RESIDENTIAL
SPACE CONDITIONING & WATER HEATING

Electrification Course

Part 2: Soft Skills in Sales 101

PRESENTED BY LARRY WATERS

ELECTRIFY MY HOME

Interested in Learning more?

3-month cohort program available

- TECH wants you to succeed!
- Program available to six vetted contractors
- No cost, just a commitment
- What's included? Weekly web video calls to discuss your progress, prospects, planning and problems

Additional costs:

- * On-site visits * Design services * Load calc services *

Tool Discount!

Tru Tech Tools: https://www.trutechtools.com/

- Promo Code: **electrify08**

Tru Tech Tools

Quality Tools. Essential Support.

This May be What You Sound Like to Your Customer

ELECTRIFY MY HOME

Part 2 - Soft Skills for Sales Pro's

Learning objectives for Part 2:

1. Clearly state **four benefits of electrification** in consumer-friendly language

2. Identify at least **two electric options** for each of the four gas-to-electric conversion targets (space heating, water heating, cooking, & clothes drying)

3. **Provide** health-related, scientific, and technical **facts** related to the need for electrification

4. Employ **strategic questioning** to discover the motivations, needs, and priorities of homeowners, and incorporate what they learn in **need-based** conversations and presentations

5. Correctly identify the **steps in communicating** a home electrification plan

ELECTRIFY
MY HOME

TIMING & OPPORTUNITY

- SEGMENT 1 -

Timing and Opportunity

- Why is electrification important now
  …for your business and society
- Getting ahead of the market
  …before your competitors do
- Your customers want this
  …they just may not know it yet

90%

90% of CA homes rely on gas for **space or water heating** [1]

11.7 Million

CA homes (96%) with gas or elec resistance **heating** [2]

85% of single-family use gas [4]

12 Million

CA homes (99%) with gas or elec resistance **water heaters** [2]

93% of single-family homes have gas DHW [4]

3.4 Million

CA homes with **no AC** [3]

[1] Decarbonization of Heating Energy Use in California Buildings. Synapse Energy Economics, Inc. 2018.

[2] CA Heat Pump Residential Market Characterization & Baseline Study. Opinion Dynamics. 2022.

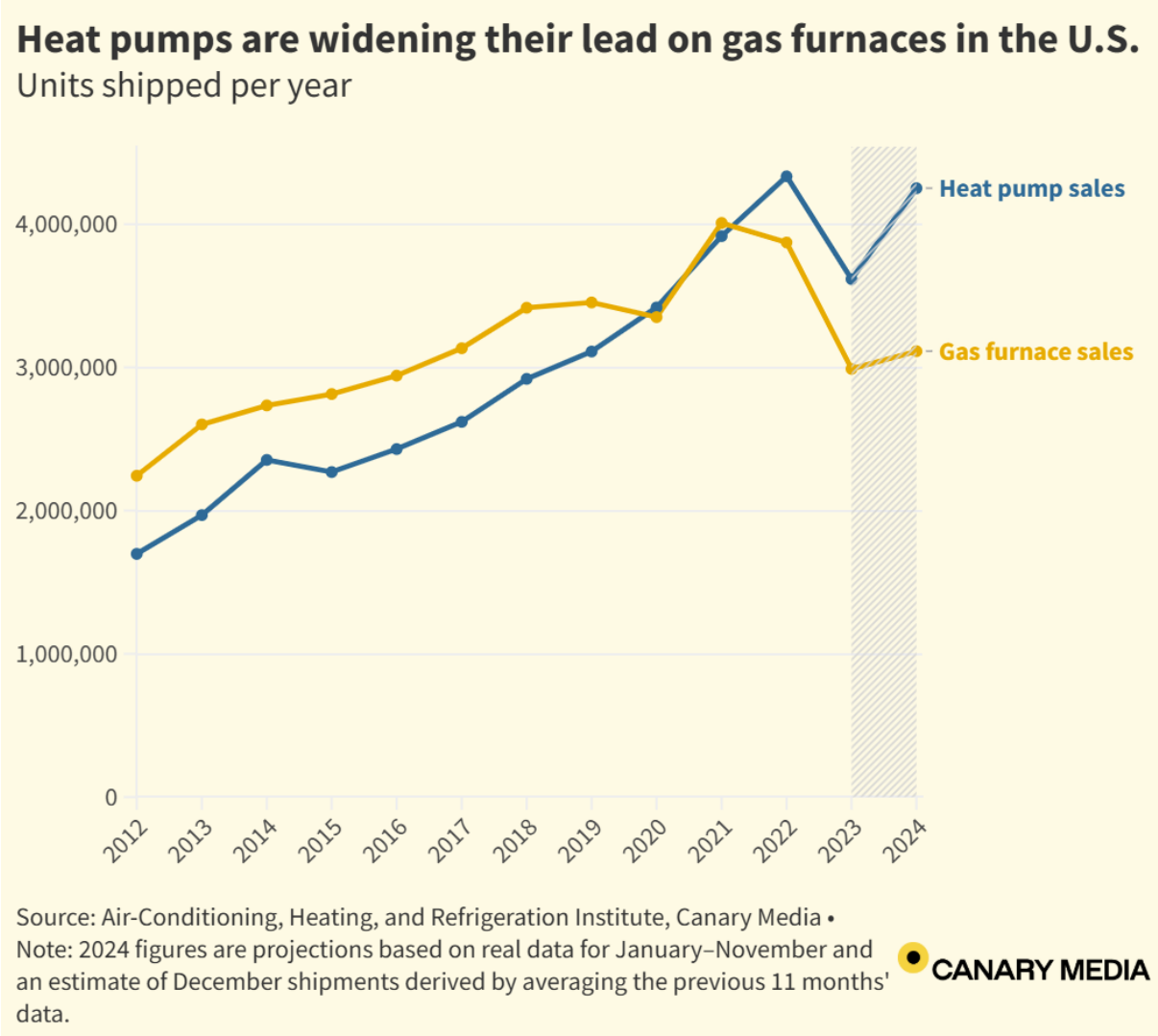
[3] Canary Media. "California could ban new gas heaters after 2030. The goal: healthier air." 2022

[4] 2019 California Residential Appliance Saturation Study (RASS) . DNV-GL/CEC. 2021

Why is Electrification Important Now?

- Timing the Electrification movement to your business
- Many forces are aligning to bring this mainstream
- Market entry has never been easier for the contractor
- Incentive programs to ease investment including rebates tax credits and financing
- Position yourself as an expert

The Tide ~~is Turning~~ has turned



ELECTRIFY MY HOME

We Can't be Naïve...Signs Unveil a Major Transition Ahead

Components of a gas transition

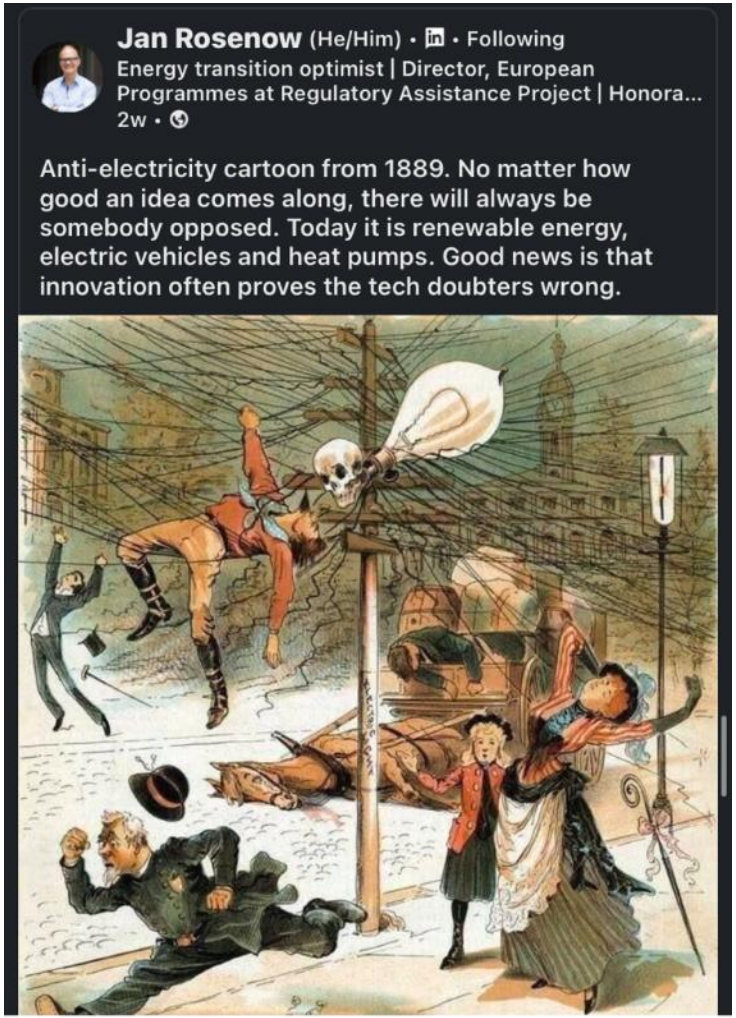
- ❑ Reduce barriers to building electrification
- ❑ Targeted building electrification pilots
- ❑ Avoid gas system expansion, reduce costs
- ❑ Targeted retirements of gas distribution system
- ❑ Accelerated depreciation
- ❑ Changes to rate design and cost allocation
- ❑ Exit fees for departing gas customers
- ❑ Other funds to manage the equity impacts
- ❑ Shut-down gas distribution system and replace any remaining gas-connected end-uses with electric or other fuels

1. Market transformation of building electrification
2. Decrease gas distribution system costs
3. Change in gas rate design
4. Gas cost recovery from electric rates or additional funds
5. Shut-down the gas distribution system

Energy+Environmental Economics 27

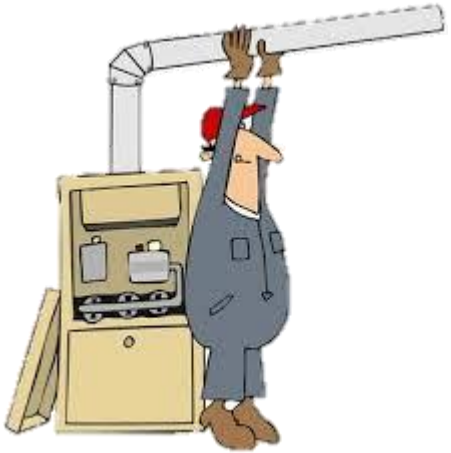
ELECTRIFY MY HOME

Fear Drives Skepticism To New Movements



Installing a New Furnace = Locking Them Into Gas for 10-20 Years

- Let the customer make the decision
- Not informing our customers is malpractice
- Share the options with the pro's and con's
- Your customers are counting on you to be their honest advocate
- Press past the first objections
- Communicate the mandates

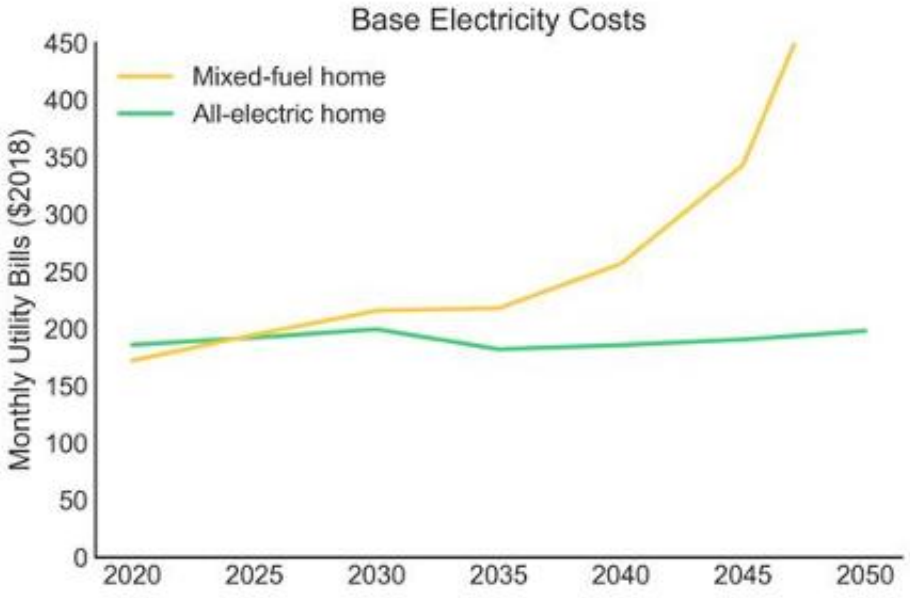


ELECTRIFY MY HOME

Embracing Yet Another Change: Electrification

- As HVAC business owners we have faced changes before
- Many capitalize on new products and technologies and outpace others
- Those who are early can become pioneers
- Others resist change
- Are you ready to make the pivot?

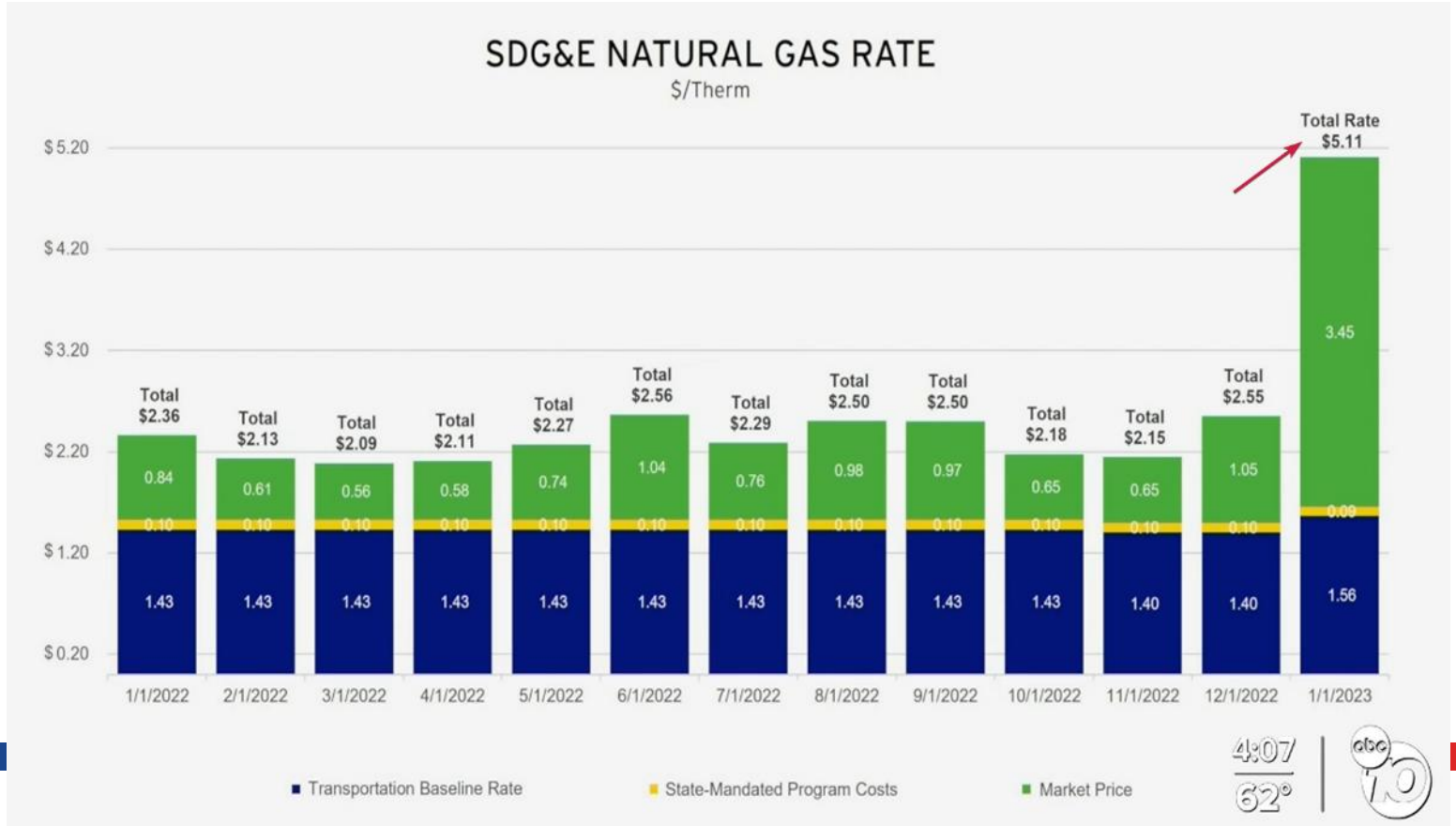
Gas is No Longer a Good Investment



Source: E3, The Challenge of Retail Gas in California's Low-Carbon Future, April 2020

- Gas cost is going up (as is electric)
- Experts agree could quadruple in next decade
- Can't offset a gas bill with solar
- Remaining gas customers will share the cost of the pipeline maintenance
- Gas heating systems in homes will be a liability when selling
- EPA announced they will no longer label any gas appliances ENERGY STAR Most Efficient

Gas Prices Fluctuate!



Gas Prices Rising! 6 Big Reasons Why

1. Geopolitical, resulting in reductions of oil production
2. Worldwide shortages created by colder winters
3. Weather patterns changing requiring more gas
4. Droughts can reduce hydro power; gas needed to offset
5. Large economies needing supply
6. Shared cost of existing infrastructure spread across fewer ratepayers

TOP REASONS

WHY YOUR BUSINESS NEEDS ELECTRIFICATION

The Time is Right for the Consumer,
How About Your HVAC Business?

