Better Buildings®
U.S. DEPARTMENT OF ENERGY

Reducing Energy Consumption in Restaurants and Kitchens

Better Buildings Alliance
Food Service Technology Team

U.S. DEPARTMENT OF ENERGY

Agenda

- Introduction and review of 2015 projects
- Integrating DCKV With EMS: A Field-study Perspective
  Don Fisher, Fisher Consulting
- Making Energy Efficiency Make Cents
  Jeffrey Clark, National Restaurant Association (NRA)
- Innovation Is Not The Game Changer: It's Behavior
  Carol Tobian, National Resource Management (NRM)
- Closing

Better Buildings Alliance
Food Service Team members:

- Arby's Restaurant Group ‡
- Army & Air Force Exchange Service
- Boston Market
- Chipotle Mexican Grill
- CKE Restaurants Holdings, LLC ‡
- Dunkin' Brands, Inc.
- Einstein Noah Restaurant Group, Inc.
- Harris Teeter Inc.
- McDonald's Corporation
- Panda Restaurant Group, Inc.
- Red Robin Restaurants
- Starbucks Coffee Company
- Wawa, Inc.
- Wendy's Quality Supply Chain Coop, Inc.
- Yum! Brands

‡ Better Buildings **Challenge** partner as well!

Better Buildings Alliance
Food Service Team affiliates:

- Consortium for Energy Efficiency (CEE)
- EPA's ENERGY STAR® program
- Food Service Technology Center (FSTC)
- National Restaurant Association (NRA)
- Restaurant Facility Management Association (RFMA)

BBA Food Service Team
Recent and Current Projects

- Recent:
  - Demand-Controlled Kitchen Ventilation Guides
  - Summary of Advanced Walk-In Cooler/Freezer Controls
  - Energy Management System (EMS) Guidance for Food Service
- Current:
  - Online Food Service Resource Catalog
  - Co-branding collaboration with National Restaurant Association

Integrating DCKV With EMS: A Field-study Perspective

Don Fisher, President

Fisher Consulting

- (Until recently) President/CEO of Fisher-Nickel, inc. (FNi)
- Cofounder of PG&E's Food Service Technology Center (FSTC)
- Over 35 years of experience managing foodservice-related energy-efficiency programs for utilities and governments
- 2006 recipient of the American Council for an Energy-Efficient Economy (ACEEE) Champion of Energy Efficiency Award
- "I have motorcycle disease. Whenever it's 75 degrees and sunny I take the time to go out riding."

Integrating DCKV with EMS: A Field-Study Perspective

Don Fisher
Fisher Consultants
PG&E Food Service Technology Center
925-866-5770
dfisher@fishnick.com

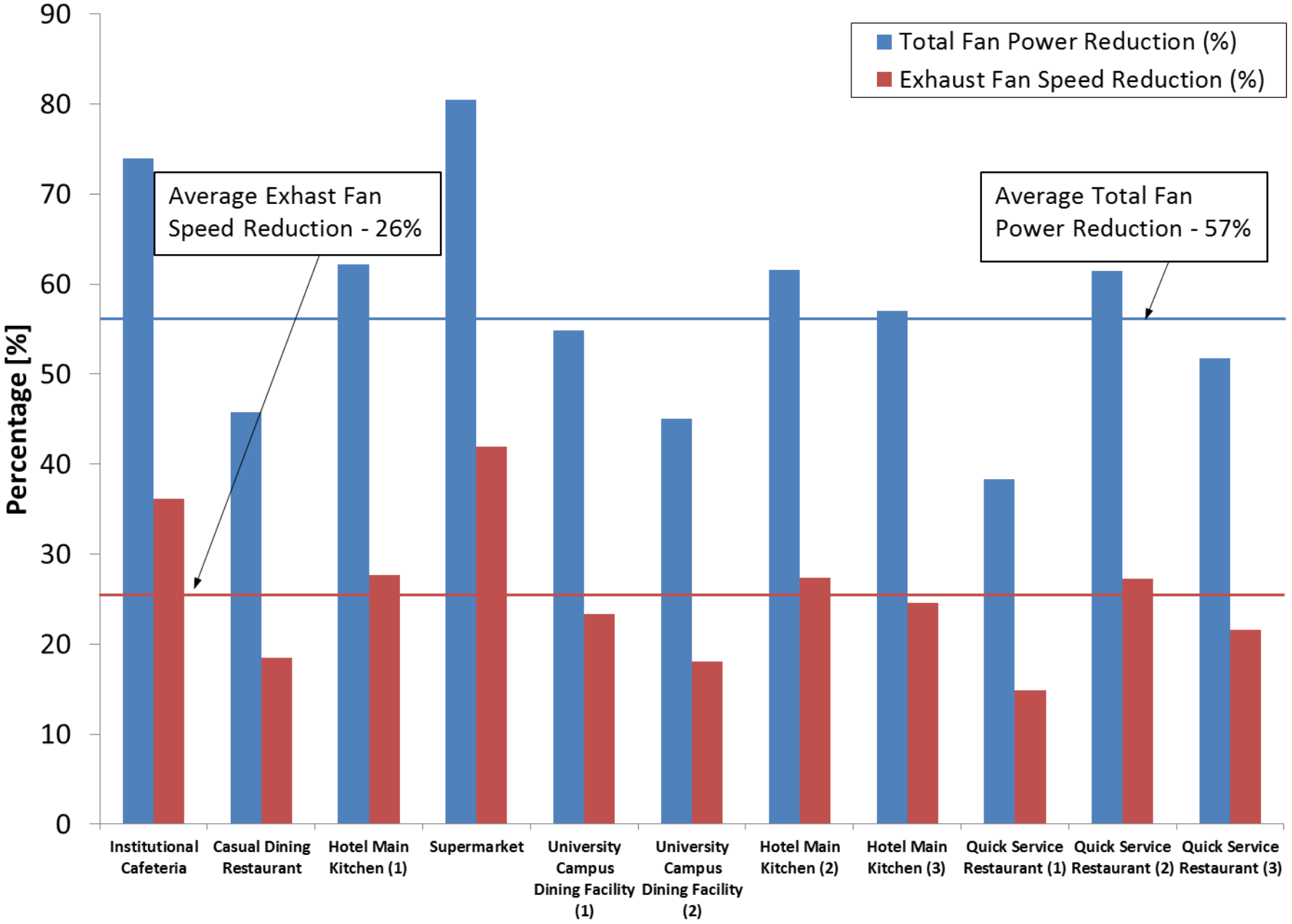
But first…

…my Perspective!


More than 3 Billion CFM…
…exhausted from Commercial Kitchens in the U.S.

…dominated by single-speed systems!

California DCKV Case Studies

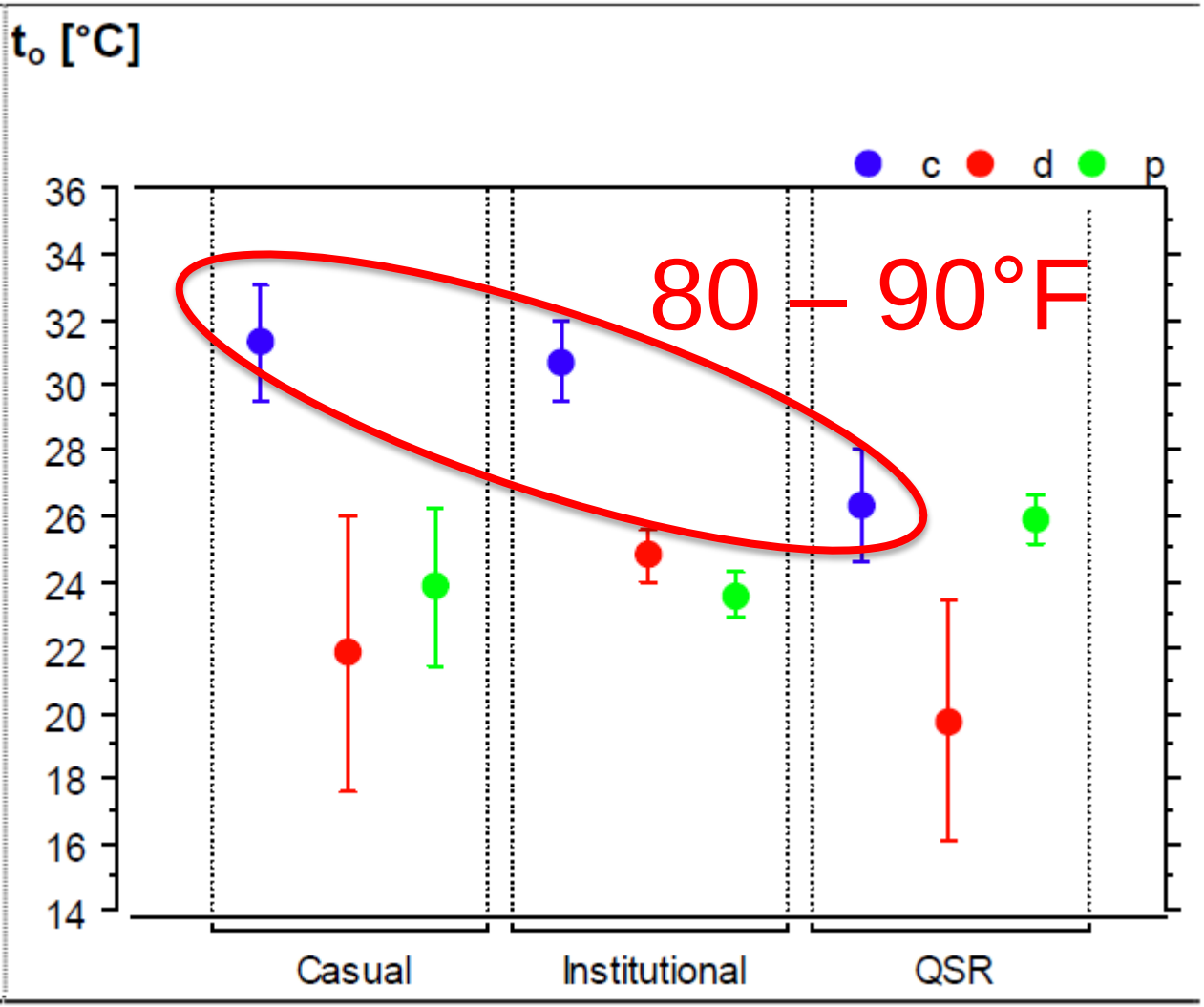


ASHRAE RP-1469 – Thermal Comfort in Commercial Kitchens

Final Report 01.06.12

Average of Operative Temperature for Kitchen Type and Kitchen Zones with 95% confidence interval (100 kitchens)

t_o [°C]	t_o [°F]
36	97
34	93
32	90
30	86
28	82
26	79
24	75
22	72
20	68
18	64
16	61
14	57



Note: “c” is Cooking, “p” is Preparation, and “d” is Dishwashing zone.

Energy Management Systems

Wiring the Intelligent Kitchen

Food Service
Technology Center

PG&E®


100
Atlanta 1996

The Energy Efficient McDonald's (T.E.E.M)

TABLE 3
Summary of Estimated Savings, Estimated Installed Costs, and Payback Period for Technologies Applied at the Demonstration Restaurant

Technology	Estimated Savings ($)	Estimated Incremental Installed Cost ($)	Payback Period (yr)
Controllable ballasts	702	620	0.9
Low-temperature occupancy sensors	327	340	1.0
Two-speed exhaust fan*	230	400	1.7
Energy management system*	3254	12,000	3.7
High-efficiency air conditioning*	480	600	1.3
Kitchen evaporative cooling*	648	1200	1.9
Play area evaporative cooling*	936	0	0.0
Evaporative precoolers on AC units*	76	1000	13.2
Spectrally selective glazing†	3950	6000	1.5

* Energy savings for these technologies were dependent on the location and weather at the demonstration project.
† The savings for the spectrally selective glazing includes $450 for energy savings and $3500 for reduced capital cost of air-conditioning units.

While this represented about 5% of energy bill…

The EMS system was absolutely crucial to the success of the TEEM project.

What were the challenges?

Hassle for the Operator

What were the challenges?

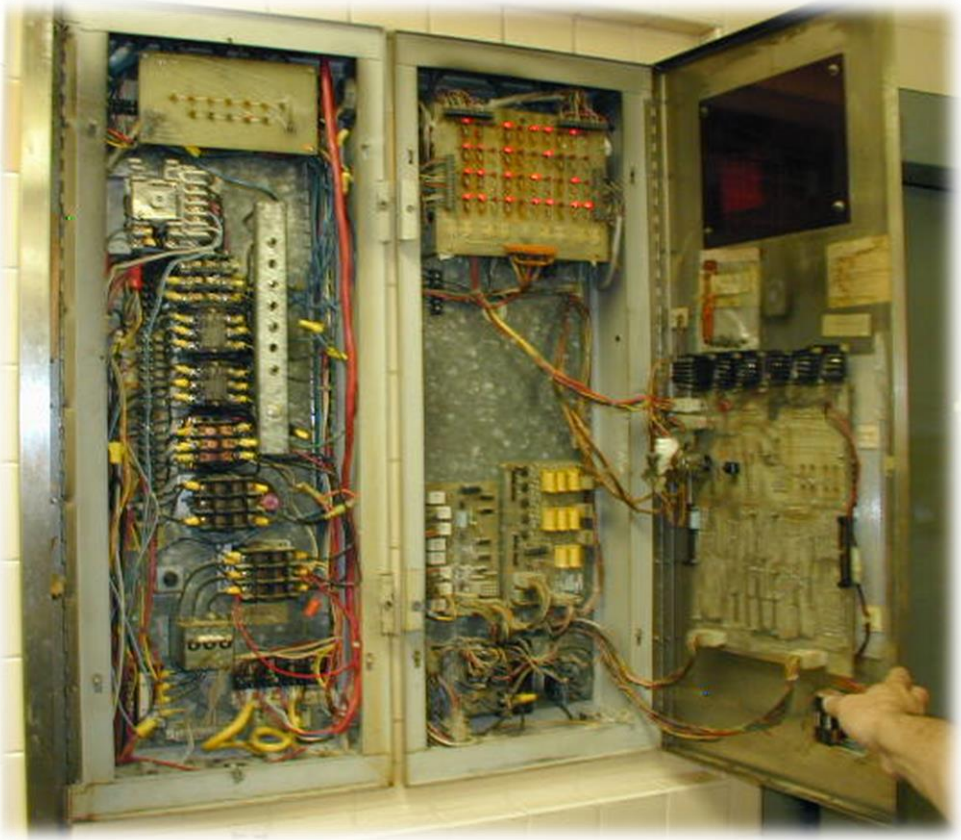
Slow Communications

Call Centers

What were the challenges?

