

Moving from the Laundry List to the Short List: *Using Behavioral Approaches to Cut Electricity Consumption in Commercial Buildings*



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Talking Points

- ❖ What you will talk about.
- ❖ Why it's important.
- ❖ What your research project shows.
- ❖ How it will change the world.

Topic of my Talk

Commercial Building Demonstration Project

Goals:

- To demonstrate the importance of tenant behavior in commercial office buildings.
- Reduce electricity consumption.

Program Structure

1. Worked with a building management company to identify a commercial office building with floor-level sub-metering and a willing participant organization.
2. Selected a second floor in the building to serve as a control group.
3. Gathered information about current practices on test floor and historical energy consumption on both.
4. Designed an intervention strategy.
5. Implementation Period – 3 months.
6. Evaluated effectiveness and persistence.

Why It's Important

1. Results / Outcomes
2. Method of understanding the problem and opportunity
3. Use of a Multi-modal or stacked approach to program design

What the Research Project Shows

Three Reasons:

#1) Measurable Electricity Savings

		Pre-program	Watt Watchers Program				
Experimental Floor		Jan-Feb	March	April	May	June	Oct
Use (kwh)	WD	1310.2	1142.8	1039.4	965.9	982.9	921.6
	WE	1005.0	940.0	890.9	871.4	908.8	670.5
Savings	WD		-12.8%	-20.7%	-26.3%	-25.0%	-29.7%
	WE		-6.5%	-11.4%	-13.3%	-9.6%	-33.3%
Comparable Floor		Jan-Feb	March	April	May	June	Oct
Use (kwh)	WD	1532.9	1454.1	1411.4	1373.9	1378.9	1389.0
	WE	1388.2	1306.3	1248.7	1250.9	1250.6	1223.5
Savings	WD		-5.1%	-7.9%	-10.4%	-10.0%	-9.4%
	WE		-5.9%	-10.0%	-9.9%	-9.9%	-11.9%
Net Savings			March	April	May	June	Oct
	WD		-7.6%	-12.7%	-15.9%	-14.9%	-20.3%
	WE		-0.6%	-1.3%	-3.4%	0.3%	-21.4%

Why It's Important

1. Results / Accomplishments
2. Method of understanding the problem and opportunity
3. Use of a Multi-model or stacked approach to program design

What the Research Project Shows

#2) Method of Understanding the Problem Matters:

Behavior Audit Protocol
+
Sociological Imagination

What is a Behavior Audit?



Rather than assume... Research

Observation

Space layout, available technologies, how the space is used, what people wear, temperature settings, individual practices (turning off lights, computers, monitors,) etc.

Interviews

Attitudes, values, practices of decision makers and influencers.

Historical, Interval-level Energy Data

Baseline energy consumption, historical patterns, weekday vs weekend use.

Focus Groups

Office dynamics, organizational culture and values, key actors, organizational structure, potentially contentious issues and concerns, etc.

Surveys

Individual work patterns, technology use patterns, attitudes, values, knowledge and concerns.

What the Research Project Shows

The Sociological Imagination
(C. Wright Mills)

