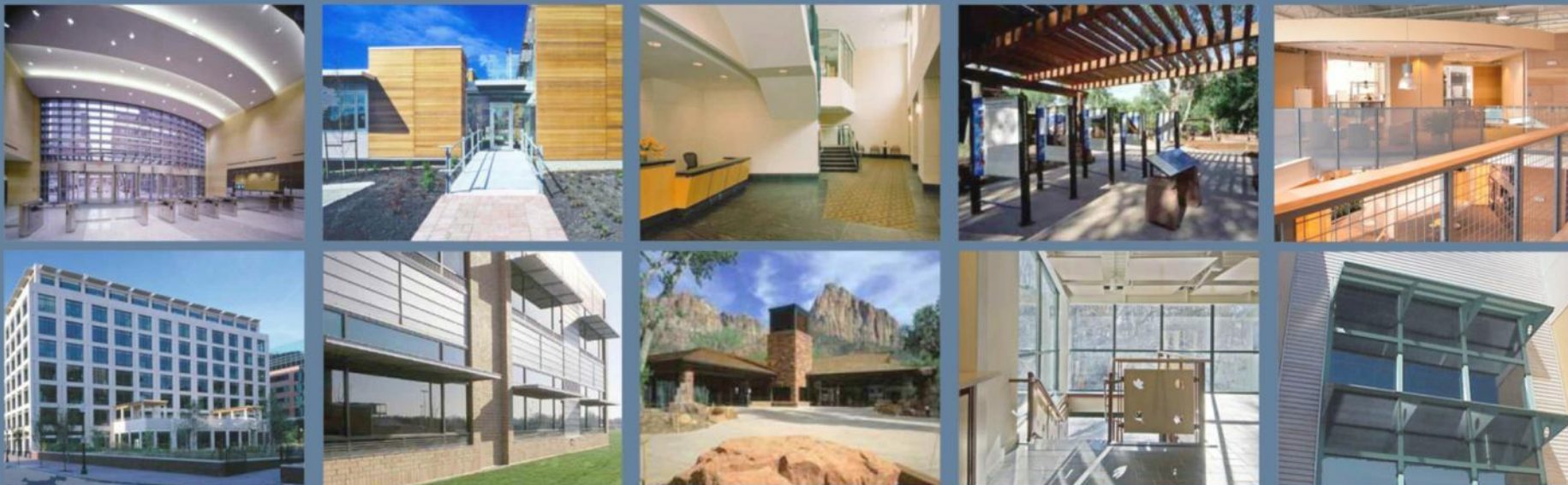


# Better Buildings Alliance

## Plug and Process Loads (PPL) Project Team Teleconference



March 29, 2016

Technical Lead Lab: NREL

- Introductions
- BBA PPL Technical Team Updates & Events
  - Updates
  - PPL events
  - New & upcoming publications
  - News from the field
- Technical Presentation
  - Plug Load Management in Healthcare; Pat Lydon, Legacy Health
- Additional Member Updates
- Open Discussion and Q&A

## Around the Phone

- Rois Langner will call out the organization name. Please state your name when your organization is called.



# PPL Team

## Updates & Events

## CONFERENCES:

- ACEEE National Symposium for Market Transformation
  - *The Past, Present & Future of Plug Load Strategies*
  - March 20-22, 2016 – Baltimore, MD
- DOE's Better Buildings Summit
  - *Engaging Building Occupants: How to Reduce PPL Energy Use*
  - Christine Wu, GSA; Moira Hafer, Stanford University
  - May 9-11, 2016 – Washington DC
- ACEEE Summer Study on Energy Efficiency in Buildings
  - Engaging Tenants in Reducing Plug Load Energy Use
  - Marta Schantz, Waypoint Building Group
  - August 21-26, 2016, Pacific Grove, CA

