



**Pacific Northwest**  
NATIONAL LABORATORY

Proudly Operated by **Battelle** Since 1965

# ***Rock the Watt: Lessons Learned From a Conservation Campaign at Pacific Northwest National Laboratory***

KATHLEEN JUDD

Pacific Northwest National Laboratory

**Behavior, Energy and Climate Change Conference**

October 20, 2015

U.S. DEPARTMENT OF  
**ENERGY**

PNNL-SA-112963 |

# Pacific Northwest National Laboratory Behavior Change Case Study

## ► About PNNL

- 4,300 scientists, engineers and non-technical staff
- 80 buildings on main campus

## ► *Rock the Watt* energy conservation campaign

- 3-month campaign in FY2015
- Implemented by Sustainability Program
- 14 buildings on main campus participated



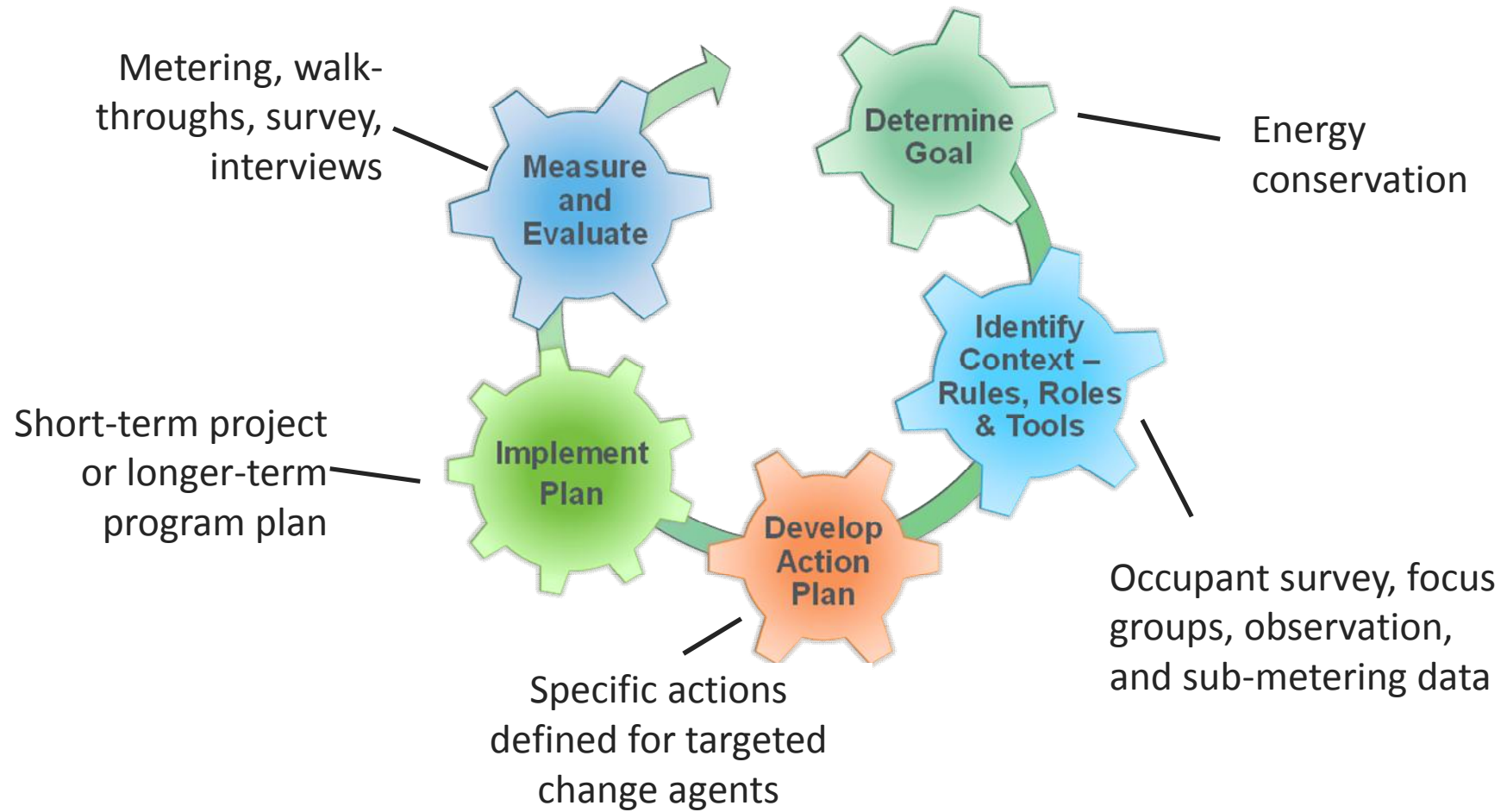
# Lessons Learned from Behavior Change Case Studies