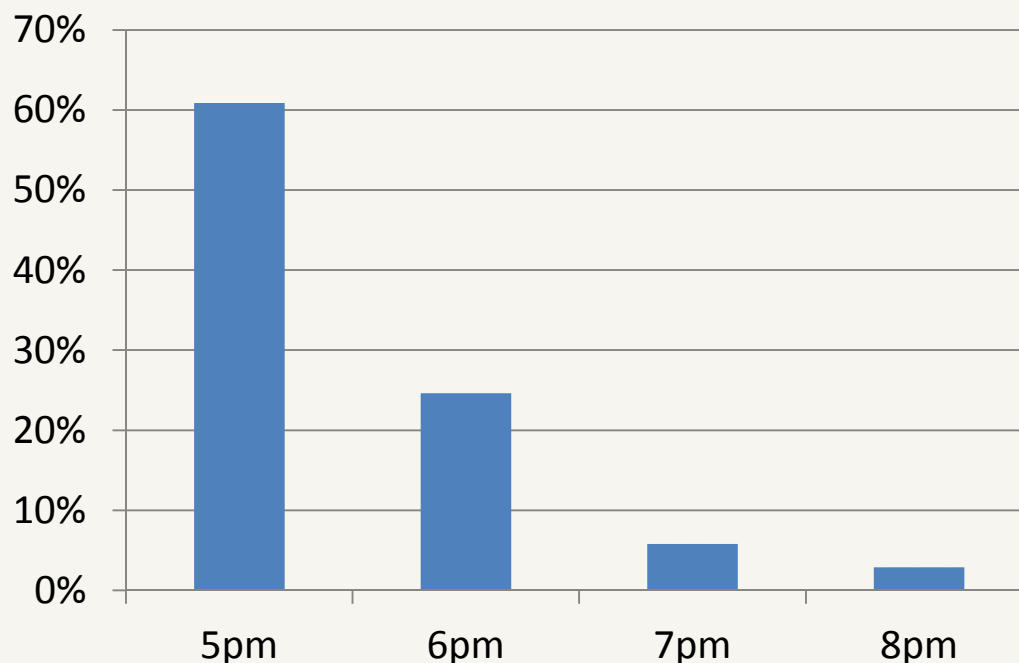
Looking for the *strange in the familiar*.

Here is part of what we found...

Audit: Work Patterns

Staying Late

Percent of staff who report staying in the office until the specified time at least once per week on average.



Only 25% of staff reported still being in the office after 6pm at least one day per week.

Yet most of the lights are left on until everyone is gone.

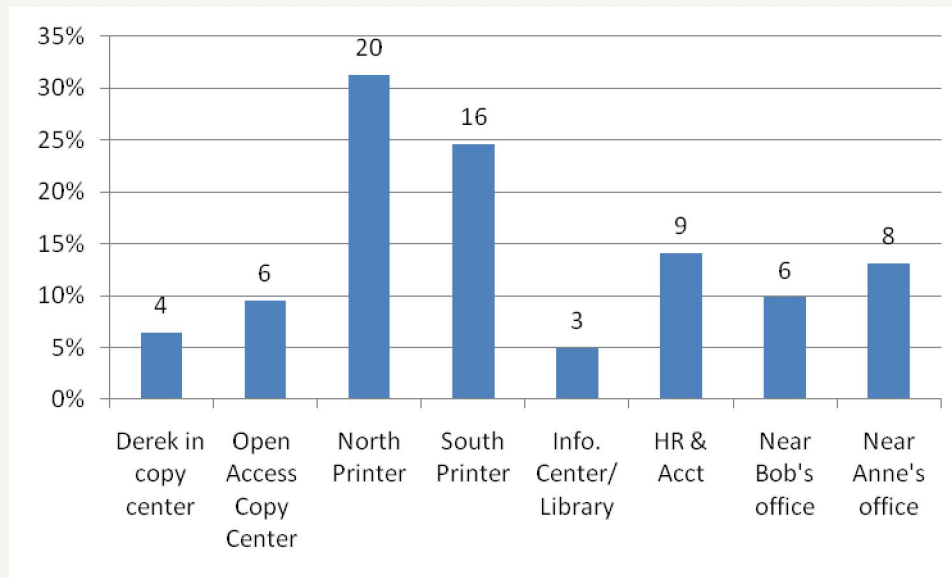
Audit: Office Technologies

Use of Copiers and Printers

98% of staff think there are enough or too many printers/copiers.

76% of staff print 50 or fewer pages per week.

48% of staff rarely or never have to wait for a print job (44% occasionally wait).