#1 - Lack of Contractor Awareness = Steady Workflow for You

You have a shoulder season; put it to work doing performance electrification!

- Project-based work means less seasonal ebb and flow
- Avoid dealing with emergency change outs
- Customers willing to wait months for right solution

2 - Lower Materials Cost

- Mini split platform system 20% to 30% less than unitary competitive models
- Easier to meet 20% to 25% equipment cost
- Less material needed for install
- Electrical less cost

#3 - Cash flow

- 20% net is possible with new benefit-driven sales position
- Additional income streams diversify revenue offerings & smooth out shoulder seasons
- Net project cost is 3 to 4 times typical furnace change out

#4 - Satisfied Customers

> This morning I got up at about 6 am. We have a purple air indoor sensor, and it was showing yellow for an AQI of 62. I turned the heat pump on with just the fan going. Over two hours, it dropped to 26. We are very happy! Haven't used it much for cooling yet though.

> Writing to thank you and your crew once again for a stellar job on our heat pump installation. Everything's been working well so far!

> Dan problem-solved lots of little blips that saved timed and made the install super smooth. They were polite and timely. We felt like we were in the best of hands. Thanks again for finding the Fujitsu unit. Everything is working great. Happy to give you a 5-star rating.

ELECTRIFY MY HOME

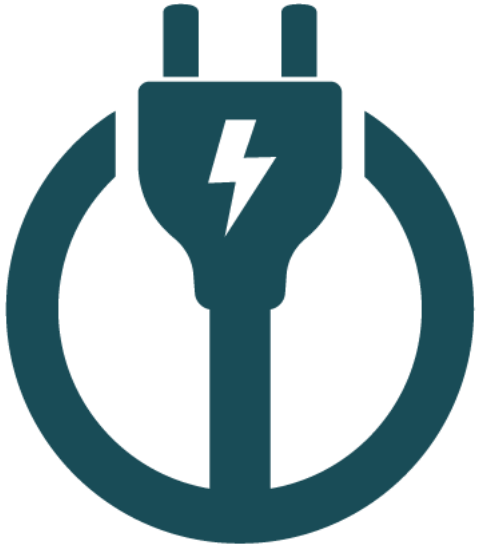
#5 - Restarts Customer Relationships

- New type of projects, new opportunity for long-term commitment
- Electrification opens doors for HPHW, solar, EV charging, and more (batteries, generators, ERV's, ++++++)
- Adds a new product category for those customers that were "sold out"

#6 – FREE MARKETING!

Public Sector Investment is Shifting Consumer Perception

https://www.switchison.org/



THE SWITCH IS ON

#7 Timing: Communicating the Carrot and Stick

CARROTS… These Won't Last Forever

- Substantial funding is being invested in consumer campaigns
- Rebates consumer and midstream
- Workforce training free prepaid apprentices with some training
- Contractor education
- Consumer financing choices - no fees with "GoGreen"
- Additional assistance for underserved communities, property and workforce

STICKS – Waiting Will Cost More!

- Miss out on incentive funds
- Early adopters see lower prices on electric upgrades
- As more Electrification is introduced, more regulation will follow = higher costs
- City permit and admin cost is mounting
- Bigger delays for electrical upgrades

#8 Mandates Will Happen… In Planning Stages Now

Plans are in place to eventually mandate heat pumps

- Waiting till it's mandatory will end your chance to be a leader In the space
- For some areas, ultra low-nox & then outright mandates
- Mad dash to install heat pumps to code can result in industry confusion and send more contractors underground (permits)
- Some big changes are in new code cycle

Incorporating High Performance Into Your Business

Source: Nate Adams

ELECTRIFY
MY HOME

CONVERTING YOUR CUSTOMER

- SEGMENT 2 -

Top 5 Benefits

STEERING CUSTOMERS AWAY FROM GAS

"Right sized" Heat pumps bring big benefits
Here are 5 that will move the needle!

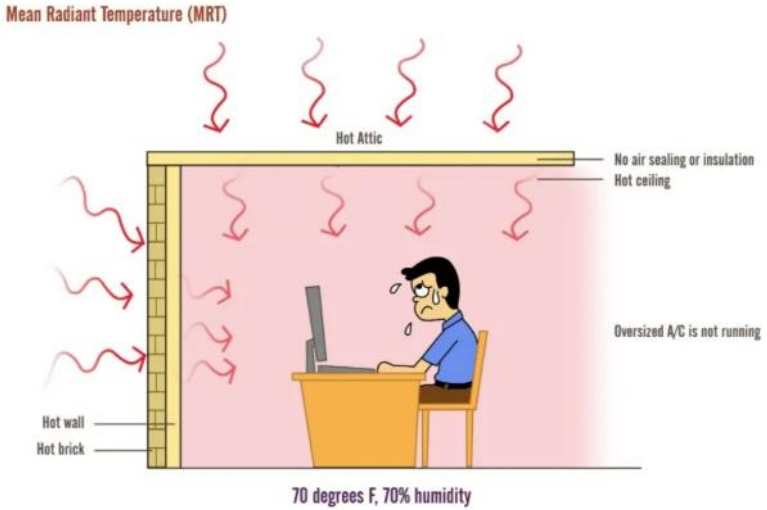
#1 - Comfort

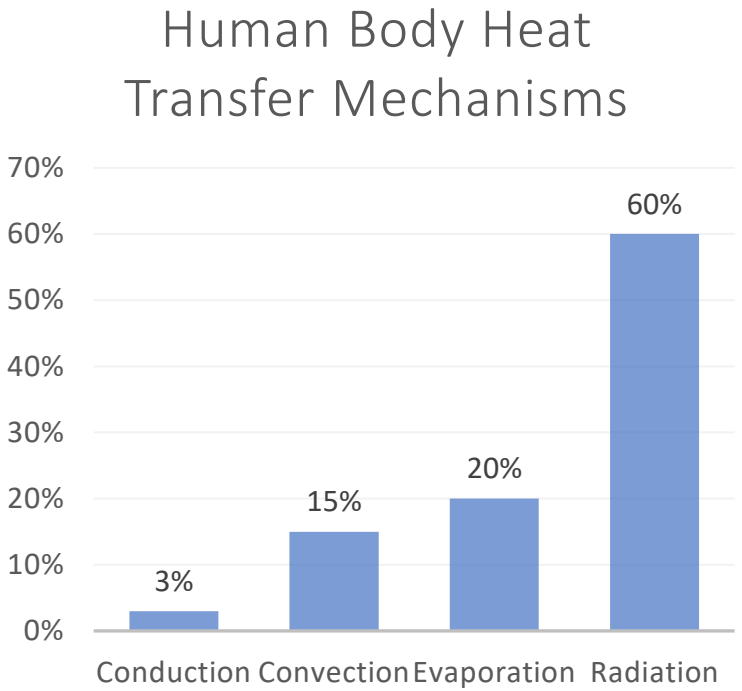
Consistent, even temperatures (when designed right)

- Room-by-room airflow
- No draftiness (with correct registers)
- Heats with lower temperature air, reduces temperature swings
- Reduced temperature stratification

ELECTRIFY MY HOME

Mean Radiant Temperature





Source: https://hvacrschool.com/mean-radiant-temperature-what-it-is-and-why-we-should-care/

#2 - Sound

- Inverter tech is the quietest possible
- Big return air ducts and return grilles
- Right registers
- Right sizing

#3 – Environmentally Friendly

- Zero onsite carbon created
- Can be completely off set with renewables
- Many inverters can run off battery longer

#4 – Safer

- No CO risk – 420 deaths/year
- No gas fire risk – 4200 fires/year
- No gas safety check needed
- No gas leak risk

#5 – IAQ: the clean air opportunity

- California now has a smoke season
- Traditional AC units now too loud for many cities
- Customers can shut the windows & have clean air
- Longer cycles, lower cfm, enhance filter efficiency
- Tip. Effective filters need big returns

Clean Air

- NO Carbon Monoxide risk – None, ZERO!
- Longer run times and more fan movement key to IAQ
- No secondary carbon
- No potential gas leaks
- Wildfires aren’t going away

ELECTRIFY MY HOME

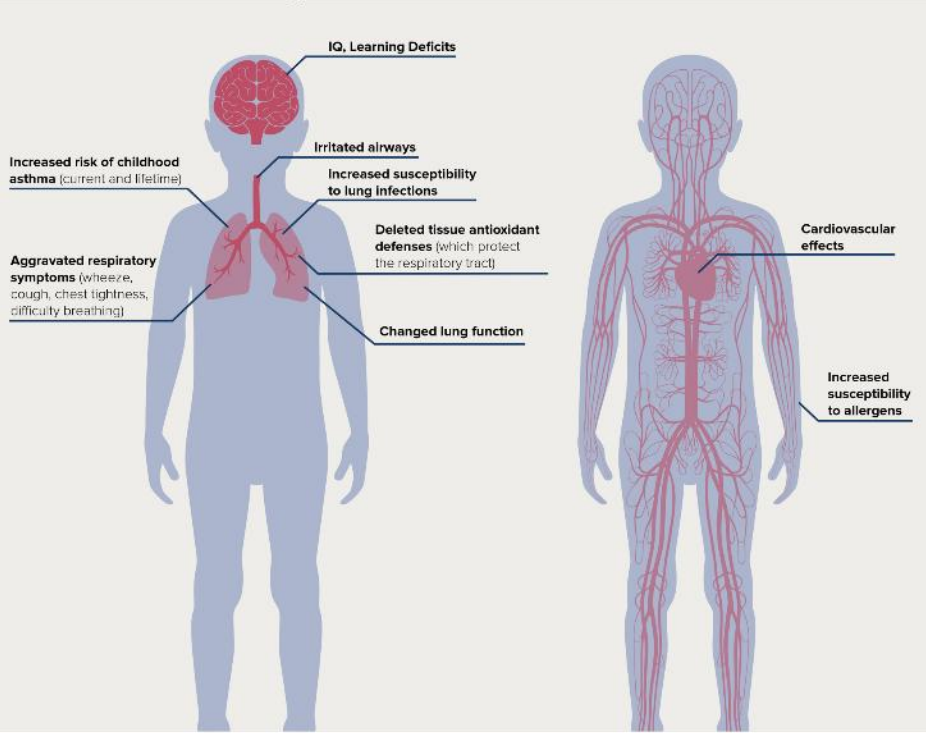
Indoor Air Quality

Advances in sensor technology have brought new findings to life

No Gas = Better Health

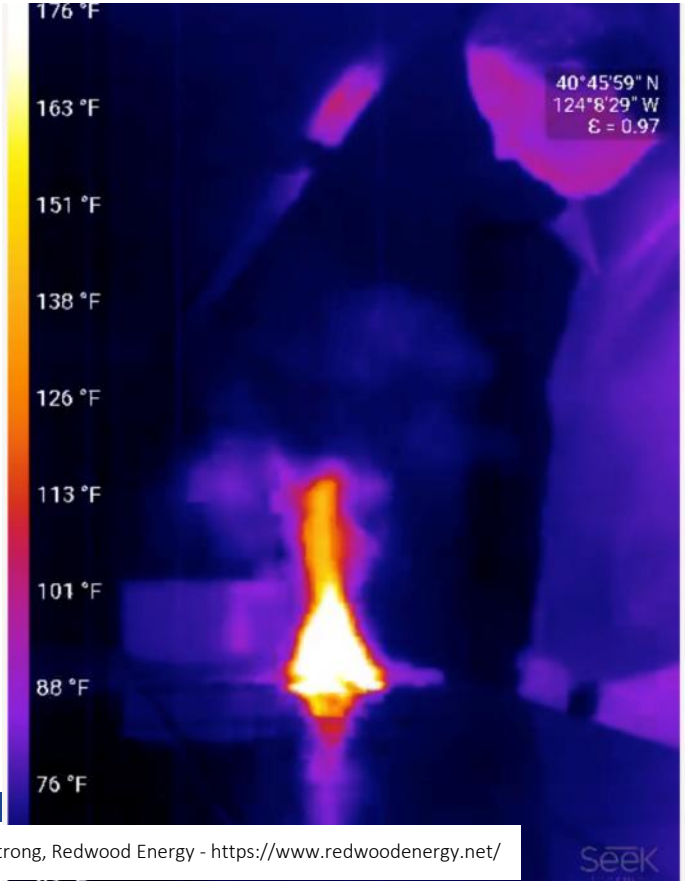
- The health benefits of electrification are well documented
- The gas range & asthma
- Gas leakage in the home
- CO leaks and gas appliances
- Water heaters and combustion leaks

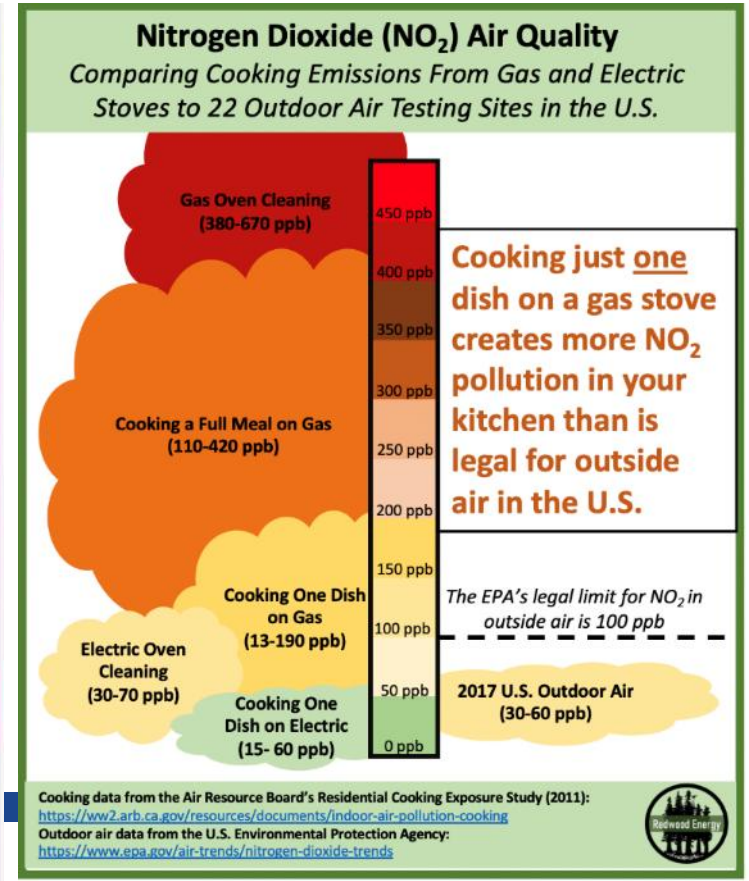
Gas stoves can produce elevated levels of Nitrogen Dioxide (NO_2), a toxic gas.
Health Effects of NO_2 in Children May Include:



Source: https://rmi.org/insight/gas-stoves-pollution-health

Gas Stoves: Like A Pack of Cigarettes



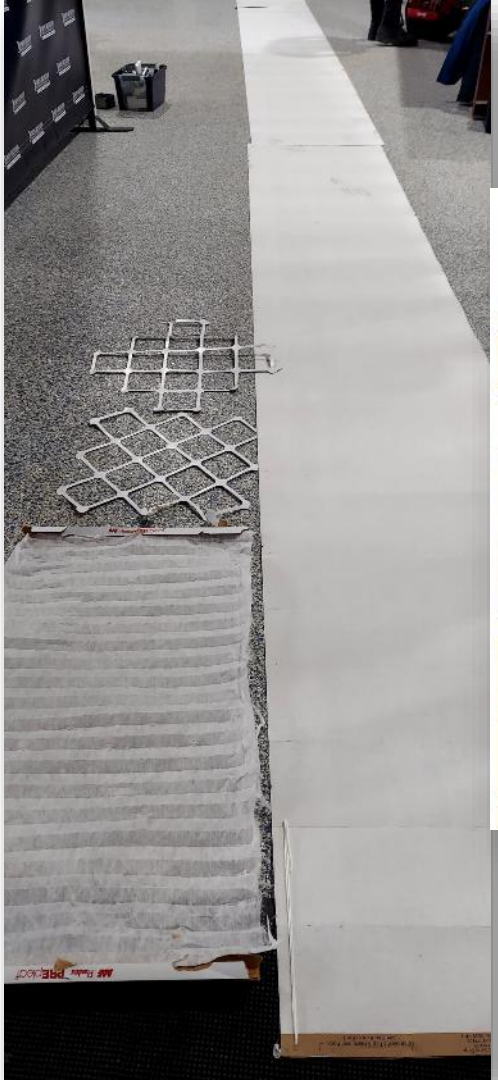


Slide citation: Sean Armstrong, Redwood Energy - https://www.redwoodenergy.net/

ELECTRIFY
MY HOME

1” Pleated Filter Next to a 4” Extended Pleated Media Filter

From John Ellis on Linkedin



BONUS #6 – Moratoriums Coming

- 2030 – statewide move away from gas appliances per CA Air Resources Board
- Regional policies – Ultra Low NOx
- Regional policies – SF Bay Area 2027 (Water Heaters) & 2029 (Furnaces) Zero NOx
- Would you buy a VCR today? Or a flip phone?
- Customer will have to replace the system with a heat pump eventually. Better to do it with today's dollars than 2030 dollars
- Ultra Low-NOx equipment not mass-produced. Possible future support & supply chain challenges.