- ▶ Know your audience and what drives their behavior
- ▶ Call for actions that are specific and relevant
- ▶ Use multiple strategies to educate, enable, and engage
  - Use known and trusted sources to deliver messages, such as a building-level advocate
  - Measure and share results



# *Manage behavior change projects like an energy conservation measure*

## **Institutional Change and Continuous Improvement Cycle**



# Know your audience and the opportunity for change

- ▶ Gathered input from facilities management and occupants during office building walk-throughs
- ▶ Developed laboratory sustainability assessment checklist and evaluated representative set of labs

PNNL Sustainable Laboratory Assessment Form			
Building and Room #:			
Date of Assessment:			
Lab Type (Biological, Chemical, Instrumentation):			
Cognizant Space Manager:			
Number of Lab Users:			
Typical Hours of Use:			
1 Energy		Answer	
1.3 Cold Storage			
Are cold storage materials labeled with clear descriptions of contents, ownership, and expiration?	Y	N	N/A
Are all of the materials currently in cold storage associated with active uses or stored because of archiving requirements?	Y	N	N/A
Are the materials in cold storage arranged to maximize storage capacity?	Y	N	N/A
Are freezers cleaned out, defrosted and maintained (e.g. coils vacuumed) on a regular schedule? How often? Who is responsible?	Y	N	N/A
Do the seals on any refrigerators or freezers need to be replaced? Check the seals on your refrigerators and freezers by seeing if they can hold a dollar bill without falling out.	Y	N	N/A
Is there any opportunity for better waste heat management e.g., by consolidating cold storage equipment, creating a hot aisle behind equipment?	Y	N	N/A

## *Call for specific and locally relevant actions*

### **In Office Spaces**

- ▶ Choose power settings that put **computers to sleep** when away
- ▶ Install a **smart power strip** in workstations with 3+ peripherals
- ▶ Enter a service request to fix HVAC issues and eliminate **space heaters**
- ▶ Remove **personal refrigerators** and use the shared refrigerators
- ▶ Turn off lights when not in use or when **natural or task lighting** is adequate
- ▶ Use networked printers and remove **personal printers**

### **In Lab Spaces**

- ▶ Close the sash on **fume hoods**
- ▶ Turn off **unused equipment** or request a timer
- ▶ “Chill up” **ultra-low temperature freezers** from -80°C to -70°C
- ▶ Label, inventory, and clean out expired samples in cold storage
- ▶ Choose **high efficiency refrigerators** and freezers when purchasing





# Define strategies that educate, enable, and engage

## Educate

- Let occupants know what actions to take and why it matters (e.g. \$ saved, equipment life extended)

## Enable

- Removed barriers to action (e.g. limited space in shared refrigerators)
- Aligned key institutional stakeholders on messaging (e.g. IT support for computer power mgt)

## Engage

- Relied primarily on building sustainability champions (BSCs) to interface with occupants
- Encouraged *personal* outreach when possible
- Created a competition across buildings

**WIN A PRIZE!**  
**ROCK THE WATT**


**50 Years**  
1965-2015

You may be eligible for a Sustainability t-shirt or tote bag. Contact your Building Sustainability Champion or Sustainability@pnnl.gov if you take energy saving actions between now and January 2015.

**ROCK THE WATT**

PNNL's weekly energy bill averages **\$100,000**. We can all do our part to lower our bills at work, just like at home. Every little bit helps!