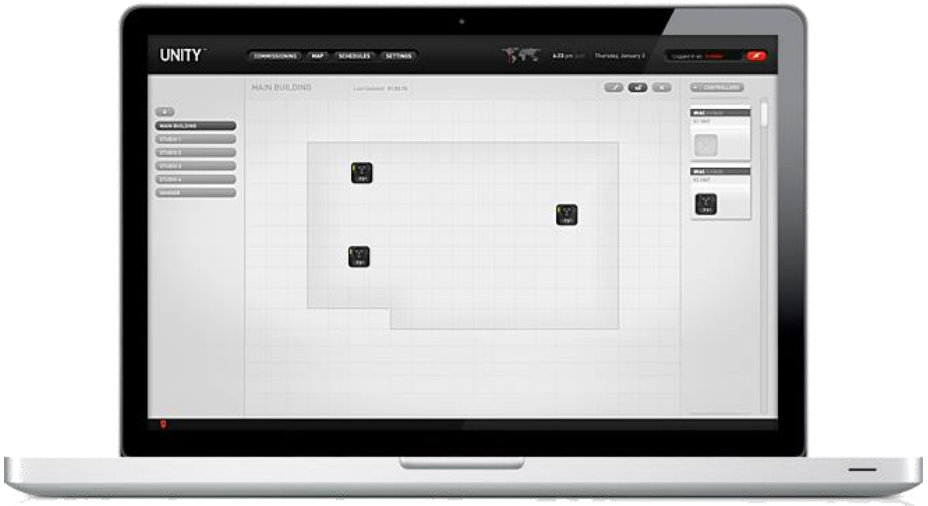
Proprietary communications protocol

EMS companies did NOT understand restaurants (or really care)



19 Years later…
Many Technological Advances

Small Inexpensive Electronics
Wireless and the Internet
Handheld Devices



kiteandlightning.com

And…other positive influences:

Higher Energy Prices  Renewed Interest

Information Boom – this is no longer “weird”

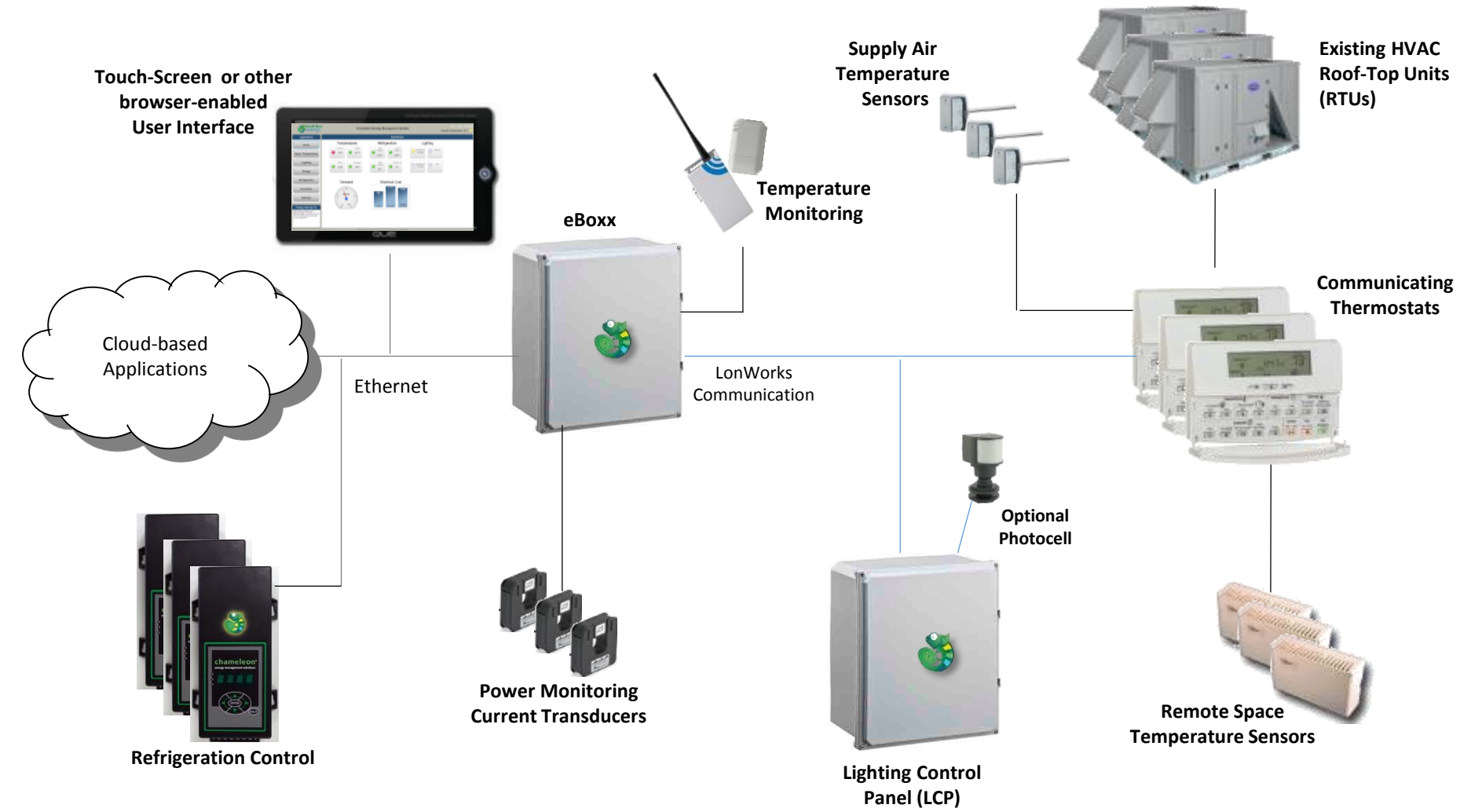
Small and nimble tech companies with more understanding of restaurants.

What will make EMS practical?

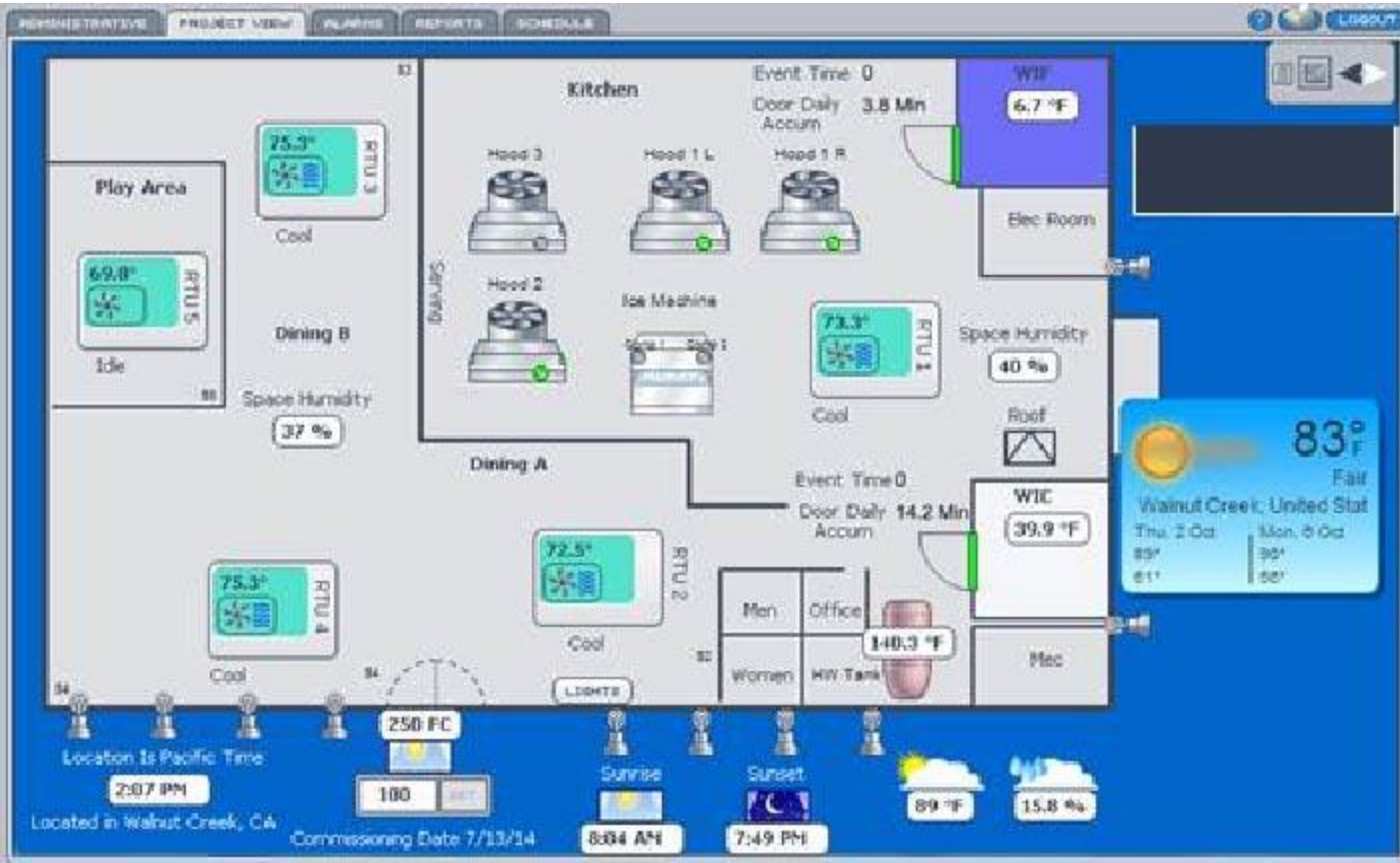
1. Controls integrated into smart appliances
   – NAFEM Protocol
2. Adaptive logic – don't bug the humans
   – Nest Thermostat

3. Continuous commissioning of systems
4. Control and/or communication with more systems – Refrigeration? DCKV?

System Architecture



EMS Dashboard: Facility Management Tool



Energy Management Systems (EMS) and Demand-Controlled Kitchen Ventilation (DCKV) Energy Savings in Restaurants

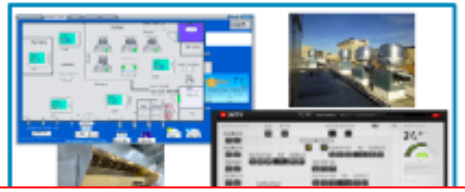
Category: Food Service Industry
Project Number: ET13PGE8151
Start Year:
- 2013

End Year:
- 2014

Markets Commercial Commercial, Small Educational Facilities Food Service Industry Government - Institutional
Segments: Facilities Hospitality Medical - Healthcare Supermarket
Project Type: Demand Savings Electric Energy Savings Product Evaluation
Type of Technology: Building Controls Commercial Cooking HVAC, Commercial
Organization: Pacific Gas and Electric (PG&E)
Project Status: Basic Research
Savings Type: Work

Scaled field placement evaluates the electrical and thermal savings for DCKV when combined with building EMS systems in order to provide work-paper updates and inform new measures. Further evaluates opportunities for chains and SMBs using a tiered pricing model.

Image:



PDF Report: et13pge8151_dcvandemsreport_final.pdf

http://www.fishnick.com/publications/fieldstudies/

Objectives of Study

- This study provided an assessment of the EMS market to determine the market's scope, the vendors that cater to the market, and the capabilities of the systems that are being offered.
- It also included a field study that demonstrated the efficacy of EMSs that were installed in conjunction with demand-controlled kitchen ventilation DCKV system in three restaurants.

Table 1. EMS Vendor Database

	Product Features			Integrated End-use Systems	
Company	**Hardware Solutions**	**Software Solutions**	**Consulting Services**	**HVAC**	**Lighting**
Adura Technologies	X	X			X
Building IQ		X	X	X	
Comverge	X	X	X	X	X
Cypress Envirosystems	X	X		X	
Delta Controls	X	X		X	X
Ecobee	X	X		X	
Energent	X	X		X	X
EnerNoc	X	X	X	X	X
EnTouch	X	X	X	X	X
FieldServer Technologies	X	X		X	X
First Fuel		X		X	X
Honeywell	X	X	X	X	X
Johnson Controls	X	X	X	X	X
Kite & Lightning	X	X	X	X	X
Lucid		X		X	X
Millenial Net	X	X		X	
Novar		X	X	X	X
Optimum Energy		X	X	X	
Powerhouse Dynamics		X		X	X
PlotWatt		X			
Profile Systems	X	X		X	X
Pulse Energy		X	X	X	X
Shneider Electric	X	X		X	X
Siemens	X	X	X	X	X

Advanced Energy-Saving Logic – Advanced energy-saving logics improve control of equipment to reduce energy expenditure. Examples of this include, but are not limited to:

- Demand control ventilation
- Lighting dimming
- Smart defrost
- Economizer control
- Water heater output temperature control and setback
- Recirculation pump control
- Booter heater night-time shut off
- Load shifting – e.g. Ice Machine

These features, however, are not typically offered in EMS packages.

And what about Water???

Save On Energy

Demand Control Ventilation for Rooftop Air Handlers

CATALYST is a fully packaged control system that converts constant volume RTU's to an energy-efficient demand-controlled air handling system yielding 25-40% savings.

CATALYST is designed and manufactured by Transformative Wave Technologies, Kent, Washington, USA. Arborus Energy Services is a Canadian Affiliate Partner with TWT and is a distributor for CATALYST.

