All Electric Commercial Kitchens
CEDA Program
7/26/2023

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

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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 net\textsuperscript{1} first year energy savings beyond standard practice baseline\textsuperscript{2}
  
  • **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.

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

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HAVE A PROJECT TO DISCUSS?

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

Jeff Glover  
Program Outreach Lead  
JGlover@Willdan.com  
952.938.1588

Tina Hendrix  
Program Outreach Specialist  
THendrix@Willdan.com  
760.585.7577
All Electric Commercial Kitchen Agenda

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

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

Presented by: Richard Young
Frontier Energy Food Service Technology Center

July 26th, 2023

Presentation by:
Richard Young
Director
RYoung@FrontierEnergy.com

The Food Service Technology Center

fishnick.com
Disclaimer

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Safety Message

Food Safety!

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

Electrification means all-electric kitchens

The Challenges for Commercial Foodservice?

Requires some behavior change!

Electricity is a more expensive fuel than Gas

Overcoming the Challenges

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

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

Overcoming the Challenges

Induction is a superior technology
How does Induction Cooking Work?

1. Electric current through a coil
2. Current creates ("induces") a magnetic field
3. Induction-ready (magnetic) cookware generates heat
4. Hot cookware heats the food

Temperature Sensor
Efficiency: Where Does the Heat Go?

Induction only heats the pan so most of the energy is used effectively. Gas heats the air and the range top as well as the pan so most of the energy is NOT used effectively.

Source: https://vollrath.com/induction/
Radiant Heat Gain for a Range Top Under a Hood

<table>
<thead>
<tr>
<th>Condition</th>
<th>Gas Range Top (Btu/h)</th>
<th>Induction Range Top (Btu/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boil 6 pots uncovered</td>
<td>7,700</td>
<td>0</td>
</tr>
<tr>
<td>Boil 3 pots uncovered</td>
<td>3,500</td>
<td>0</td>
</tr>
<tr>
<td>Idle Ready-to-Cook 6 positions</td>
<td>12,300</td>
<td>6,500</td>
</tr>
<tr>
<td>Idle Ready-to-Cook 3 positions</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Benefits:

- **No flame means less fire and burn risk**
- **Precise controls can reduce labor & food waste**
- **Easy cleaning reduces labor**
Induction Warming and Holding
On-Demand Commercial Induction Class

PG&E Energy Center:

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

Induction Cooktop Loaner Program

pge.com/inductionloaner
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

Big Picture Drivers of Kitchen Change

- Real Estate Cost
- Waste Reduction
- Labor Shortage
- Decarbonization
The Change:

Replace with...

The traditional cookline

The Electric Kitchen of the Future

Fast, Small, and Flexible
Combination ovens, flexible braising pans, blast chillers and induction create a flexible lineup
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
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.
Resource for Classes, Rebates, Design Guides
CAEnergyWise.com

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

![QR Code]
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 CO\(_2\)e)*

- O. Create a Carbon Emissions-Free Grid: 55.7
- J. Increase Industrial EE and Fuel Switching: 25.8
- H. Increase Adoption of Light Duty Electric Vehicles: 23.8
- D. Incentivize Building Electrification: 12.3
- K. Incentivize and Increase Use of RNG: 10.5
- M. Reduce Methane from Oil and Gas Systems: 8.8
- G. Implement the PAHUV MOU: 7.4
- E. Distributed On-site Solar: 5.8
- C. Residential and Commercial EE (Gas): 4.3
- R. Land Management for Natural Sequestration: 2.9
- F. Reduce VMT and Increase Fuel Efficiency: 2.8
- L. Incentivize and Increase use of Distributed CHP: 0.9
- Q. Trainings and Tools for Agricultural Best Practices: 0.2
- A. Energy Efficient Building Codes: 0.2
- P. Increase Energy Efficiency for Agriculture: 0.003
- I. Implement a Low Carbon Fuel Standard: 0.0

**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*

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

*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](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
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
Electric Kitchens & Induction Cooking
Gas Vs. Induction Cooking

Gas

- 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

Induction

- 90%+ Efficient (1.1KW – 1.0 KBTU)
- 70.9# of food per hour
- Easy to Clean
- Safe to use

Source: Fishnick

Gas vs Induction Comparison

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

Source: ASHRAE
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
**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
Myth Busting!

You can’t produce quality food on induction.

Bocuse d’Or

The Fat Duck

The Culinary Olympics

R2

ONE65

Noma
• "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
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!!!
Modeling Eden Hall

- 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

Modeling Eden Hall: Updated Assumptions

- 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.

Sign up: NaturalGasStudy@psehealthyenergy.org
Thank You.

Chef Chris Galarza      CGalarza@ForwardDiningSolutions.com
Founder/Culinary Sustainability Consultant - Forward Dining Solutions LLC