

All Electric Commercial Kitchens

CEDA Program

7/26/2023



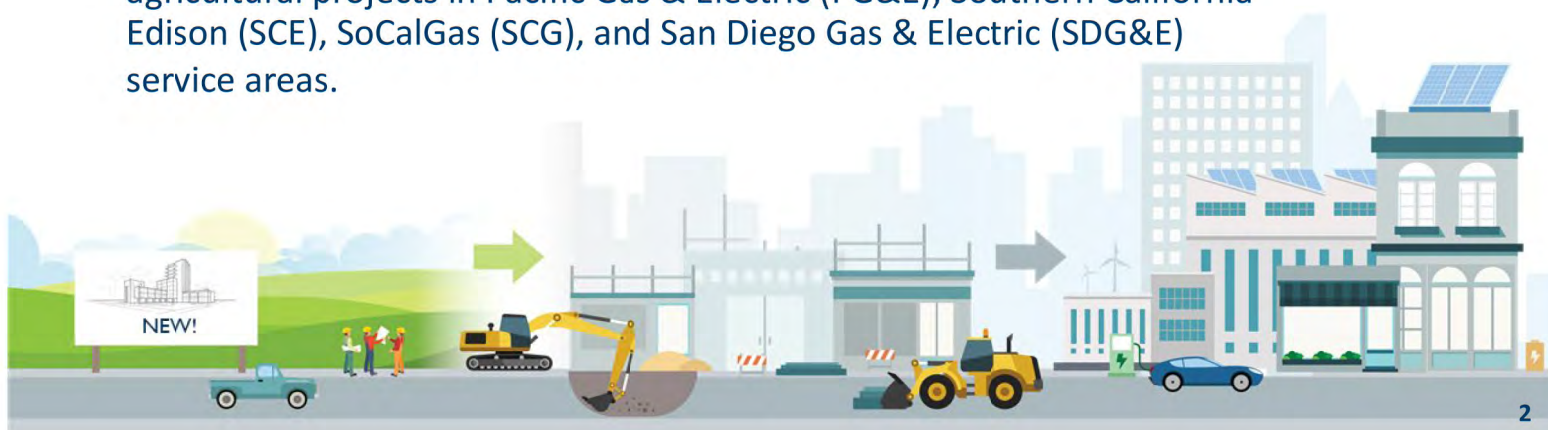
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WHAT IS CEDA?



The California Energy Design Assistance (CEDA) program promotes the electrification and decarbonization of new building construction or major renovation. CEDA works in collaboration with project teams to reduce energy demand, consumption, and carbon emissions.

CEDA serves commercial, public, high-rise multifamily, industrial, and agricultural projects in Pacific Gas & Electric (PG&E), Southern California Edison (SCE), SoCalGas (SCG), and San Diego Gas & Electric (SDG&E) service areas.



WHY PARTICIPATE IN CEDA?

- Receive complimentary custom **decarbonization** analysis to identify and evaluate opportunities
- Gain analysis of **energy costs and paybacks**
- Receive **financial incentives** to help offset the costs of decarbonization measures for qualified projects
- Demonstrate commitment to high performance building practices and design



DESIGN TEAM INCENTIVES

Design teams are stretched thin on time and budget, but that doesn't mean decarbonization needs to be put on the back burner.

CEDA is now offering design team incentives on top of the incentives your project will get for implementing decarbonization measures. It's a win-win!



INCENTIVE SUMMARY

- Based on **net¹ first year energy savings** beyond standard practice baseline²
 - **Fixed incentive rates** for kWh, therms saved (bonus for electrification)
- Incentives are capped at the lesser of 100% of incremental measure costs or 50% of full measure costs
- Incentives may be capped for buildings with onsite generation exceeding usage on an hourly basis.

Energy Savings:

- \$0.20/kWh
- \$0.30/therm
- \$1.00/therm (electrification)

¹ Net savings are based on CPUC determined net-to-gross ratio to account for free-ridership and program influence
² The All-electric program's standard practice baseline is mixed fuel for buildings with natural gas available nearby

HAVE A PROJECT TO DISCUSS?

For more information, please contact one of our program outreach specialists:



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Program Outreach Lead
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952.938.1588



Tina Hendrix
Program Outreach Specialist
THendrix@Willdan.com
760.585.7577

All Electric Commercial Kitchen Agenda

Section	Subsection	Time Allotted
Welcome + Introduction	CEDA introduction	5 mins
	Why Electric kitchens	
What is an All-Electric Commercial Kitchen?	What is an electric ready kitchen?	30 mins
	What is an all-electric commercial kitchen?	
	How do you design and build one?	
	What are the challenges?	
Example State Rebate	Pennsylvania's Electric Commercial Kitchen Rebate	10 mins
Benefits and Case Study	Benefits of All-Electric Commercial Kitchens	20 mins
	Case Study – Eaten Hall	
	Myth Busting	
Q + A		25 mins
Total time		90 mins

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Today's Panelists



Richard Young

Richard Young is Director of Outreach at Frontier Energy Food Service Technology Center, an unbiased, commercial foodservice, research-and-training facility. Richard focuses his efforts on translating Frontier Energy's 35 years of food service research into practical information.



Chef Christopher Galarza

Chef Christopher Galarza is the Founder and Culinary Sustainability Consultant for Forward Dining Solutions LLC and works with clients to create kitchens that promote healthy, efficient, and equitable working conditions.



Heidi Kunsch

Heidi Kunsch serves as an Environmental Group Manager at PADEP's Energy Programs Office, where she manages and oversees education and outreach, as well as financial incentive programs for high-performance, green buildings and clean transportation.

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Wholistic Design for the Energy-Efficient, High-Performance, All-Electric Kitchen

Presented by: Richard Young
Frontier Energy Food Service Technology Center





July 26th, 2023

1

Presentation by:
Richard Young
 Director
 RYoung@FrontierEnergy.com



FRONTIER
energy

**The Food Service
Technology Center**



fishnick.com

2



1992



Now

3

Disclaimer

The information in this document is believed to accurately describe the technologies addressed herein and are meant to clarify and illustrate typical situations, which must be appropriately adapted to individual circumstances. These materials were prepared to be used in conjunction with a free educational program and are not intended to provide legal advice or establish legal standards of reasonable behavior. Neither Pacific Gas & Electric (PG&E) nor any of its employees and agents: (1) makes any written or oral warranty, expressed or implied, including but not limited to the merchantability or fitness for a particular purpose; (2) assumes any legal liability or responsibility for the accuracy or completeness of any information, apparatus, product, process, method, or policy contained herein; or (3) represents that its use would not infringe any privately owned rights, including but not limited to patents, trademarks or copyrights. Furthermore, the information, statements, representations, graphs and data presented in this report are provided by PG&E as a service to our customers. PG&E does not endorse products or manufacturers. Mention of any particular product or manufacturer in this course material should not be construed as an implied endorsement.

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These offerings are funded by California utility customers and administered by PG&E under the auspices of the California Public Utilities Commission.



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Safety Message

Food Safety!