Get a Quote

CATALYST
Efficiency Enhancing Controller
Patent Pending

TABLE 2. DCKV PRODUCT DATABASE

Manufacturer	Product Name	VFD Capable of 50% Speed Reduction	Optical / Infrared Sensors	External Connection Capabilities	Alert System	Warranty
Accurex	Vari-Flow	Yes	No	Yes	Yes	Yes
CaptiveAire	SC-EMS	No	No	Partially	Yes	Yes
Gaylord	DCV-AV Air Vantage	Yes	No	Yes	Yes	Yes
Gaylord	DCV-F	Yes	No	Yes	Partially	Yes
Gaylord	DCV-R	Yes	No	Yes	Partially	Yes
Green Energy Hoods	TEL Kitchen Control System	Yes	Yes	Yes	Yes	Yes
Halton	MARVEL	Yes	Yes	Yes	Yes	Yes
Hood Depot	On Demand Ventilation	Yes	No	Yes	Partially	*
Melink	Intelli-Hood	Yes	Yes	Yes	Yes	Yes
Noveo	EcoHood	*	Yes	Yes	*	Yes
Spring Air	TruFlow	Yes	No	Yes	Yes	Partially
Streivor	DemandAire	No	No	Yes	No	*
Intellinox	ConceptAZUR	*	Yes	Yes	Yes	*

TABLE 1: FIELD STUDY EMS AND DCKV PRODUCTS

		Site 1—QSR (Burger)	Site 2—QSR (Chicken)	Site 3—Casual
EMS	**Manufacturer**	Franke	Halton	Kite & Lighting
	Product Name	EEMS	F.O.R.M.	Unity
DCKV	**Manufacturer**	Franke	Halton	Gaylord
	Product Name	VariVent	M.A.R.V.E.L.	DCV-R

Source: FNI

Table 4. Electric Billing Data Summary by Site

Electric	Site 1—QSR (Burger)		Site 2—QSR (Chicken)		Site 3—Casual	
	Baseline	EMS-DCKV	Baseline	EMS-DCKV	Baseline	EMS-DCKV
Average Daily Energy (kWh/day):	1,268	1,246	1,164	1,222	863	921
Start Date:	7/1/13	7/1/14	8/1/13	8/1/14	12/18/10	12/15/12
End Date:	8/26/13	8/26/14	10/29/13	10/30/14	12/15/11	12/15/13
Average Monthly Peak Demand (kW):	82	75	113	123	N/A	N/A
Avg. Monthly Cost ($):	3,045	2,967	7,415	8,388	3,509	3,899
Avg. Outdoor Air Temp (°F):	69	71	67	68		
Percent Energy Savings (%):	1.7		-6.2		-6.7	
Percent Cost Savings (%):	2.6		-11.6%		-11.2	

**Site 1 was on a rate schedule which did not include time-of-use charges.*

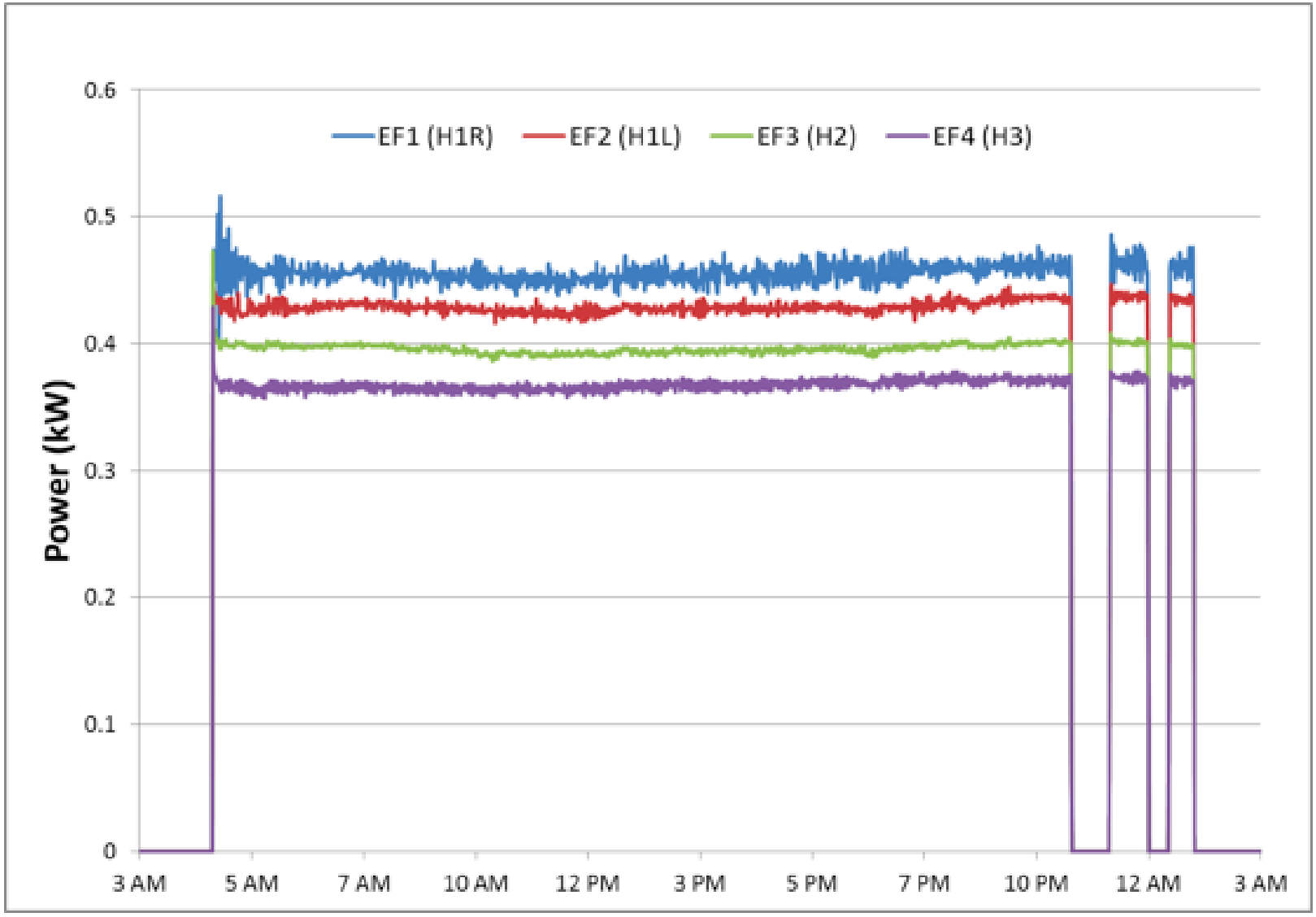
Table 5: Gas Billing Data Summary by Site

Gas	Site 1—QSR (Burger)†		Site 2—QSR (Chicken)[c]		Site 3—Casual	
	Baseline	EMS-DCKV	Baseline	EMS-DCKV	Baseline	EMS-DCKV
Average Daily Energy (therm):	N/A	N/A	N/A	N/A	53.1	42.0
Average Monthly Cost ($):	N/A	N/A	N/A	N/A	1,619*	1,272*
Start Date:	7/1/13	7/1/14	8/2/13	8/2/14	11/18/10	11/18/12
End Date:	8/26/13	8/26/14	10/30/13	10/31/14	11/18/11	11/18/13
Average Outdoor Air Temperature (°F):	N/A	N/A	N/A	N/A	57	58
Percent Energy Savings:	N/A		N/A		21.0%	
Percent Cost Savings (%)*:	N/A		N/A		21.0%	

* *Calculation based on $1.00 per therm.*

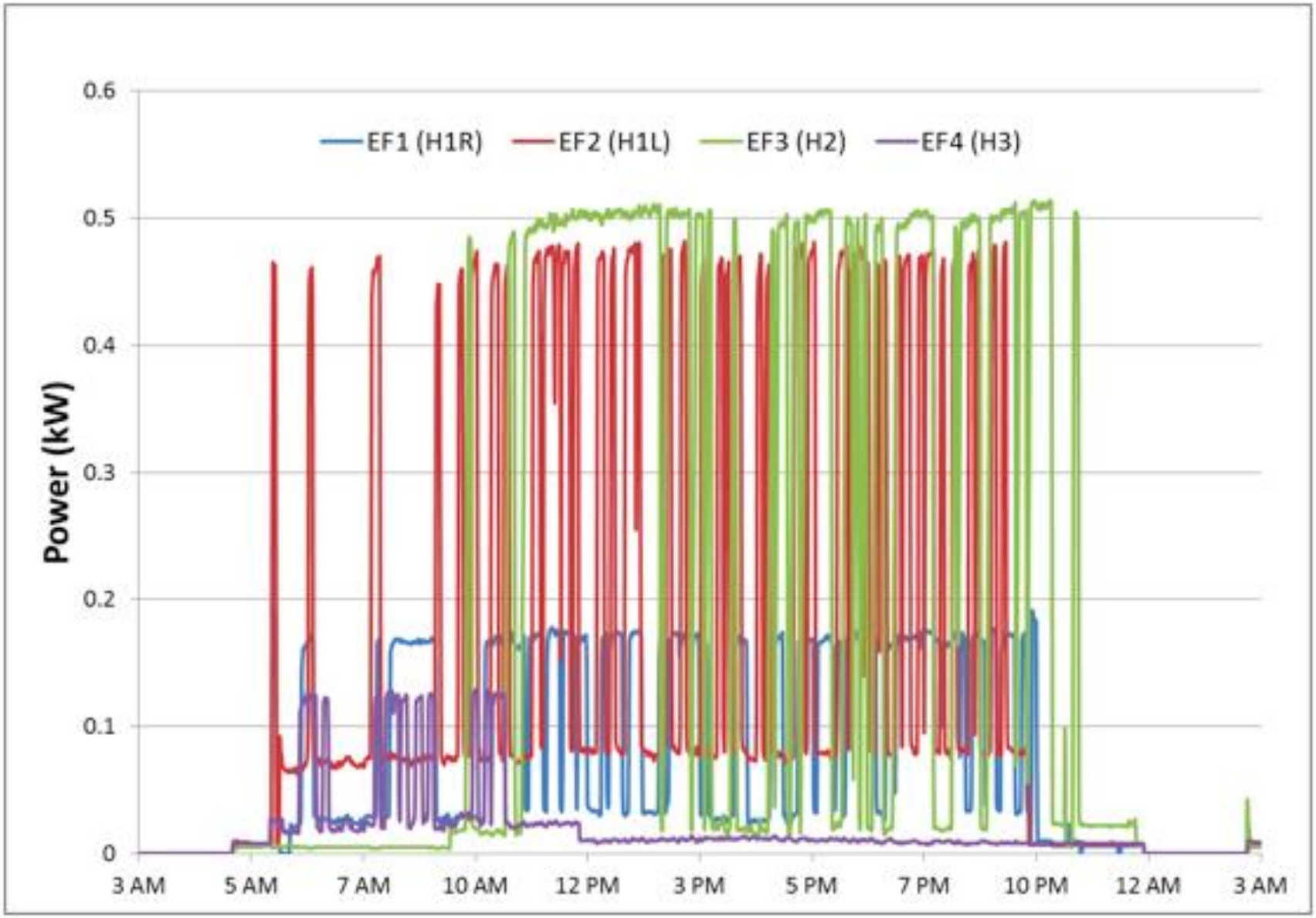
† *Gas data was not available for Site 1.*

[c] *The monitoring period at Site 2 occurred during a period when gas use would not apply to the results of this study.*