**COMPUTERS**

  
If 1 in 4 people switch computer power settings from always on to "go into sleep mode" after 30 minutes  
**= ~\$20,000 savings/year**


**LIGHTING**

If 1 in 8 people turn off overhead lights and use task lighting for part of the day  
**= ~\$4,300 savings/year**

**SPACE HEATERS**

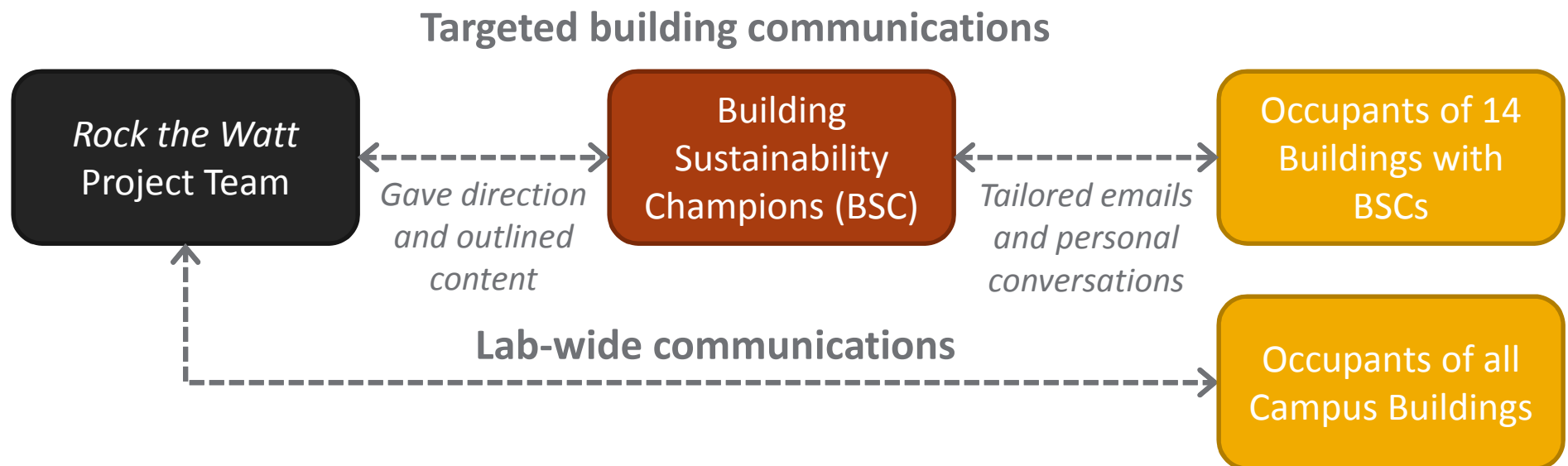
If 100 people work with Facilities to address heating issues in their workspace and eliminate space heaters  
**= ~\$2,400 savings/year x 100**

**COMPACT REFRIGERATOR**

  
If 100 people start using shared refrigerators and unplug private refrigerators  
**= ~\$1,400 savings/year x 100**

## Use known and trusted sources to deliver messages

- ▶ BSC correspondence with occupants frequently prompted dialogue
  - Occupants shared > 50 suggestions with BSCs; many resulted in energy savings
- ▶ 5 lab-wide messages reached up to 4,000 people; received one direct response





# Example Communications and Tools

## WIN A PRIZE! ROCK THE WATT

### LABORATORY SPACES ROCK THE WATT

"Rock the Watt" is an energy reduction challenge for PNNL staff in Richland, running from October through January. Each month we'll be taking note of energy conservation actions and energy savings. Tell us about your energy-saving actions at [sustainability@pnnl.gov](mailto:sustainability@pnnl.gov) and you could win a cool prize.

### Building XYX Energy Use

If 100 people work with Facilities to address heating issues in their workspace and eliminate space heaters = **~\$2,400 savings/year**

More

**Step 1:**  
Select **CONTROL PANEL** or **SYSTEM PREFERENCES (Mac)** from the **START** menu.

**Step 2:**  
Select **POWER OPTIONS** or **ENERGY Saver** (Mac) from the **CONTROL PANEL** window.

**Step 3:**  
Click on the **Change settings for the selected power plan** link.

#### FUME HOODS

- ▶ Be safe and save energy. Shut the sash when fume hoods are not in use.
- ▶ Have a fume hood in your lab that's not being used for containment? Make a service request if it could be taken out of service until it's needed again. One fume hood can use as much energy as three typical American households use in a year!

