



Manufacturer's Roundtable

All-Electric Commercial Kitchens

June 11, 2024



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1

WHAT IS CEDA?



The California Energy Design Assistance (CEDA) is the only statewide utility incentive program for new construction and major renovations.

- Promotes **electrification** and **decarbonization**
- CEDA works in collaboration with project teams to reduce energy demand, consumption, and carbon emissions.
- 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.



2

WHY PARTICIPATE IN CEDA?



- Receive complimentary **decarbonization** analysis tailored to project goals to identify most effective measures to implement



- Gain analysis of **energy costs and paybacks**
- Receive **financial incentives** to help offset the costs of decarbonization measures



- Demonstrate commitment to high performance building practices and design

3

INCENTIVES



- **\$2800 Design team incentive** per project as a thank you for participation
- Based on the project measure package the design team chooses for implementation



4

HIGH PERFORMANCE MEASURES



CEDA aims to exceed California’s decarbonization standards by identifying high performance measures and providing educational opportunities to explore use cases and best practices.

This not only advances the market, but also qualifies participants for enhanced incentives through our program.

A current list of eligible high-performance measures can be found on our website [here](#).



5

HAVE A PROJECT TO DISCUSS?



For more information, please contact our program outreach specialists, visit our website, or fill out an interest form

Scan me to enroll a project



CaliforniaEDA.com

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6

Why All-Electric Commercial Kitchens?

In today's roundtable we'll discuss:

- Why are a growing number of kitchens embracing electric equipment?
- What are the barriers and solutions for the adoption of all-electric kitchen equipment?
- What are some examples of the latest electric equipment for commercial kitchens?
 - Combination ovens
 - Induction cooktops
 - Heat pump water heating equipment



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7

Today's Panelists



Richard Young
Frontier Energy, Food
Service Technology
Center (FSTC)



Lee Baker
RATIONAL, USA



Kurt Eickmeyer
Jade Range/Beech Ovens



Michael Slater
Frontier Energy, FSTC

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8




All-Electric Commercial Kitchen Roundtable

June 11th, 2024



9

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



10

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.

11

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>

12

Description:

Commercial kitchen electrification is a growing movement. Reasons include safety, improved cooking, easier cleaning, better HVAC operations, efficient space utilization, and lower costs for installation and operations (depending on location). It is an important movement for building decarbonization and with more municipalities and air districts imposing restrictions on gas-fueled appliances, smart planning.

13

Learning Goals

Participants will be able to:

1. Describe how energy efficiency and proper equipment selection are essential for kitchen electrification
2. Locate and specify next-generation cooking equipment including combination ovens and induction cooktops
3. Incorporate Heat Pump Water Heaters into commercial kitchen electrification projects

14




Efficiency and Equipment Selection

Richard Young, Director, Frontier Energy
Food Service Tech Center
Ryoung@FrontierEnergy.com

15

The Main Challenge to All-Electric kitchens

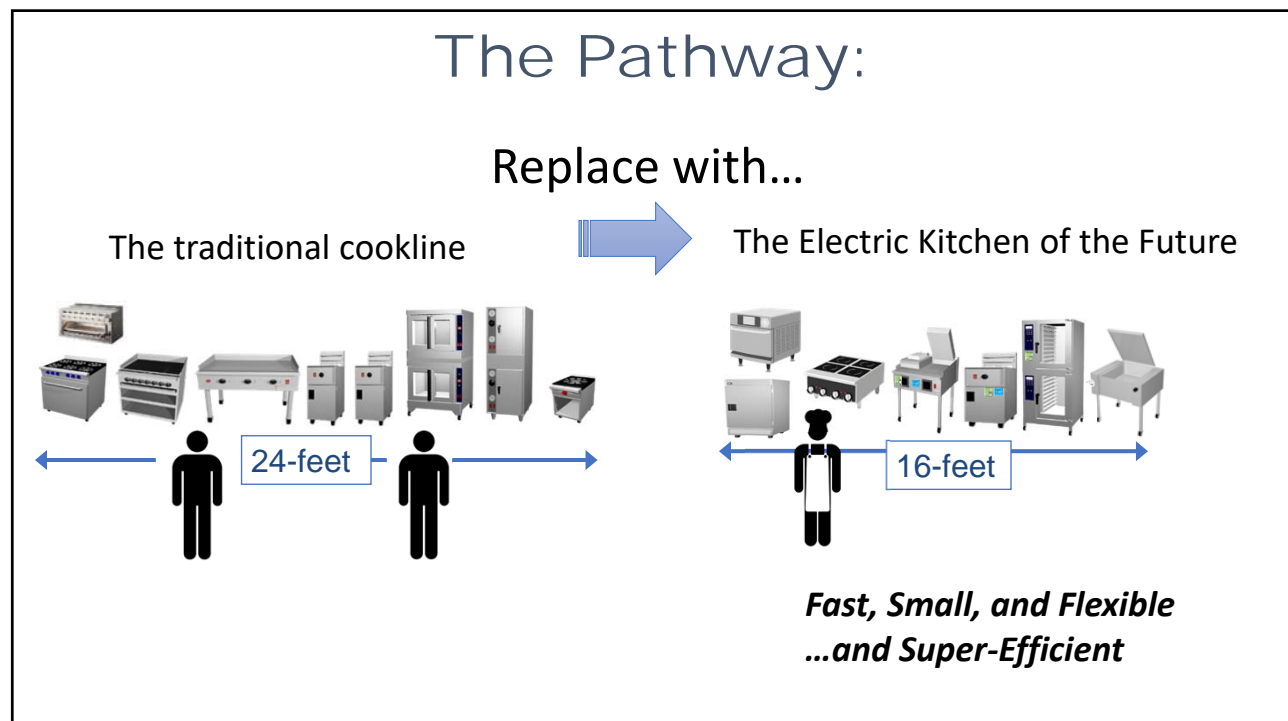
Electricity is a more expensive fuel than Gas