Source: FNI

FIGURE 13: BASELINE FAN POWER PROFILES FOR SITE 2



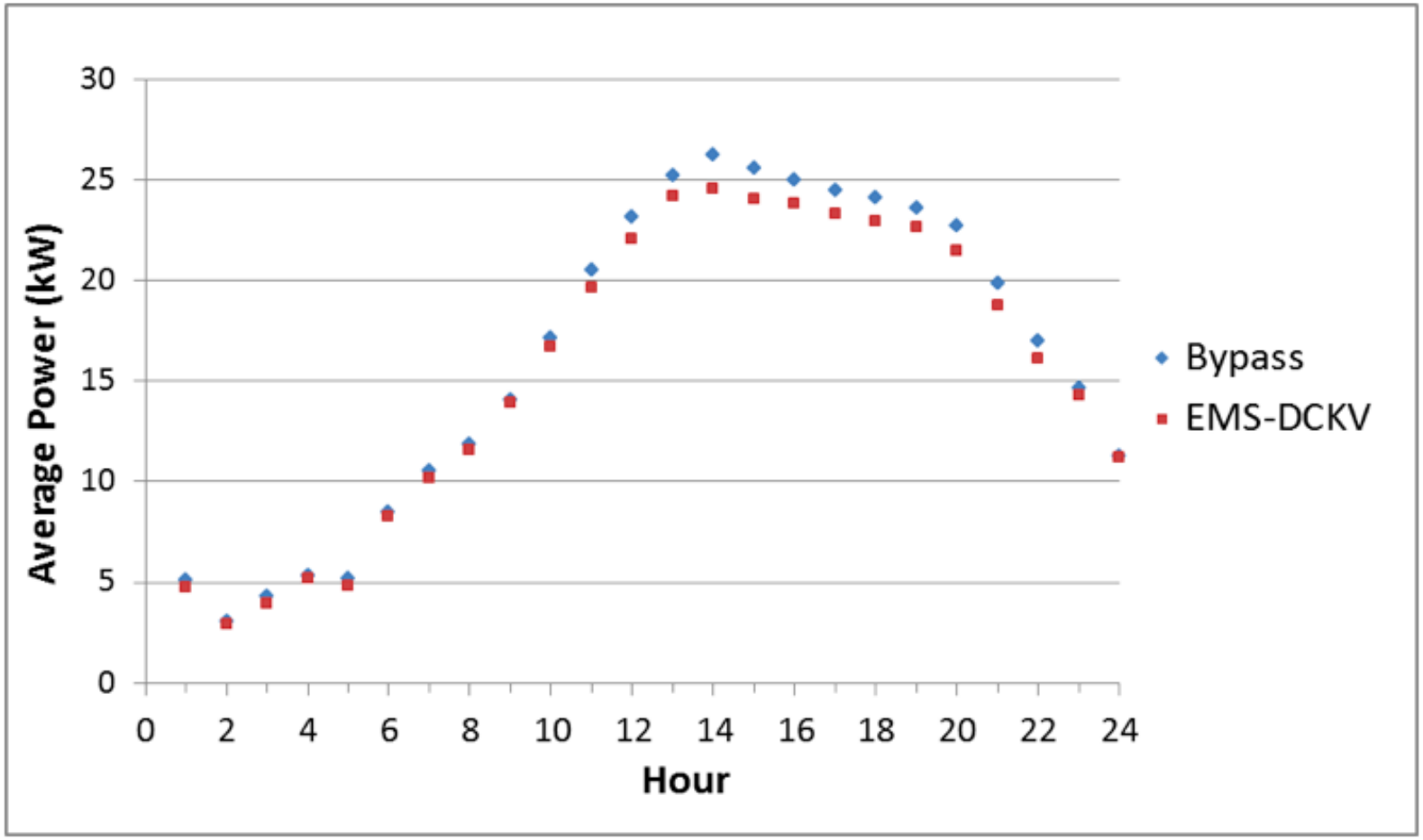
Source: FNI

FIGURE 14: DEMAND-CONTROLLED FAN POWER PROFILES FOR SITE 2

TABLE 6. DCKV SAVINGS BY SITE

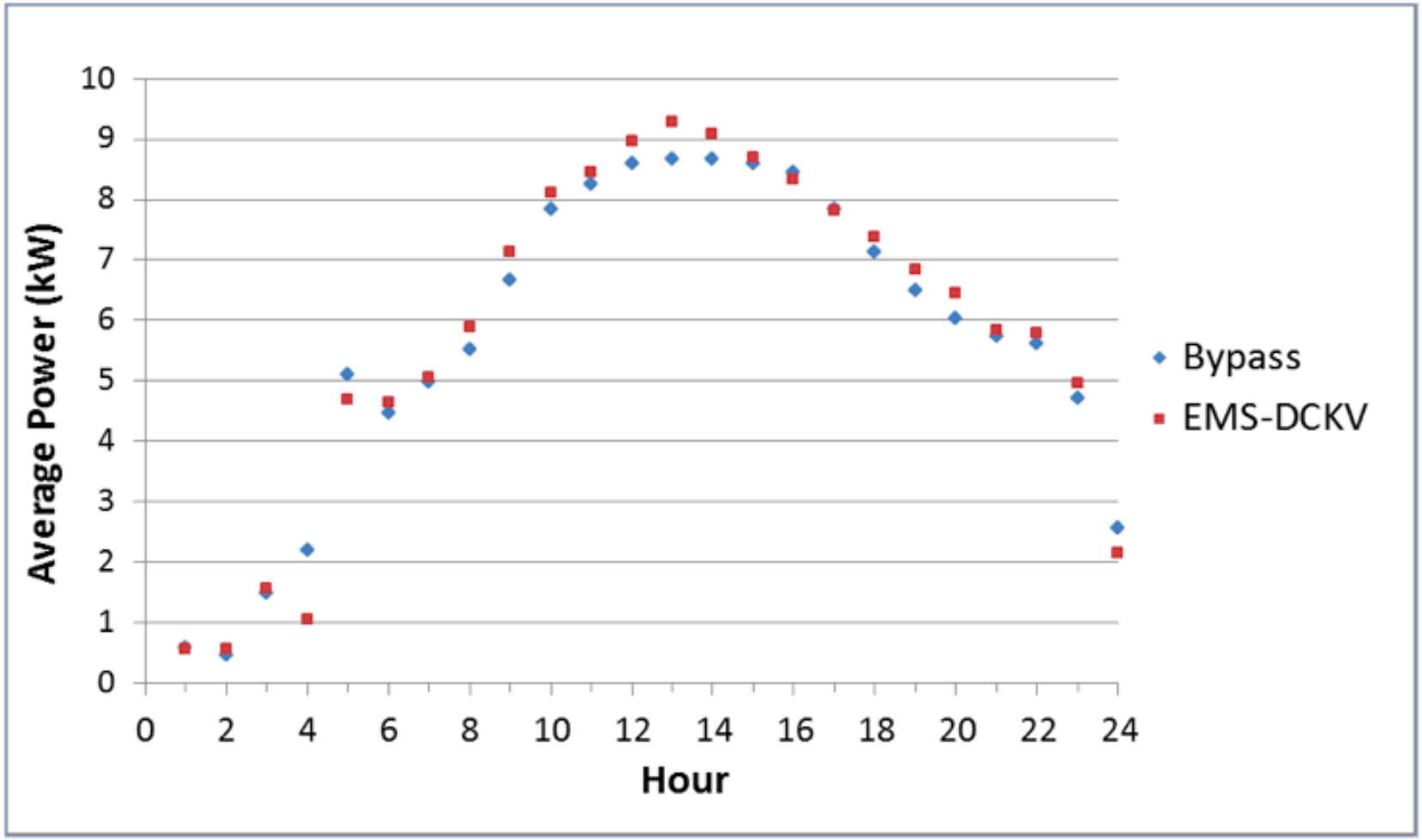
Fan Energy Savings	Site 1—QSR (Burger)	Site 2—QSR (Chicken)	Site 3—Casual	Average
Average Daily Baseline* Energy (kWh/d):	40.5	26.1	89.4	52.0
Average DCKV† Energy (kWh/d):	20.3	8.4	61.0	29.9
Reduction (kWh/d):	20.2	17.7	28.4	22.1
Percent Reduction (%):	49.9	67.9	31.8	49.9
Average Monthly Cost Savings[C] ($):	72	64	102	80

** The exhaust fans were set to maximum fan speed during normal operating hours.*
† The DCKV was active and modulating the fan speed during normal operating hours.
[C] Annual cost savings projection based on $0.12/kWh. This average cost savings was based on the data sampled between 6/3/2014 and 9/21/2014. The monthly energy was based on a 30-day period.



Source: FNI

FIGURE 16: KITCHEN AND DINING ROOM COMBINED RTU HOURLY POWER AT SITE 1, AVERAGED FOR 6/3/14 - 9/21/14



Source: FNI

FIGURE 17: SITE 2'S KITCHEN RTU HOURLY POWER, AVERAGED OVER A FOUR-WEEK PERIOD

TABLE 7. RTU SAVINGS AS A RESULT OF EMS-DCKV INTEGRATION OUTSIDE ECONOMIZER WINDOW

	Site 1—QSR (Burger)	Site 2—QSR (Chicken)
Baseline Daily RTU Energy Use (kWh)	386.8	185.3
EMS-DCKV Daily RTU Energy Use (kWh)	371.3	186.2
Daily RTU Energy Savings (kWh)	15.5	-0.9
Percent Energy Savings (%)	4.00	0.48
Average Monthly RTU Cost Savings ($)*	56	-3

** Average monthly cost savings projection based on $0.12/kWh. This average cost savings was based on data sampled between6/3/14 and 9/21/14.*

TABLE 8. PRE- AND POST-INSTALLATIUON HVAC AND EXHAUST ENERGY AND COST SAVINGS

	Site 1—QSR (Burger)	Site 2—QSR (Chicken)
Daily Baseline HVAC and Exhaust Energy (kWh/day)	427.3	211.4
Daily DCKV-EMS HVAC and Exhaust Energy (kWh/day)	391.6	194.6
EMS-DCKV Energy Savings (kWh/day)	35.7	16.8
Monthly Cost Savings* ($)	128.5	61
Savings as Percentage of Monthly Energy Bill (%)	2.8	**1.4**

**Average monthly cost savings projection based on $0.12/kWh. These results may only pertain to the time of year when the tests were conducted at each site.*

Conclusions – Market Assessment

- The core hardware capabilities of all systems identified in this study were comparable; however, the individual software-driven features offered between products varied significantly.
- The primary features offered with most EMSs are equipment monitoring, scheduling, controls, and alarms for HVAC and lighting systems.

Conclusions – Market Assessment

- A small percentage of EMS providers have expanded upon these base offerings to include DCKV integration, water heater setback, smart defrost for walk-in freezers, and other advanced energy-saving options.
- In addition, select EMS products enable load-shifting and peak-demand management through various methods. While hardware from most EMS products can support the aforementioned features, the preprogrammed software logic and learning capabilities of most systems is relatively limited.

Conclusions – Market Assessment

- EMS is as much a preventative maintenance and diagnostic tool as it is a energy-saving platform. A building management tool.
- The efficacy of these aspects is hinged upon the extent to which the data is leveraged.

Conclusions – Field Study

- The installation of EMS integrated with DCKV within the scope of this ET project was considered successful; the challenges of securing, installing and commissioning the equipment and then holding to the project schedule were significant.
- Furthermore, meter-level energy savings were not quantified to the degree that can directly support a deemed rebate or program at this time.

Conclusions – Field Study

- It was concluded that the EMS adopt DCKV as a primary “control” attribute.
- Similarly, the EMS should monitor and/or control the water heater setpoint, recirculation pump, refrigeration defrost, evaporator fan controls, and ice machine operating time, all where appropriate.

Conclusions – Field Study

- Independent of the field results, the authors believe that EMS products have the inherent capability of achieving energy savings and load shifting that would otherwise be unattainable.
- Multiple energy-saving EMS strategies were examined and vetted in the study; however, it was clear that the efficacy of these systems is hinged upon commissioning, equipment maintenance, and programming (these can be changed).

Conclusions – Field Study

- It should be recognized that the California climate zone is a hurdle for both EMS and DCKV savings. The heating and cooling loads for both space and outdoor air are minimal compared to other regions in the country. Thus, savings claimed by vendors of EMS and DCKV may reflect operating experiences averaged across the country—not California.

Has anyone installed a DCKV and an EMS in the same facility?

FSTC

FOOD SERVICE
TECHNOLOGY CENTER
PROMOTING ENERGY EFFICIENCY IN FOODSERVICE

Give a Hoot!

be energy wise

save energy, save money,
save the environment.

Making Energy Efficiency Make Cents (*Why Restaurants Tend to Not Care About Energy*)

Jeffrey Clark, Conserve Program Director

National Restaurant Association (NRA)

- Environmental liaison to the restaurant industry
- Regularly speaks to audiences about environmental issues
- Jeff also works with Atlanta-based environmental groups and the Georgia Restaurant Association to implement the Zero Waste Zones (ZWZ) program
- A part-time surfer, a full-time foodie, and an amateur photographer

May 27, 2015

Making Energy Efficiency Make Cents

Why Restaurants Tend to Not Care About Energy

Presented by:

Jeff Clark, Conserve Program Director

National Restaurant Association

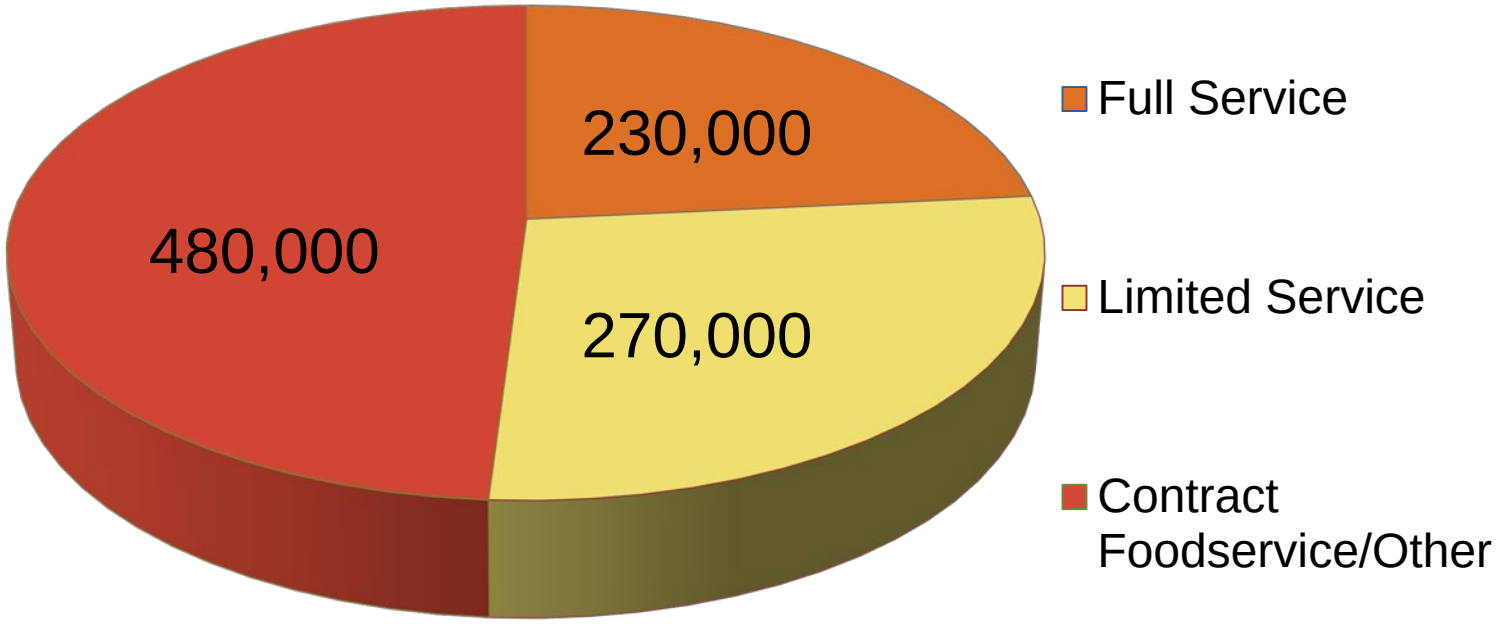
Restaurant.org/Conserve

National Restaurant Association

- The association represents the restaurant industry, which is:
  - Nation's second largest private sector employer.
  - An industry with nearly 14 million jobs.
  - Almost one million restaurant and foodservice locations.
  - Annual sales of more than $709 billion.

NATIONAL RESTAURANT ASSOCIATION™

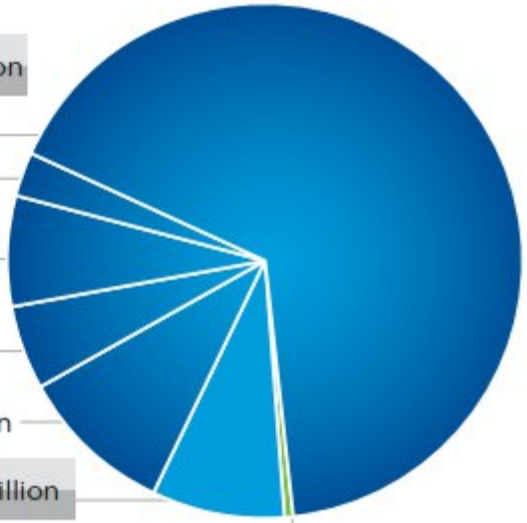
Location Breakdown



Enormous Economic Impact

Adding It All Up: $709.2 billion

Projected restaurant industry sales in 2015



Commercial Restaurant Services $648.0 billion

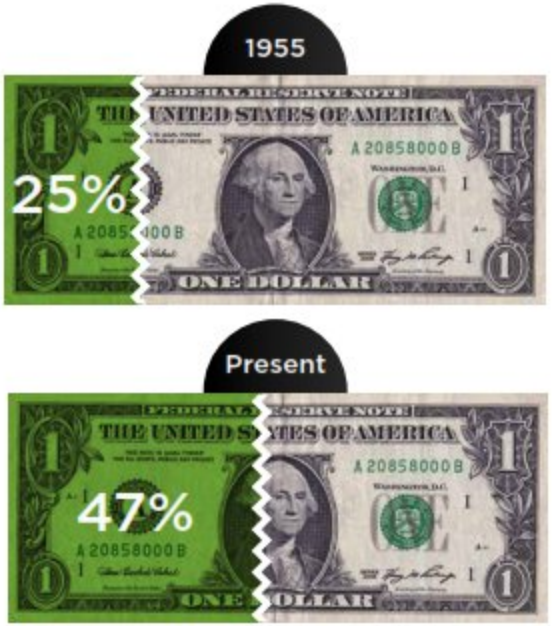
- **Eating Places*:** $471.1 billion
- **Bars and Taverns:** $20.6 billion
- **Managed Services:** $49.5 billion
- **Lodging Places:** $36.7 billion
- **Retail, Vending, Recreation, Mobile:** $70.2 billion

Noncommercial Restaurant Services $58.5 billion

Military Restaurant Services $2.7 billion

**Eating places include tableservice restaurants and quickservice/fast-casual restaurants, cafeterias and buffets, social caterers, and snack and nonalcoholic beverage bars.*