Avoid foodborne illness – use proper refrigeration and storage at home to avoid sickness and hospitalization



<https://www.cdc.gov/nceh/ehs/publications/pfio-infographic.html>

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Electrification means all-electric kitchens

The Challenges for Commercial Foodservice?

Requires some behavior change!



Electricity is a more expensive fuel than Gas



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Overcoming the Challenges

Many appliances require no behavior change to go all-electric...for example:



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Overcoming the Challenges

Much of the equipment is already electric and trends are moving more electric equipment into the kitchen.



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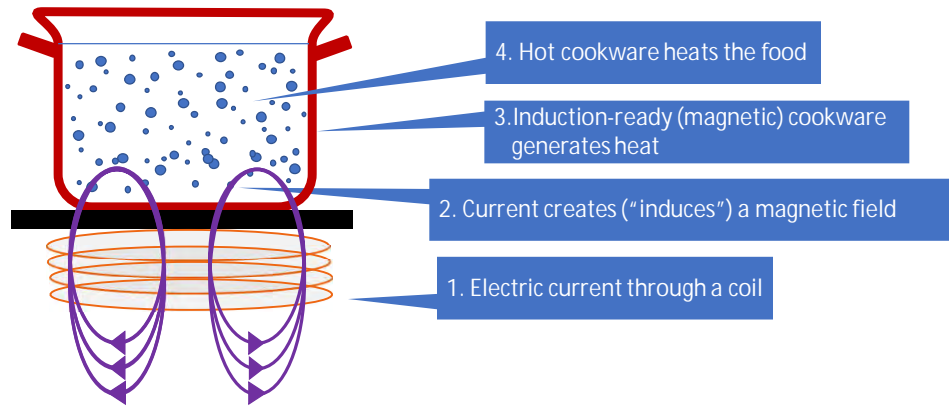
Overcoming the Challenges

Induction is a superior technology

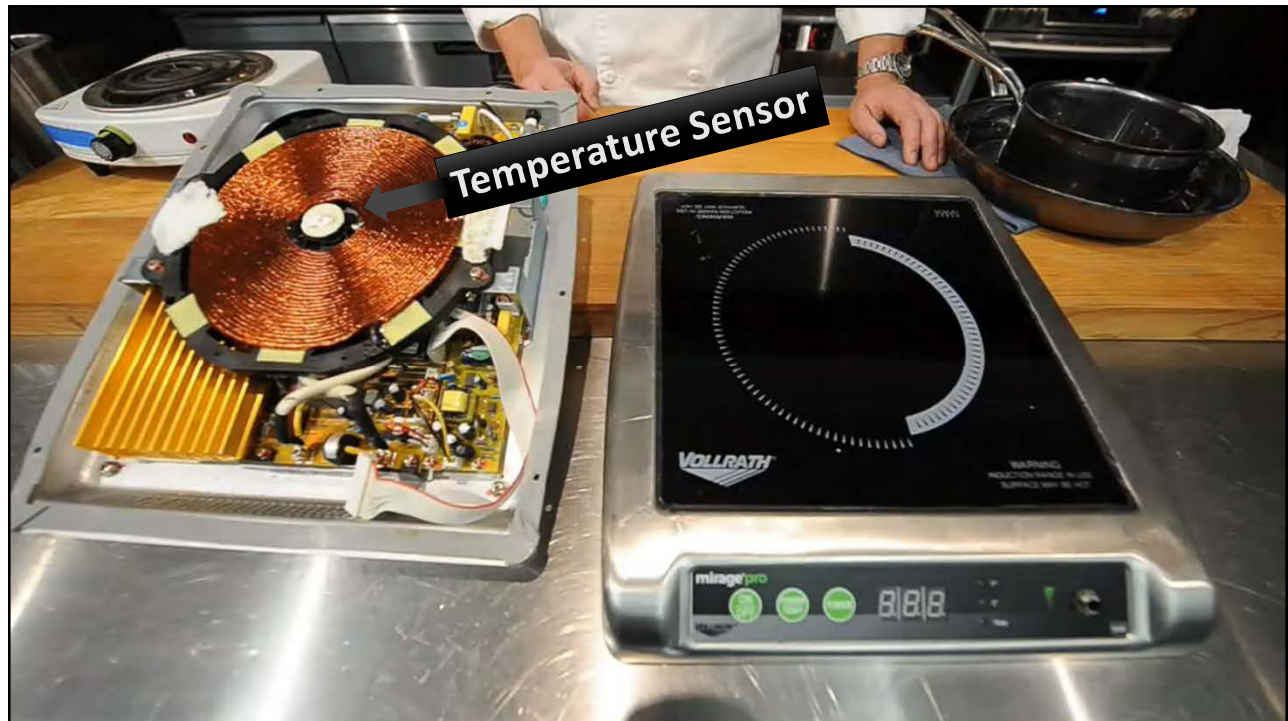


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How does Induction Cooking Work?

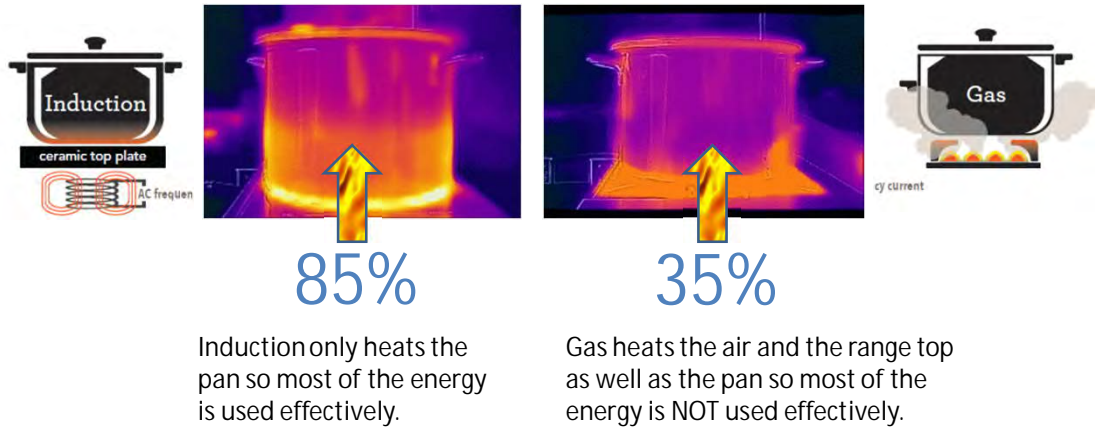


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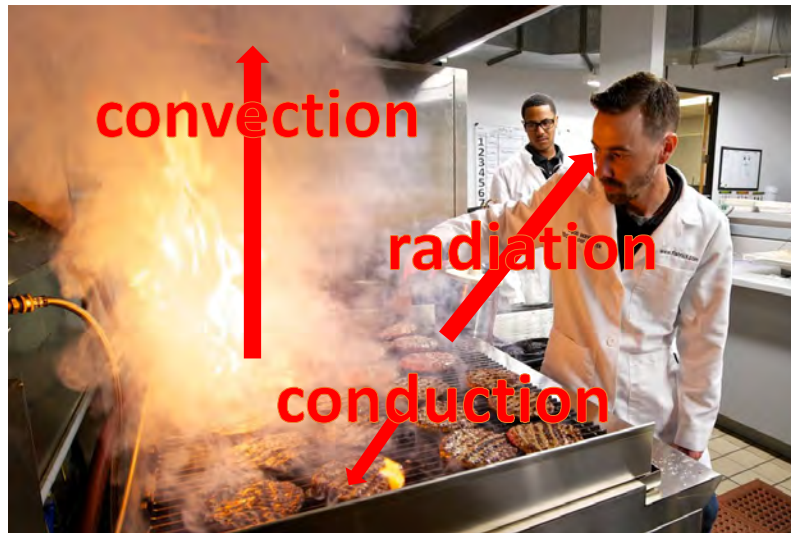
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Efficiency: Where Does the Heat Go?