16

Reality:
 Energy Efficiency is the most crucial component
 of decarbonization and electrification

17

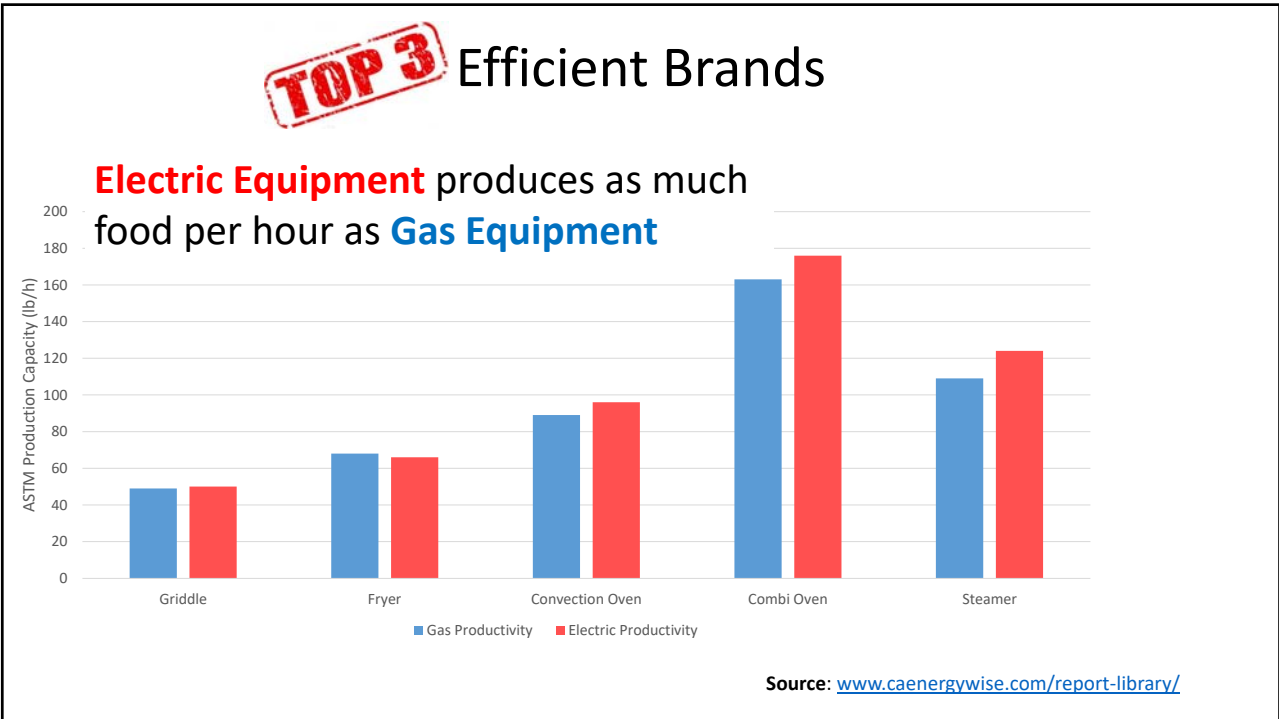


18

Performance: Can electric equipment keep up?