Part 2, Quiz 1: Converting Your Customer

Name 4 benefits of electrification

_____ _____ _____ _____

TRUE OR FALSE?

___ 1. Heat pump run times help improve air quality.

___ 2. Heat pump systems can be responsible for CO poisoning.

___ 3. Customers will not be open to electrification.

___ 4. During your inspection you should list all of the electrification opportunities.

___ 5. We should assume everyone in California will ultimately have an electric car.

10 minute break

Sales

KNOWING YOUR CUSTOMER

Know your client's personality type

Determining Personality Type

Realizing your client's personality starts with knowing your own

Take 5 min to complete this test lets find out together who you are

ELECTRIFY MY HOME

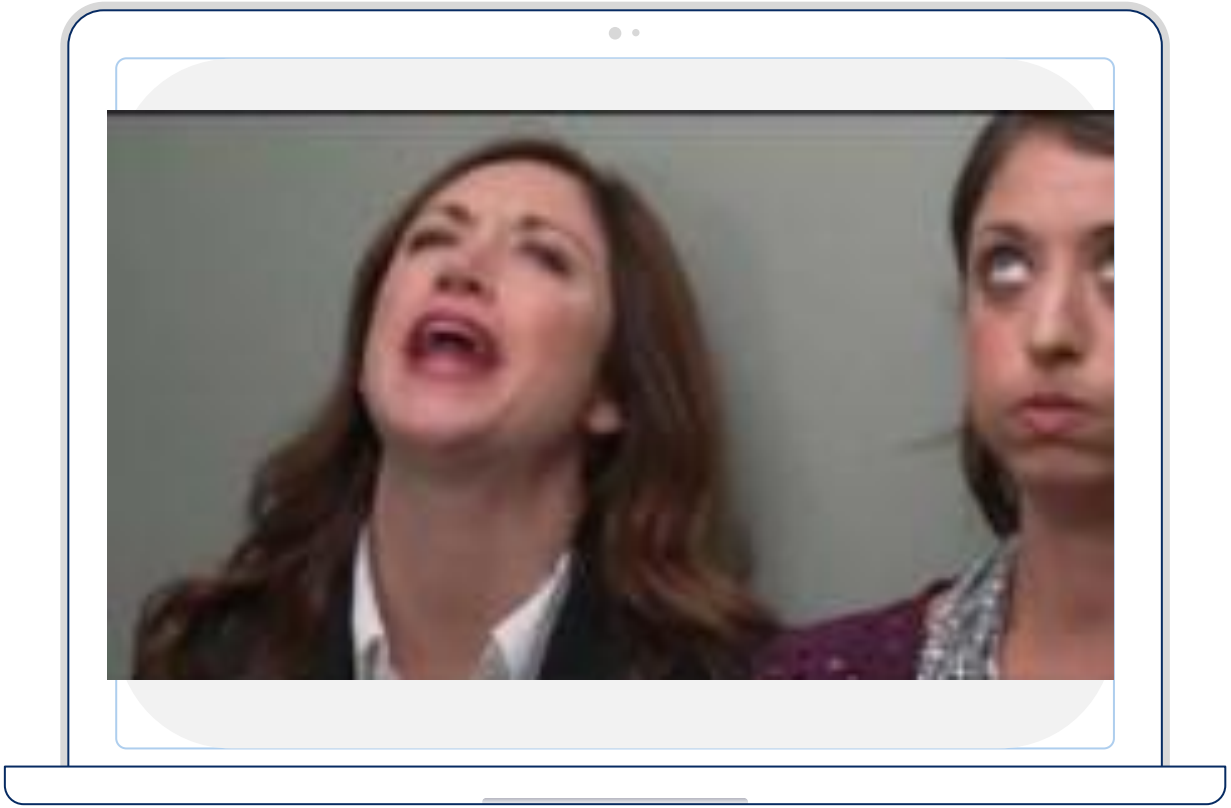
Understand Yourself

Dominant/Driver

Influencer/ outgoing

Steady/ Sympathetic

Compliant/ Conscientious



Understand your client's and team members

...it could DOUBLE your income

4 Personality Types

D – Driver – leader, boss, get down to business

I – Influencer – talkative, easy to befriend flash

S – Sympathetic – environmentalist

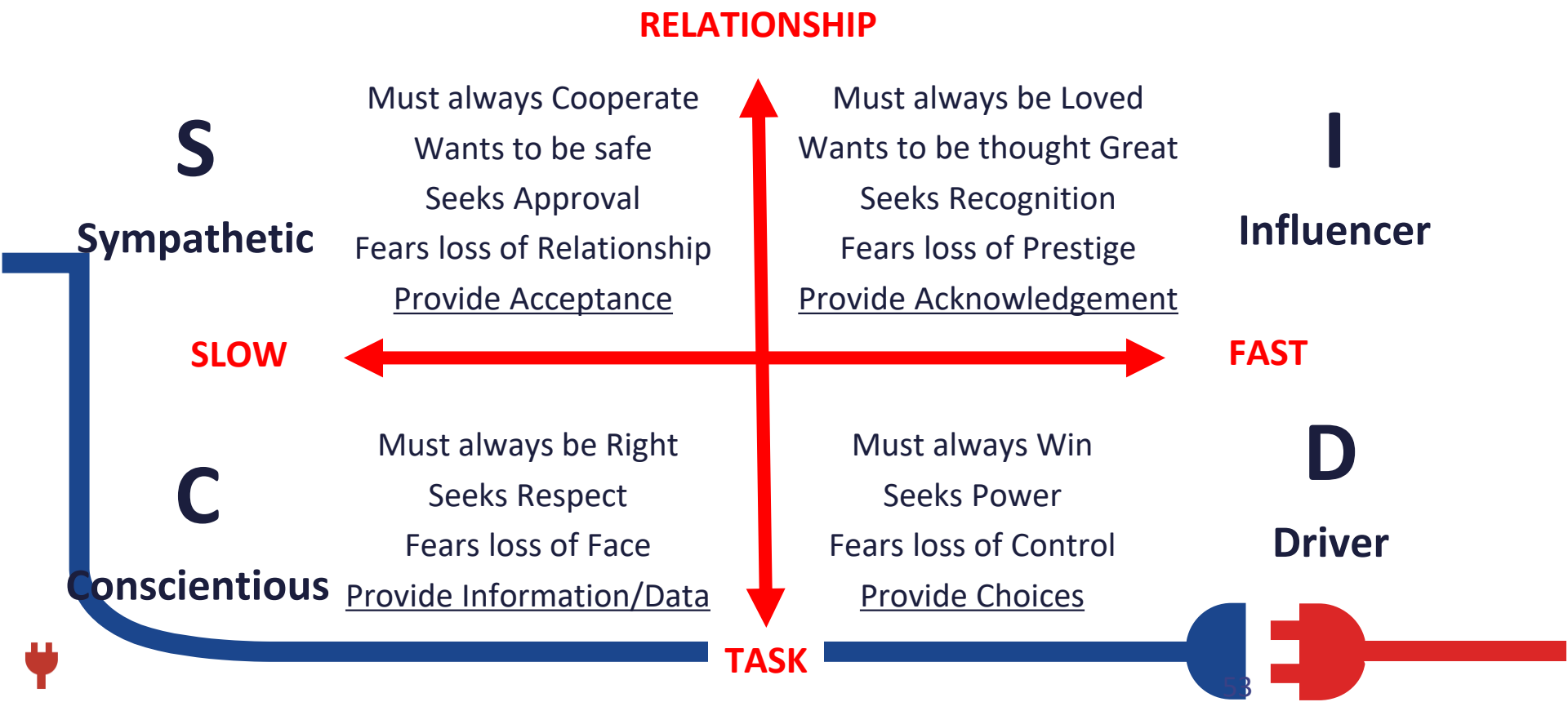
C – Conscientious – engineer, older car but $$

ELECTRIFY MY HOME

ELECTRIFY MY HOME

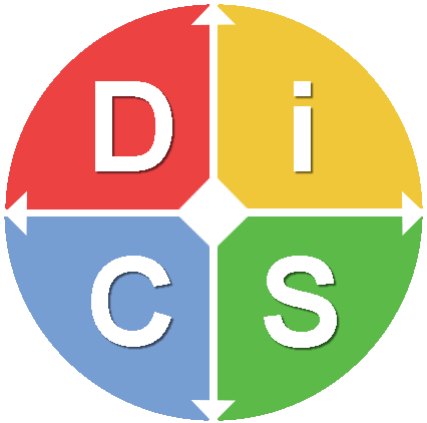
Classic I-Type (AKA Larry)

Everybody Fits Into 4 Quadrants



Class Exercise – DISC

- **You Show Me Yours, I'll Show You Mine (DISC RESULTS)**
- **Heat Pumps are great because _____**



…They'll save you $250/year
…They're great for the environment
…They're safer for my family
…They're the latest and greatest
…They come with a great warranty
…The outdoor units have slim profile
…They have a wide capacity range
…They have huge efficiency ratings
…They provide optimal comfort

Sales

MUST-HAVE SALES PROCESS

4 Steps to Success

Let's Talk About Communication - Active Listening

Tailored Persuasion

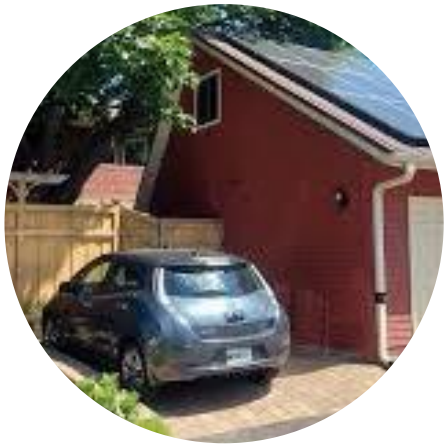
- Finding the **needs** is the secret weapon
- Goes **beyond** generational selling
- **Discover** the group and communicate accordingly

Must-Have Sales Process – Prep

Prepare, Prepare, Prepare!

- Use content from this training program to sharpen your saw
- Get your facts straight and practice communicating them
- Prep, then practice your opening question/statement
- Understand the products you are presenting
- Truly know the solution you're offering

The Approach & Observation



- Step 1: Check out the house online before you go out. Zillow or RedFin are good sources
- Step 2: Be observant as you approach the customer's home; look for clues that could help guide you
  - Electric or hybrid car?
  - Solar panels?
  - Modern home design?
  - Drought-tolerant landscape?

Must-Have Sales Process – Open

Opening

- **Why?**
  - What's led to the meeting?
- **Expectations**:
  - Confirm the goal of the call or meeting
  - How long will it take?
- **Initiate The Relationship**
  - Opportunity to discover DISC type
  - Rapport-building steps
- **Worst case** – you discover misalignment early

> Rapport isn't about following a prescribed path, it's about understanding and accepting what the customer most wants.

Take Some Time to Chat and Build Rapport, Gather Clues to Guide Your Approach

- Listen your way to success
- Starts with first impression call first and be on time
- Always give a sincere compliment
- Be observant of the decor
- Look for conversation starters
- Try to pinpoint personality type: Analytical, Empathetic, Influencer, Alpha, or Driver

ELECTRIFY MY HOME

Site Evaluation, Pre-Full Assessment

- Attic evaluation is very important
- Give special attention to the Ducts
- Inspect insulation for quality and R-value
- Looking for interstitial wall cavities air leaks and bald spots, light cans, bath fans
- Note all gas appliances
- Size up the floorplan, count the registers
- Take lots of pictures

Assume every home in CA will have an electric car!

Must-Have Sales Process – Questioning

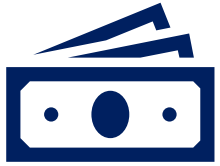
Understanding Your Customer's Needs

- We have two ears and one mouth; use them in that order
- Finesse your questions
- Ask open-ended questions and listen to the whole answer
- Probe with follow-ups
- Make notes on most important needs
- Discover needs, focus on them
- This maximizes “Service Value” and gives you “Preference Value

Categories of Need for Heat Pumps

Drivers/Needs	Personalities
Cost & Energy Savings	**D**river & **C**onscientious
Comfort	**I**nfluencer, **S**ympathetic & **C**onscientious
Health/Air Quality/Safety	**S**ympathetic & **C**onscientious
Environmental Responsibility	**S**ympathetic & **C**onscientious
Modern Technology	**I**nfluencer & **D**river

Categories of Homeowner Needs



Savings/Energy Efficiency (Financial)

- Monthly bill savings, reduced risk of future escalating bills
- Increase resale value or salability
- Take advantage of incentives

Comfort - Physical and Emotional

- Eliminate hot, cold or drafty spots/rooms
- Be able to keep home warmer or cooler within budget
- Reduction of noise from outdoor & indoor units
- Provide comfortable, safe living environment for self and loved ones - peace of mind

Categories of Homeowner Needs

Health/Air Quality/Safety

- Reduce pollutants, allergens, and/or VOCs
- Control moisture and eliminate risk of mold and/or questionable smells
- Resiliency against wildfire smoke

Environmental Responsibility

- Reduce Carbon Footprint
- Do the “right thing”- save the planet, reduce dependence on fossil fuel, create jobs

Topic and Follow-up Questions

- Introduce a topic with a Question
  - The “Opening” Question
  - Related to Categories of Need
  - Suspected Areas of Interest
  - Things that Differentiates You/Your Firm
- Listen to the answer, ask follow up questions

The Client will lead you to their needs, problems, perceptions, priorities, and preferences

THE PERSON ASKING QUESTIONS IS IN CONTROL!

FIRST QUESTION: Motivation

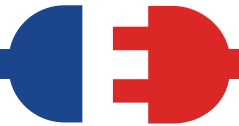
After introductions, open with the Motivation Question:

“What is going on that that has initiated you to consider electrifying your home at this time?”

Their answer:

“Concern about our energy bills going up, up... we have solar and heard that going all electric will save money.”

What would you ask next?



OTHER RESPONSES – What's Next?

<u>If they had answered</u>:

"Some friends have just installed a heat pump and are very happy with the results."

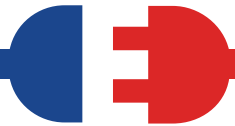
"Our grandchildren spend a lot of time with us, and we want to make sure that the indoor air quality is OK."

"We have been considering going all electric for a while, and now the timing seems right."

What would you ask next?

Benefits of Strategic Questioning

- Provides the opportunity to introduce questions to provide more value
- Lowers the barrier to being honest and candid because it provides a basis for your questions
- Allows you to drill down to relevant insights/issues they might not think of on their own
- Allows you to establish yourself as a knowledgeable problem solver... Credibility and Trust



Lunch Time

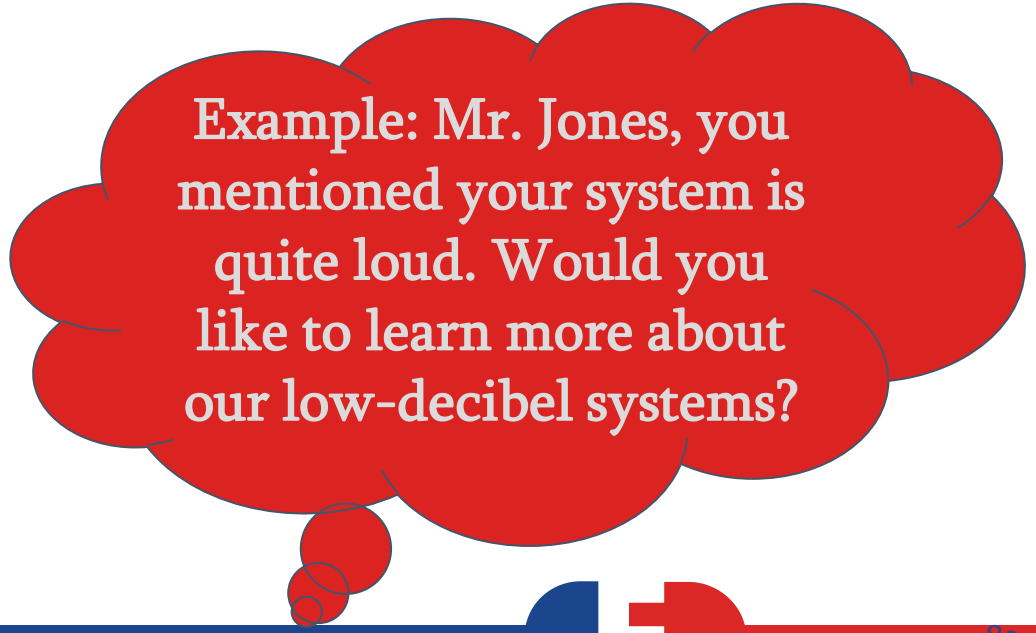
Become the Master – Room Temperature Room

Truest Repairman

Class Exercise Topic Questions

Write a strategic question for 2 homeowner needs / pain points
Using topic questions. Slides 34-45

- Comfort (even temps)
- Sound Quiet (indoor and outdoor)
- High bills
- Health/Air Quality/Safety
- Environmental driven



Must-Have Sales Process – Close It

Present Your Findings

- Solution for **their needs**
- Presentation of discoveries
- Share the images to push impact
- Discuss the deficiencies and best methods of correction
- Share their electrification opportunities
- Inform them of future needs (e.g., battery, EV charger etc.)