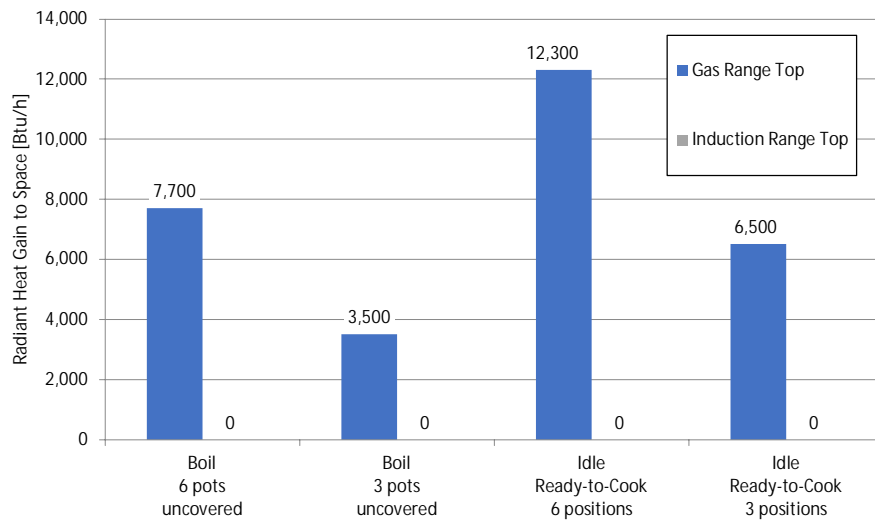
Source: <https://vollrath.com/induction/>

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Radiant Heat Gain for a Range Top Under a Hood



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Benefits:

- No flame means less fire and burn risk
- Precise controls can reduce labor & food waste
- Easy cleaning reduces labor

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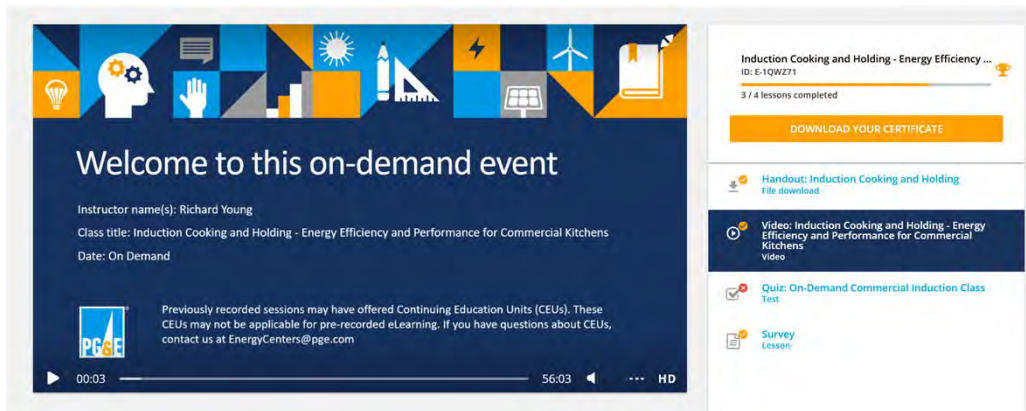


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On-Demand Commercial Induction Class

PG&E Energy Center:

https://pge.docebo.com/lms/index.php?r=course/deeplink&course_id=859&generated_by=31662&hash=8fdeb0e2c63916ae40ec8237bae2d30ab991389e



The screenshot shows a video player interface for an on-demand class. The video player has a dark blue header with the text "Welcome to this on-demand event". Below the header, it lists the instructor as Richard Young, the class title as "Induction Cooking and Holding - Energy Efficiency and Performance for Commercial Kitchens", and the date as "On Demand". A PG&E logo is visible in the bottom left of the video player. The video progress bar shows 00:03 out of 56:03. To the right of the video player, there is a sidebar with a list of items: "Induction Cooking and Holding - Energy Efficiency ..." (ID: E-1QWZ71, 3/4 lessons completed, with a "DOWNLOAD YOUR CERTIFICATE" button), "Handout: Induction Cooking and Holding" (File download), "Video: Induction Cooking and Holding - Energy Efficiency and Performance for Commercial Kitchens" (Video), "Quiz: On-Demand Commercial Induction Class" (Test), and "Survey Lesson" (Lesson).

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The advertisement features a background image of a person cooking with a white spatula in a stainless steel pan on an induction cooktop. The pan contains a colorful vegetable medley including broccoli, mushrooms, and bell peppers. In the top left corner, there is a PG&E logo. The text "Induction Cooktop Loaner Program" is overlaid in large white font. In the bottom left, the website "pge.com/inductionloaner" is displayed. In the bottom right, there is a QR code and the text "ICLP Website".

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Induction Cooktop Loaner Program

You must be a PG&E customer to participate in this program.

**If not, check to see if there is a loaner program in your area.
(SCE, EBCE, SCP are examples)**



pge.com/inductionloaner

• ICLP Website

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Big Picture Drivers of Kitchen Change