Yes

19



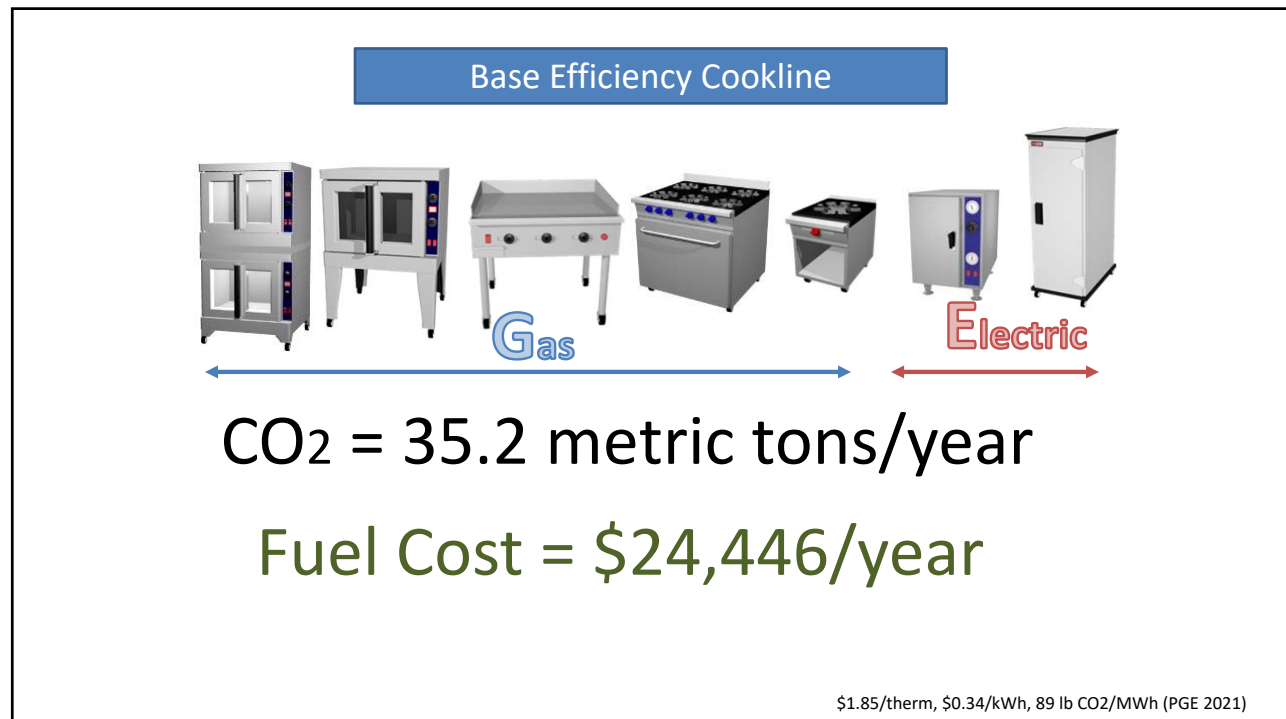
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Let's model 4 configurations of a small kitchen and then compare operating costs and carbon emissions:

1. Base Efficiency Kitchen – Gas and Electric
2. High Efficiency Kitchen – Gas and Electric
3. "Kitchen of the Future" – Gas and Electric
4. "Kitchen of the Future" - Electric

Assumptions: \$1.85/therm, \$0.34/kWh, 89 lb CO₂/MWh (PGE)

21



22

CALIFORNIA ENERGY WISE
SEAN O'NEILL
FOODSERVICE
APPLIANCE

Efficient Cookline

CO₂ = 24.5 metric tons/year
Fuel Cost = \$16,283/year
Savings vs Base = 10.7 tons and \$8,163

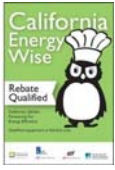
\$1.85/therm, \$0.34/kWh, 89 lb CO₂/MWh (PGE 2021)

23


**Fast, Small, Flexible, and Energy Efficient:
Kitchen of the Future**

\$1.85/therm, \$0.34/kWh, 89 lb CO₂/MWh (PGE 2021)

24



Hybrid “Kitchen of the Future” Cookline

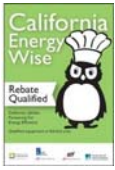


Gas **Electric**


CO₂ = 12.5 metric tons/year
Fuel Cost = \$7,816/year
Savings vs Base = 22.7 tons and \$16,929

\$1.85/therm, \$0.34/kWh, 89 lb CO₂/MWh (PGE 2021)