ELECTRIFY MY HOME

Objections


The Best Way to Handle Objections is Foreseeing & Addressing Them Ahead of Time

Before We Jump Into Addressing Objections…

Understand Your Customer/Client

- Their Personality
- Their Concerns
- Their Needs

Understand Their Home

- What's Been Done Already
- Panel Condition
- Space Available

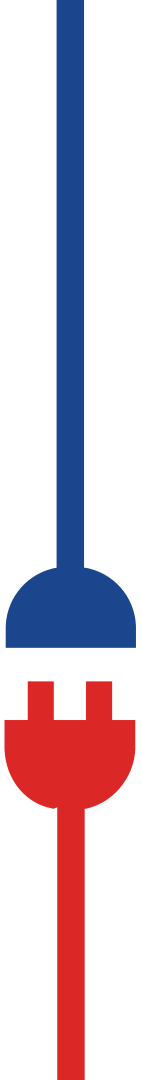
Address Objections

- With understanding of customer
- With understanding of home

ELECTRIFY MY HOME

Sample Objections! Stump The Chump

- It'll cost too much
- Electricity is more expensive than gas
- What if the power goes out?
- Grid can't handle it
- Heat Pumps Don't Put Out Hot Air
- Heat Pumps Don't Work In The Cold
- How Do I Know It Will Be Reliable?
- They're Too Loud
- I Don't Have Space For the Outdoor Unit!
- Not Carbon Friendly Because Electricity Comes From Fossil Fuels
- I Prefer To Sleep Cool



Definitions

Feature
Characteristic of a product/service, easily understood or demonstrated

Function
How the feature works in order to provide the benefit or benefits

Benefit
What the Customer gains from the feature/features and their functions

Need
More fundamental… makes the benefit relevant to the Customer

How Cool is That!

- I'm selling this HVAC system
- It comes with a spine fin coil
- **How cool is that?**

Feature – Function - Benefit

- My system comes with a spine fin coil
- It reduces formicary corrosion
- Your system will have better efficiency for a longer period of time
- **How cool is that?**

Need – Benefit - Feature

- You told me efficiency is important to you
- I assume you don't want a system that will corrode in just a few years
- That is why system has spine fin coils
- **How smart is that?**

3 Reasons for N-B-F Presenting

- Begin with something you know about the customer
- Finish with something that is easily observed, understood, or demonstrated
- It keeps you from talking about features and benefits that don't matter

Results in a Nod

Another Nod

A Feature that is not connected to a Need has little value

Part 2, Quiz 2: Sales Personalities & Strategic Questioning

1) Conscientious and Driver personalities fall on which end of the spectrum?

A. Relationship
B. Task

2) Which end of the horizontal spectrum applies to Influencer personalities?

A. Tell/Fast
B. Ask/Slow

3) In a Customer Conversation the person asking the questions is in control

A. TRUE
B. FALSE

4) Why is it important to listen carefully when a person answers a Topic Question?

A. You can often respond with benefits of what you plan to recommend
B. Their answers will help with composing relevant follow up questions
C. You can decide whether to continue with the topic or introduce a new topic
D. B and C above

5) When you uncover a problem, what questions should you ask?

A. What do you believe is causing this?
B. How is this impacting you or your family?
C. What, if any, actions have you taken to address this?
D. All of the above

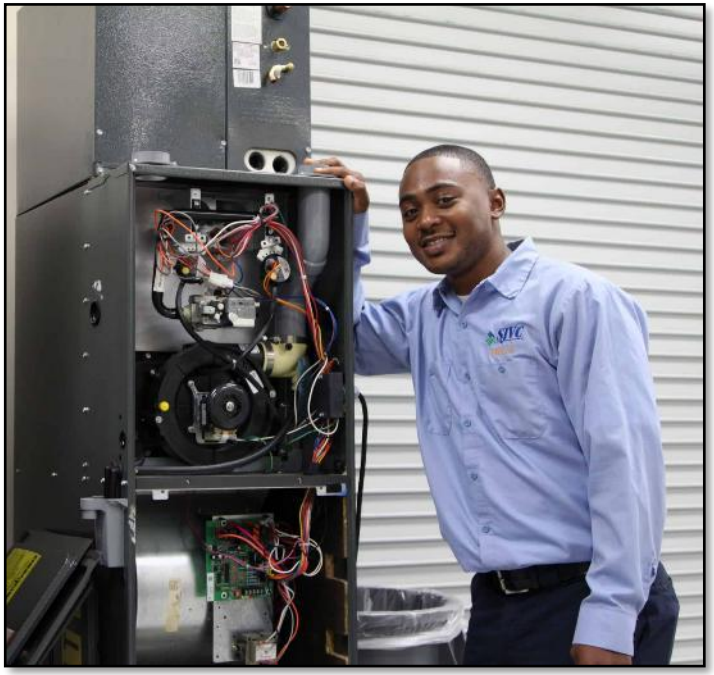
SERVICE TECHNICIANS

Electrification Opportunities Extend to Techs

Good Service Technicians are Always Looking for Something NEW to Share

Same customers, new products to sell

- Keep an electrification goal sheet on every customer
- Inventory the gas loads on your next service call or tune-up
- Break the ice with customer regarding and electrification long term plan
- Intro electrification with awareness questions
- Assess insulation, ductwork and attic space



ELECTRIFY MY HOME

Good Service Technicians are Always Looking for Something NEW to Share

How to prepare:

- Reread the class book policy from Day 1
- Make sure you understand the **why**, this is what you will have to communicate
  - Changes are coming policy ab 32 sb100 etc
  - Important dates 2020-2030-2045-2050
- Repeat the "in your own words exercise"
- Include full scope and at your own pace options.

Remember:

- Stop talking your customers **out** of this
- Understand that electrification is a massive opportunity for your company and your customer
- New money, as the future of the industry is no longer in gas

ELECTRIFY MY HOME

Selling the A/C Change Out With Upgrade to Heat Pump

- Perhaps the biggest no-brainer in the history of mankind
- Incentives in place for fuel switching when replacing an AC
- Reduced Electrical costs
- Customer already understands the value of cooling
- Customer has endured high Summer cooling bills
- Huge upside for comfort since most existing systems are too big and designed poorly
- Sell safety on the furnace side, efficiency on the cooling side

#1 Quick Tip for the Comfort Advisors

If a customer is asking you for an electric solution, <u>don't try to talk them out of it!</u>

*If you are not yet comfortable in the sales process please look for our Advanced sales training

Good Service Techs Do This Well

Planting Seeds

1) Good Service techs understand that *planting seeds gets leads*
2) Conversation leads to conversion
3) Conversion is not an instantaneous event. In reality, conversion is a lot more like farming. It's a *nurturing* process that leads your client from:
   - Hearing about your service to …
   - The first transaction to …
   - Repeat business with you to …
   - Recommending your offerings to …
   - Helping plant the seeds for friends and family

But How Exactly Does Conversion Happen?

1) Delivering information & following up!
2) Keeping records of the opportunities and calling when slow

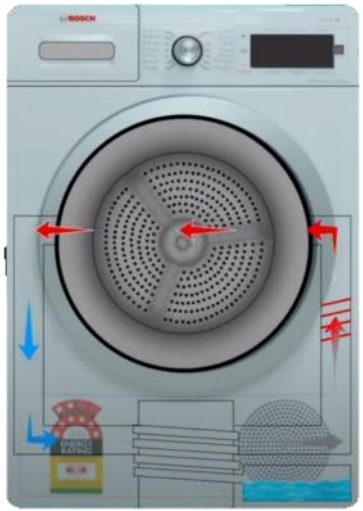
ELECTRIFY
MY HOME

ELECTRIFICATION PRODUCTS & PANELS

- SEGMENT 3 -

Segment 3 – Electrification Products, Opportunities, and Challenges

Disclaimer: The products and brands shown in this presentation are provided as examples of potential electrification solutions. Electrify My Home does not endorse, recommend, favor, or receive payment from any of the examples shown herein.



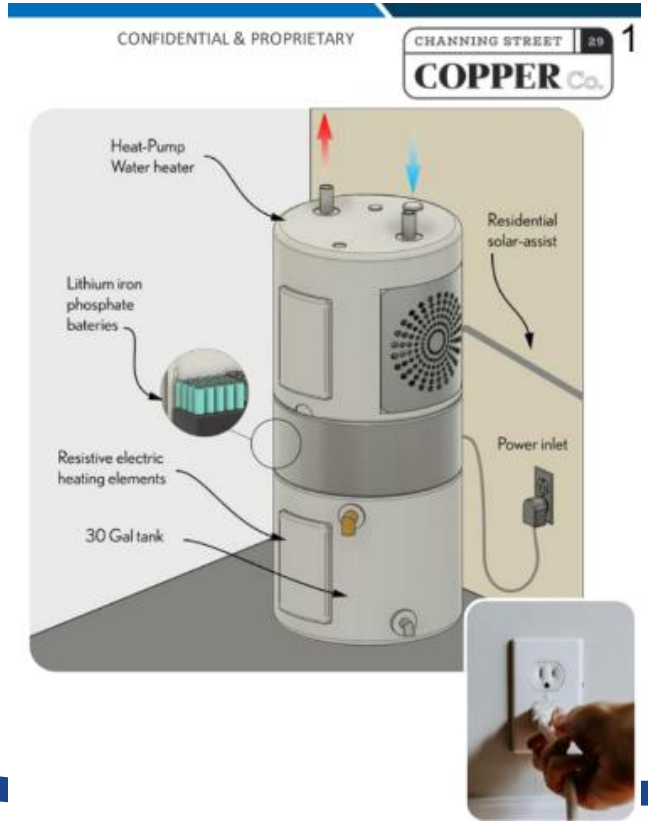
Heat Pump Water Heater Review – 2 Styles

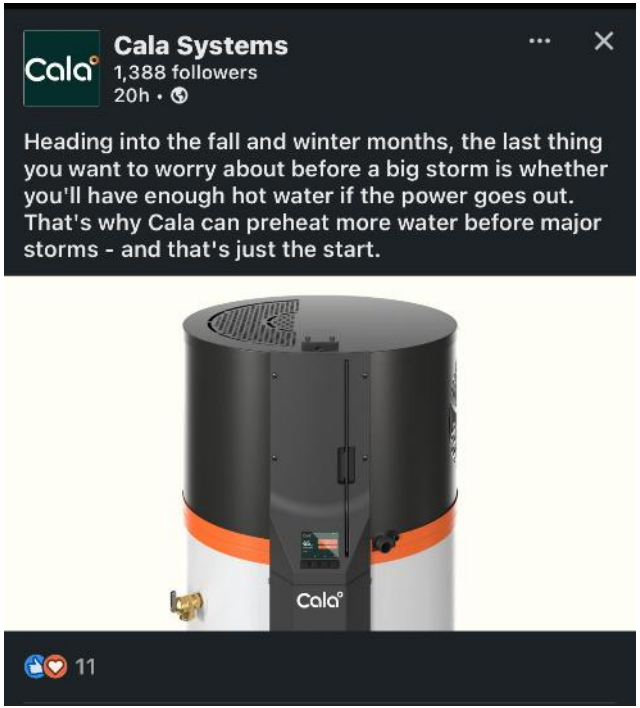
Self-contained, heat pump on top

Split System Sanden SanCO$_2$

SANCO2

New HPWH Concepts





Value Proposition for Heat Pump Water Heaters

To Your Customer

- Perfect water temp with mixing valves
- Lower lifecycle costs
- Solar offset
- Carbon free
- Limited time incentives for early adopters
- Safer no combustion

To your company

- Higher profit margins
- Don't sell yourself short charged enough for them
- Midstream incentives means you make some money
- Get the right one some have problems
- Get everyone trained up