#### COLD STORAGE

- ▶ Clean out old, unneeded samples and look for opportunities to consolidate and unplug refrigerators or freezers. You'll free up some lab space.
- ▶ Map the contents of your freezer and place it on the door (group frequently used items). You'll save time and energy, holding the door open less when getting materials.
- ▶ Running an ultra-low temperature freezer? Join scientists from federal and university labs nationwide who are "chilling up" from -80°C to -70°C. Often, samples do not require -80 °C. This will extend the life of your freezer and save energy.
- ▶ Service units regularly for a longer freezer life and energy savings. Submit a service request for help.
- ▶ In the market for a new freezer? Contact the B2B Program for high efficiency options.

#### TURN OFF EQUIPMENT

Turn Off all Unused Equipment Such As Ovens, At Night. Request A Timer And Forget About It.

#### CONSOLIDATE LOADS

Do you run autoclaves or lab dishwashers? Consolidate loads whenever possible—be neighborly and ask your neighbors if they have items.

Interested in helping your building win the Energy Challenge? Volunteer to be a Building Sustainability Champion for the next three months and we'll give you everything you need to get started. Contact [sustainability@pnnl.gov](mailto:sustainability@pnnl.gov).

People switch computer power from always on to "go into sleep" mode for 30 minutes = **1000 savings/year**

**Congratulations and thank you!**

Pick up a free Sustainability t-shirt or tote bag:  
MATH lobby (east), Jan. 7, 8-9am  
LSB lobby (west), Jan 8, 8-9am

**Making a Difference**

Karen Smith, who has been turning off her computer at night, Don Jones, who has made a request to the Building Management regarding office temperatures, and Ann Lewis who have been turning off unoccupied meeting room lights.

**Win a Prize**

Help us measure our impact in NSB. Please email me with any actions you've taken as a result of the 3-month Rock the Watt challenge and you'll be entered to win a prize!

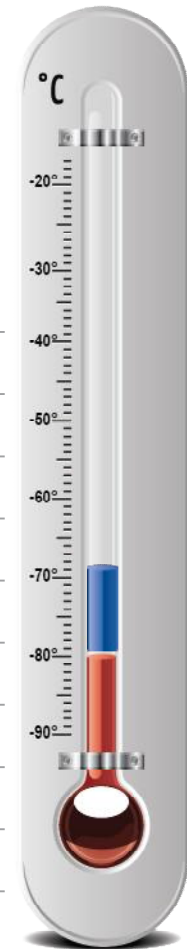
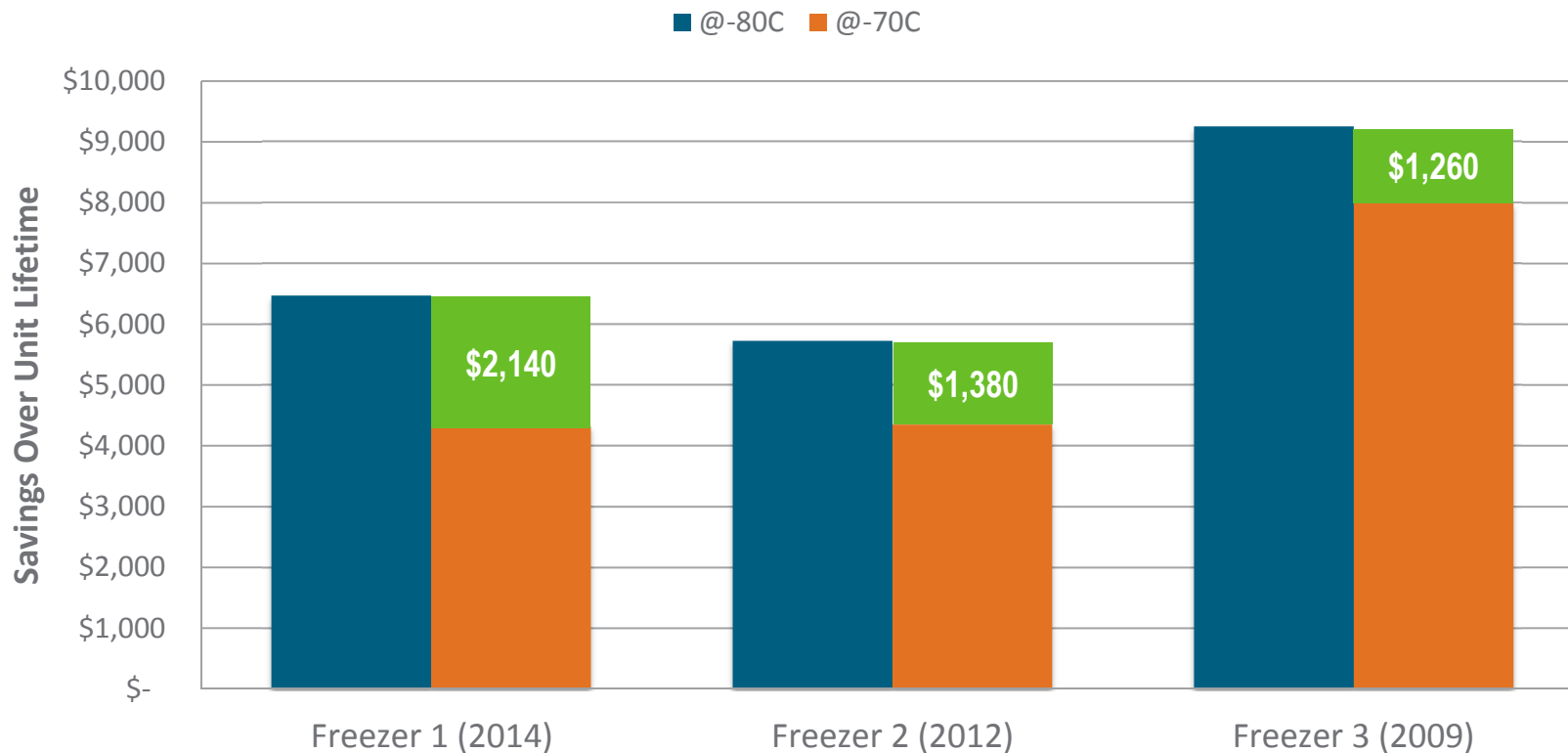
If 100 people start using shared refrigerators and unplug private refrigerators = **~\$1,400 savings/year**