25



All-Electric “Kitchen of the Future” Cookline

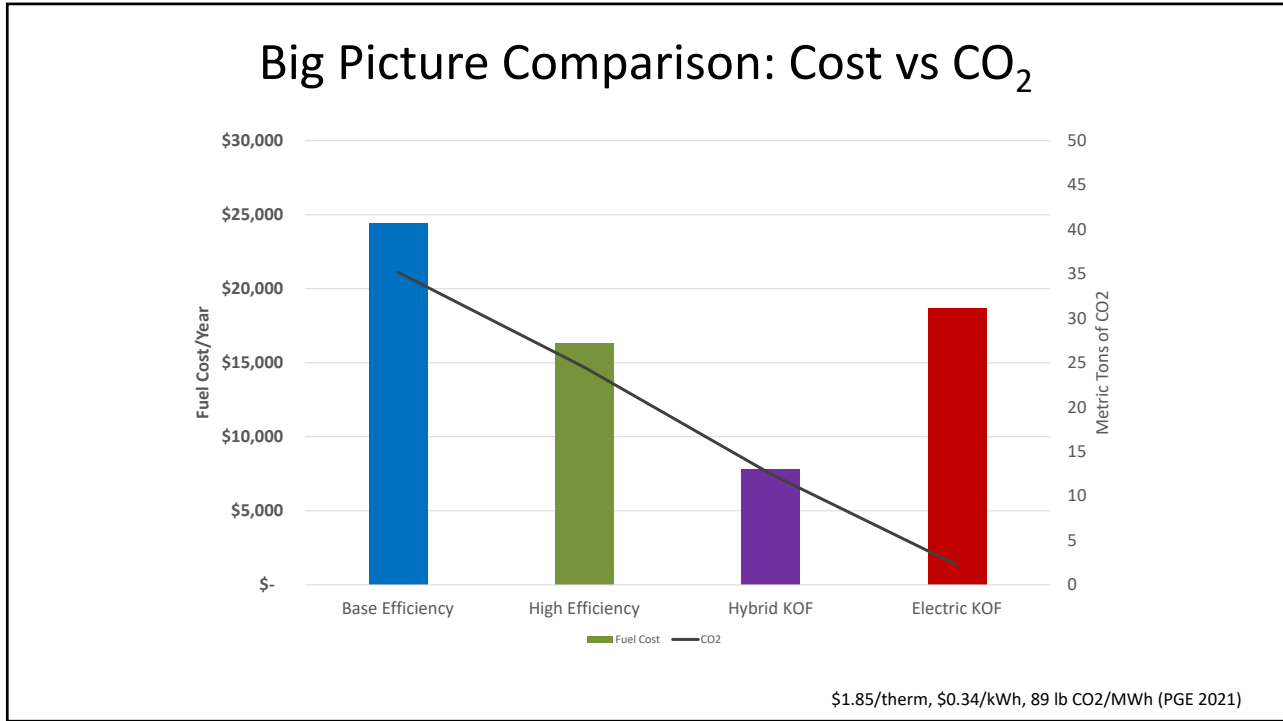


Electric

CO₂ = 2.2 metric tons/year
Fuel Cost = \$18,710/year
Savings vs Base = 33.0 tons and \$5,710

\$1.85/therm, \$0.34/kWh, 89 lb CO₂/MWh (PGE 2021)

26



27



28



ENERGY SURVEYS
Do-It-Yourself Energy Surveys

DESIGN GUIDES
Performance & Efficiency Guides

SEMINARS
See What's New

TRY BEFORE YOU BUY
Love It Before Buying

CALCULATORS
Calculate Energy Cost

REBATES
Foodservice Equipment Rebates

CALIFORNIA ENERGY WISE

CAEnergyWise.com

29

California Foodservice Instant Rebates Program



CALIFORNIA ENERGY WISE

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CALIFORNIA FOODSERVICE
instant rebates.

SoCalGas. **PG&E** Pacific Gas and Electric Company **SDGE**

30

Induction Cooktop Rebates

63 models spread across 10 different manufacturers
\$250 Instant Rebate per hob



= \$1,000

31

PG&E Induction Cooktop Loaner Program (ICLP)

PG&E Customers: Try induction cooking at home!

Benefits of induction include:

- Faster Heat Up Times
- Precise Temperature Control
- Increased Safety & Kitchen Comfort
- Easy to Clean

Borrow a unit for two-weeks at no cost.
We cover shipping!

Visit pge.com/inductionloaner or
scan the QR code to reserve your cooktop! → → → →



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32

Reality:
Energy Efficiency is the most crucial component
of decarbonization and electrification

33



Advanced Cooking Platforms

Lee Baker, VP Product Management,
Rational Cooking Systems
l.baker@rational-online.com

34

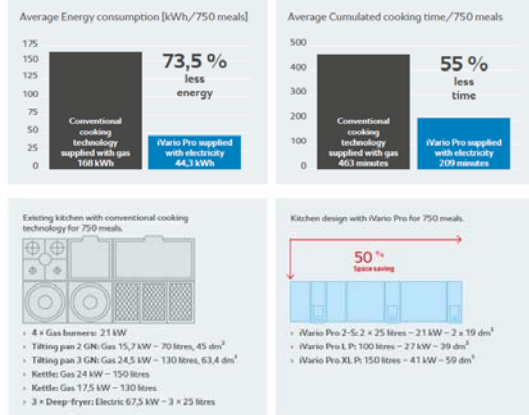
Electric appliances

- › This electric design enables heating from edge to edge
- › This eliminates “hot spots” which prevents sticking
- › Massive reduction in CO2 emissions
- › Significant increase in recovery time & precision



Energy and time savings.

Average energy consumption and cumulated cooking times.



RATIONAL

35

Example- Application Cooking

Pasta

- › 40 gallon electric tilt skillet
 - 40kg dry pasta (88 Pounds)
 - 80l water (21 Gallons)
- › Preheating time: 13 min
- › Total cooking time: 22 min.
- › Setting: no basket, rolling boil / simmering, 8 min

Capable of 176 pounds/hr



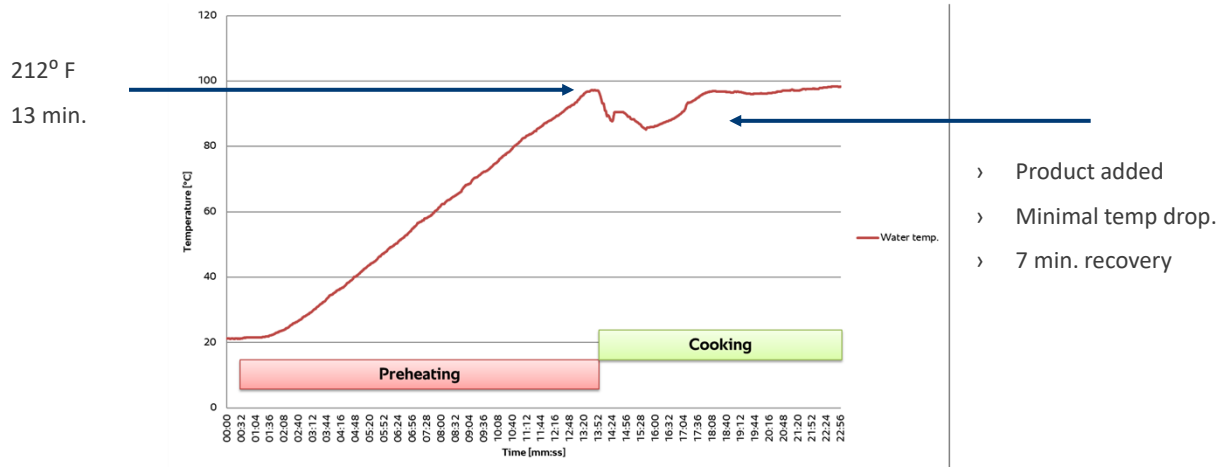
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36