Inverter Heat Pumps for Space Conditioning

Unitary

Mini Split Platform

ELECTRIFY MY HOME

There’s No Way I’m Putting That On My Wall

- **Startups solving this!**
- **cassettes**
- **Go ducted!**

Room Options – Great for Apartments/Single Rooms

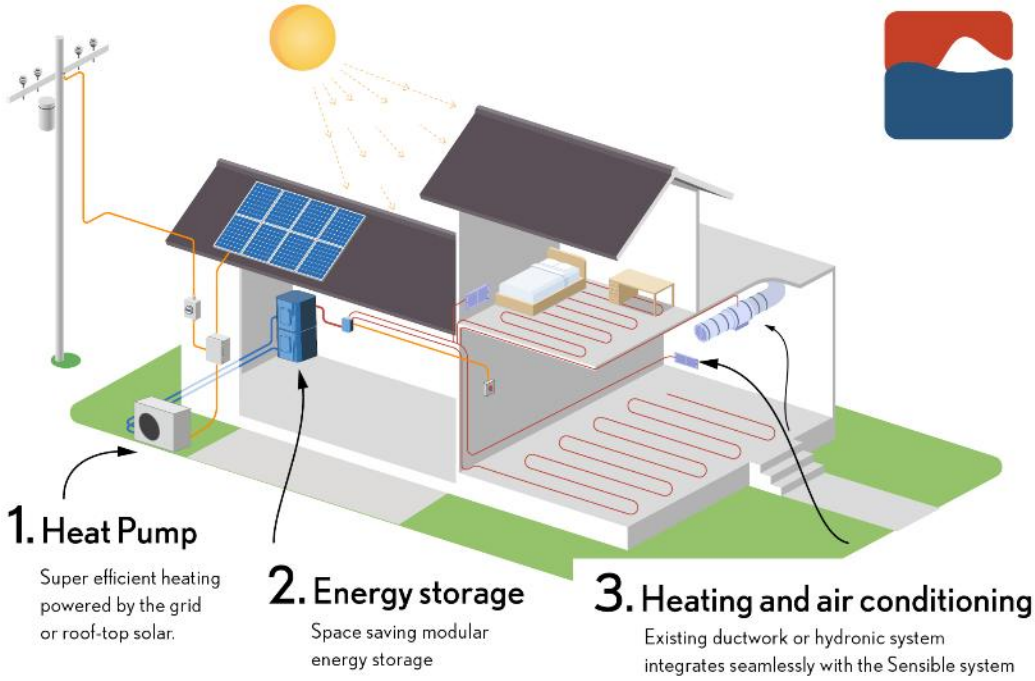
Gradient

Ephoca

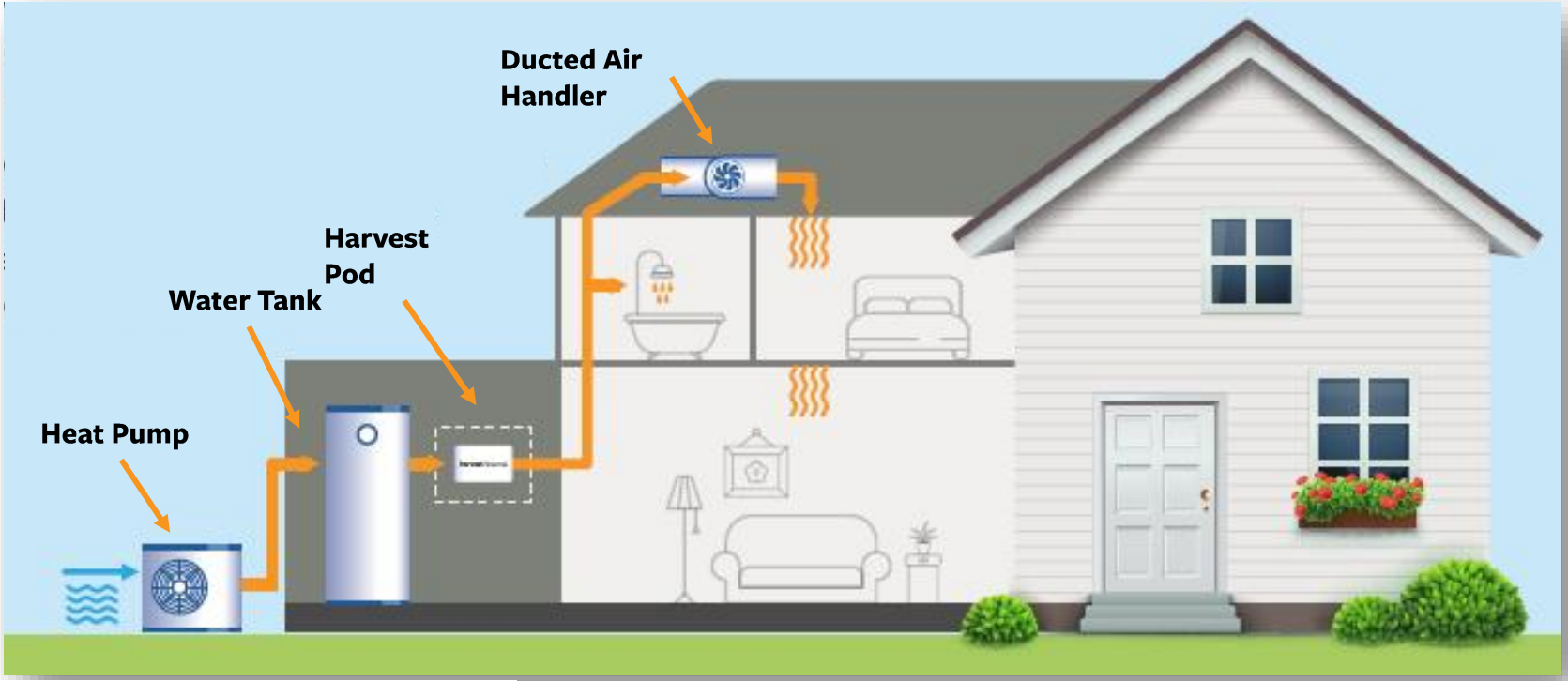
Olimpia Splendid

Portable HP

Air to Water Heat Pumps for Hydronic Fan Coils or Radiant

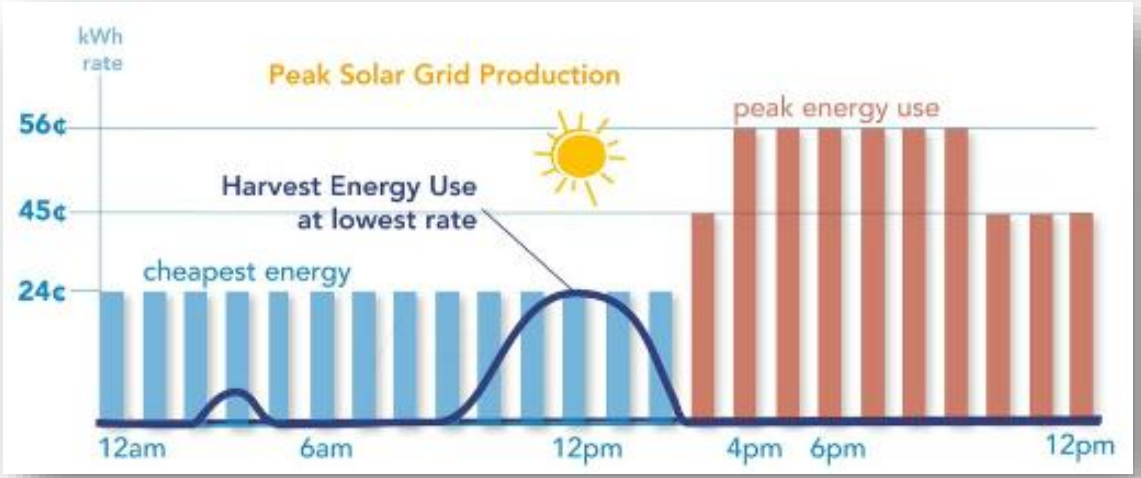


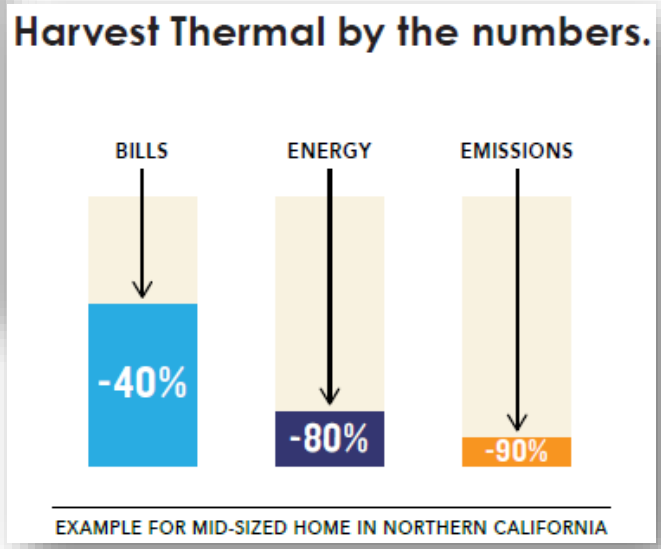
2-In-1 HVAC+Water Heating – Harvest Thermal



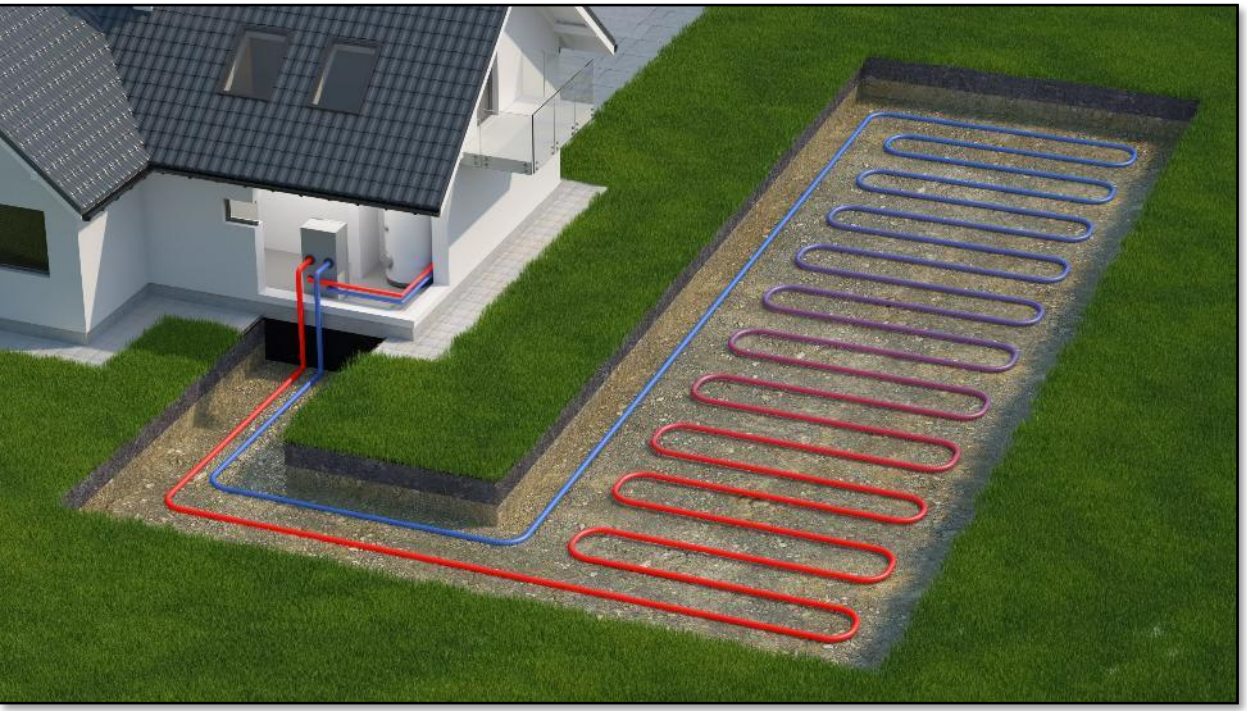
harvest thermal

Harvest Thermal





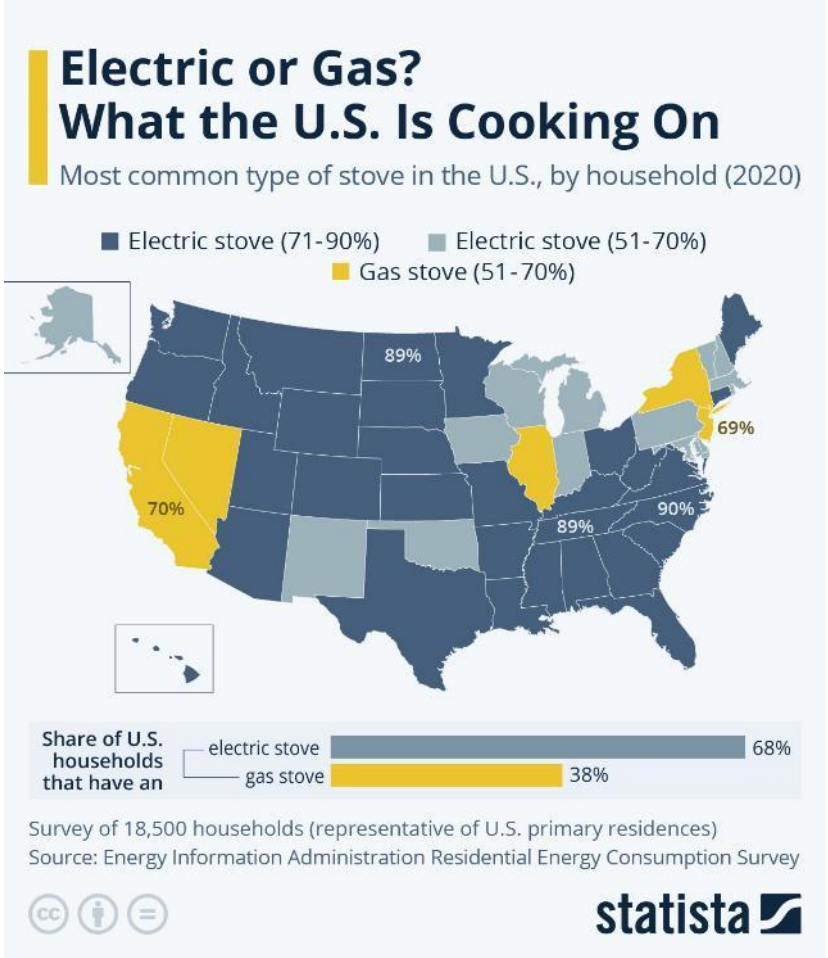
Geothermal



Not best for mild climate but great for areas with cold winters

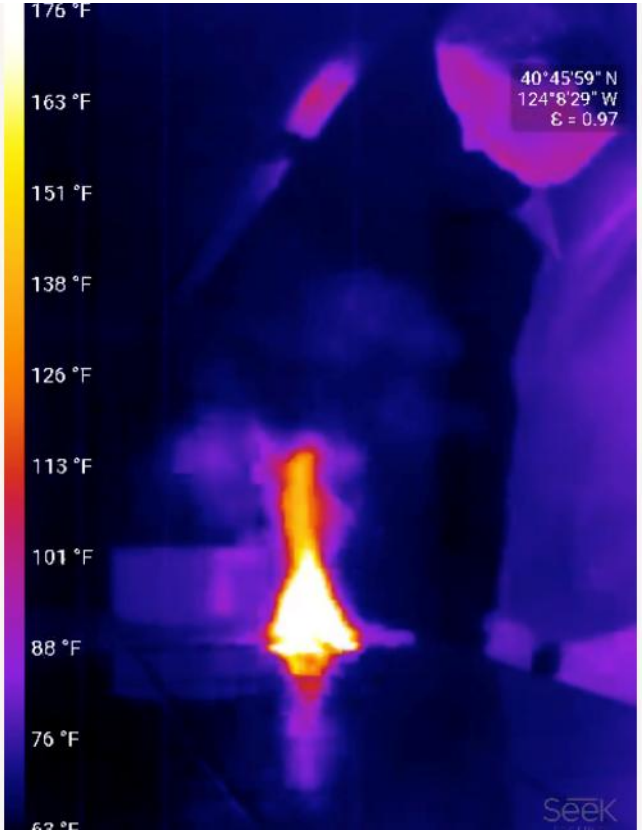
ELECTRIFY MY HOME

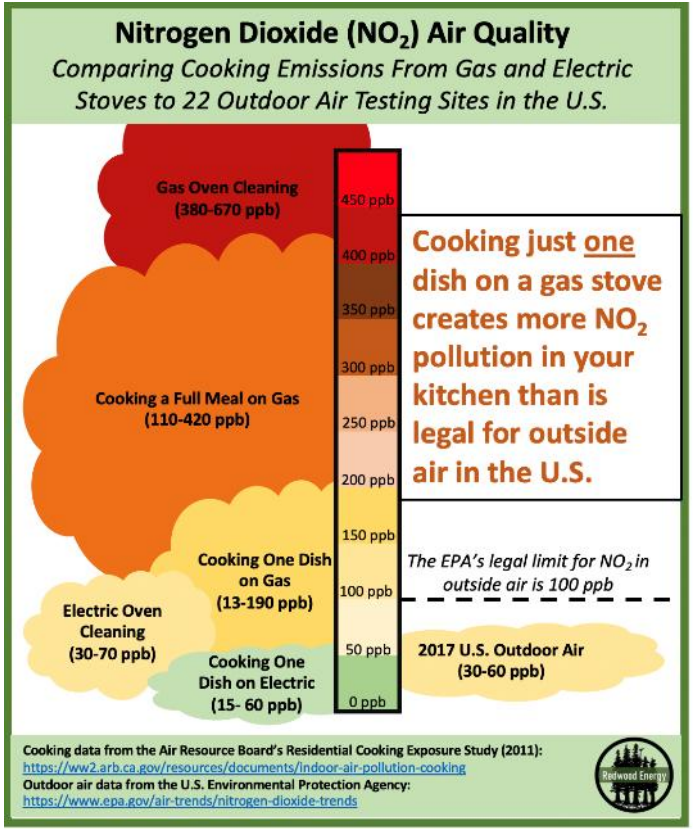
Is Electric Cooking REALLY That Rare?



ELECTRIFY MY HOME

Gas Stoves: Like A Pack of Cigarettes





Slide Courtesy of Redwood Energy

Electric Cooking Including Induction

Electric Cooking (Coil & Infrared)

Induction Cooking

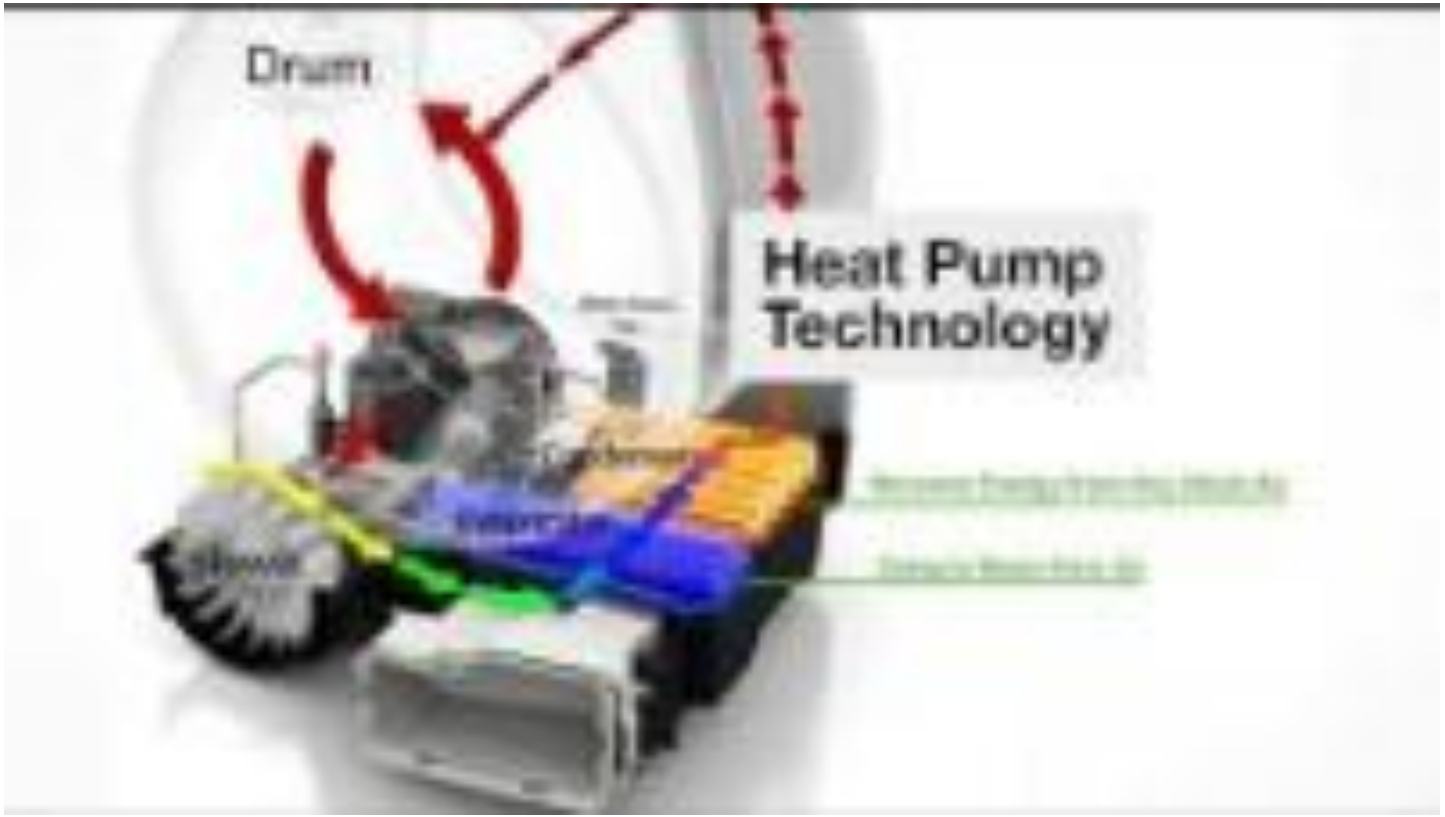
Induction – How it Works

Induction – How it Works

Energy Storage Enabled (ESE) Cooking

Channing Street Copper 110V Battery-Integrated Range

Electric Dryers – 3 Options Including HEAT PUMP



Other Drying Solutions

In a Pinch

Most Environmentally Efficient Dryer

GE Profile, LG WashCombo, Samsung Bespoke Future of Laundry | All-In-One Units

GE: $1,998 LG: $1,899

Samsung: $1,898

- 120v
- Heat pump
- Ventless
- No transferring required
- Large capacity up to 5.3 cu. ft.
- Smart features
- Cold Wash

Fireplaces

Opti-myst fireplace

EV Chargers

Batteries to Charge Batteries

Electric Car Chargers

Portable generators for electric cars!

Sometimes Tech Makes Things Easier: Share a Circuit or Run Another?