# 2016 SUMMIT REGISTER TODAY

WASHINGTON, DC ■ MAY 9-11

REGISTER TODAY >

<http://betterbuildingsolutioncenter.energy.gov/summit>

DRAFT – Do Not Cite

## NEW PUBLICATIONS & EFFORTS:

- Decision Guides for Plug and Process Load Controls



### Decision Guides for Plug and Process Load Controls

DECEMBER 2015



#### Decision Guide

Education Solutions	Strategy Considerations				Project Types				
	Total Cost	Potential Savings	Implementation Complexity	User Acceptance of Change	On It Now	Staged Rollout	Whole-Building Retrofit	New Construction	Low-Cost/Smart Solutions
Turn It Off Campaigns	\$	\$\$\$	○	☑	☑	☑	☑	☑	☑
Advanced Power Strips (APS)*	\$	\$\$\$	○	☑		☑	☑	☑	☑
Upgrade Equipment with Low-Energy or ENERGY STAR Certified Equipment**	\$\$	\$\$\$	○	☑		☑	☑	☑	☑
Use Built-In Low Power States	\$	\$\$\$	○	☑	☑	☑	☑	☑	☑
Design Strategies for Consolidating Plug and Process Loads (PPLs)***	\$\$	\$\$\$	○	☑		☑	☑	☑	☑
Integrate PPL Controls with Other Building Systems	\$\$\$	\$\$\$	○	☑		☑	☑	☑	☑
Additional Submetering and Control Options****	\$\$	\$\$\$	○	☑		☑	☑	☑	☑

Available resources for PPL control strategies.

#### Education Building-Specific PPL Resources

- Advanced Energy Design Guide for K-12 School Buildings Achieving 30% Energy Savings
- Advanced Energy Design Guide for K-12 Schools Achieving 50% Energy Savings
- Advanced Energy Retrofit Guide for K-12 Schools

Learn more at [betterbuildingsolutioncenter.energy.gov](http://betterbuildingsolutioncenter.energy.gov)



#### Available Resources

Turn It Off Campaigns	Advanced Power Strips	Low Power States
<p>Creating an awareness campaign</p> <p>Assessing and Reducing PPL in Office Buildings</p> <p>Creating an Energy Awareness Campaign: A Handbook for Federal Energy Managers</p> <p>Green Lease Library</p> <p>Steveson Flip the Switch! Will It You Will Campaign</p> <p>GSA Sustainable Facilities Tool - Plug Loads</p>	<p>GSA Advanced Power Strips for Plug Load Control</p> <p>Technical Specification for Advanced Power Strips</p> <p>How To Use Advanced Power Strips in an Office Setting</p> <p>List of Utility Incentives for Purchasing Advanced Power Strips</p> <p>NEEP Advanced Power Strips Test Protocol</p> <p>Using Energy Through Advanced Power Strips</p> <p>SA Sustainable Facilities Tool - Plug Loads</p> <p>Integrating the APS Specification for Commercial Buildings</p> <p>Using Office Plug Loads</p> <p>Plug Load Savings Through APS</p> <p>How to Know Advanced Power Strips</p>	<p>ENERGY STAR certified products</p> <p>Cost Savings Calculators for Energy-Efficient Products</p> <p>Low Power States</p> <p>Use Computers: Put Your Computer to Sleep</p> <p>Reducing Plug and Process Loads in Office Buildings</p> <p>Reducing Plug and Process Loads in Retail Buildings</p>
<p>GUIDE</p> <p>GUIDE</p> <p>GUIDE</p> <p>WEBSITE</p> <p>CASE STUDY</p> <p>TOOL</p>	<p>FACT SHEET</p> <p>SPEC</p> <p>GUIDE</p> <p>LIST</p> <p>TEST</p> <p>PROTOCOL</p> <p>GRAPHIC</p> <p>TOOL</p> <p>WEBINAR</p> <p>REPORT</p> <p>CASE STUDY</p> <p>TOOL</p> <p>FAQ</p>	<p>LIST/REFERENCE</p> <p>WEBSITE</p> <p>GUIDE</p> <p>GUIDE</p> <p>TOOL</p>
<p>carbonconnect.com/media/13089/ccg056_creating_an_awareness_campaign.pdf</p> <p>nrel.gov/docx/13081/24173.pdf</p> <p>energy.gov/eere/femp/downloads/creating-energy-awareness-campaign-handbook-federal-energy-managers</p> <p>greenlease.org/</p> <p>greenhouseinstitute.com/main.cfm?toc=flip-the-switch&amp;pid=weywi</p> <p>sftool.gov/team/about/426/plug-loads</p>	<p>gsa.gov/portals/content/164611</p> <p>www4.eere.energy.gov/alliance/files/default/files/FINAL%20200911%20.pdf</p> <p>nrel.gov/docx/genfile/1613800.pdf</p> <p>www4.eere.energy.gov/alliance/activities/technology-reductions_teams/plug-process-loads/utility-incentives-Report_APSTesting/protocol/FINAL.pdf</p> <p>nrel.gov/docx/1606/60461.pdf</p> <p>sftool.gov/team/about/426/plug-loads</p> <p>www4.eere.energy.gov/alliance/events/past-webinars/02/0815</p> <p>nrel.gov/docx/13081/24173.pdf</p> <p>sftool.gov/team/about/426/plug-load-control_506c.pdf</p> <p>nepo.org/sites/default/files/resources/APSCommonMacroconceptualFinal.pdf</p>	<p>energy.gov/products/certified-products</p> <p>energy.gov/eere/femp/energy-and-cost-savings-calculators/energy-efficient-products</p> <p>energystar.gov/index.cfm?c=power_mgr.pl_power_mgr_low_carbon_join</p> <p>nrel.gov/docx/13081/24173.pdf</p> <p>nrel.gov/docx/13081/24174.pdf</p> <p>sftool.gov/team/about/426/plug-loads</p>