Application Cooking

Pasta

40-gallon electric tilt skillet



RATIONAL

37

Self - contained ventilation

- › Significant savings in hood construction/ additions
- › No additional fire suppression needed
- › Historical buildings remain undisturbed
- › Massive reductions in CO2
- › Reduction in air exchange by up to 70%
- › Cooler work environment- employee attraction
- › Electric appliances are typically cheaper to purchase



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38

Combination of cooking technologies

- › Intelligent combination of dry heat, steam and microwave
- › Only possible in an electric utility
- › Electric appliances are evolving much faster; creating much more flexibility and customer benefits- “kitchens of the future”



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39



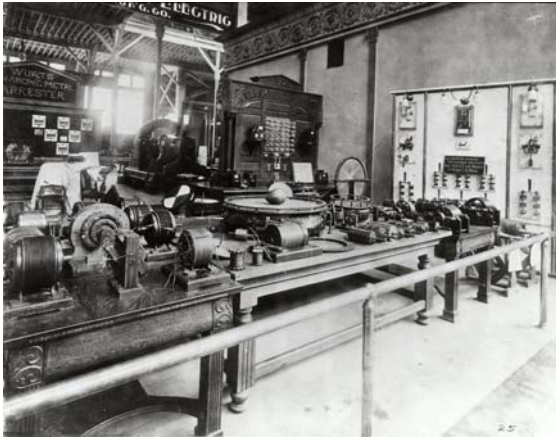
Induction Cooking

Kurt Eickmeyer, Senior VP Strategic Initiatives
 Jade Range / Beech Ovens
 A Middleby Company
keickmeyer@jaderange.com

40

History of Induction

1893 Columbian Exposition - Chicago



<https://historicpittsburgh.org/islandora/object/pitt%3A20170320-hpichswp-0001>

1933 Chicago World's Fair



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41

History of Induction

Westinghouse Cool Top 2 (CT2) - 1972



Bill Moreland & Terry Malarkey - I got this file from Terry Malarkey, the inventor of the Cool Top 2



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42

Induction can be Everywhere – Countertops to Ranges



Four-burner Range



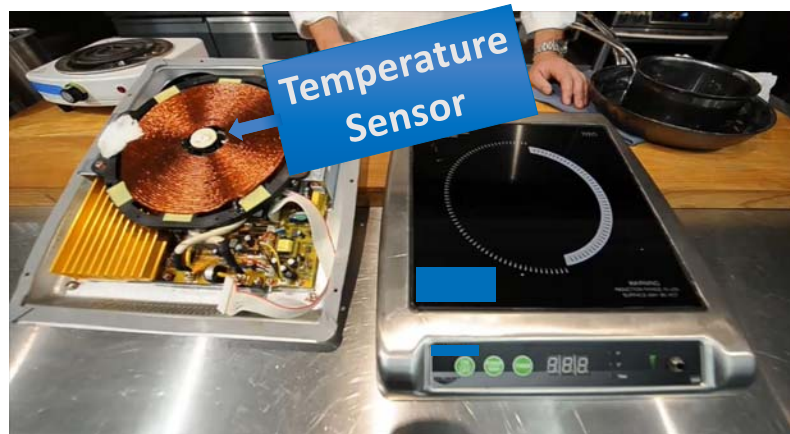
Six-burner Range



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43

How induction works



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44

How induction works

How does Induction Cooking Work?

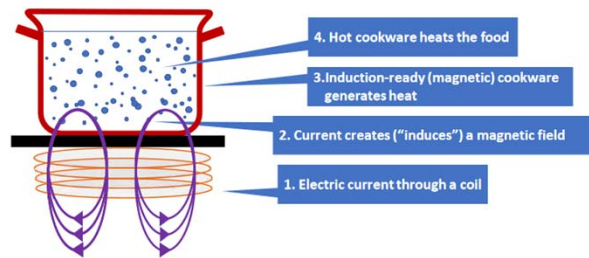


Image courtesy of Richard Young – Frontier Energy



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45

How induction works



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46

Induction can be Everywhere – Hot Surfaces & Planchas



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47

Induction can be Everywhere – Integrated into Lineups



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48

Induction can be Everywhere – As part of Cooking Suites



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49

Induction can be Everywhere – Holding



Image Courtesy of CookTek



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50

Induction can be Everywhere – Serving



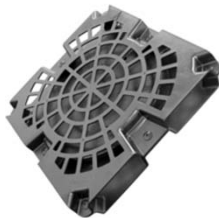
- 1. Chafing Dish (sold separately)
- 2. Magneeto™ 2
- 3. Stone Countertop (not included)
- 4. Plywood Substrate (not included)
- 5. Incogneeto™ Unit



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51

Induction can be Everywhere – Delivery



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52

Induction can be Everywhere – Woks



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53

Trevor Noah Learns What's Cooking at Microsoft



[YouTube - Tools and Weapons with Brad Smith – Vice Chair and President, Microsoft](#)