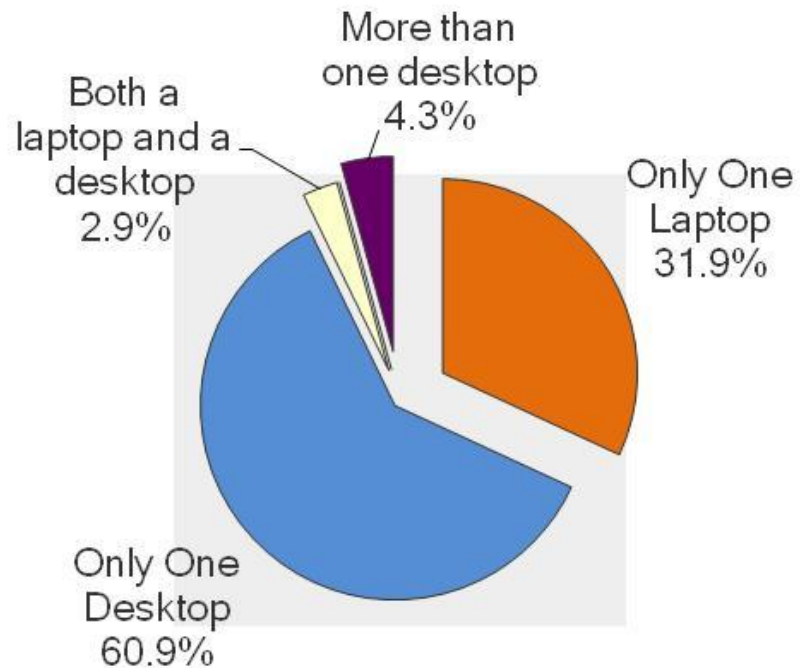


The organization was cutting back on printing but it had 8 mega-printers, some of which were rarely used.

Audit: Office Technologies

Laptop versus Desktop Computers

1/3 of staff have laptops while 2/3 of desktop computers..



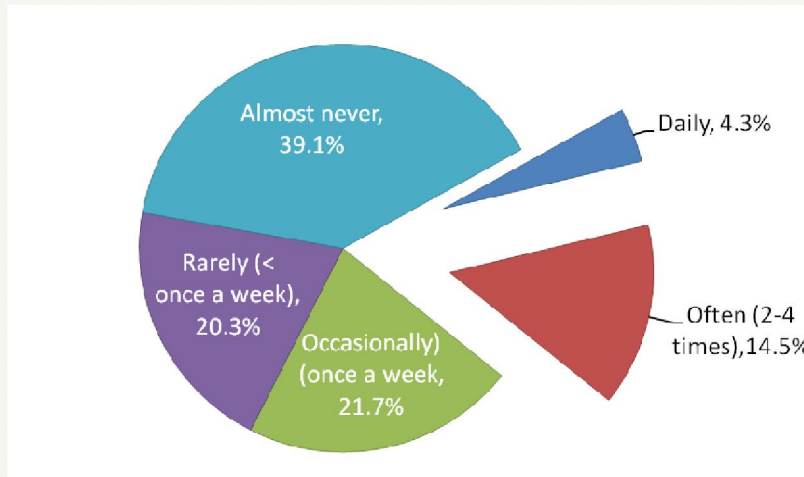
Many people reported working from home occasionally but only 30% had laptop computers.

Audit: Technology Use Patterns

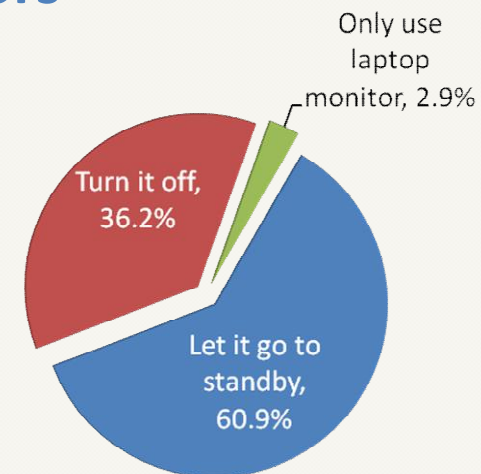
Powering Down Computers and Monitors

People occasionally connected to their computers from home, but at least half left their work computers turned on .. “Just in case.”