[http://betterbuildingsolutioncenter.energy.gov/sites/default/files/attachments/Decision\\_Guides\\_for\\_PPL\\_Controls.pdf](http://betterbuildingsolutioncenter.energy.gov/sites/default/files/attachments/Decision_Guides_for_PPL_Controls.pdf)

## NEW PUBLICATIONS & EFFORTS:

- Decision Guides for Plug and Process Load Controls
- Myth-Busting Rumors About Advanced Power Strips
- Updated list of utility incentives for PPL controls
- Technology & behavioral study: thin clients vs. traditional computing systems
- New effort TBD



## NEWS FROM THE FIELD:

- New APS technologies for commercial buildings
  - Tier 2
  - Custom sensors
- Advanced Load Identification and Management for Buildings
  - <http://www.osti.gov/scitech/biblio/1172882>



**Better  
Buildings**  
U.S. DEPARTMENT OF ENERGY

# Legacy Health Plug Load Management in Healthcare

*Pat Lydon*

Our legacy is yours.



# Plug Load Management in Healthcare

Better Buildings Alliance Plug & Process  
Load Team

March 29, 2016

Pat Lydon

*Caring for patients... and the planet.*



EMANUEL Medical Center

GOOD SAMARITAN Medical Center

MERIDIAN PARK Medical Center

MOUNT HOOD Medical Center

SALMON CREEK Medical Center

RANDALL CHILDREN'S HOSPITAL Legacy Emanuel

LEGACY MEDICAL GROUP

LEGACY LABORATORY

LEGACY RESEARCH

LEGACY HOSPICE

## *Our mission*

### The mission and values of Legacy Health

#### Our legacy is good health for:

- Our people
- Our patients
- Our communities
- Our world

*“Be good stewards of our resources, ensuring access to care for all.”*

#### We will work as a team to demonstrate our values:

- **Respect** - Treat all people with respect and compassion
- **Service** - Put the needs of our patients and their families first
- **Quality** - Deliver outstanding clinical services within healing environments
- **Excellence** - Set high standards and achieve them
- **Responsibility** - Be good stewards of our resources, ensuring access to care for all
- **Innovation** - Be progressive in our thinking and actions
- **Leadership** - Serve as a role model of good health and good citizenship

# About Legacy

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- Nonprofit, locally owned, based in Portland
- Serving Oregon and Southwest Washington
- 6 hospitals on 5 campuses:
  - > Legacy Good Samaritan Medical Center (N Portland)
  - > Legacy Emanuel Medical Center (NW Portland)
  - > Randall Children's Hospital at Legacy Emanuel (NW Portland)
  - > Legacy Meridian Park Medical Center (Tualatin)
  - > Legacy Mount Hood Medical Center (Gresham)
  - > Legacy Salmon Creek Medical Center (Vancouver, WA)
- Approx. 4.5 million sq. ft.