Circuit Splitters – Smart Load Control Stretch the Panel Capacity

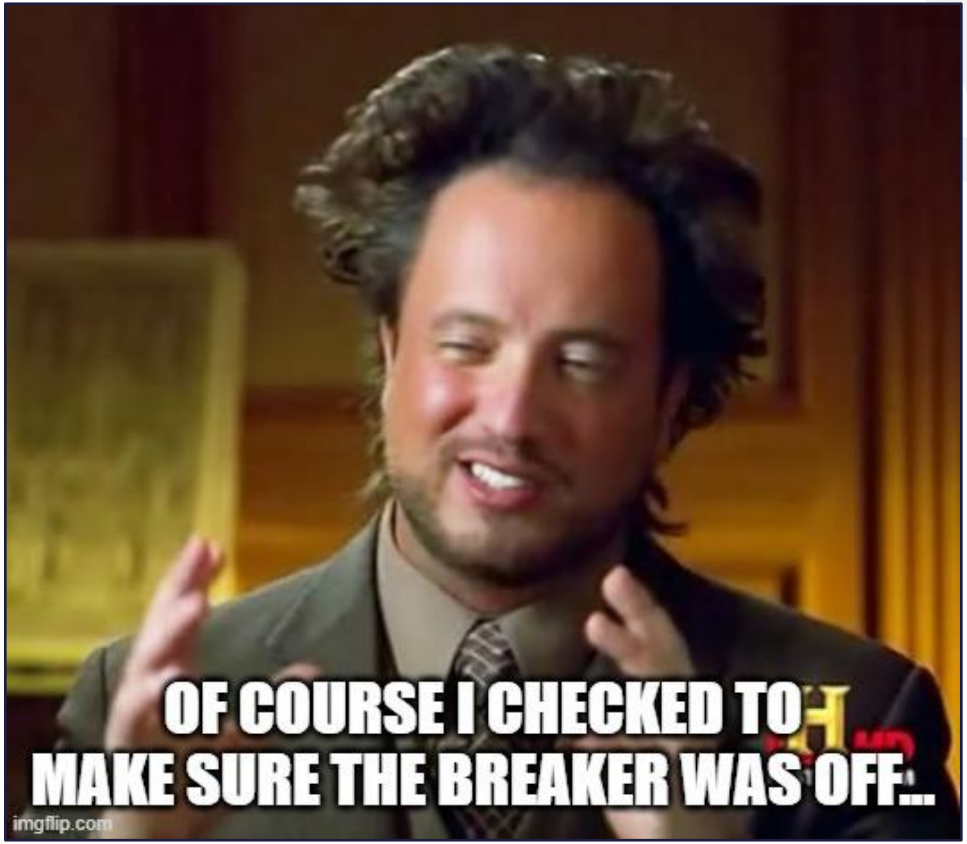
New devices, methods, tools and technologies

- Allows you to power two 240v appliances with one outlet (one at a time)
- Several options on the market, check for UL certification
- This is a life saver with tight panels or challenging electrical runs
- Customer education is extremely important
- Our favorite = EV Charger + Range or EV Charger + Dryer
  - Make sure Range or Dryer are set to primary load

DCC9 Smart Tech In that Mysterious Gray Box

- This device allows adding car charging on a full panel
- The DCC 9 manages energy
- Senses when the panel is at 80% and de-energizes
- Multi family car charging game changer

ELECTRIFY MY HOME


OF COURSE I CHECKED TO
MAKE SURE THE BREAKER WAS OFF...
imgflip.com

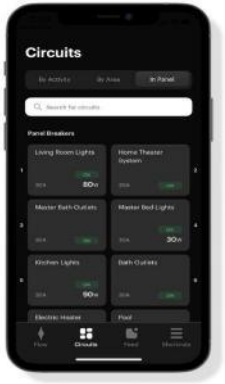
New Panel Technology Helps us Achieve Good Electrification

- It's not always possible to change an electrical panel quickly
- Location of panel
- Direction of wire feed
- Necessary additional load
- Lack of breaker space
- Cost in complication of including utilities and permitting processes

The Span Panel, Stretch Loads on Low Amperage Feeds

It replaces your existing electric panel.

And lets you control every circuit in your home.



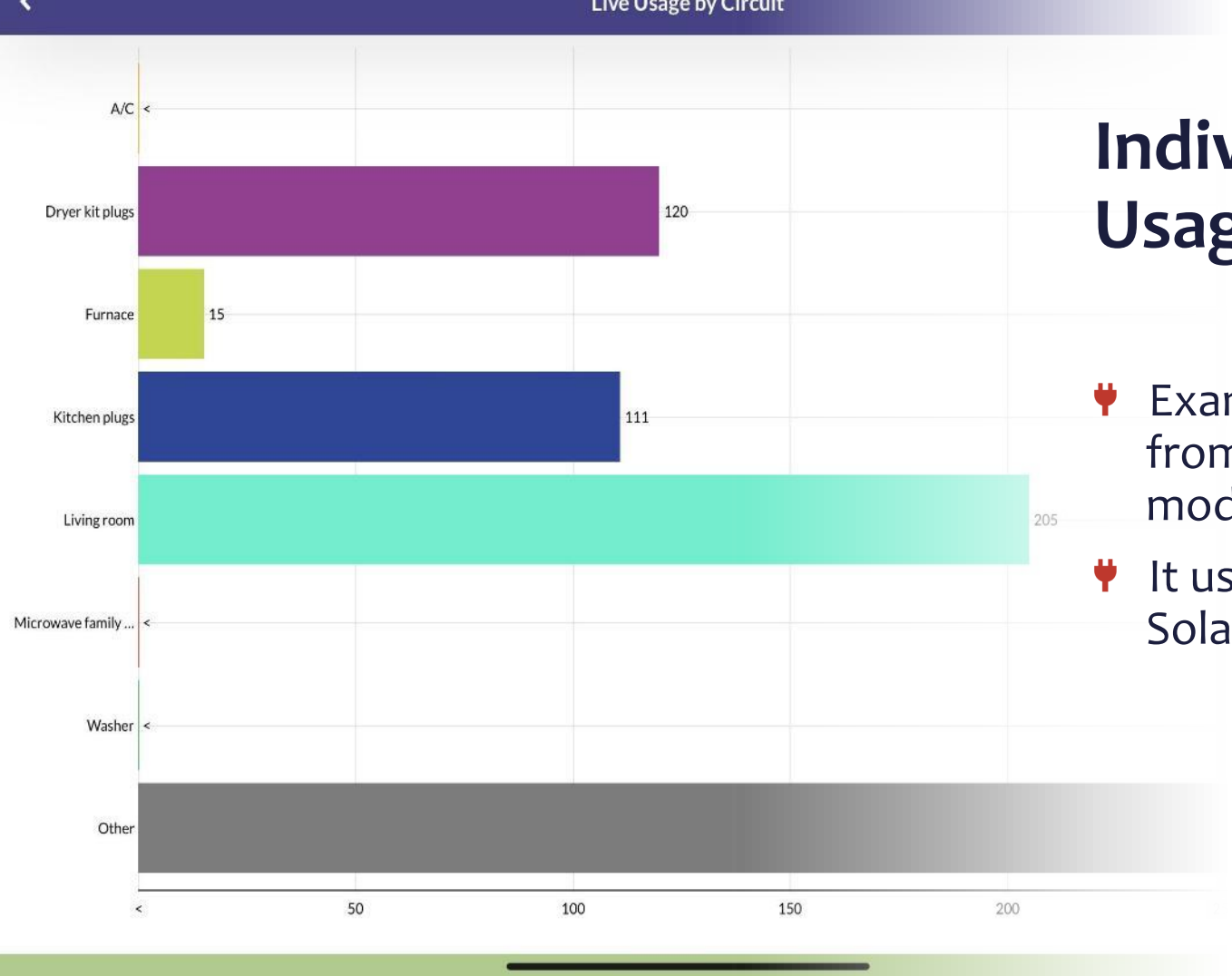
Right from your phone.

Leviton Electric Whole House Solution

ELECTRIFY MY HOME

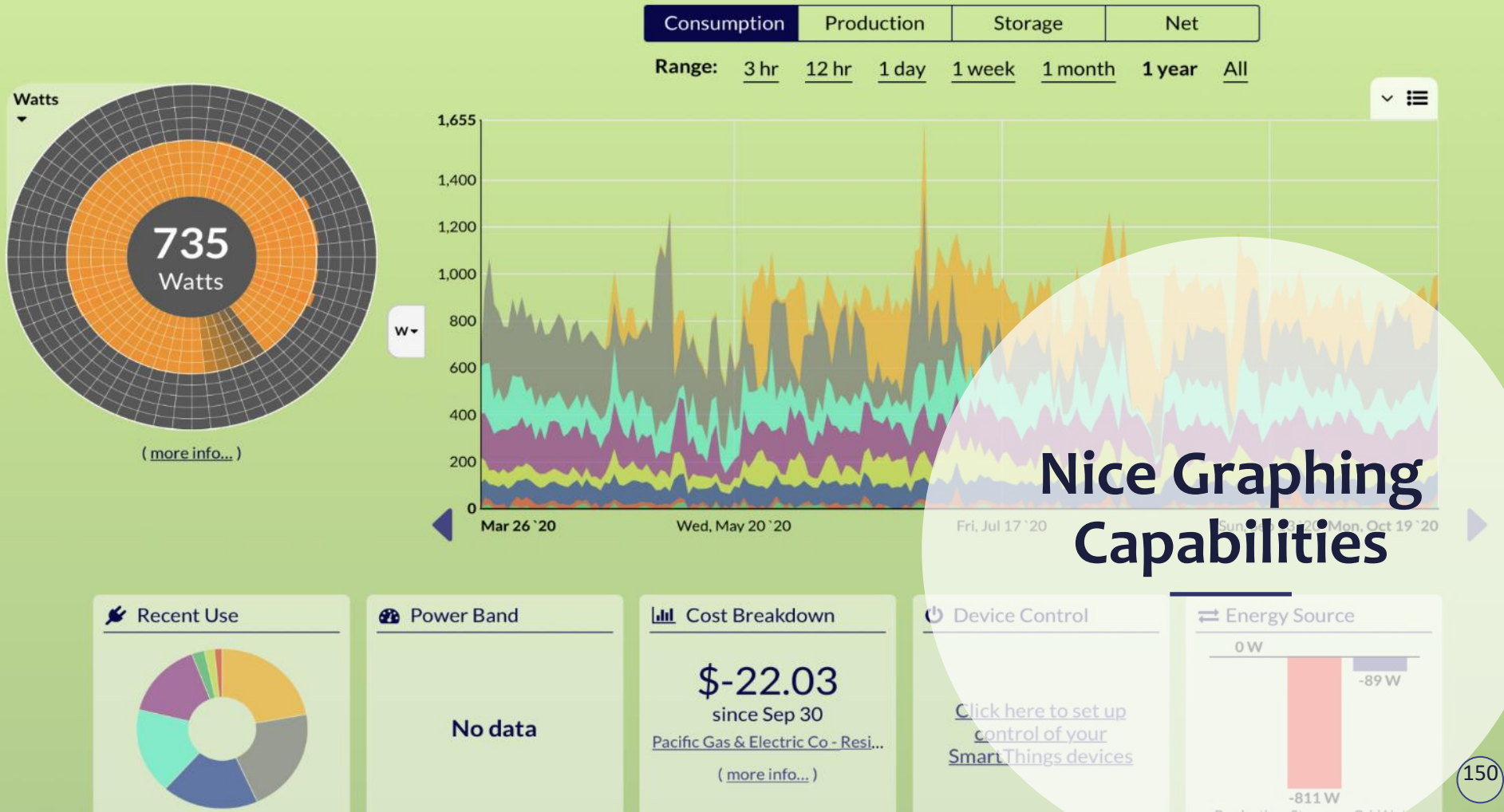
Home Energy Monitors – Curb Energy System

- Brilliantly adjust to your rate plan
- Extrapolate your actual cost



Individual Circuit Usage – CURB

- Examples shown here are from the 12-channel model
- It uses one channel for Solar and one for battery


Consumption
Production
Storage
Net
Range:
3 hr
12 hr
1 day
1 week
1 month
1 year
All
Watts
735
Watts
(more info...)
1,655
1,400
1,200
1,000
800
600
400
200
0
Mar 26 `20
Wed, May 20 `20
Fri, Jul 17 `20
Mon, Oct 19 `20
Nice Graphing Capabilities
Recent Use
Power Band
No data
Cost Breakdown
$-22.03
since Sep 30
Pacific Gas & Electric Co - Resi...
(more info...)
Device Control
Click here to set up control of your SmartThings devices
Energy Source
0 W
-89 W
-811 W

Compare Energy Usage from 2020 to 2021

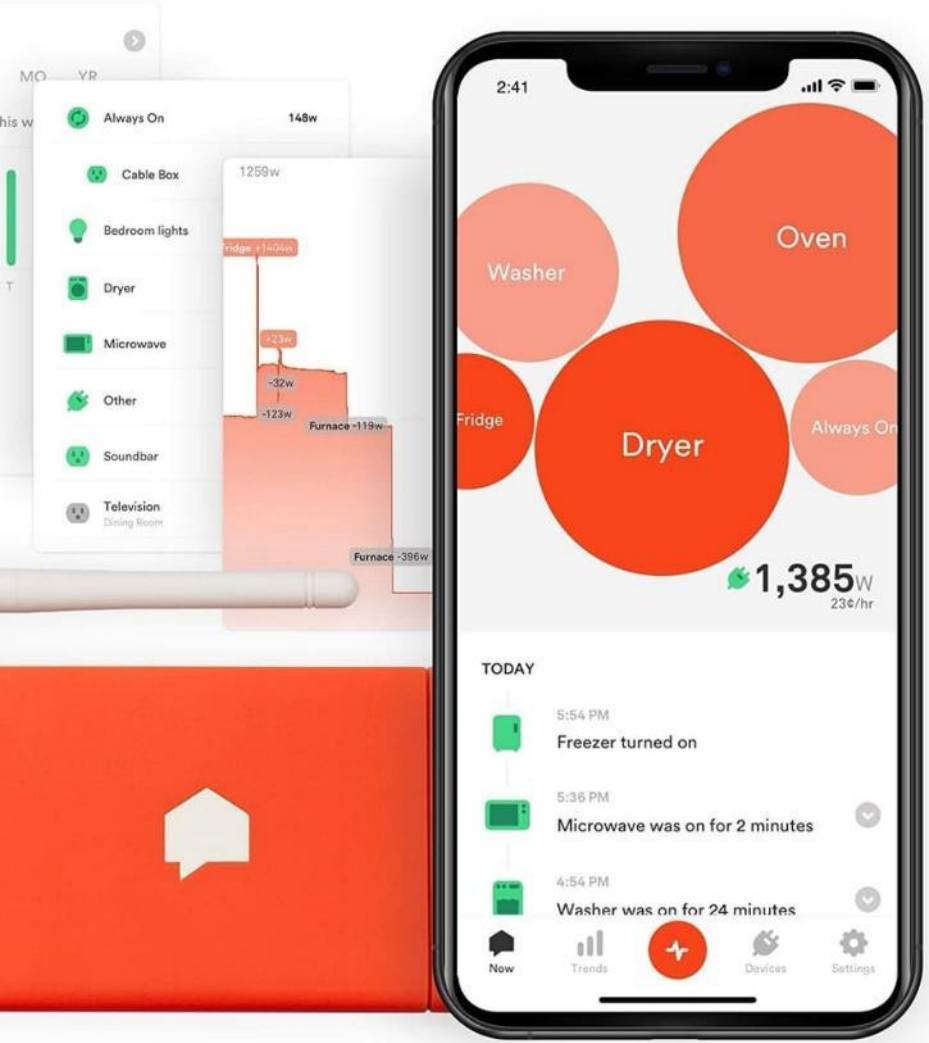
My home's heat pump system (Mitsubishi Mini split platform with upflow air handler)

Used nearly 50% less energy in September 2021 versus 2020

- 212 kWh in Sept 2020
- 109 kWh in Sept 2021

That's 50% folks! If you have really high bills this will really cut them in half.

That's 50%



Sense

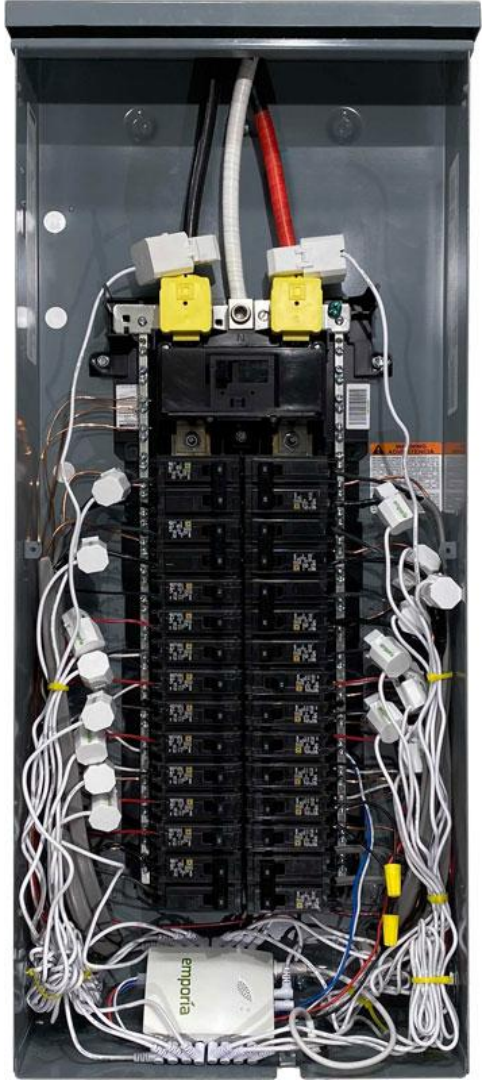
- Another option for energy management
- Uses machine learning to automatically label your circuits
- Internet-connected and aggregates data from all users to improve accuracy
- Has positive reviews; ~$250 or $300 if you have solar and battery
- It comes down to personal preference and what features are needed

ELECTRIFY MY HOME

ELECTRIFY MY HOME

Emporia Vue 2

- Cost-effective individual circuit monitoring ($124)
- Need space in panel or breakout box
- Accessing mains can be challenging



Interested in Learning more?