Real Estate Cost

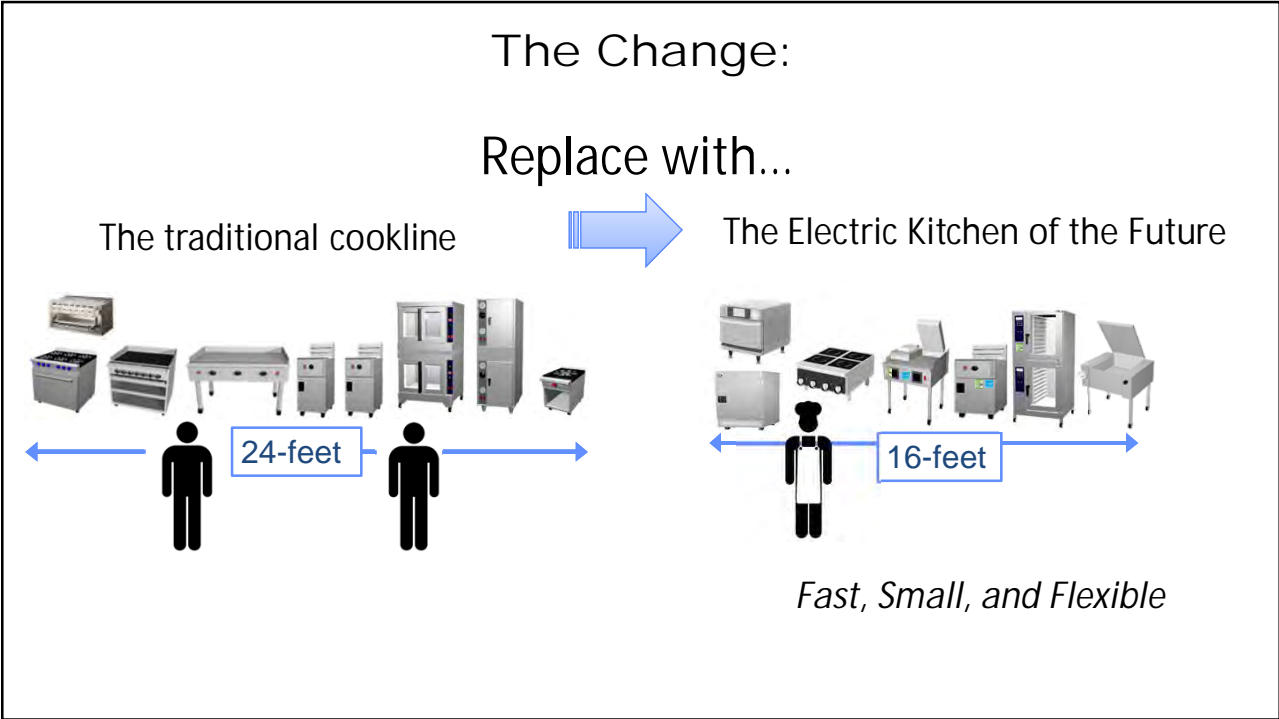
Labor
Shortage



Waste Reduction

Decarbonization

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Combination ovens, flexible braising pans, blast chillers and induction create a flexible lineup



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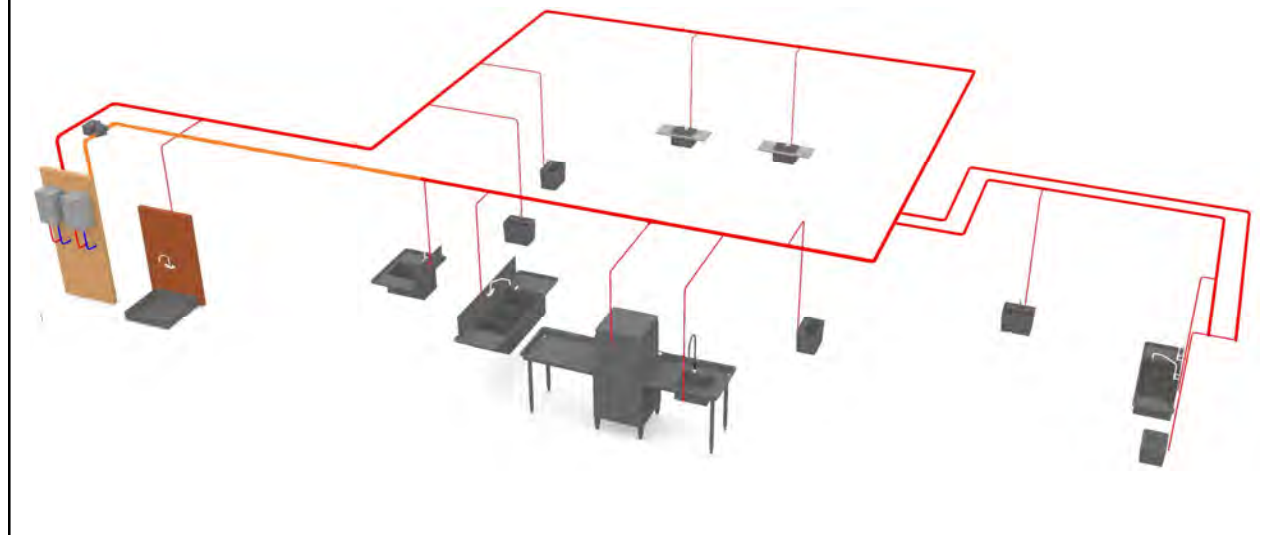
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Building the Decarbonized Kitchen of the Future Requires Wholistic Design

- Smart, high-tech equipment - combination & rapid-cook ovens
- High-efficiency cooking, holding, refrigeration, and sanitation
- Safer, faster, equipment – induction cooking and holding
- Off-peak production – automation, cook/chill, sous vide
- Demand controlled ventilation
- Advanced plumbing design with HPWH
- Optimized HVAC with HP space heating

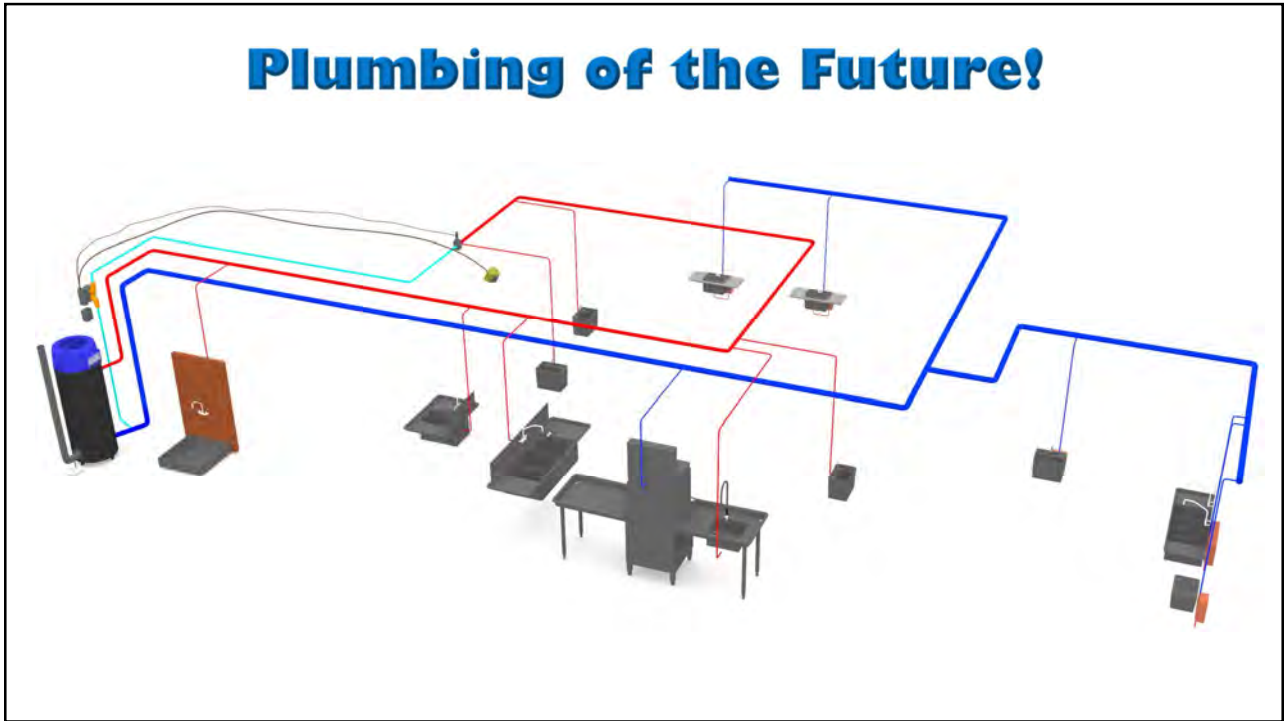
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Today's Plumbing Design



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Plumbing of the Future!