# Site Profiles

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- Buildings range in age from early 1900's through 2015
- Diverse building types:
  - > Acute care hospitals
  - > Medical office buildings
  - > Administrative office buildings
  - > Warehouses
  - > Research center
  - > Centralized laboratory services
  - > Old houses
- Diverse space use within each campus:
  - > Patient beds; a lot like a lodging/hotel operation
  - > Cafeterias; a lot like retail food establishments
  - > Warehouse
  - > Data centers
  - > General office

What percent of our operating expense do you think our utilities (electricity, natural gas, water) represent?



Answer:

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0.73%

...and that includes water & sewer



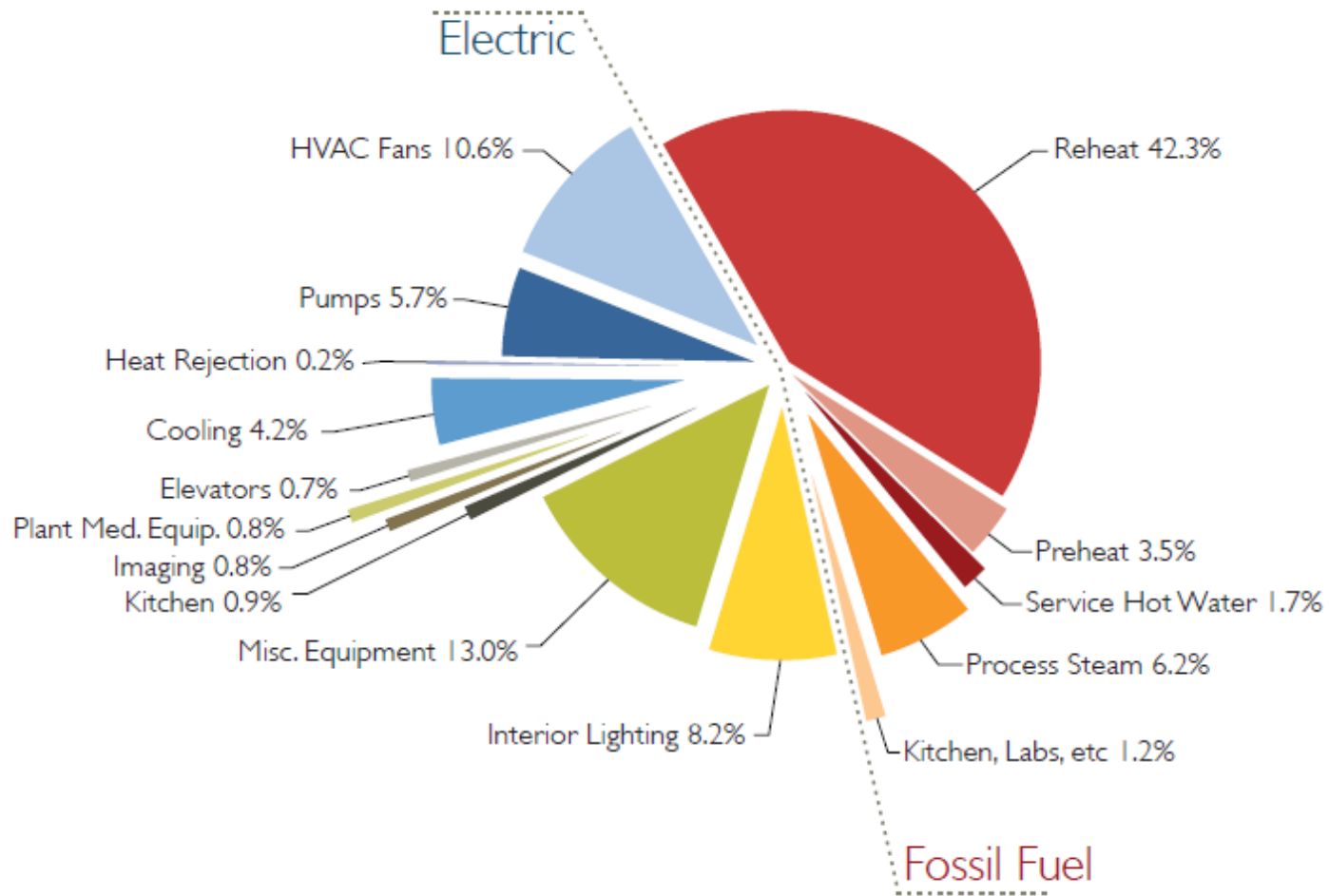
# Why is energy efficiency important to us?