Restaurant Industry's Share of the Food Dollar



Environmental Sustainability is Hot

But…

2015 What's Hot Survey

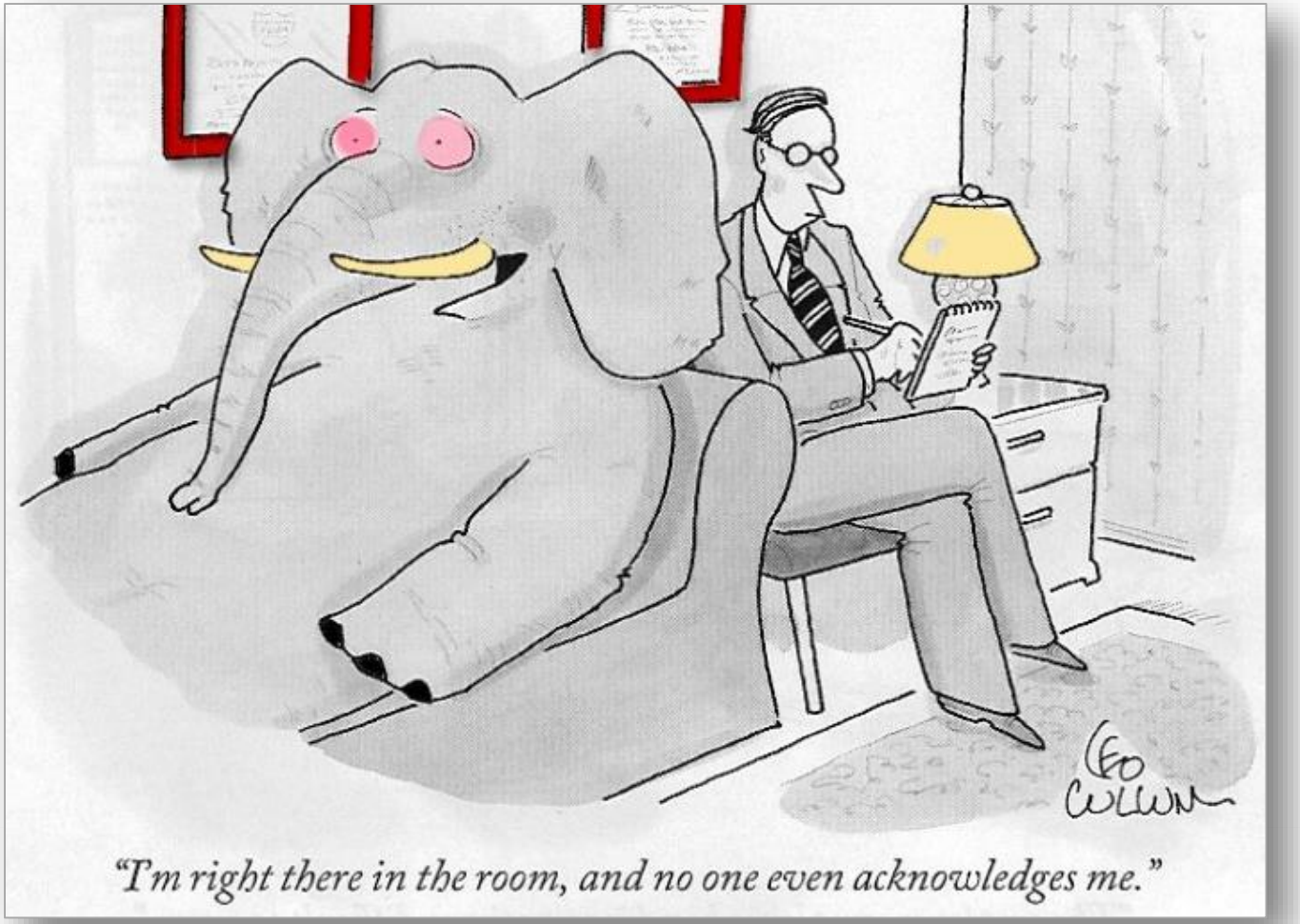
1) Locally sourced meats and seafood
2) Locally grown produce
3) Environmental sustainability
4) Healthful kids' meals
5) Natural ingredients/minimally

Nothing specific to conserving energy

2015 What's Hot Survey

Nothing specific to conserving energy

Why? Energy Is An Afterthought



Source: The New Yorker Magazine

Top Operating Costs & Profitability

Cost Category	Family Dining (under $15)	Casual Dining ($15 to $25)	Fine Dining ($25 and up)	All Limited Service
Food and Beverage Sales	32.2%	31.8%	31.9%	31.9%
Salaries and Wages	33.7%	33.2%	33.7%	29.4%
Restaurant Occupancy	4.9%	5.1%	6.1%	7.7%
Utility Costs	3.6%	3.4%	3.5%	3.0%

***Note*:** Family and casual dining definitions have changed since 2010 (e.g., family dining went from $15 to $10 per person).

***Source*:** National Restaurant Association, 2010 Industry Operations Report

Top Operating Costs & Profitability

&

	Casual Dining ($15 to $25)	Fine Dining ($25 and up)	All Limited Service
Food & Beverage Sales	31.8%	31.9%	31.9%
Salaries and Wages	33.2%	33.7%	29.4%
Rent, Occupancy	5.1%	6.1%	7.7%
Utilities	3.4%	3.5%	3.0%

Almost **10x** costs of utilities

Note: ...ing definitions have changed since 2010 (e.g., family dining went from $15 to $10 per person).

***Source*:** National Restaurant Association, 2010 Industry Operations Report

Pre-Tax Profit Margin

Family Dining (under $15)	**Casual Dining** ($15 to $25)	**Fine Dining** ($25 and up)	**All Limited Service**
3.0%	3.5%	1.8%	5.9%

***Note*:** Family and casual dining definitions have changed since 2010 (e.g., family dining went from $15 to $10 per person).

***Source*:** National Restaurant Association, 2010 Industry Operations Report

DID YOU KNOW?

Commercial kitchens use about 5 to 7 times more energy per square foot than other commercial building spaces like office buildings and retail stores.

Willingness to Upgrade

Proportion of restaurant operators devoting more or fewer resources to capital expenditures:

Adding new equipment

Restaurant Category	More resources	Fewer Resources
Family Dining	31%	13%
Casual Dining	28%	14%
Fine Dining	29%	14%
Quickservice	31%	18%
Fast Casual	26%	14%

Source: National Restaurant Association, *Restaurant Trends Survey*, 2012

Putting Energy Into Conservation

Proportion of restaurant operators making purchases in the following areas:

Purchase energy-saving light fixtures

Restaurant Category	More resources	Fewer Resources
Family Dining	33%	16%
Casual Dining	38%	16%
Fine Dining	46%	16%
Quickservice	37%	19%
Fast Casual	37%	15%

Source: National Restaurant Association, *Restaurant Trends Survey*, 2012

Restaurateurs Put Energy Into Conserving Resources

Zapping Energy Costs With Conservation Efforts

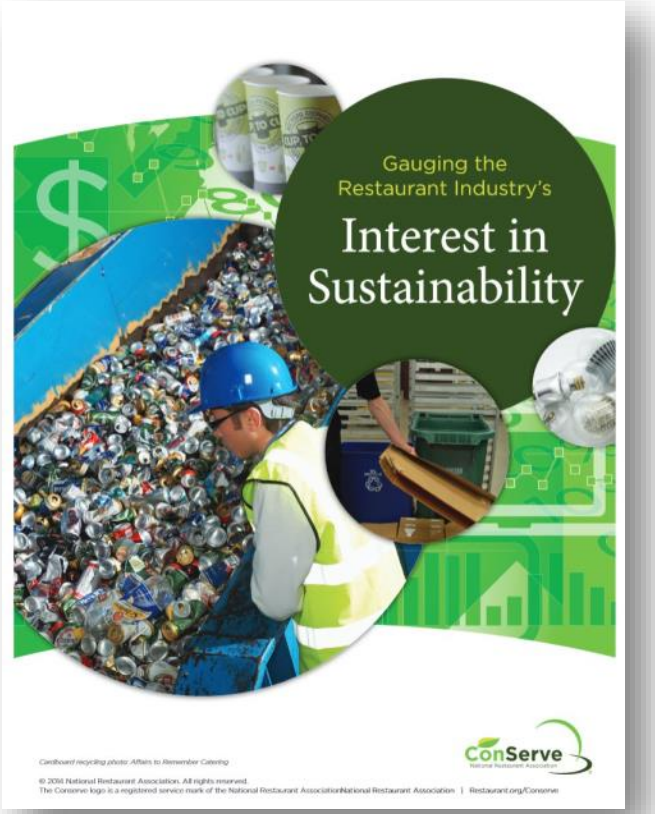
Proportion of restaurant operators planning to take the following actions in 2012

	Family Dining	Casual Dining	Fine Dining	Quick-service	Fast Casual
Purchase energy-saving light fixtures	63%	68%	65%	76%	78%
Purchase energy-saving kitchen equipment	61%	72%	58%	67%	73%
Purchase energy-efficient refrigeration, air conditioning or heating systems	53%	53%	57%	65%	65%
Install water-saving equipment or fixtures	42%	54%	52%	47%	48%

Source: National Restaurant Association, *Restaurant Trends Survey*, 2011

Gauging Industry's Interest

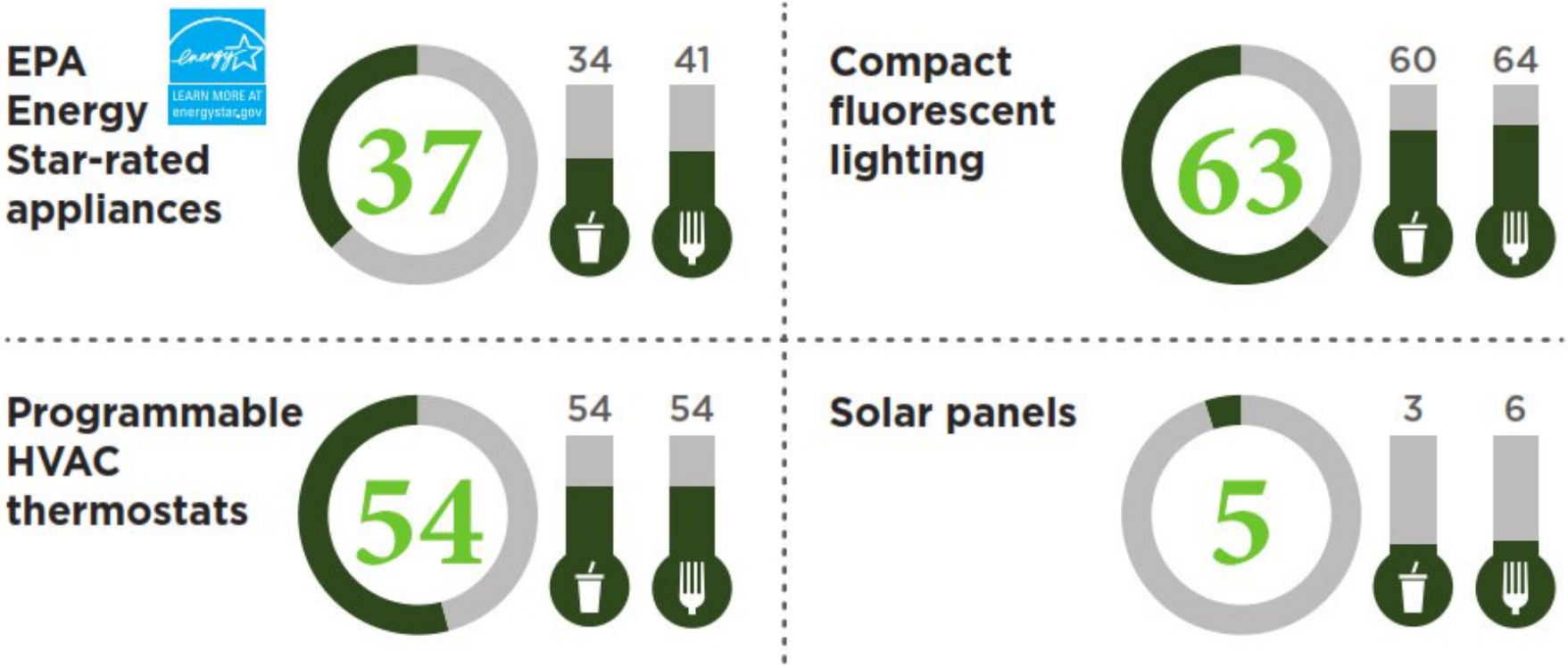
- Released report in Sept. 2014.
- Survey of 1,000 fullservice and quickservice operators.
- Available on Conserve website under: About → Research + Tools.