Information on actions with impact.

## Take time to measure and evaluate impact

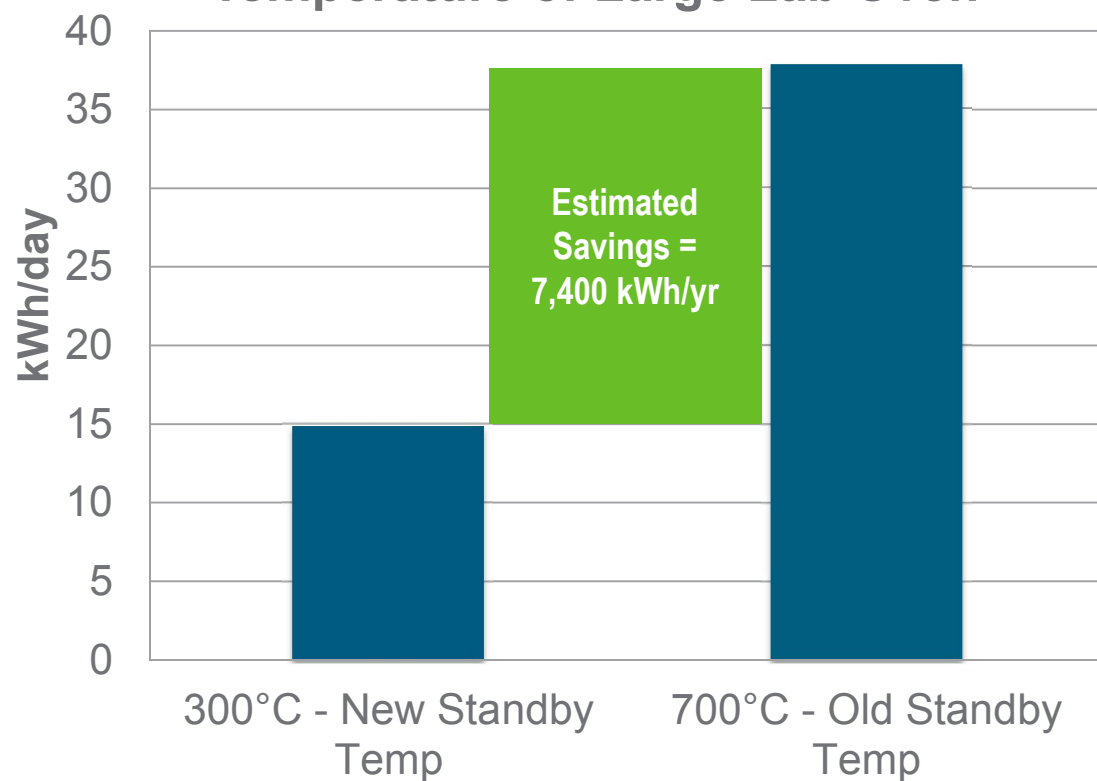
*“Based on feedback from senior staff and the internet search I performed, I found no reason to not make this change.” –PNNL scientist who turned up the temp on a freezer*