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- Very energy intensive buildings
  - > EUI range from 81 to 304 (kBtu/ft<sup>2</sup>)
  - > Hospital EUI range from 168 – 220 (kBtu/ft<sup>2</sup>)
  - > 24x7x365 operation
  - > High air change requirements
  - > Humidity control requirements
  - > Highly regulated environment
  
- Purchased energy
  - > Electricity (grid)
  - > Natural gas
  - > Wind power (utility programs)
  
- Onsite generation
  - > One PV solar at Emanuel; 16 kW

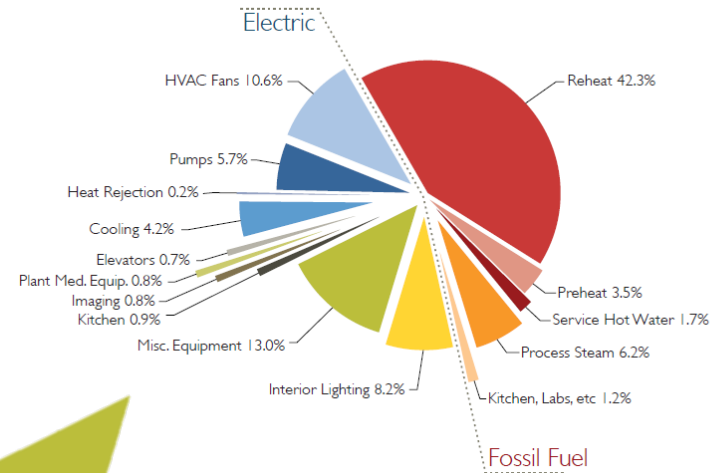


# Where does plug load management fit in priorities?



# Relatively high priority... but...

Misc. Equipment = office and medical equipment, receptacle loads, portable task lighting.



Plug Load (Misc. Equipment) represents 13% of total energy use; 28% of electrical use.

# Plug load management challenges

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## Challenges:

- Many more points of use that require influence/control
  - > Large building systems are operated by a small number of people.
  - > Plug load is influenced by many, many people.
- PC power management... should be simple... but...
  - > Fear of data loss
  - > Some applications don't recover "gracefully" from sleep/hibernate mode
- Plug strips (relocatable power taps) ... should be simple... but... must be medical grade
  - > [http://ul.com/wp-content/uploads/2014/04/ul\\_RelocatablePowerTapsInHealthCareFacilities.pdf](http://ul.com/wp-content/uploads/2014/04/ul_RelocatablePowerTapsInHealthCareFacilities.pdf)

# Plug load management successes

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## Successes:

- Increased deployment of laptops; lower energy use per device
  - > but also deployed dual displays
- Specify Energy Star equipment whenever possible
- Including energy efficiency requirements in vending machine contracts