Some key findings include…

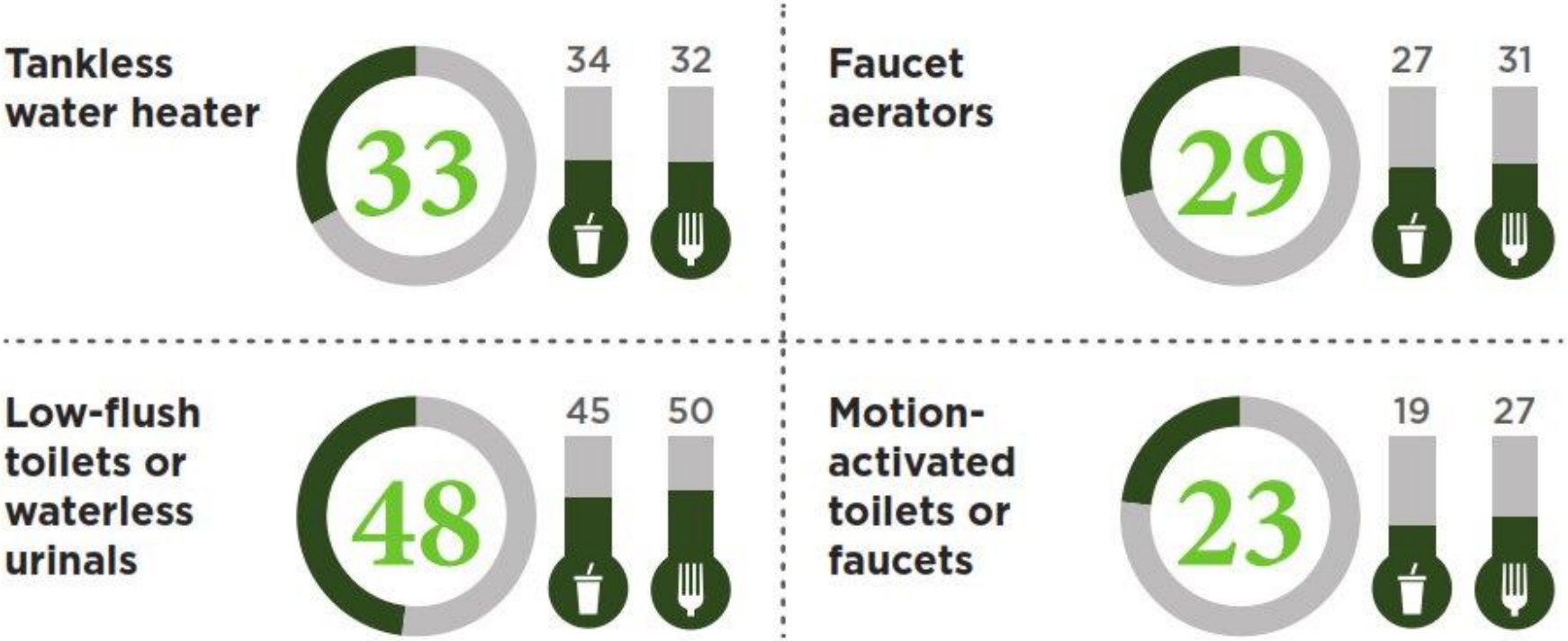
Energy Efficiency

Is your restaurant business currently using any of the following items? *% yes*



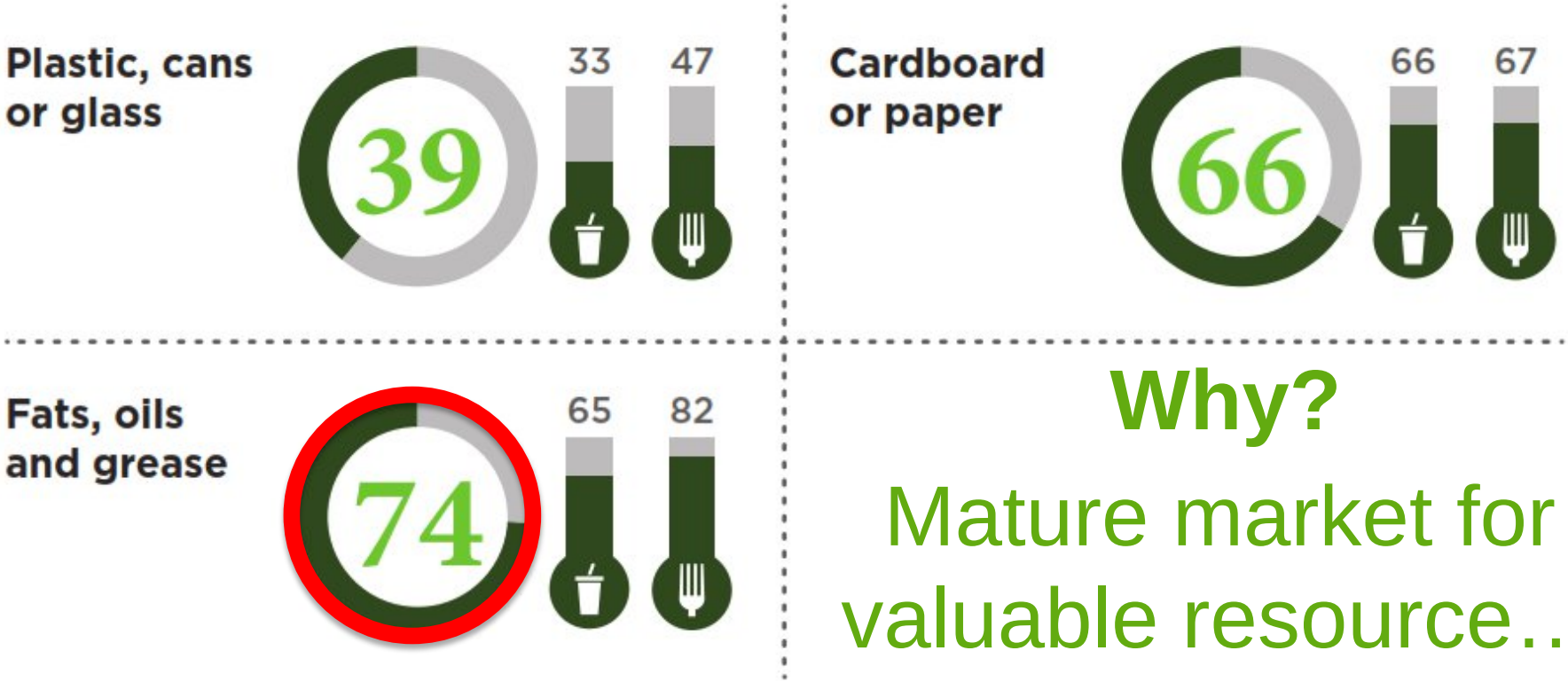
Water Efficiency

Is your restaurant business currently using any of the following items? *% yes*



Fats, Oils, & Greases

Does your restaurant business currently recycle any of the following items? *% yes*



Why?

Mature market for valuable resource…

What Do Chefs/Owners Care About?

Have you considered that the average person might not find the number of watts saved by a CFL quite as intriguing as you do?

Engage restaurant power players by communicating **attention grabbing** and **memorable** ideas.

Tell A Story to Your Power Players

- Highlight **losses from inaction**, rather than savings from action/changed behavior
- Leverage association…we're more persuasive if we align with things that people like (e.g., food)
- Appeal to **self-interest** and **identity**
- Avoid **negative descriptive norms**
  - Common behaviors that are undesirable
  - 75% of people leave lights on when not at home

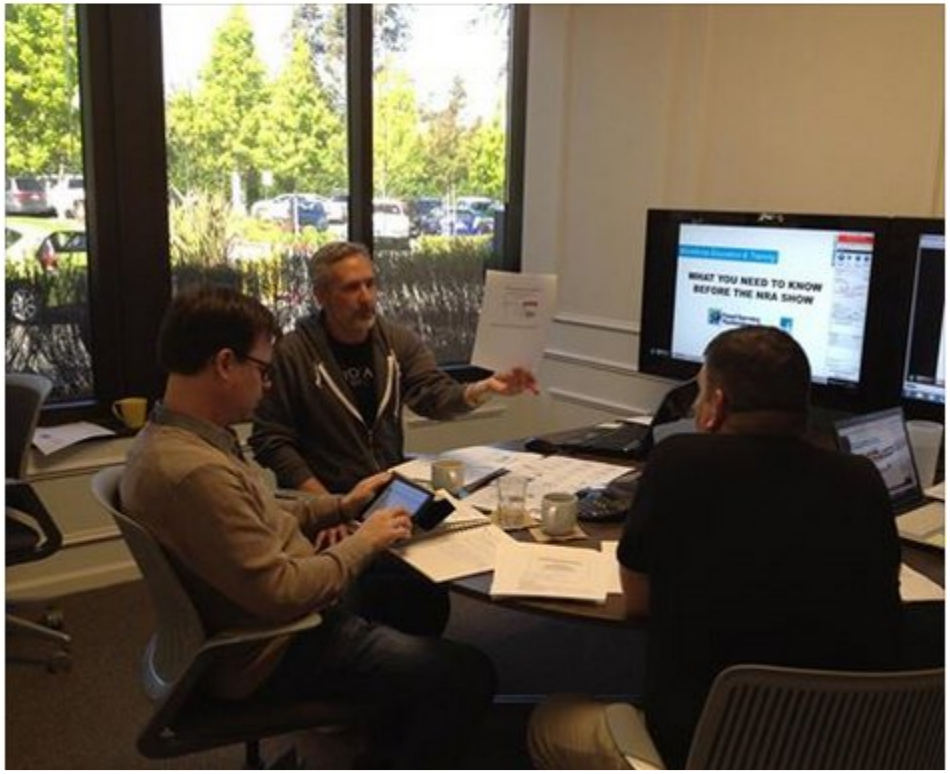
Source: **Promoting Sustainable Behavior: Psychology and Communication**, University of California, Berkeley Office of Sustainability, 2010

Webinar / Hands On Ed. Is Great

FSTC education sessions

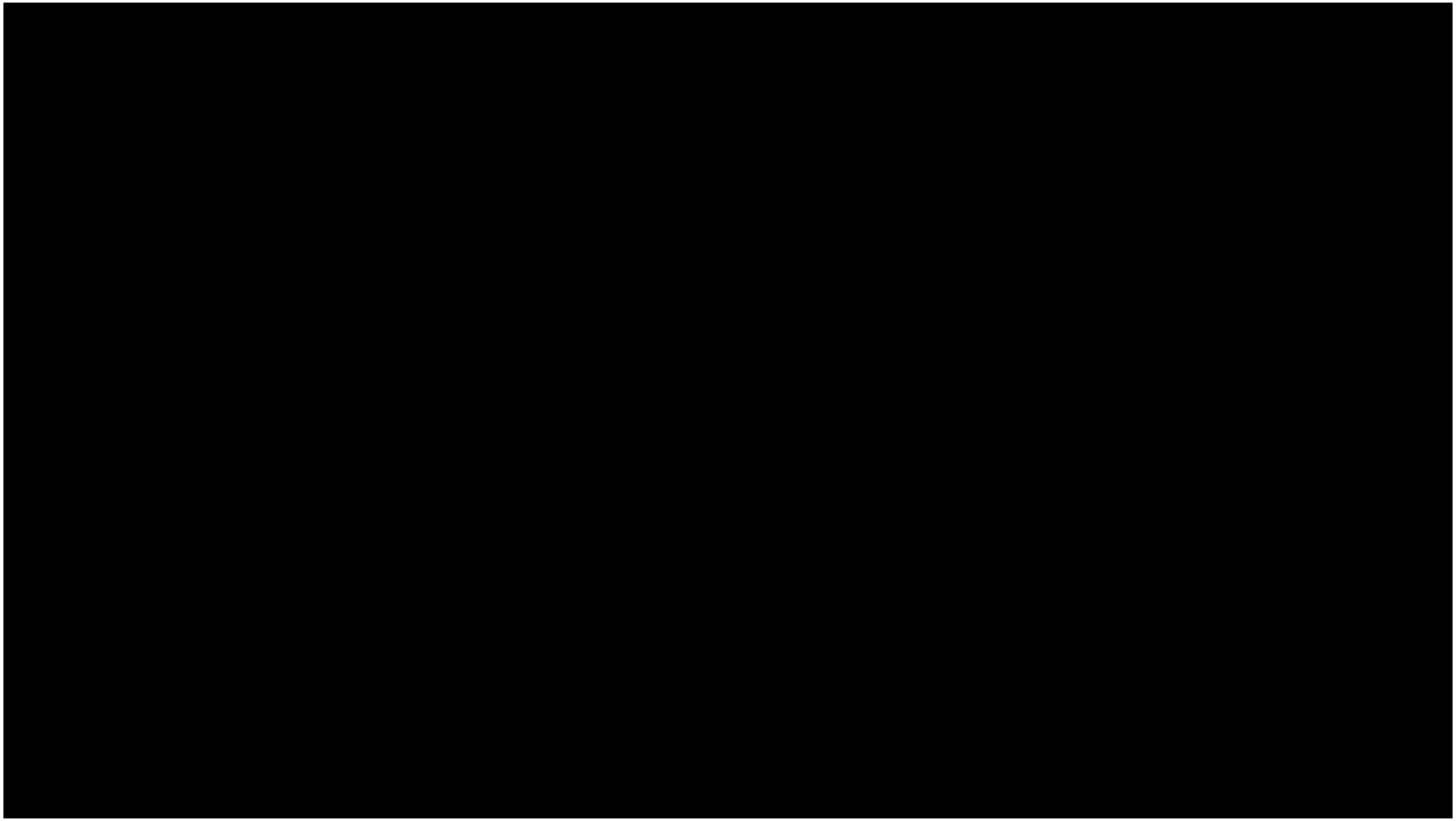
Food Service Technology Center
Yesterday at 1:37pm · Edited ·

FSTC's Richard Young, David Zabrowski & Mark Finck prepping before the LIVE webinar "What You Need To Know Before NRA" which is going on now!



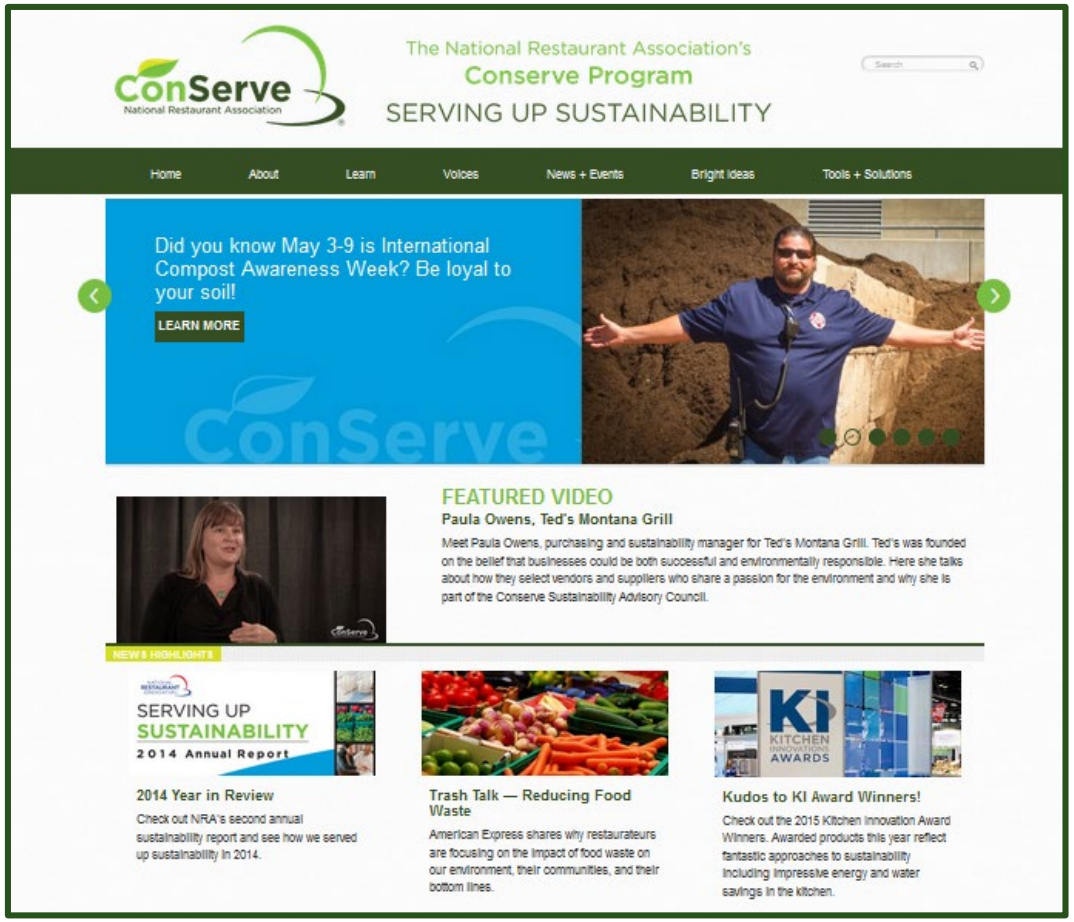
Where to Start with Chefs & Owners

- Work with the five senses:
  - See pilot lights get turned down
  - Feel the cold air leaking out of the open refrigerator
- Explain the “why” better (Conserve included!)
  - Esp. for chefs! They are used to talking about taste, smell, and tooth feel; not electrons.
- Work towards market mechanisms to change behavior
  - Fats, oils, greases as an example
- Personal touch helps!



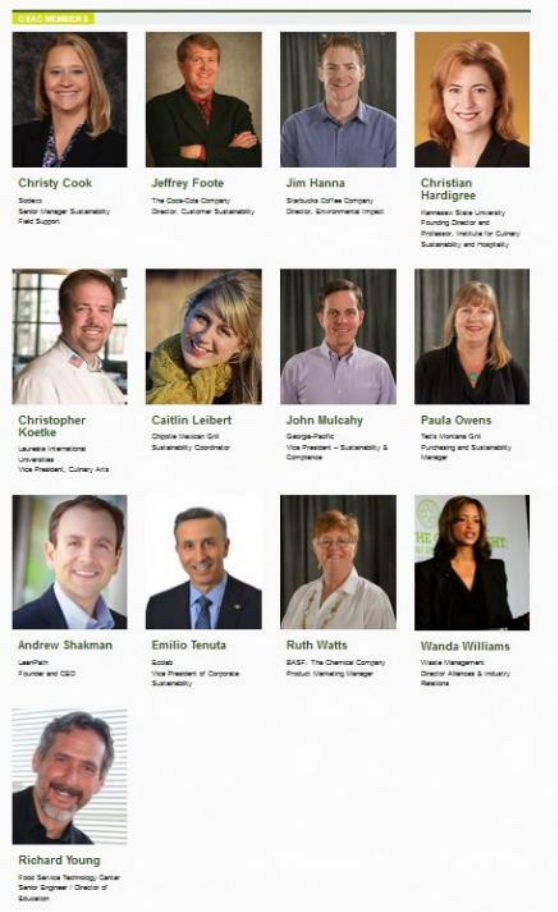
- Double-click on the paper clip to the left to play the video.