### Impact of 10°C Change in Ultra-Low Temp Freezer Setpoints



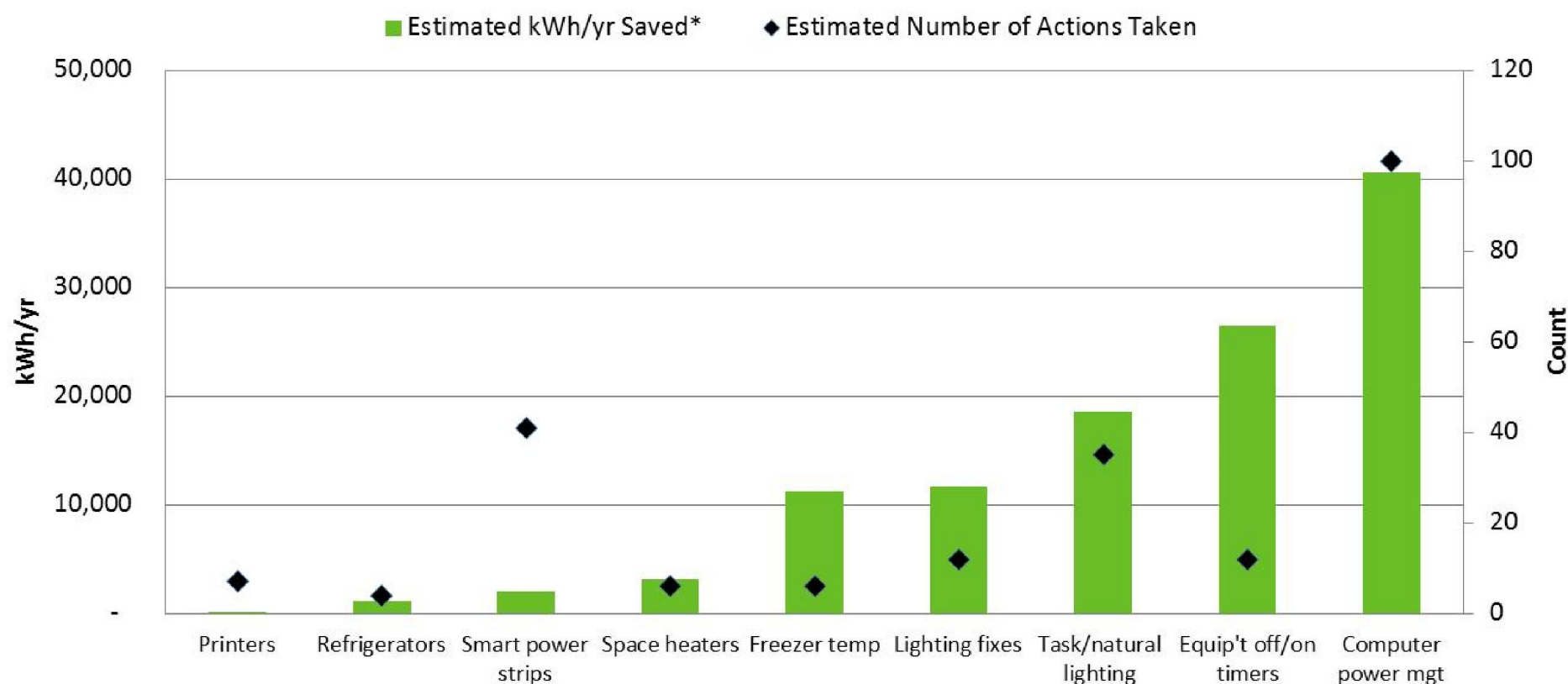
## Take time to measure and evaluate impact