# Plug load management

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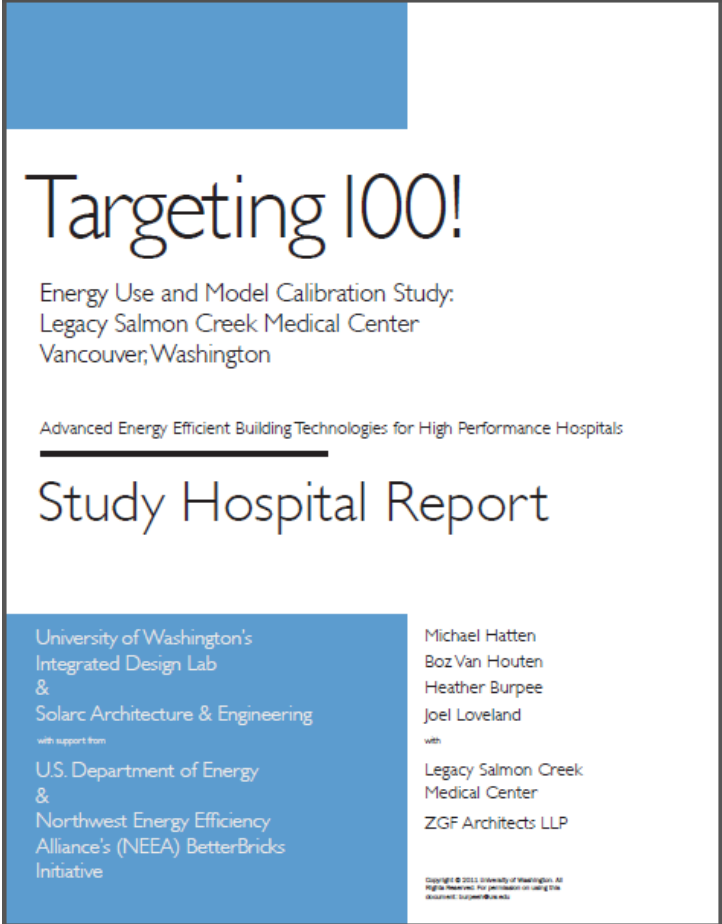
## What we could try:

- Find sources for medical grade occupancy sensing RPTs (assuming they are available)
- PC power management in non-clinical areas
  - > At least displays if not CPU
- Find easier/less controversial opportunities in medical office buildings (MOBs)
- Improve our tenant lease language to clarify energy and building comfort standards

What have YOU tried?

# Source of truth

<http://www.cidseattle.com/resources/>



**Targeting 100!**

Energy Use and Model Calibration Study:  
Legacy Salmon Creek Medical Center  
Vancouver, Washington

Advanced Energy Efficient Building Technologies for High Performance Hospitals

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**Study Hospital Report**

University of Washington's  
Integrated Design Lab  
&  
Solarc Architecture & Engineering  
with support from  
U.S. Department of Energy  
&  
Northwest Energy Efficiency  
Alliance's (NEEA) BetterBricks  
Initiative

Michael Hatten  
Boz Van Houten  
Heather Burpee  
Joel Loveland  
with  
Legacy Salmon Creek  
Medical Center  
ZGF Architects LLP

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abstract, contact: [surped@uw.edu](mailto:surped@uw.edu)

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Pat Lydon  
Legacy Health  
[plydon@lhs.org](mailto:plydon@lhs.org)



## Questions and Member Updates

- Any updates on progress in reducing PPLs in your building or portfolio of buildings?
- Comments/questions on the BBA PPL Team updates?
- Comments/questions on the technical presentation?
- What information would members like?
- What are interesting topics for future projects?



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Space Conditioning

[Plug & Process Loads](#)

Food Service

Refrigeration

### Plug & Process Loads

Plug and Process Loads (PPL) consume about one third of primary energy in U.S. commercial buildings. PPLs cover a wide variety of electronic, computer, refrigeration, and cooking devices, including equipment essential to information processing, medical treatment, and food service businesses. Each of these categories contains hundreds of types of devices.

PPLs account for an increasingly large percentage of commercial building energy use. The primary energy use associated with PPLs is projected to grow from 30% to 35% of total commercial building energy use between 2010 and 2025, due to an increase in the number of plug-in devices and the energy intensity of those devices. Due to the wide range of commercial building types, uses, sizes, and vintages found in the United States, PPL

<https://www4.eere.energy.gov/alliance/activities/technology-solutions-teams/plug-process-loads>

# Thank you!

Rois Langner  
National Renewable Energy Laboratory  
[Rois.Langner@nrel.gov](mailto:Rois.Langner@nrel.gov)  
Phone: (303) 275-4329