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54

More About Wok Cooking at Microsoft

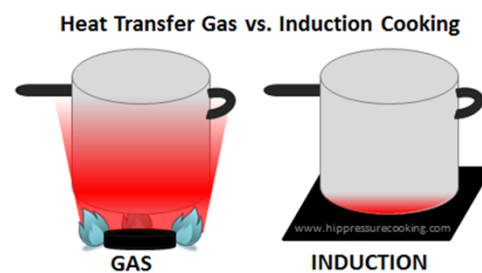


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55

Some Benefits of Induction in Foodservice Spaces

- Greater Efficiency of Heating – about 35% with gas vs 85% with induction
 - More direct heating and less heat loss exhausting the products of combustion
- Increased Speed of Heating with Induction
 - Heat goes directly to pans and not surrounding air and spaces
- Enhanced Uniformity of Heating
 - Gas flames are very hot but the heat is not easy to evenly diffuse
 - Electrically generated heat can be easily proportionally applied – only hot enough to match needs



www.hippressurecooking.com

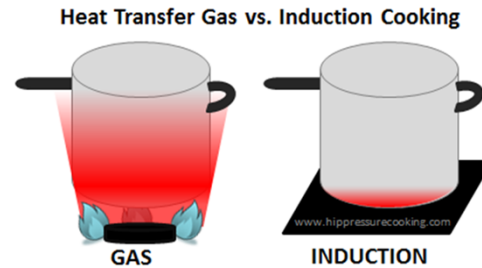


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56

Some Benefits of Induction in Foodservice Spaces

- Improved Comfort of Operators
 - Less heat required and wasted results in cooler working environments
- Ventilation Efficiency – Less ventilation required because less heat is waste heat
 - “Vent-free” Opportunities – Without combustion gases effluent can be filtered and exhausted inside
 - No roof penetrations and less fresh make-up air required
 - Greater cooking location flexibility without a static hood
 - Less Noise in Kitchen

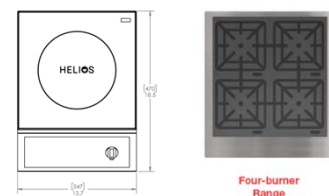


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57

Considerations When Planning for Induction

- Optimize Induction by considering the spacing/quantity of induction burners
 - Account for Surrounding Heat to Avoid Service Issues
 - Induction heats quickly so staging multiple pre-heated pans isn't required
 - Speed can also make it difficult to manage multiple pans simultaneously – 4 induction burners may match 6 gas burners in production capacity
 - Single burners may be preferable to larger multiple burner surfaces
 - Single burners limit cracked/broken glass downtime which can disable the entire appliance
 - Single burners allow different power levels to be specified across the counter to meet client requirements



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58

All Electric Doesn't Mean All Induction

There is a slight misperception that creating All-Electric Kitchens requires All-Induction Kitchens

Induction is just one way of transferring heat that happens to work well for Range Tops

Examples of effective electric appliances that are not induction include:



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59

Manufacturers Roundtable: All Electric Commercial Kitchens

If you are still awake... Thank You!

Kurt Eickmeyer
Sr. VP, Strategic Initiatives
Jade Range / Beech Ovens
A Middleby Company



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60




Decarbonizing Hot Water Systems in Commercial Kitchens: a Speedrun

Michael Slater, Research Engineer,
Frontier Energy Food Service Tech Center
MSlater@FrontierEnergy.com

61

Get the Resources: CAEnergyWise.com

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62

Technical Design Guide for Advanced Water Heating for Foodservice

Improving Operating Performance of Hot Water Systems in
Commercial Kitchens

The information in this presentation can be found in a new design guide.

This was made possible with funds from the CalNEXT program by a team of energy industry professionals from TRC and Frontier Energy.



Advanced Water Heating for Foodservice will help you achieve optimum performance as well as water and energy efficiency in your commercial foodservice hot water system. It will also help you identify best practices towards building net zero energy commercial kitchens. The information presented is applicable to new construction and, in some instances, retrofit construction.

This design guide is intended to augment comprehensive design information published in previous design guides as well as the Sizing Dish Room Ventilation design guide. You can also review the Operators Guide for information on how commercial kitchen owners and users can optimize equipment use through commissioning needs, operating best practices, and maintenance plans.