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Plumbing of the Future!

Distributed Generation: Hybrid of Simple and Demand Recirc

Reduce the hot water system load by designing a distributed generation system using water-efficient equipment, pipe insulation, demand recirculation controls, point-of-use heaters at remote fixtures, and heat recovery dishmachines.



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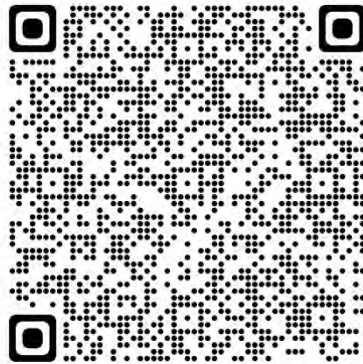
Resource for Classes, Rebates, Design Guides CAEnergyWise.com

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Please help us improve our training
by answering a few questions:



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Thanks!

RYoung@FrontierEnergy.com

PG&E Together, Building a Better California

fishnick.com

Food Service Technology Center
FRONTIER energy

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Cooking in Healthy Electrified Commercial Kitchens (CHECK)

New Buildings Institute webinar

July 26, 2023

Josh Shapiro, Governor

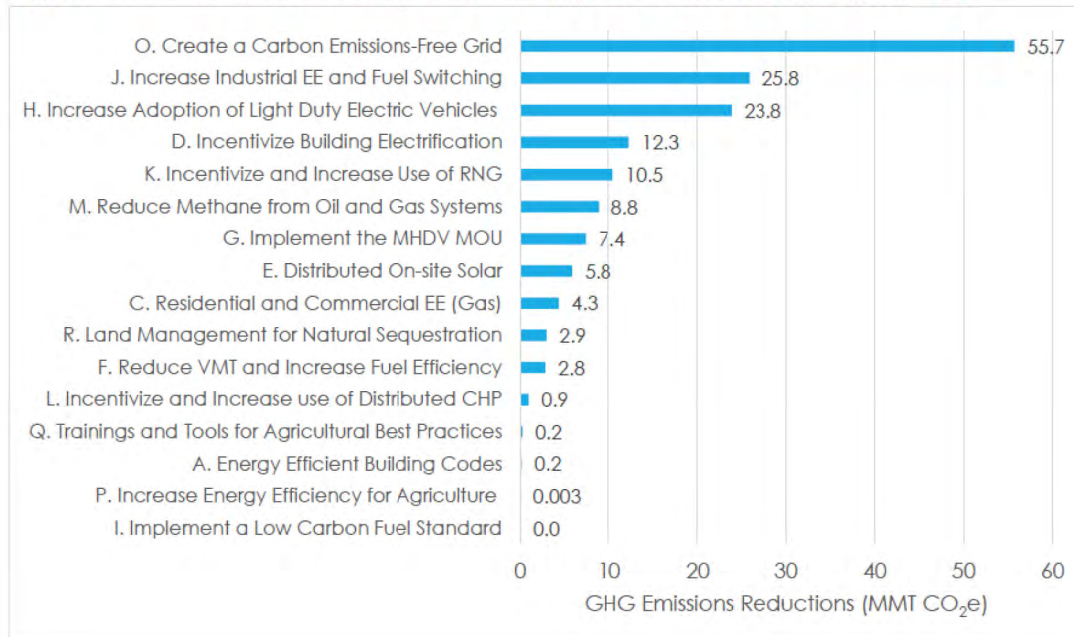
Richard Negrin, DEP Secretary

DEP Energy Programs Office (EPO)

- Work with citizen's groups, businesses, trade organizations, local governments and communities to innovate, educate, prevent pollution, & provide financial/technical assistance
- Guide Pennsylvanians on energy conservation & efficiency, as well as expand use of renewable & alternative energy solutions

Why Electrification?

Figure 18. GHG reductions from strategies in 2050, compared to business as usual (MMT_{CO₂e})



CHECK: Overview

- Education and rebate **pilot** program
- Goal: Help commercial kitchens in Pennsylvania become healthier places to work via energy efficiency and electrification
- Applicant must view a recorded/live CHECK webinar or attend an in-person workshop to apply for the rebate
- Official launch of the rebate was on October 1, 2022
- Second round of rebates launched July 5, 2023

CHECK Education Program

Training provider:

Chef Chris Galarza, Forward Dining Solutions

Two training options:

Webinars:

- Live session on 8/15
- Recordings on CHECK webpage

In-person workshops:

- 8/3 in Gibsonia
- 9/15 in State College



CHECK Rebate Program

Funding basics:

- Approximately \$150,000 in available funding
- Up to \$8,500 per applicant
- Available on first-come, first-serve basis with EJ focus
- Projects can be existing buildings or new construction
- Must apply for rebate prior to purchasing equipment

Eligible applicants:

- 501c3 community service nonprofits
- Not-for-profit hospitals
- K-12 schools
- Higher education institutions
- Restaurants



CHECK Rebate Program

Table 1. CHECK Rebate Amounts

Technology (all equipment must be combustion-free; electric-only)	Eligible Equipment	Maximum Rebate Amount Per Applicant
ENERGY STAR certified commercial cooking equipment	Steam cooker, fryer, combination oven, convection oven, griddle, hot food holding cabinet	Up to 50% of purchase cost \$4000 max
Ventilation	Demand control kitchen ventilation system	Up to 50% of purchase cost \$7,500 max
Induction cooking equipment	Range, cooktop, wok, griddle	Up to 50% of purchase cost \$7,500 max
Associated electrical infrastructure upgrades to accommodate additional load from induction equipment	Electrical equipment (circuits/breaker/wiring for new load)	Up to 50% of infrastructure costs \$1,000 max

*Max rebate amount per applicant is 8,500 USD



How to Apply

- Online applications accepted via DCED's Electronic Single Application website:
<https://www.esa.dced.state.pa.us/Login.aspx>
- Step-by-step application instructions on CHECK webpage
- Open through December 31st, 2023*
- Product specs and price quotes must be uploaded with application
- You must apply BEFORE purchasing or installing equipment



How to Redeem Voucher

- Successful applicants issued a rebate voucher that secures the approved rebate amount for **180 days from date of issuance**
- Following equipment installation, voucher recipient must provide required documentation to DEP prior to voucher expiration date to receive rebate funds:
 - Before (if applicable) & after photos
 - Equipment invoice(s)
 - Proof of payment



Successes & Challenges

- 196 people educated
- Inspired WPPSEF to invest \$55,000 on induction cooking programs and projects in PA
- Most interest from K-12 schools
- During round 1, only two rebates redeemed & 10 rebate vouchers issued
- Perhaps the program was initiated a bit too soon?
“Appetite” wasn’t there yet
- As a result, we’ve opened the program to restaurants in round 2 & increased rebate amounts



For More Information

CHECK rebate guidelines & online application instructions:

<https://www.dep.pa.gov/CommercialBuildings>

For questions or to be placed on CHECK email distribution list:

RA-EP-CHECKProgram@pa.gov



Thank you!