3-month cohort program available

- Tech Clean California, Wants you to succeed!
- Program available to first six vetted contractors
- No cost, just a commitment.
- What's included ? Weekly web video calls to discuss your progress, prospects, planning and problems
- Traveling on-site training for your install technicians

Additional costs:

- * On-site visits * Design services * Load calc services *

Part 2, Quiz 3: Products

1. Identify at least two electric options for each of the following:

Gas space heating: _____ _____

Gas water heating: _____ _____

Gas cooking: _____ _____

Gas clothes dryers: _____ _____

TRUE OR FALSE?

___ 2. Some electrical panels can monitor energy use and loads.

___ 3. Smart splitters can be used for adding an EV charger without updating a panel.

___ 4. Energy monitors can help pinpoint opportunities to reduce energy use.

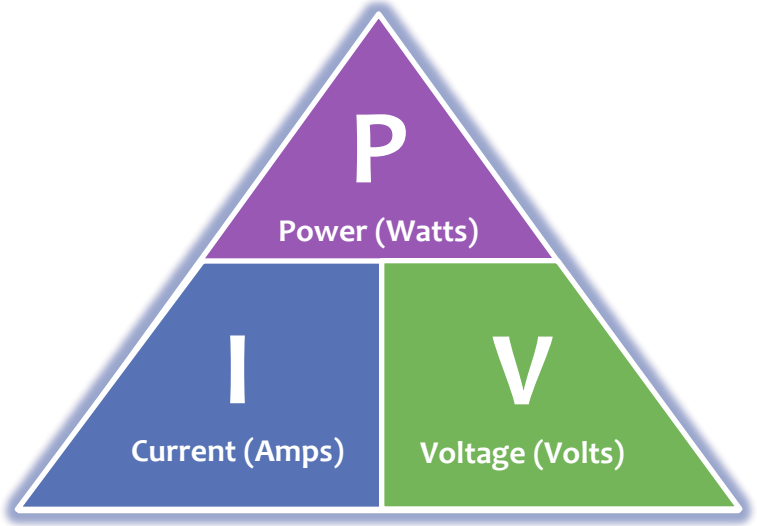
ELECTRICAL PANELS

Sizing & Safety for Electrification

Important Concept Power Law

Important Concept #1: Power law is useful in calculating energy loads

- Watts = amps X volts
- Amps = watts/volts
- Volts = watts/amps



Important Concept # 2

- Electricity can kill you

Panel Sizing – Loads, Breakers and Wires

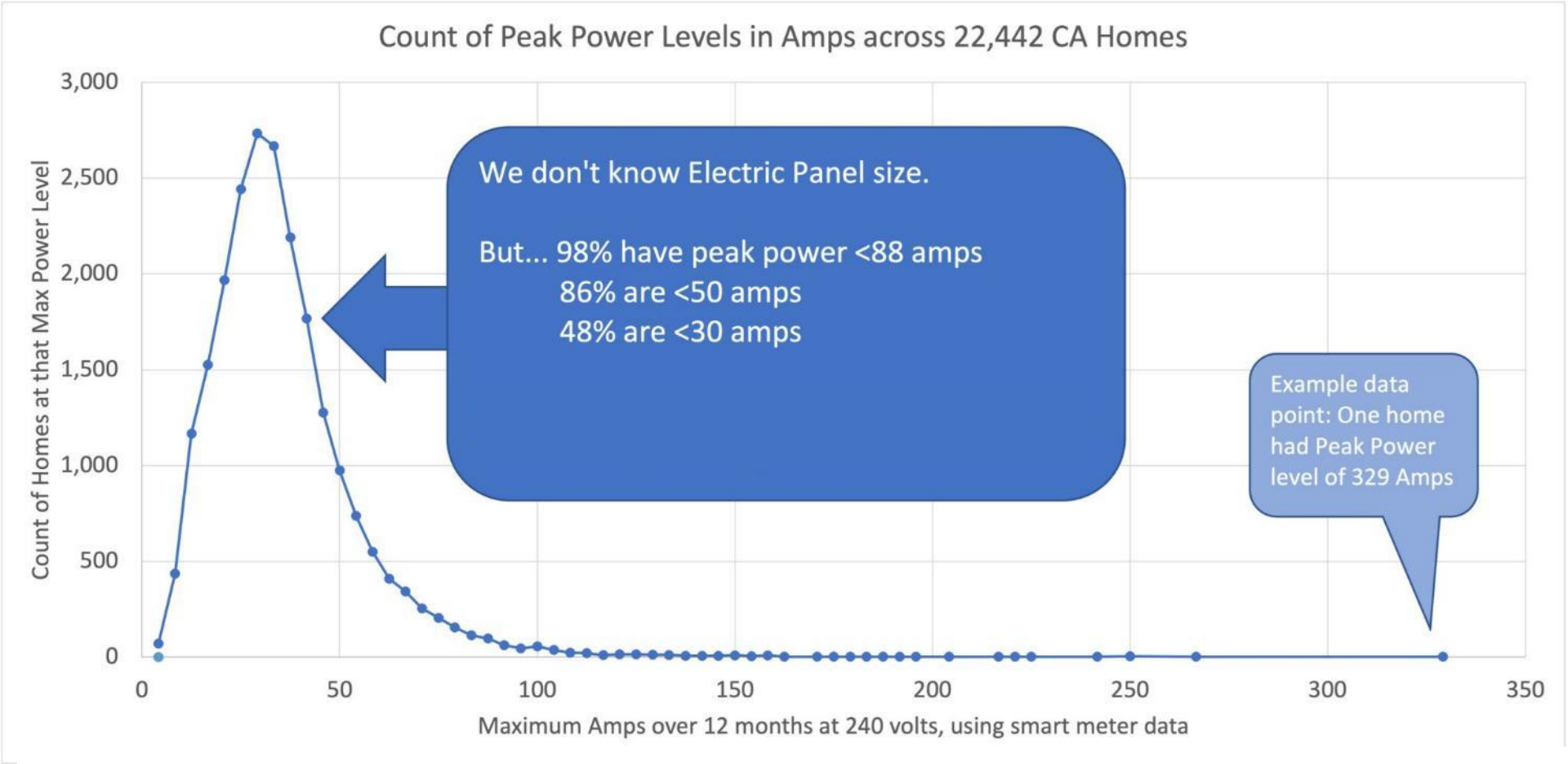
This following content graciously provided by

Tom Kabat,

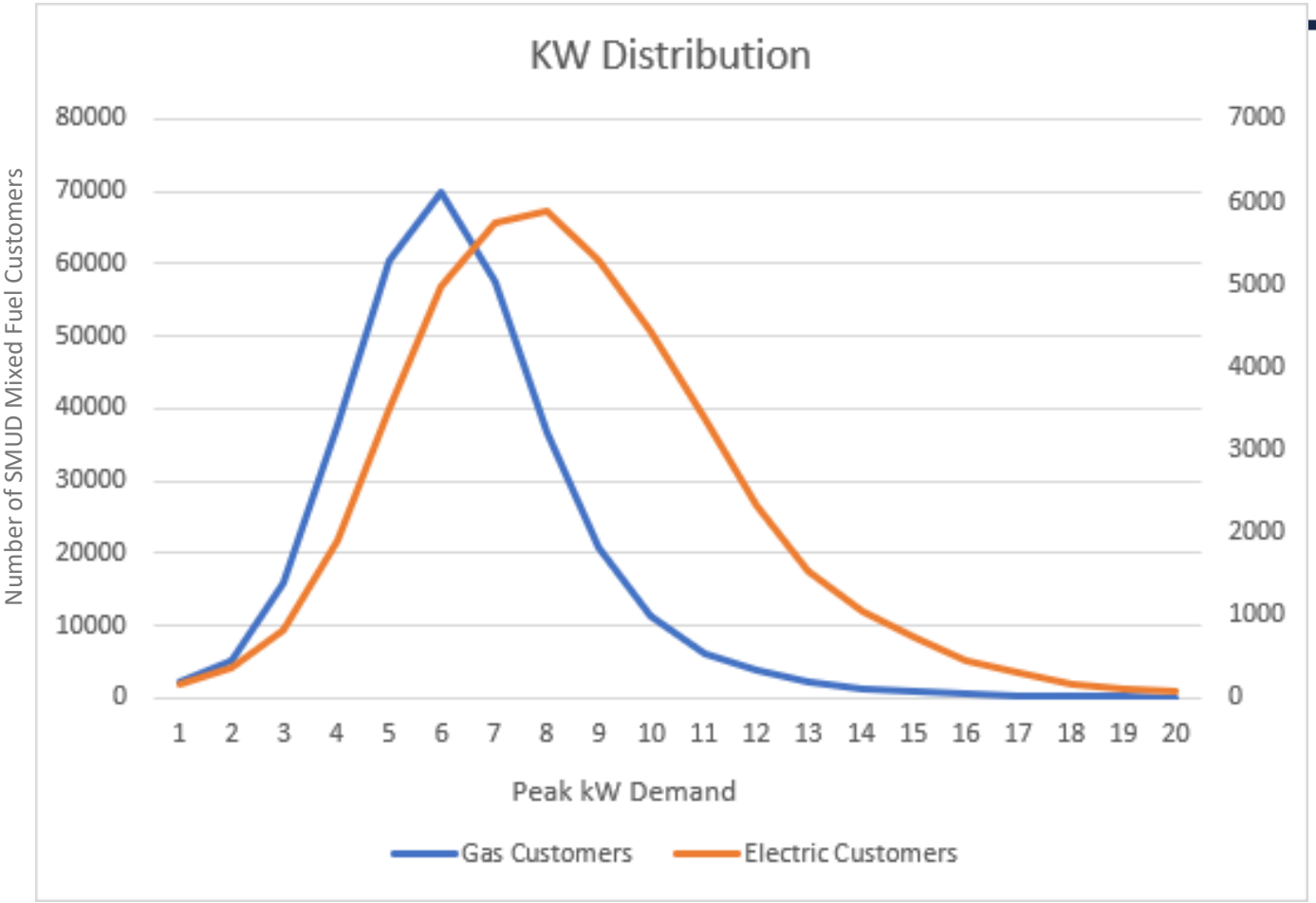
Energy and Electrification Consultant at Good Gridizen

Here's What Tom Has to Say

- A 100-A panel has more power than you think – 24,000 Watts!
- Everything doesn't run at once
- Stretch loads behind panel



Source: Home Energy Analytics (HEA), PG&E HomeIntel service single family user data



Source: Home Energy Analytics (HEA), Sacramento Municipal Utility District (SMUD) customer peak kW distribution

Fitting it All on the Panel: Spaces and Amps

- A typical 100 Amp panel can deliver 24 kilowatts of power (100A X 240 V). That's a lot of power.
- National Electric Code (NEC, Adopted by California) defines how to perform panel load calculations that the AHJ* can check to see the panel is not overloaded with circuits and loads beyond 100% of its rated capacity.
  - The purpose is to keep the busbars of the panel from overheating and overheating the contents of the panel.
  - Much of the NEC code regarding sizing is to avoid overheating of wires or panels that would lead to melting of the wire's insulation, and other high-temperature problems.
  - It looks at amps of current flow on a circuit (regardless of voltage) as an indicator of internal resistance heating of the conductors in the circuit. Larger cross-section wires (lower gauge numbers) present less resistance to current flow and therefore less resistance heating of the wires.
  - Breakers are sized (in amp rating) so they open in time to protect the wires downstream from overheating.

*AHJ = Area Having Jurisdiction

Summary of Retrofit Rules when Adding Heat Pumps

- 4,500 Count 3 watts per square foot of conditioned space (ex. 1500 sqft*3 = 4500)
- 3,000 Add 1500 W per kitchen countertop circuit (minimum two circuits) (ex. 2*1500 = 3000)
- 1,500 Add a 1500 watt laundry circuit (usually for washing machine)
- _____ Count the nameplate rated watts on every dedicated circuit load
  - Garbage disposal , dishwasher , attached microwave , clothes washer , oven+cooktop
- _____ EVSE (EV Charger) count the rated input watts for the DIP switch settings chosen
- _____ Tom Says the NEC wants 5,000 for the dryer. He advocates (2,500) heat pump
- _____ Any remaining 220.83b section code electric loads (furnace AC,)
- _____ Sum that all up and move to next slide

Courtesy of Tom Kabat

Continued – Summary of Retrofit Rules when Adding Heat Pumps

- _____ Sum that all up.
- _____ For the first 8,000 watts, not HVAC or EV count it as 100% coincident with the building peak electric load
- _____ For all of the parts beyond those first 8,000 watts, count that additional part as 40% coincident
- _____ Look at heat pump winter and summer load take the highest number count 100% of that wattage

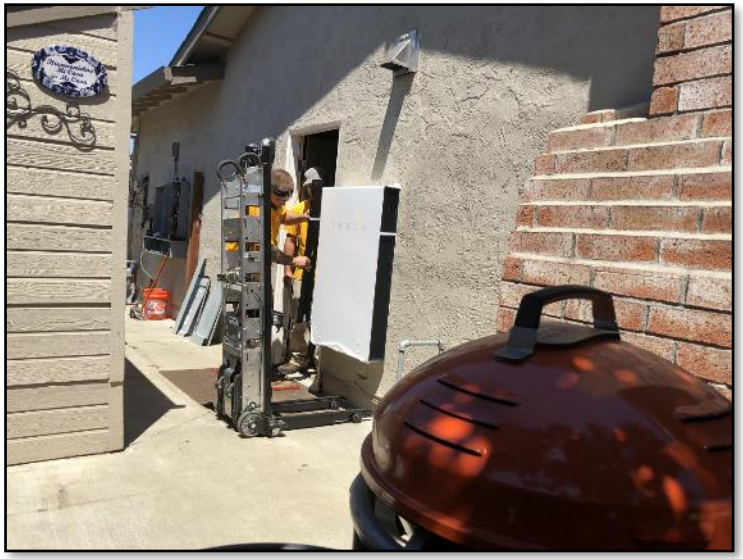
- _____ Total counted watts must be less than the watts found by multiplying panel rated amps times 240 volts
  - (e.g. less than 24,000 counted watts for a 100 amp panel, less than 48,000 counted watts on 200)

Courtesy of Tom Kabat

Panel Capacity, Being a Good Steward of the Electrical Panel

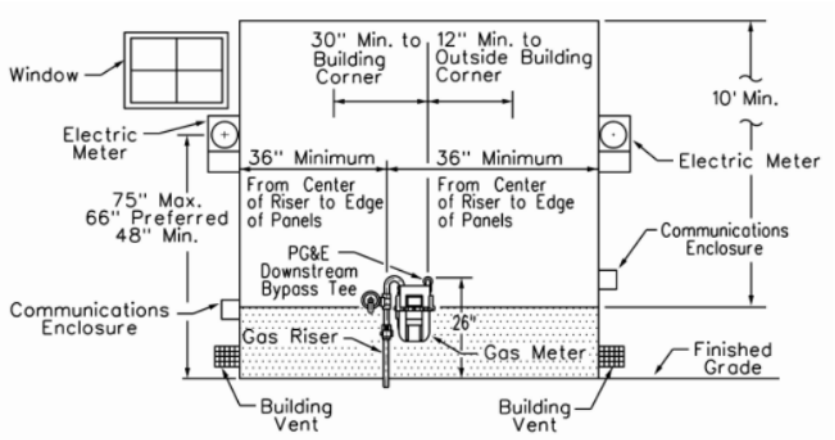
In this section, we will explore:

- Types of panels (old versus new)
- Strategies to extend the capacity past the first electrification event
- Understanding a full panel versus a panel at capacity



Check Gas Meter Location Before Recommending Higher Amp Panel

- Higher amperage upgrade = >36 inches from the gas meter
- Higher capacity panels with (a) the same amperage (b) in the same location are usually ok
- Moving the panel could cost twice as much
  - Panel change → $2,500 to $3,500
  - Panel move → $5,000 to $7,000 – much more for bottom feed
- Use systems with as little breaker space as necessary

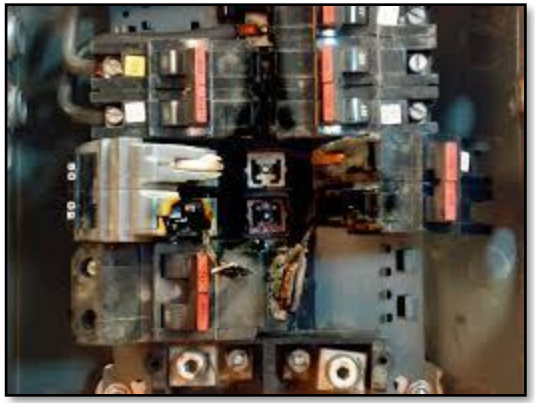


Electrical Panels: Old School Overview

- Most panels have room if the load is small enough
- Be careful adding to old panels! Be on the lookout for Zinsco, FPE Stab-Lok, Pushmatic