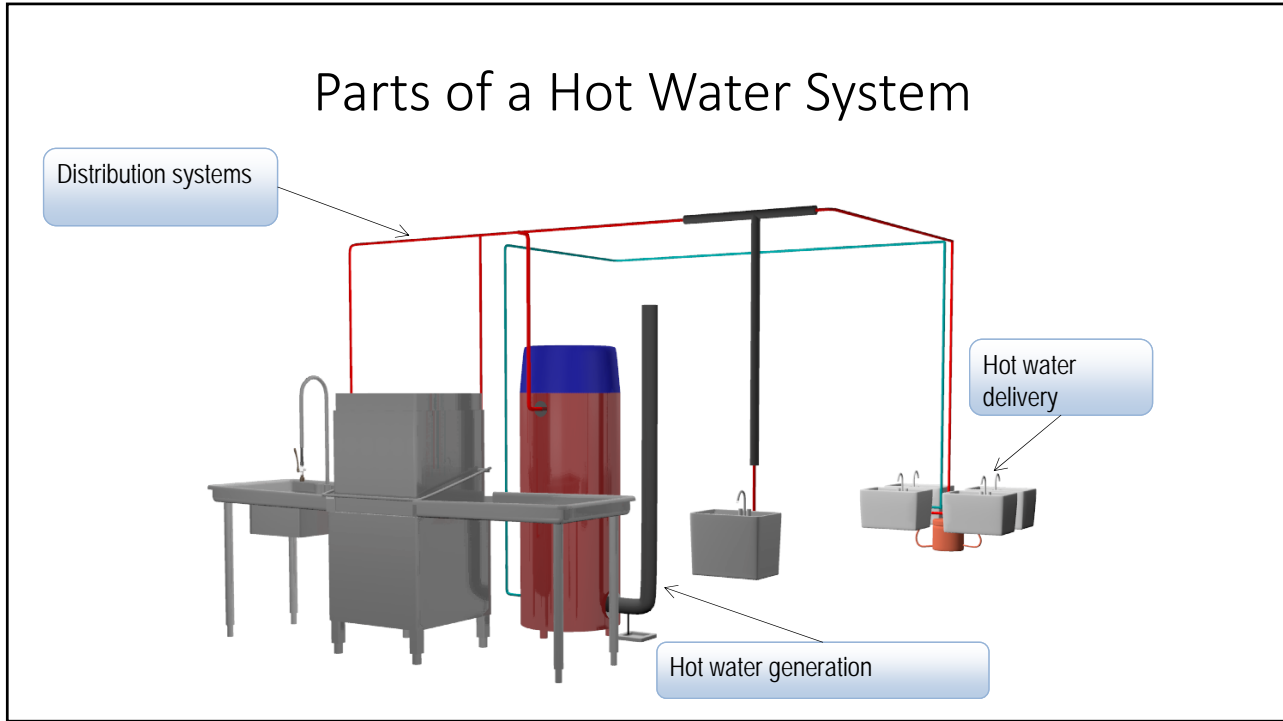
Introduction	2
Background	2
Path for Savings	4
Equipment and Fixtures	5
Distribution Systems	12
Water Recirculation Controls	18
Water Heaters	21
Design Examples	33
Key Takeaways	49

63

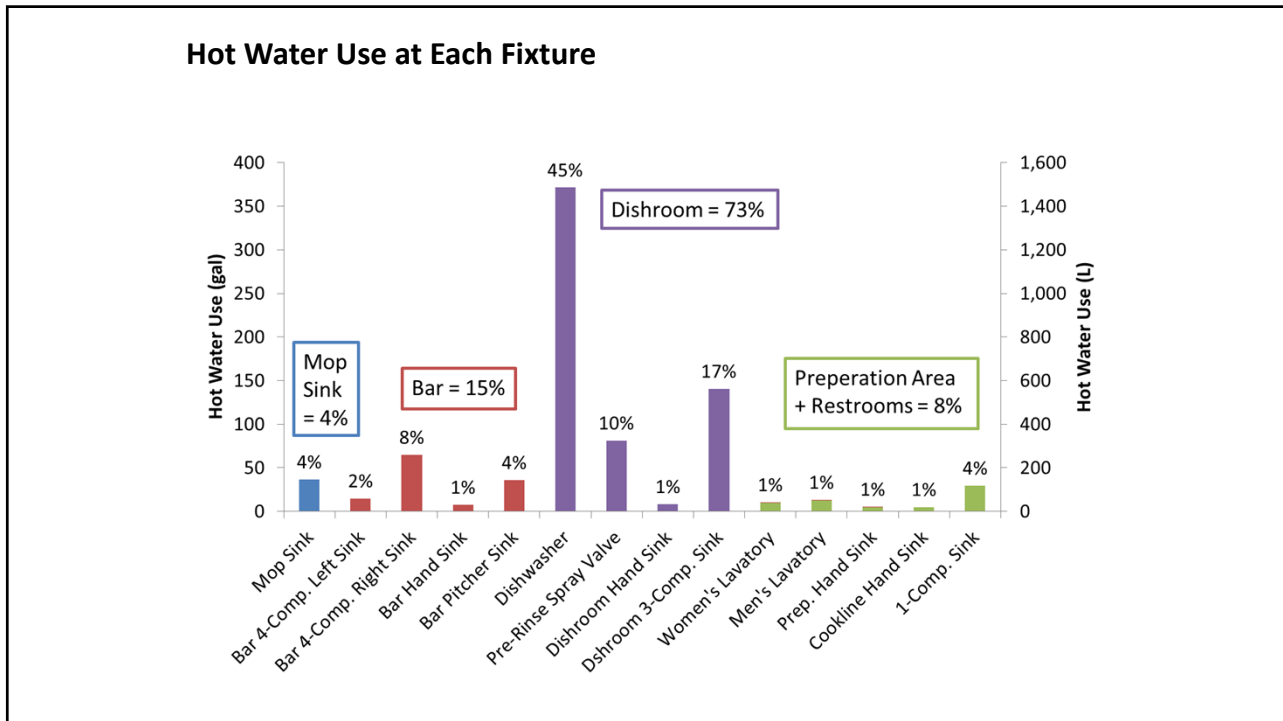
Why do we care about hot water systems?