Heidi J. Kunsch, LEED AP BD+C
Environmental Group Manager
DEP Energy Programs Office
hekunsch@pa.gov

DEP Energy Programs Website: www.dep.pa.gov/energyprogramsoffice

DEP Website: www.dep.pa.gov

FDS PRESENT

Electrifying Commercial Kitchens

NBI

07/26/23



Chef Chris Galarza
Founder – Forward Dining Solutions



Electric Kitchens & Induction Cooking





Gas

Vs.



Induction

- 50% Efficient (2.0 KW – 1.0 KBTU) *at best
 - 38.6# of food per hour
 - Needs time and elbow grease to clean
 - Can cause burns and fires
- 90%+ Efficient (1.1KW – 1.0 KBTU)
 - 70.9# of food per hour
 - Easy to Clean
 - Safe to use

Source: Fishnick

Quick Comparison

Range:

30kBtu/h burner at 35% = 10kBtu

5kW at 85% = 14kBtu/h

Wok:

100kBtu/h at 20% = 20kBtu

3.5kw at 91% = 11kBtu/h

5kW at 91% = 15kBtu/h

12kw at 87% = 35kBtu/h

Source: Fishnick

Induction Comparison: Annual Energy Cost



Assumptions: 360
days/yr.
15 hrs/day
\$1/therm
\$.17/kwh



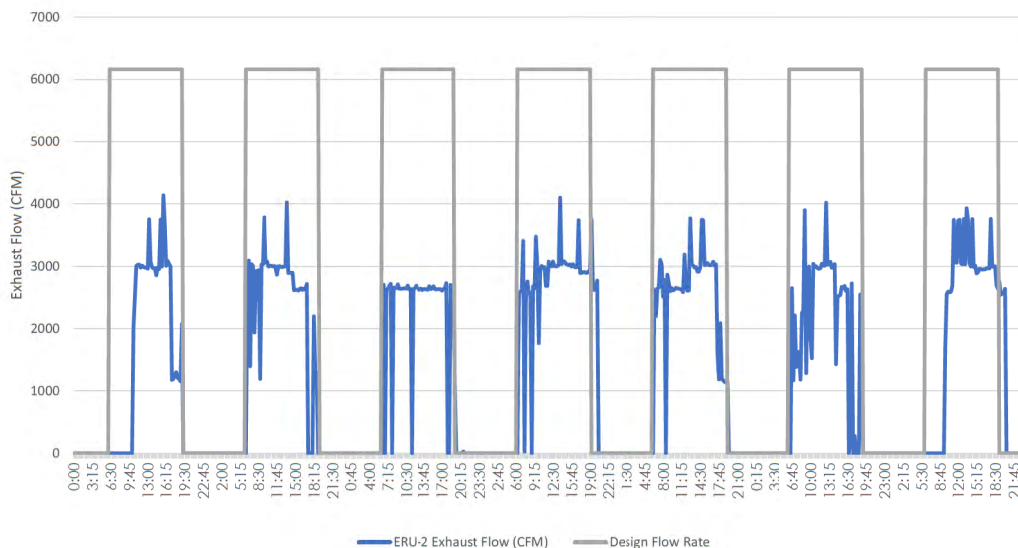
\$1,123 per year
6 burner range
25,000 BTU burner