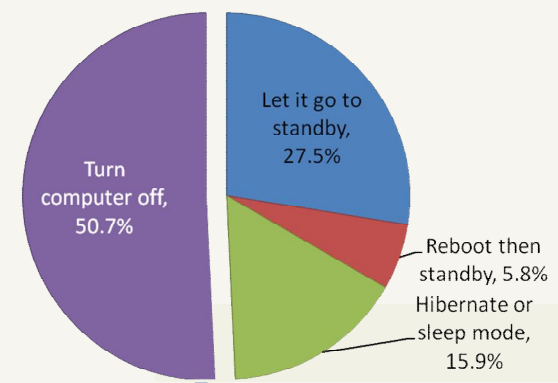
Connect from Home or Remotely



Monitor Shut Down



Computer Shut Down



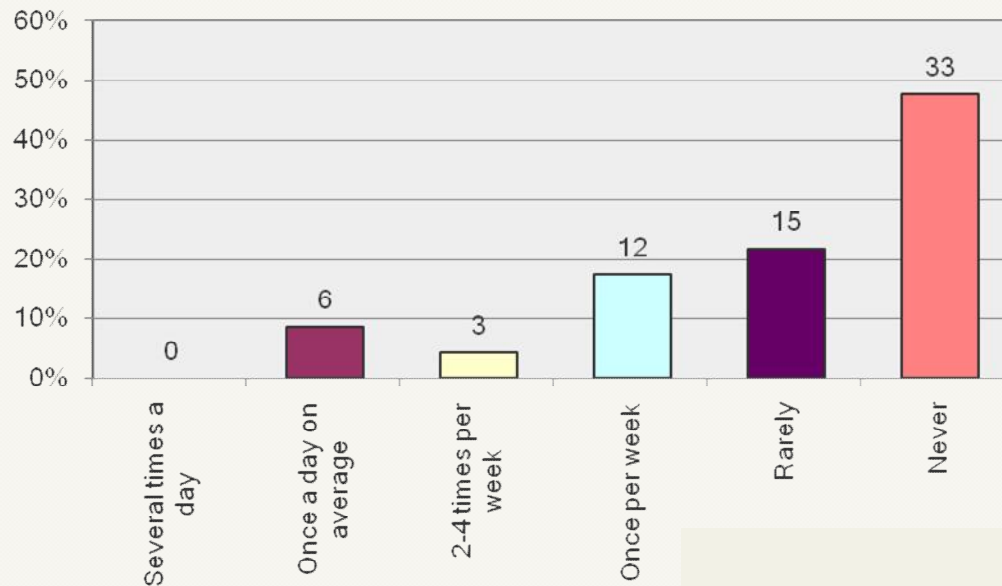
Audit: Office Technologies

Vending Machine and Refrigerators



Only 9 people reported using the soda machine more than once per week, but this floor had their own machine in their kitchen.

Soda Machine Use



Why It's Important

1. Results / Accomplishments
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Multi-modal Design

Program Elements:

1. Organizational Elements
 - Organization-wide goal
 - Organization-level feedback
 - Policy Changes (VPN, printers, vending machine)
2. Team Activities (Earn team points)
 - Friday night lights
 - Charity donation from winning team
3. Individual Actions (Earn team points)

Multi-modal Design

Individual Commitments and Actions

Workstation Commitments and Actions in May	Commitment	Action	Future Commit.	Opportunities
Turn off Monitors*	95.7%	81.0%	93.6%	
Shut off Electrical Devices*	80.3%	77.0%	75.8%	
Turn off Computer*	78.7%	63.0%	67.7%	+++
Print less*	77.0%	53.0%	71.0%	+
Turn off Lights at Night*	72.1%	50.0%	74.2%	+
Change Computer Settings	60.7%	68.0%	72.6%	+++
Unplug Electrical Devices*	59.0%	48.0%	50.0%	+
Turn off Daytime Lights for 2 or more Hours*	54.1%	47.0%	56.0%	++
Trade in Dual Monitor	8.2%	10.0%	16.0%	+++

* Reported having taken this action 4 to 5 times per week.

** Actual changes in computer settings were predominantly using hibernate.

A Multi-modal Design



Cognitive Approaches

- Goals
- Feedback
- Information
- Commitments

Social Approaches

- Team work
- Social Accountability

Emotional Approaches

- Games (fun)
- Organizational Culture
(work with charities and culture of giving)

What the Project Shows

- Behavioral approaches can have a big impact.
- Multi-method approaches help us to see the “***see the strange in the familiar***” and provide essential insights.
- Addressing organizational procedures together with individual behaviors provides greater opportunities for savings.

How it will change the world???

- Middle-out approach via property managers.

Contact Information

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