- Hot water is the lifeblood of restaurants
 - Clean Hands
 - Wash dishes and equipment
 - Cook food
- Health department regulations
- Highly energy intensive
 - 340 MTherms/year – 16% of commercial gas usage statewide

64



65



66

Cost impacts of different Water Heaters in QSR

	Standard Gas-fired WH	Condensing Gas-Fired WH	Gas-Fired ASHP Split System	Electric Resistance WH	Hybrid HP/ERWH	Electric HP Split System with ERWH Backup	Electric HP Split System with ERWH Backup
First Year Energy Cost	\$ 1,540	\$ 1,250	\$ 930	\$ 6,470	\$ 1,940	\$ 1,660	\$ 1,350
First Year Water Cost	\$ 2,410	\$ 2,410	\$ 2,410	\$ 2,410	\$ 2,410	\$ 2,410	\$ 2,410
Installed Cost	\$ 2,450	\$ 4,340	\$ 30,215	\$ 3,190	\$ 8,460	\$ 7,990	\$ 7,990
1 Year Cost	\$ 6,400	\$ 8,000	\$ 33,555	\$ 12,070	\$ 12,810	\$ 12,060	\$ 11,750
Payback Period	0	5.9					16.2
10 year cost	\$ 53,000	\$ 51,400	\$ 73,200	\$ 110,300	\$ 62,800	\$ 59,100	\$ 55,500
Percentage Increase in 10 Year Cost	0	-3.0%	38.1%	108.1%	18.5%	11.5%	4.7%

67

Heat Pump Water Heaters

Pros

- Coefficient of Performance vs. Efficiency
 - Standard electric efficiency = 95%
 - HPWH COP = 3.5+ = 350% efficiency
- Free cooling can lead to A/C savings!*

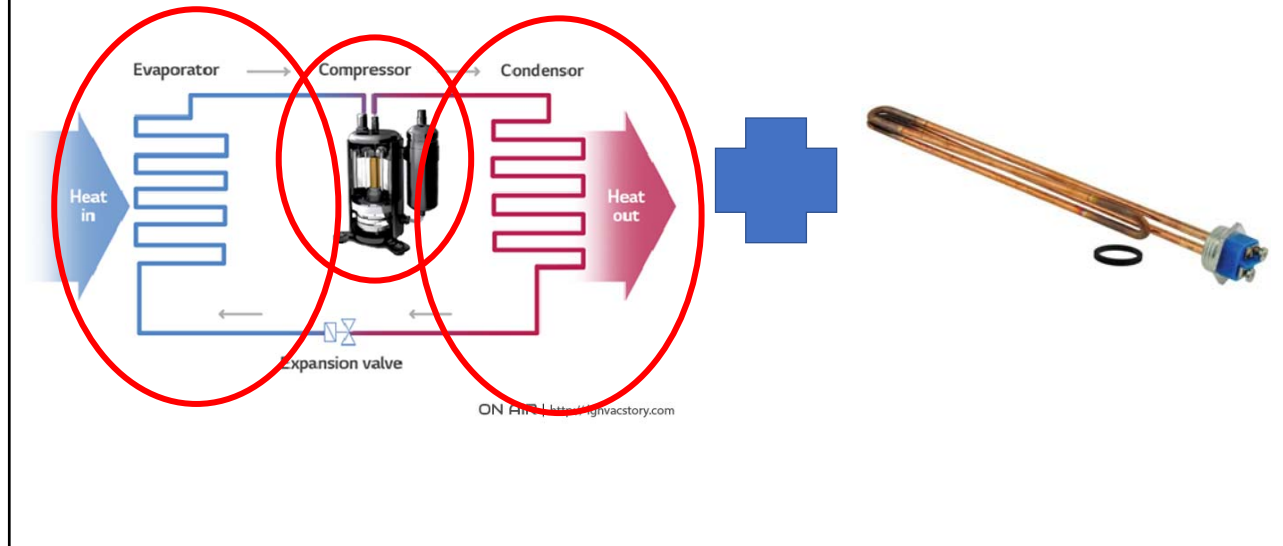
Design Challenges

- Larger footprint
- Slower recovery
- Requires ventilation
- 2x cost of traditional WH



68

How Electric HPWHs work



69

Design constraints for HPWH

- Noise
 - Only 60 dBA for some models
- Refrigerant?
 - Low GWP available
- Ventilation?
 - Small enclosed spaces may not be suitable
- Panel Upgrade for retrofit
- Must use CDEH sizing guidelines



70

Traditional Sizing Methodology

- Step 1: create a list of fixtures
- Step 2: add up their required flow rates if tankless or first hour ratings if tank type
- Step 3: Plug results from step 2 into $Q = MC\Delta T$ as M, then solve for the water heater's required minimum input rate

71

Issues with Traditional Sizing

- Leads to way oversized water heaters
- Leads to way oversized distribution systems
- Leads to huge energy waste
- Never realize full COP



72

Replacing the current stock of natural gas water heaters with conventional electric water heaters **is going to make your favorite restaurant go broke.**

Because of their high efficiency, HPWHs offer a financially feasible solution for decarbonizing water systems. However, we need to resolve our hot water system sizing issues, address some health department concerns, and field test this emerging technology before moving forward with a statewide replacement.

73

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



74



Thank You




Together, Building
a Better California

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75

Questions & Answers



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76