\$1,114 per year
represents 6 hob unit

Source: Fishnick

REAL-WORLD DATA ELECTRIFIED KITCHEN

Variable vs Constant Volume Exhaust



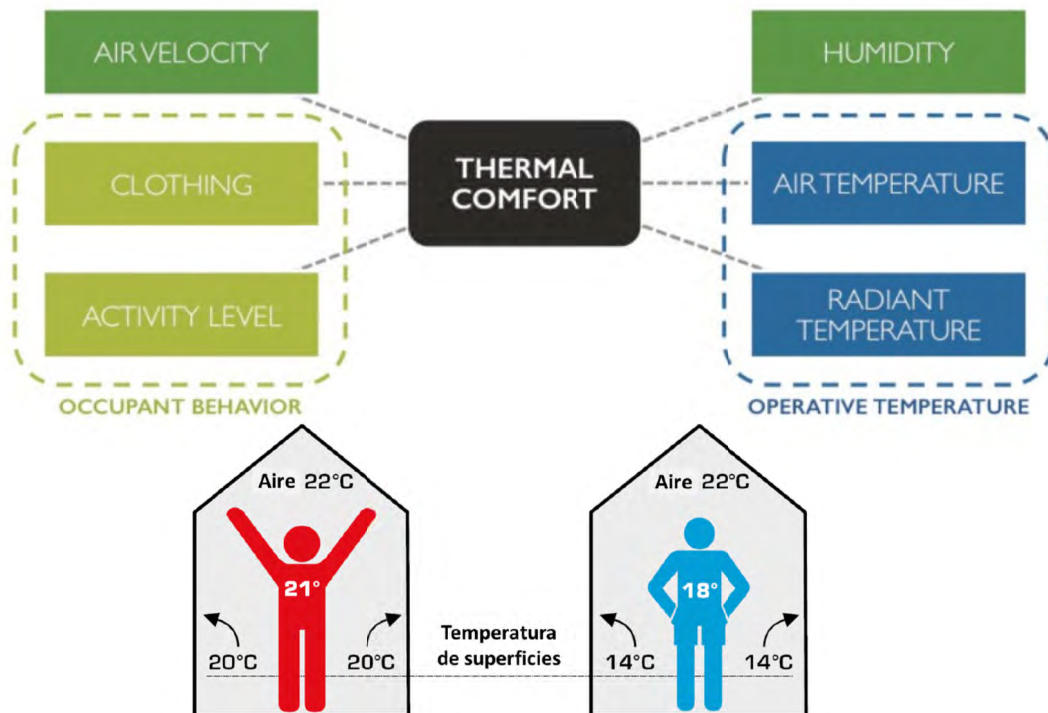
Source: Interface Engineering



Thermal Comfort in Commercial Kitchens

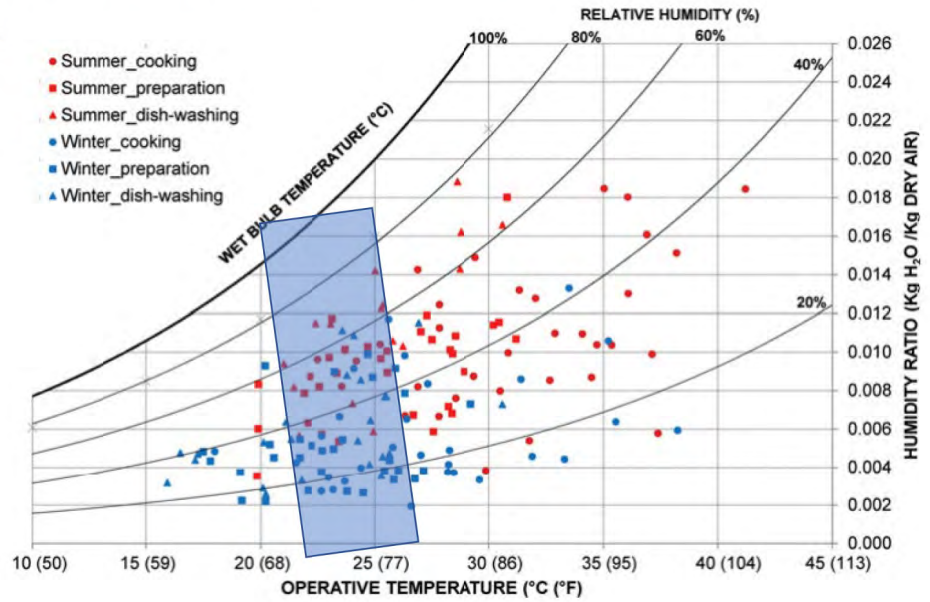


THERMAL COMFORT IN TYPICAL KITCHENS



ASHRAE RP-1469 Thermal Comfort in Commercial Kitchens

- >100 Kitchens in U.S., one week test
- All climate zones represented
- Comparison of Summer and Winter



Source: ASHRAE

Quality of Life Differences



Source: EcoCanopy



Source: WRNS

Kitchen Temp in September



Source: Interface Engineering

SUMMARY OF BENEFITS

Benefits of Electrifying:

- No more idling equipment
- Reduces building emissions = reduced environmental impact
- Operates efficiently = saving energy & utility costs
- Precision cooking controls
- Dramatic improvement to thermal comfort
- Extended life of pots & pans
- Easier to clean = saving on chemical costs
- Faster throughput = increased productivity
 - Dollar per labor hour improved
- Improved indoor air quality



Source: Interface Engineering



Myth Busting!



FORWARD DINING SOLUTIONS LLC
PUSHING SUSTAINABLE KITCHEN DESIGN FORWARD



YOU CAN'T PRODUCE QUALITY FOOD ON INDUCTION



FORWARD DINING SOLUTIONS LLC
PUSHING SUSTAINABLE KITCHEN DESIGN FORWARD



Bourse d'Or



The Fat Duck
heston blumenthal



- "Induction Cooking Speed is Exaggerated"
- "Sautéing isn't possible on Induction"
- "Chefs or home cooks can't preheat their pans therefore can't sauté properly"
- "Cooking with gas gives you more control"
- "Induction cooking technology does not accommodate wok cooking"
- "Glass surface of the induction equipment will crack/warp because it's not able to withstand a professional kitchen setting."



Chatham University Eden Hall

Eden Hall, Chatham University

Gibsonia, PA

Architect: Mithun Partners

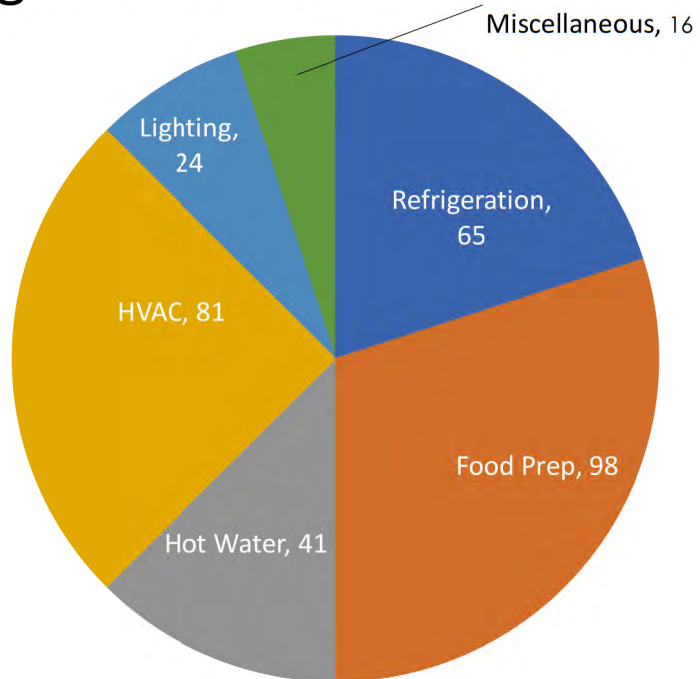


Typical Food Service Stats

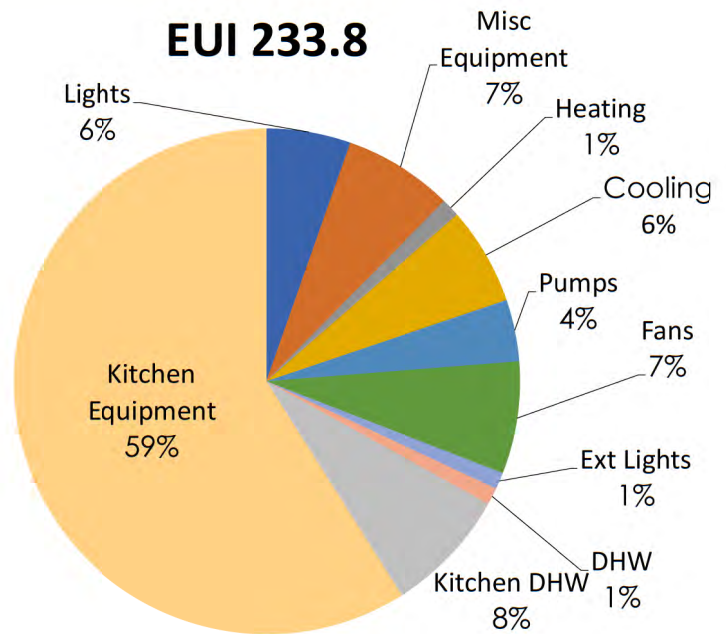


Average EUI of 325

- Typical Cafeteria EUI Range: 250-400 kBTU/sf-yr
- No Ventilation Heat Recovery
- No VAV hoods
- Fossil Fuel Heating.
- Re Farm EUI – **Zero!!!**