Restaurant.org/Conserve

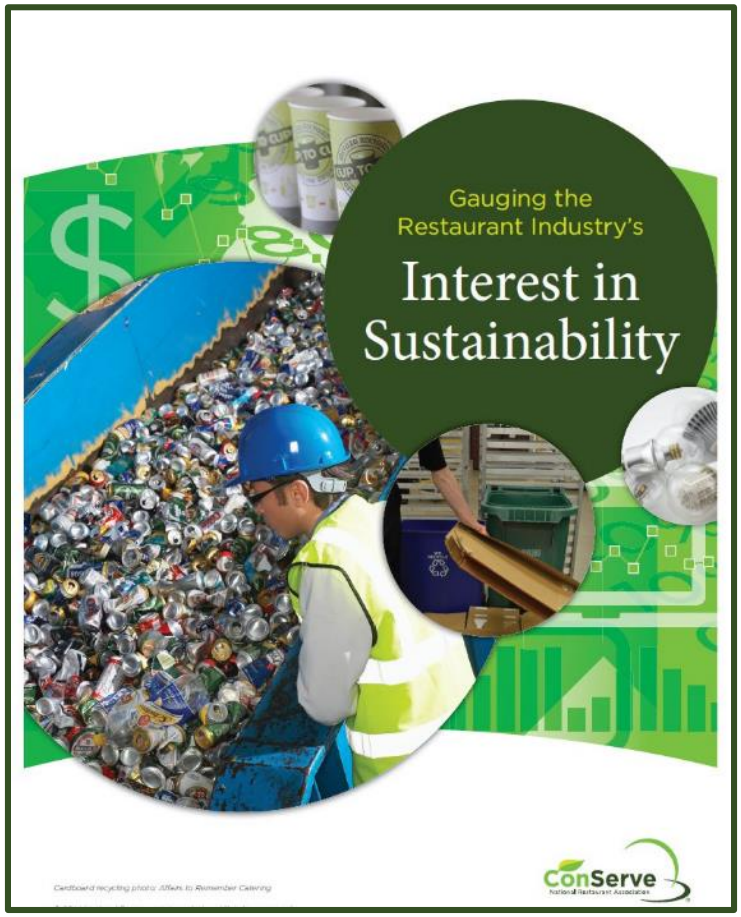


Best Practices

Bringing Industry Insights to the Table



Advisory Council



Reports

Engage with us!

Newsletter: Bright Ideas (on Conserve page)

Follow us on social!

- Twitter: @ConserveNow
- Facebook: “Restaurants Conserve” www.facebook.com/restaurantsconserve

Subscribe to our video channel www.youtube.com/CafesConserve

Thank You

Jeff Clark

Conserve Program Director
National Restaurant Association
E: jclark@restaurant.org

Innovation Is Not The Game Changer: It's Behavior

Carol Tobian, Mid-Atlantic Business Development Manager

National Resource Management (NRM)

- Leads all aspects of business development for NRM in New Jersey, Maryland, and Pennsylvania
- Clean-tech energy industry experience includes commercial & industrial energy efficiency program management, demand response, and transmission system development
- Carol was a part of the 'founding 20' team at EnerNOC
- Served on the Leadership Council of the MA Chapter of the Surfrider Foundation (non-profit dedicated to the protection and enhancement of the world's waves and beaches)

INNOVATION IS NOT THE GAME CHANGER

IT'S BEHAVIOR

Carol Tobian, *Business Development Manager, Mid-Atlantic*
National Resource Management, Inc.

Department of Energy Better Buildings Summit

May 27 – 29, 2015

Learning to Recognize Wasted Resources

Down the drain is a metaphoric term for resources (e.g. money) on the way to being lost or wasted

Driving Value in the Business Context

Sustainability continues to emerge as a business opportunity yet execution is often haphazard due to a lack of performance tracking data

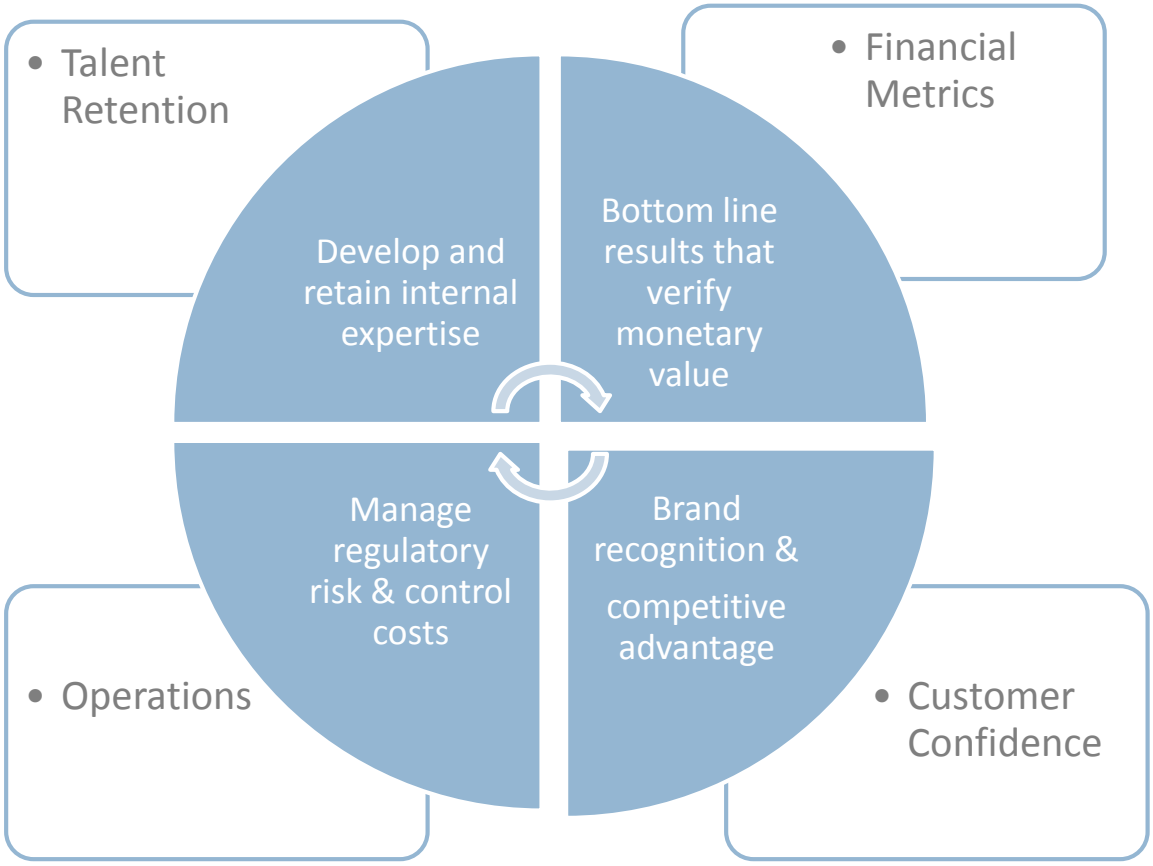
"The best strategy in the boardroom means nothing if the operational personnel feel disengaged or burdened by the SPM"

Sustainability plans should be strategic, not just tactical, and linked to business performance so the benefits are realized across a number of facets:

- ✓ Revenue Generation
- ✓ Cost Control
- ✓ Building Trust
- ✓ Risk Management

"Rapacioli, Sandra; Osborn, Dr. Jeremy; Thimmiah, Sonia; Richardson, Shaun. London. CIMA and Accenture. *Sustainability Performance Management: How CFOs Can Unlock Value*. www.cimaglobal.com/sustainability, October 2011."

Engage Mid-Level Managers in Corporate Sustainability Goals Delivers Strong Results



Let's Talk About You

Beyond good intentions and learning how to recognize new efficiency opportunities

Teams of energy engineers conduct investment grade energy audits for a broad set of measures yet walk past Walken

Unlikely Source of Energy Efficiency? **Think Again.**

Walk-in cooler and freezers are often sized for the warmest days of the year (*and then some*) and/or air velocities of door openings which results in excess cooling capacity

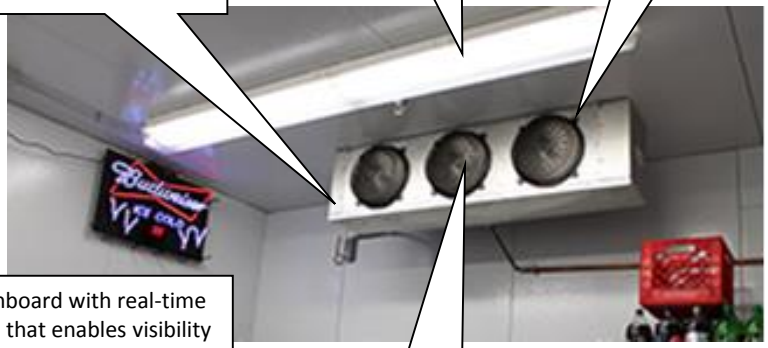
Learning to Recognize & Trust Technology

How to ‘unlearn’ what is considered conventional wisdom about refrigeration systems and why organizations trust technologies to underpin operational & sustainability goals

Fan-cycling by controlling the thermostat & monitoring the solenoid valve

LED retrofit

Electric Defrost control for walk-in freezers



Dashboard with real-time data that enables visibility and control to key personnel

EC Motor Retrofit

NRM CoolTrol MC Series 4			Temperature °F				Status					Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	SP	24hr	Mode	Dfrst	Sol	Fan	Door	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
Freezer	_		13	8	-3	7.1	Run	Off	On	On	Open	-6.3	21	38	23	75.1	75.2	75.5	71.2	72.6	73.3

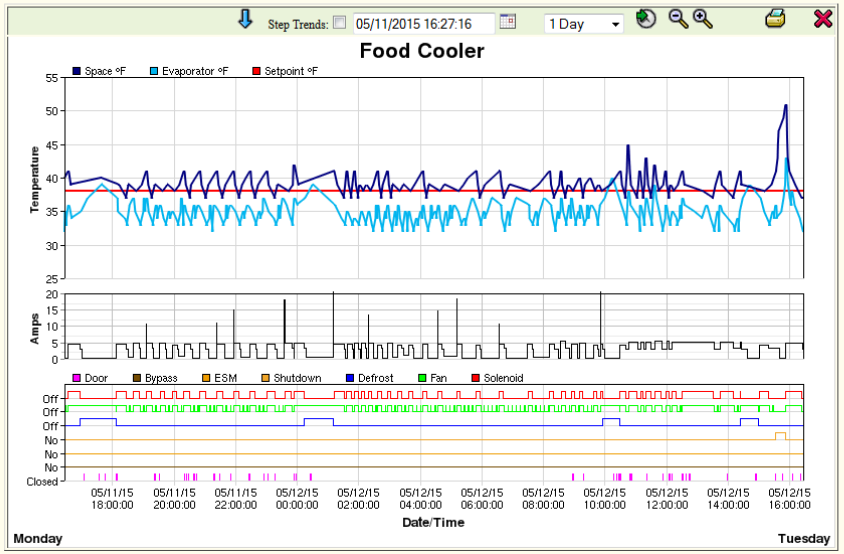
IP Thermostat		Temperature °F						Status					Compressor			
Description	Status	Space	Supply	Return	24hr	Sp Heat	Sp Cool	Unit Mode	Unit State	Fan Mode	Fan State	Door	Amps	Starts 24 Hr.	% Run 24 Hr.	% Run Week
Bar HVAC		71.5	65	70.7	69.6	66	68	Cool	Cool	Auto	On		42.8	8	35.2	37.3
Dining HVAC		72.7	74.5	72.8	69.4	70	72	Cool	Off	Auto	Off	Open	11	4	4.7	20
Kitchen HVAC		71.5	62.7	72.7	66	64	70	Cool	Cool	On	On	Open	44.1	7	49.1	37.9

Chilis Lincoln #1070
622 George Washington Hwy, Lincoln RI 02865
Tel: 401-333-4085

Pawtucket, North Central State Airport, RI
Last Updated on May 12 2015, 2:55 pm EDT - Partly Cloudy
Temperature 82°F, Humidity 48%, Dewpoint 61°F

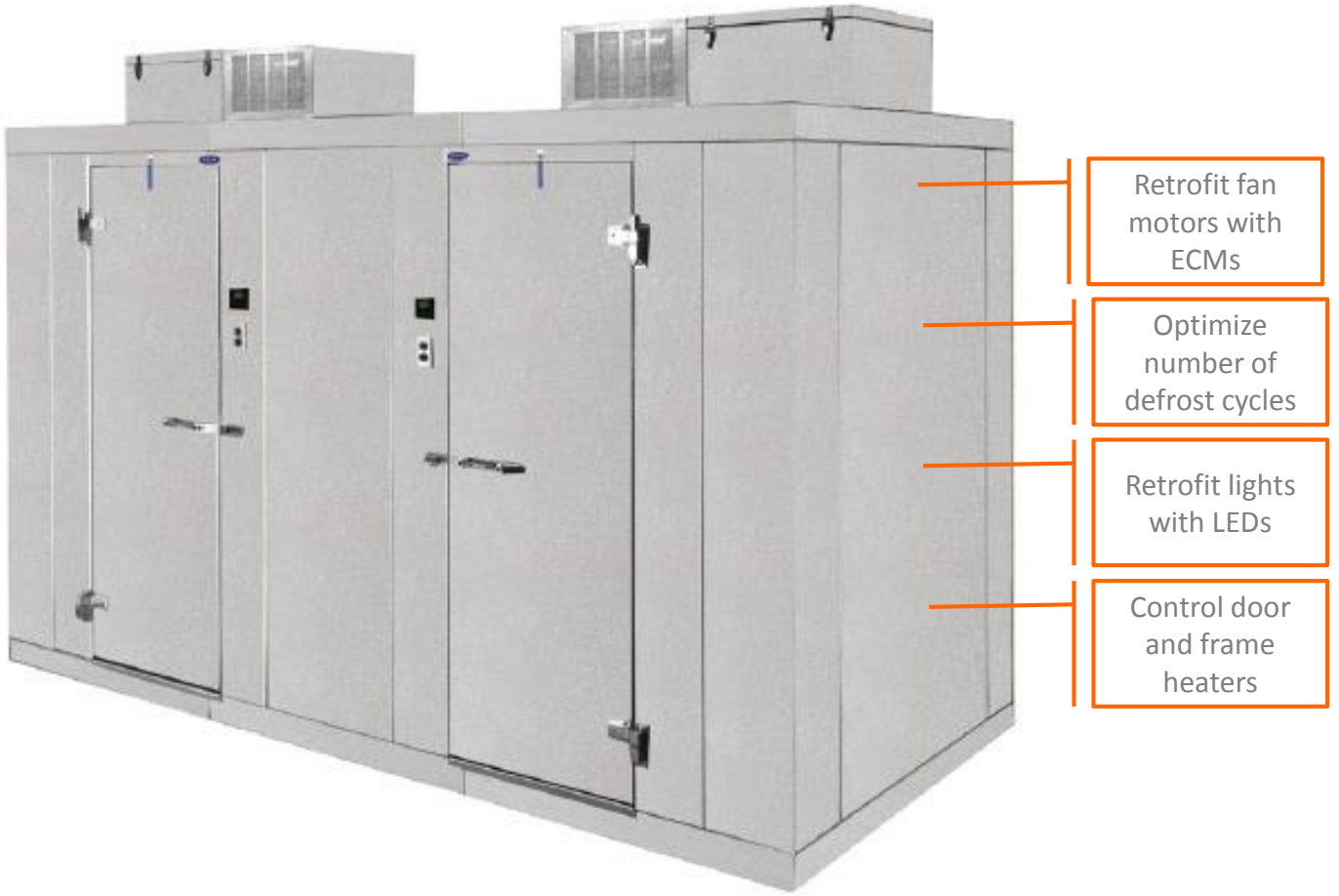
Log Out:

NRM CoolTrol Series 1			Temperature °F				Status							Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	SP	24hr	Byp	Mode	Dfrst	Sol	Fan	Door	Amps	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
Beer Cooler	_		40	36	38	38.8	Off	Run	Off	On	On	Closed	4.9	39	40	157	14.7	15.4	32	16.8	17.9	33.2
Food Cooler	_		38	32	38	39	Off	Run	Off	Off	Off	Closed	3.0	47	10	100	37.4	0.1	59.2	44.4	0.1	64



Heat Load Reduction

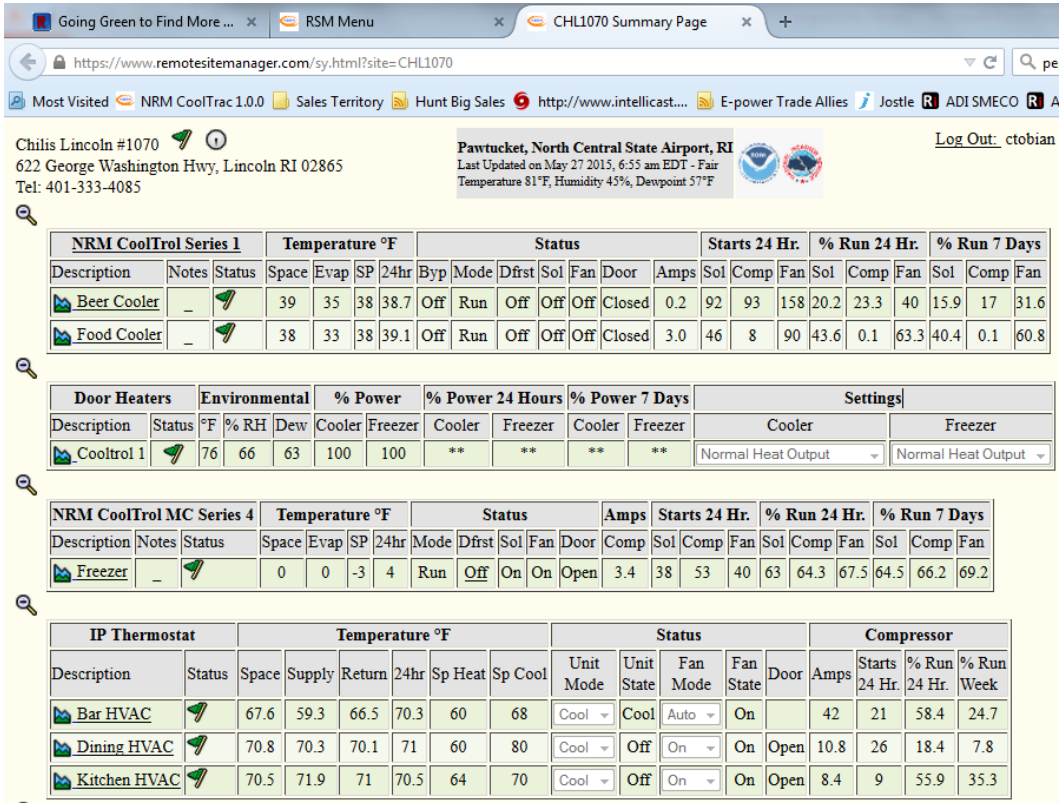
Reducing heat loads in refrigerated spaces delivers a secondary effect as a result of reduced compressor run time



Case Study: Pepper Dining

Pepper Dining has realized $ 180,000 in annual electricity costs across 60 locations in Massachusetts, Rhode Island, and Connecticut

- (1) Walk-in Cooler
- (1) Walk- in Freezer
- EC Motor Retro fit
- Door Heater Controls
- Novelty Cooler Night Shut off



Going Green to Find More ... | RSM Menu | CHL1070 Summary Page

https://www.remotesitemanager.com/sy.html?site=CHL1070

Most Visited | NRM CoolTrac 1.0.0 | Sales Territory | Hunt Big Sales | http://www.intellicast.... | E-power Trade Allies | Jostle | ADI SMECO

Chilis Lincoln #1070
622 George Washington Hwy, Lincoln RI 02865
Tel: 401-333-4085

Pawtucket, North Central State Airport, RI
Last Updated on May 27 2015, 6:55 am EDT - Fair
Temperature 81°F, Humidity 45%, Dewpoint 57°F

Log Out: ctobian

NRM CoolTrol Series 1			Temperature °F				Status							Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	SP	24hr	Byp	Mode	Dfrst	Sol	Fan	Door	Amps	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
Beer Cooler	_		39	35	38	38.7	Off	Run	Off	Off	Off	Closed	0.2	92	93	158	20.2	23.3	40	15.9	17	31.6
Food Cooler	_		38	33	38	39.1	Off	Run	Off	Off	Off	Closed	3.0	46	8	90	43.6	0.1	63.3	40.4	0.1	60.8

Door Heaters		Environmental			% Power		% Power 24 Hours		% Power 7 Days		Settings	
Description	Status	°F	% RH	Dew	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
Cooltrol 1		76	66	63	100	100	**	**	**	**	Normal Heat Output	Normal Heat Output

NRM CoolTrol MC Series 4			Temperature °F				Status					Amps	Starts 24 Hr.			% Run 24 Hr.			% Run 7 Days		
Description	Notes	Status	Space	Evap	SP	24hr	Mode	Dfrst	Sol	Fan	Door	Comp	Sol	Comp	Fan	Sol	Comp	Fan	Sol	Comp	Fan
Freezer	_		0	0	-3	4	Run	Off	On	On	Open	3.4	38	53	40	63	64.3	67.5	64.5	66.2	69.2

IP Thermostat		Temperature °F						Status					Compressor			
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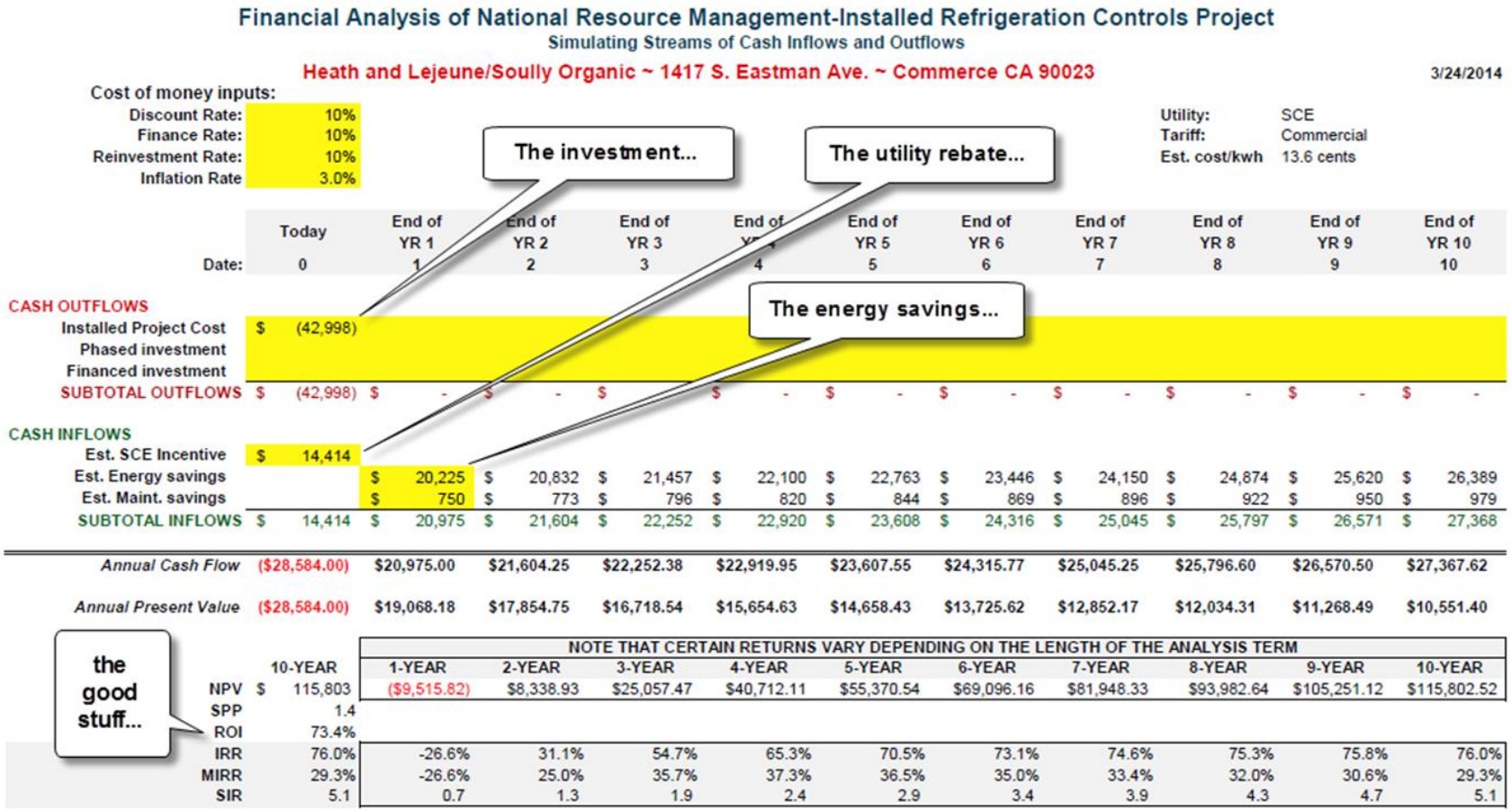
Dining HVAC		70.8	70.3	70.1	71	60	80	Cool	Off	On	On	Open	10.8	26	18.4	7.8
Kitchen HVAC		70.5	71.9	71	70.5	64	70	Cool	Off	On	On	Open	8.4	9	55.9	35.3

Sustainability and the Value it Creates

Link sustainability to business performance so the benefits so it becomes part of the planning and reporting



Financial Analysis of National Resource Management-Installed Refrigeration Controls Project

Simulating Streams of Cash Inflows and Outflows

Heath and Lejeune/Soully Organic ~ 1417 S. Eastman Ave. ~ Commerce CA 90023

3/24/2014

Cost of money inputs:

Discount Rate:	10%
Finance Rate:	10%
Reinvestment Rate:	10%
Inflation Rate	3.0%

Utility:	SCE
Tariff:	Commercial
Est. cost/kwh	13.6 cents

The investment...

The utility rebate...

The energy savings...

	Today	End of YR 1	End of YR 2	End of YR 3	End of YR 4	End of YR 5	End of YR 6	End of YR 7	End of YR 8	End of YR 9	End of YR 10
Date:	0	1	2	3	4	5	6	7	8	9	10
CASH OUTFLOWS											
Installed Project Cost	$ (42,998)										
Phased investment											
Financed investment											
SUBTOTAL OUTFLOWS	$ (42,998)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CASH INFLOWS											
Est. SCE Incentive	$ 14,414										
Est. Energy savings		$ 20,225	$ 20,832	$ 21,457	$ 22,100	$ 22,763	$ 23,446	$ 24,150	$ 24,874	$ 25,620	$ 26,389
Est. Maint. savings		$ 750	$ 773	$ 796	$ 820	$ 844	$ 869	$ 896	$ 922	$ 950	$ 979
SUBTOTAL INFLOWS	$ 14,414	$ 20,975	$ 21,604	$ 22,252	$ 22,920	$ 23,608	$ 24,316	$ 25,045	$ 25,797	$ 26,571	$ 27,368
Annual Cash Flow	($28,584.00)	$20,975.00	$21,604.25	$22,252.38	$22,919.95	$23,607.55	$24,315.77	$25,045.25	$25,796.60	$26,570.50	$27,367.62
Annual Present Value	($28,584.00)	$19,068.18	$17,854.75	$16,718.54	$15,654.63	$14,658.43	$13,725.62	$12,852.17	$12,034.31	$11,268.49	$10,551.40

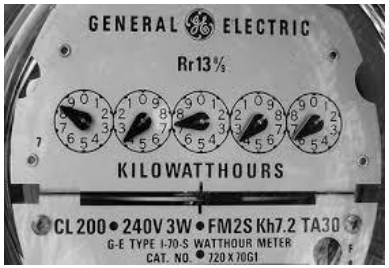
the good stuff...

NOTE THAT CERTAIN RETURNS VARY DEPENDING ON THE LENGTH OF THE ANALYSIS TERM

	10-YEAR	1-YEAR	2-YEAR	3-YEAR	4-YEAR	5-YEAR	6-YEAR	7-YEAR	8-YEAR	9-YEAR	10-YEAR
NPV	$ 115,803	($9,515.82)	$8,338.93	$25,057.47	$40,712.11	$55,370.54	$69,096.16	$81,948.33	$93,982.64	$105,251.12	$115,802.52
SPP	1.4										
ROI	73.4%										
IRR	76.0%	-26.6%	31.1%	54.7%	65.3%	70.5%	73.1%	74.6%	75.3%	75.8%	76.0%
MIRR	29.3%	-26.6%	25.0%	35.7%	37.3%	36.5%	35.0%	33.4%	32.0%	30.6%	29.3%
SIR	5.1	0.7	1.3	1.9	2.4	2.9	3.4	3.9	4.3	4.7	5.1

Where Financial and Sustainability Goals Align

National Resource Management (NRM) delivers verifiable kWh savings from commercial refrigeration that results in permanent reduction in electricity consumption for its clients.



As a turn-key full service provider, NRM serves its business clients by linking regional utility incentive programs our with refrigeration energy-efficiency measures which accelerates ROI while delivering newly found operations and maintenance savings opportunity.

NRM

Contact NRM to learn more:
(800) 377-5439 ext. 1
www.nrminc.com

Closing

- Thank you to Don, Jeff, and Carol!
- We would love to hear from the audience:
  - What are your challenges and successes in saving energy?
  - What does the industry need in order to accelerate energy & cost savings?

Feel free to email us about these topics, or with questions about the BBA Food Service Team:

Richard.Shandross@navigant.com

Andrew.Mitchell@EE.Doe.Gov

Thank you for joining us today!

U.S. DEPARTMENT OF ENERGY