Impact of Changing Standby Temperature of Large Lab Oven



# Estimated Minimum Impact of *Rock the Watt* Campaign

- ▶ 200 actions taken in 3 months – many unsolicited
- ▶ 117,000 kWh/year annualized\*
- ▶ Does not account for post-campaign changes

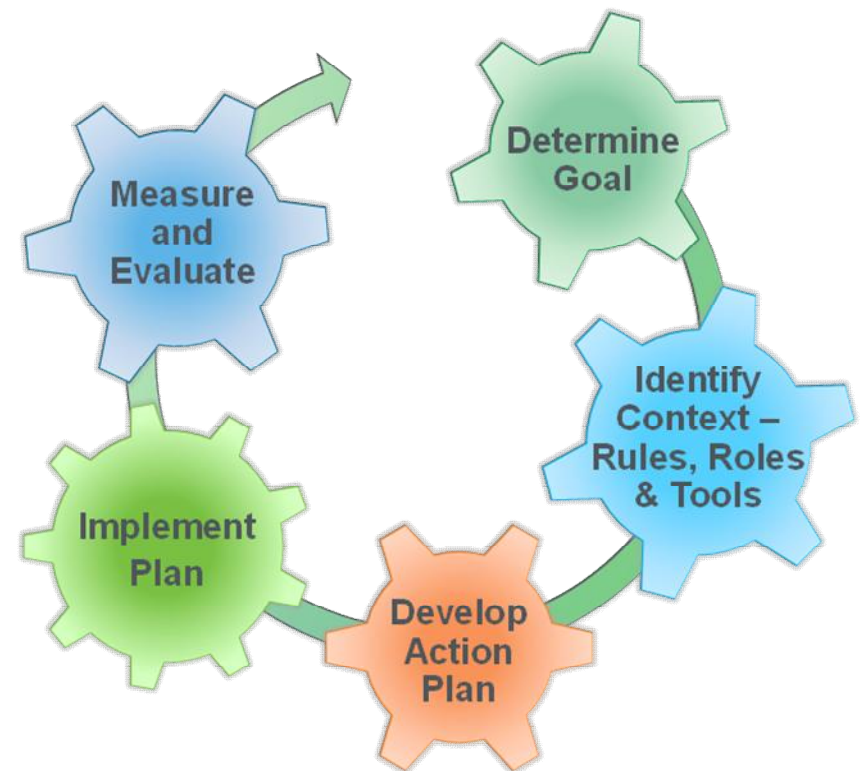


\*accounts for reduced cooling loads part of the year



# Conclusions about Behavior Change Campaigns

- ▶ Plan, implement, and evaluate like any energy project
  - Know your buildings and occupants
  - Focus on actions that matter
  - Use strategies that educate, enable *and* engage
  - Expect an ROI and evaluate impact
  - Share results to prompt further action and convey the value of behavior change



# Behavior Change Campaigns are One Piece of the Institutional Change Puzzle

- ▶ **Empowerment**, e.g. funding for employee-generated ideas through “Sustainability Pay\$”
- ▶ **Information**, e.g. cold storage best management practice guidance
- ▶ **Feedback**, e.g. metering equipment to show impact
- ▶ **Incentives**, e.g. \$800 high efficiency freezer utility incentive
- ▶ **Leadership**, e.g. briefings on sustainability performance
- ▶ **Commitment**, e.g. asked R&D lab operations managers to commit to taking sustainability actions
- ▶ **Policies and Procedures**, e.g. integrating sustainability checks into existing safety checks
- ▶ **Communications**, e.g. Annual Sustainability Report, newsletter





# Questions?



**Kathleen Judd**

Senior Research  
Scientist and Team Lead

BUILDING  
PERFORMANCE TEAM

Kathleen.Judd@pnnl.gov

**[www.pnnl.gov](http://www.pnnl.gov)**