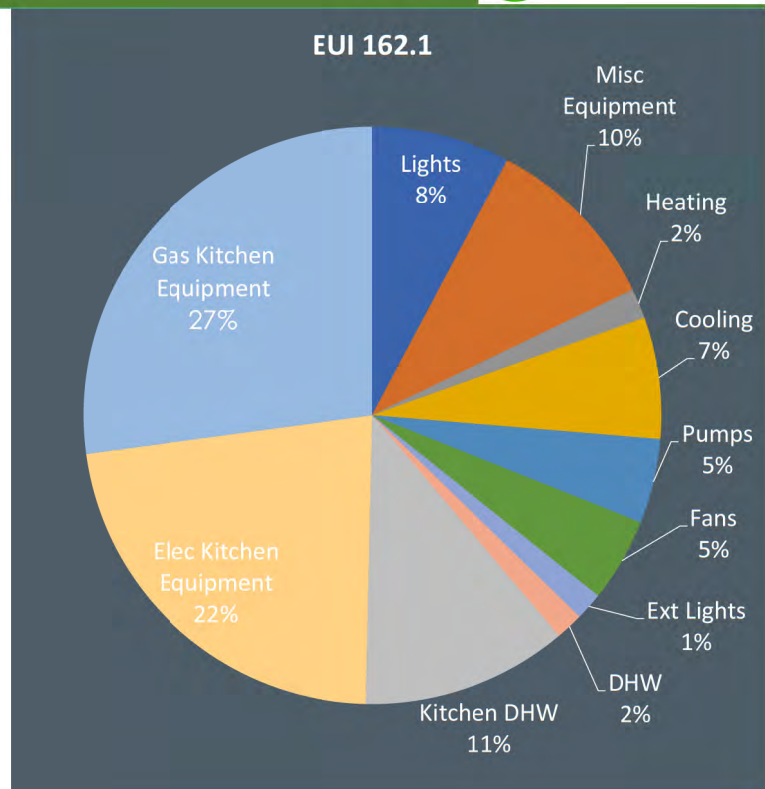


- Typical food service process loads for 1500 full time students
- Gas equipment Idling throughout the day
- Constant flow exhaust hoods
- Standard refrigeration
- Heat Pump heating and cooling (air systems)



Source: Interface Engineering

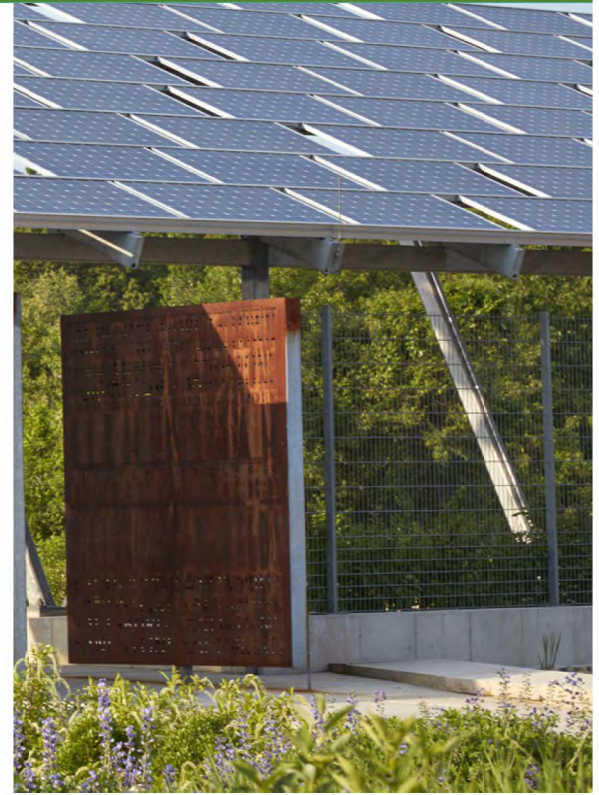
- Detailed food service loads
- Radiant heating and cooling
- Variable flow exhaust
- Remote refrigeration loop
- Induction range, griddle, and warmers
- Heat recovery makeup air unit



Source: Interface Engineering

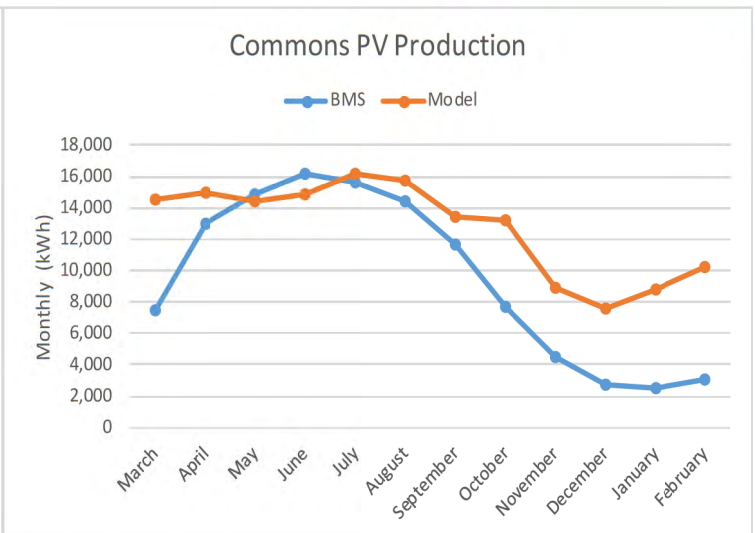
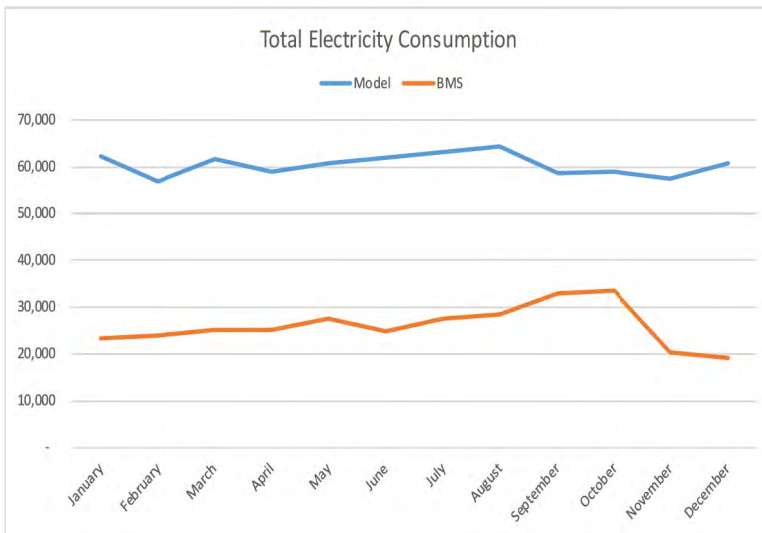
Final Energy Modeling Predictions

- EUI of 121 kBTU/Sf-Yr (before renewables)
- Design is net zero ready (450 KW north parking PV canopy planned)



Source: Interface Engineering

Measurement & Verification



- The Commons is operating at an EUI of 51.9 vs 121.9 predicted (for 2017)
- Renewables – EUI of 16 from roof mounted PV, 19 from Green Gas co-gen (68% renewable!!)

Source: Interface Engineering



Commercial Kitchens Wanted!

PSE scientists want to measure air quality in commercial kitchen settings.
We are interested in measuring both gas-fired and electric appliances.

Sampling can be performed during on or off hours with very minimal
equipment. We provide compensation and an air quality report to participants.



www.psehealthyenergy.org

Sign up: NaturalGasStudy@psehealthyenergy.org



Thank You.

Chef Chris Galarza

CGalarza@ForwardDiningSolutions.com

Founder/Culinary Sustainability Consultant – Forward Dining Solutions LLC.