Zinsco

FPE Stab-Lok



Pushmatic

Zinsco

- Breakers can arc and damage buss bar
- OEM breakers are no longer made - some retro plug-ins are available and are okay to use
- When installing a new load, make sure bus bar is not arced
- Check all of the breaker connections to buss bar, if possible
- Check tightness of all wires
- Always recommend new panel if buss bar is damaged

FPE Stab-Lok

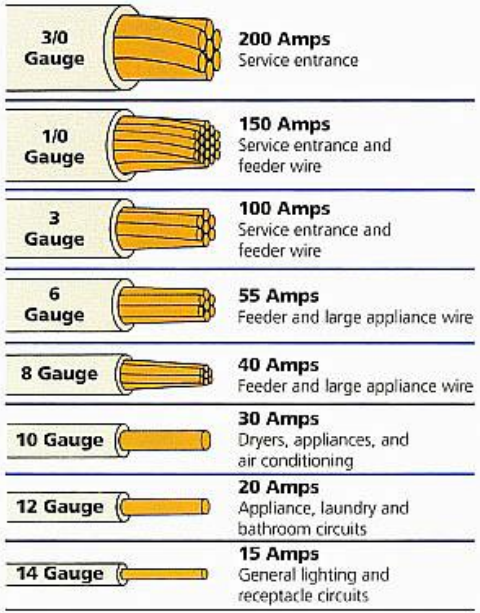
- Connection points small and tight tend to heat up and arc at bus bar
- Some small panels have only 2-230 volt slots
- Only reconditioned, used or knock-off breakers available
- Consider a sub panel before re-arranging a Stab Loc panel

Pushmatic By ITE

- Systems are rare
- Circuit breakers are hard to find
- Dangerous to change breaker without turning off main
- Breakers are secured on the bus bar with a screw

Consider a Sub Panel When Adding Loads if Space is Tight

- Always follow electric code and use a licensed electrician if you are unsure
- Make sure circuit amperages never exceed wire size
- Never feed a sub with less than an #8
- If there is limited space on the main, but load is not exceeded stretch with a quad to a subpanel

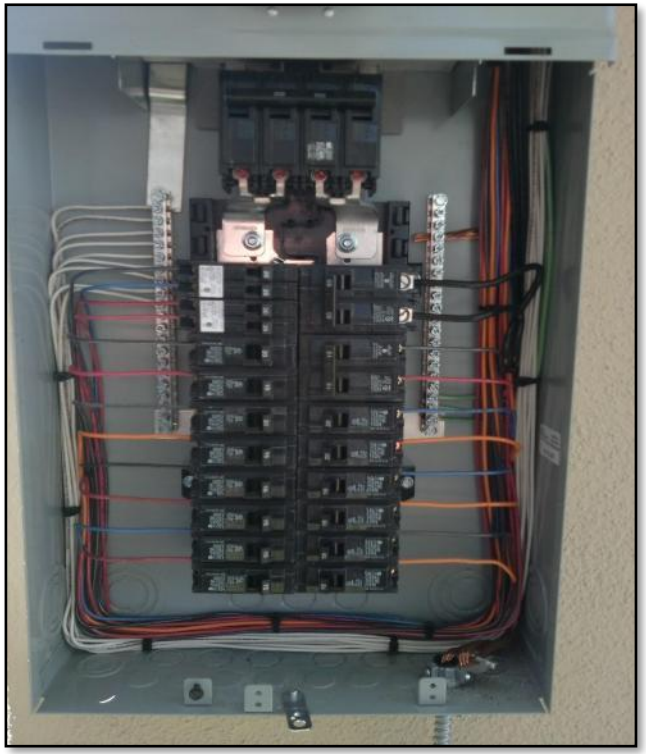


ELECTRIFY MY HOME

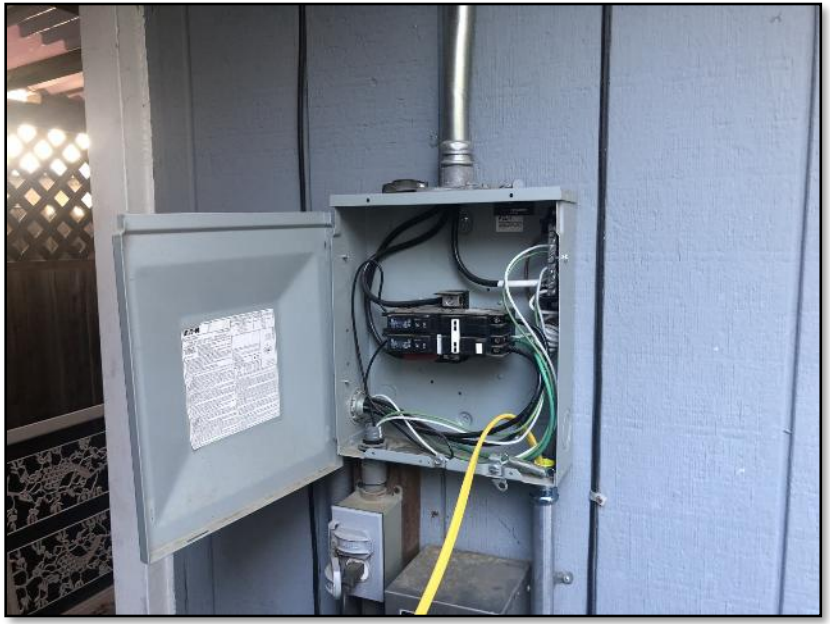
Since I Know We're Presenting to HVAC Guys

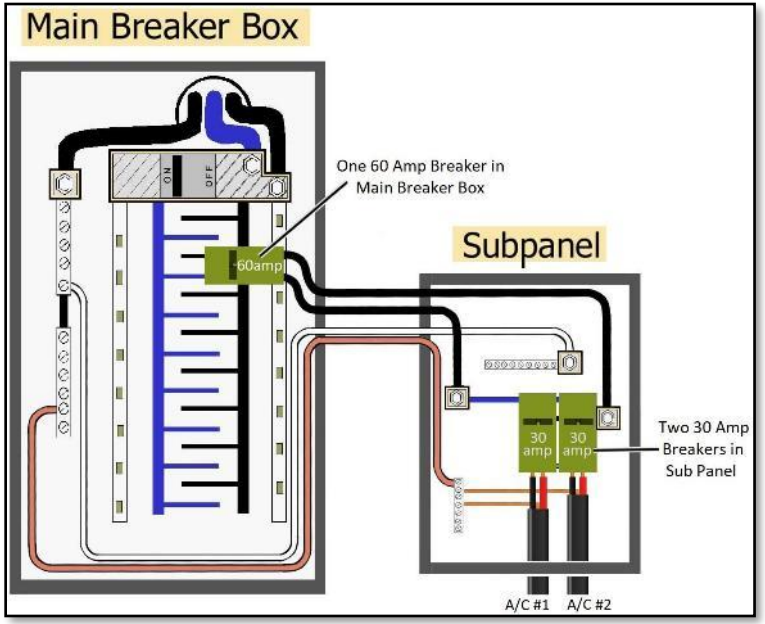
Panel is Full? “No Space” but *Not* at Capacity

- Good example of panel that can be expanded by
- Replacing wide 15 and 20’s with 2 pole or quad



An Example of How We Get There

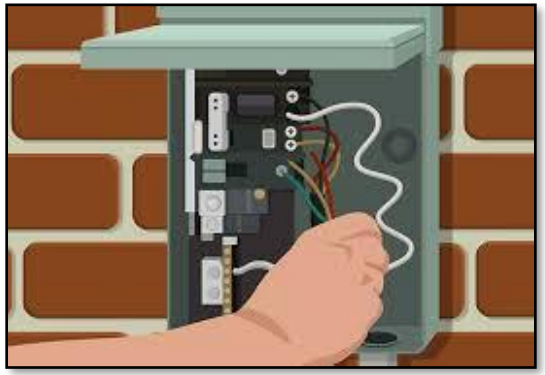




“Good Electrification” – Reusing an A/C Circuit

- Existing A/C circuit, system is now downsized, so you can add additional loads
- 50 amp wire 2 circuits
- Mini split platform inverter 1- 2 pole breaker to run the entire system
- “Smart splitters” to stretch load capacity

Safety First; Be sure breaker is OFF!

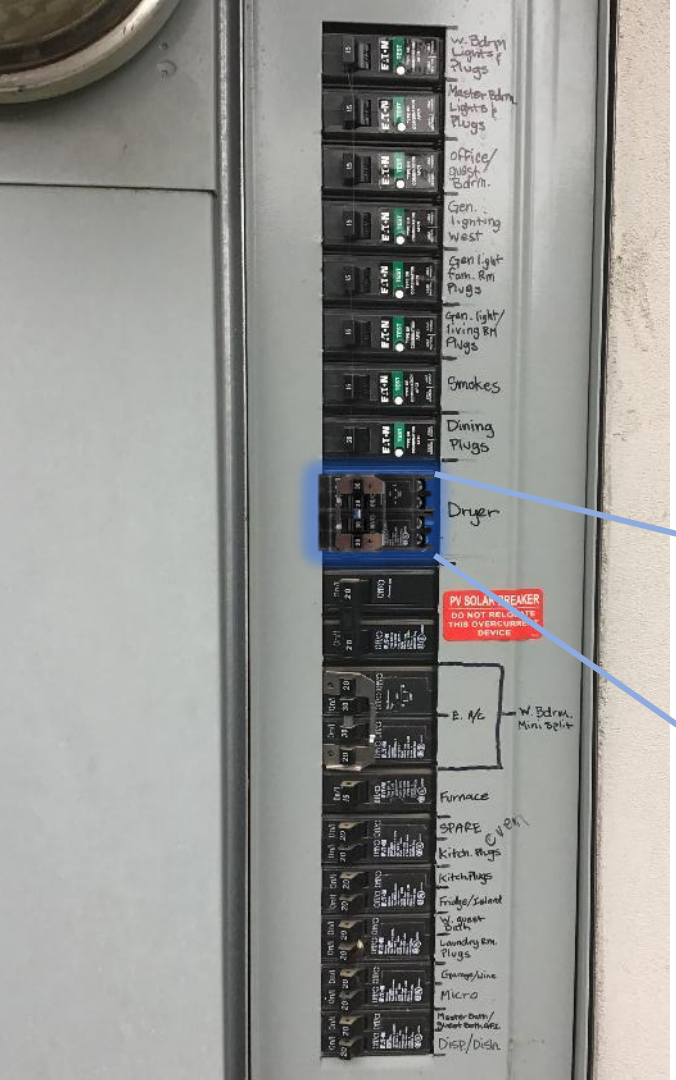


ELECTRIFY MY HOME

Knob and Tube (K&T) Wiring

- K&T wiring can be safe but it's a good idea to replace if the customer has the means
- Commonly used in North America from ~1880 to the 1930s
- When K&T is present, there's no grounding in the circuits
- If you see splices in the K&T, it should be examined by an electrician
- If the knob and tube wiring is easily accessible within the attic space, it should be replaced
- Never blow insulation over knob and tube wiring without first having it inspected (my recommendation is just never do it)

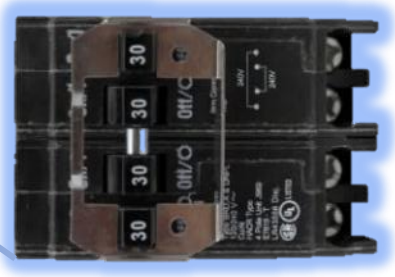
ELECTRIFY MY HOME



Summary: Solutions to “Full” Panels

Task: Add a HPWH Circuit

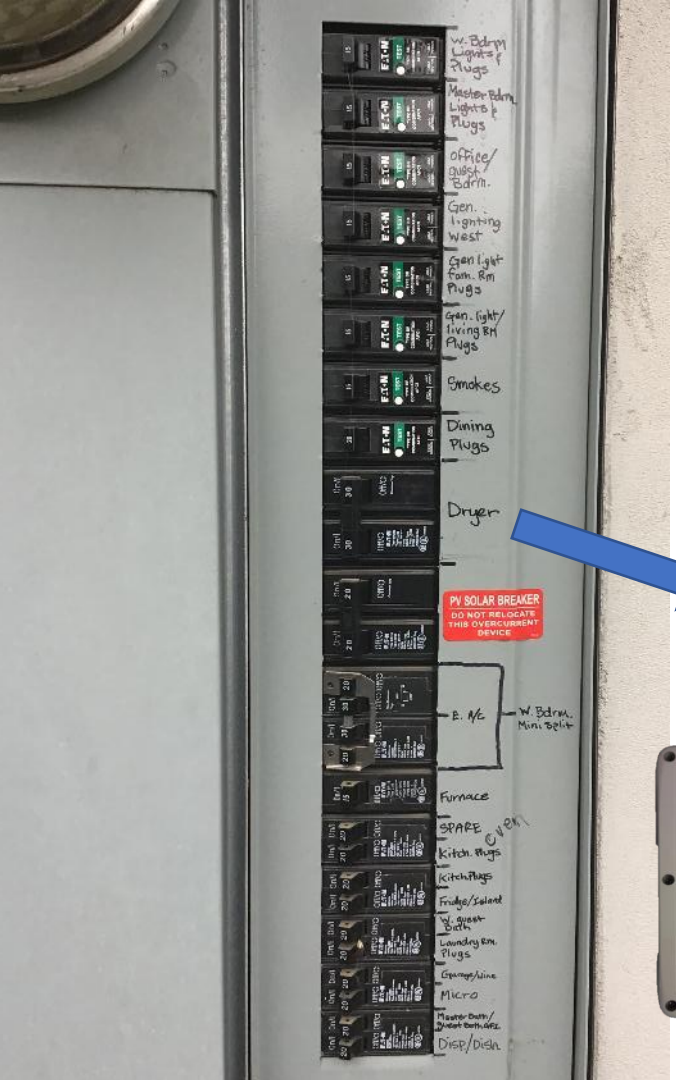
- Option 1: Quad it out!



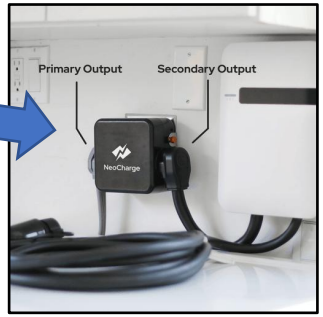
Summary:
Solutions to “Full” Panels

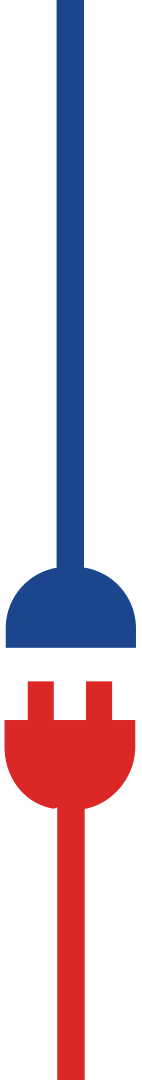
Task: Add a HPWH Circuit

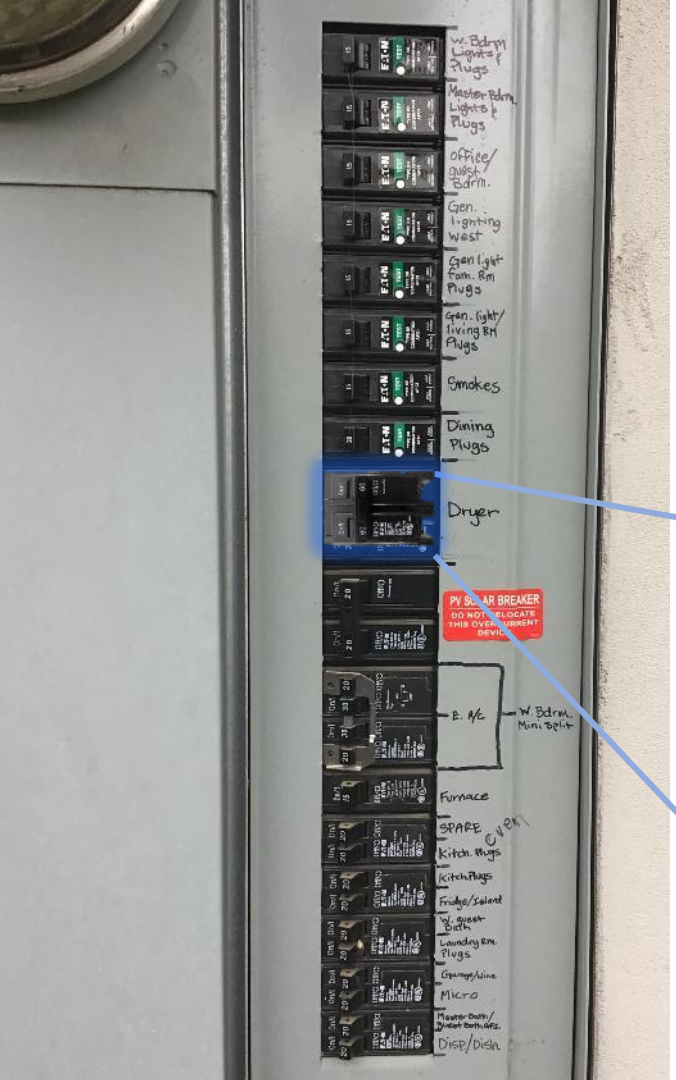
- Option 2: Circuit Splitter!



+







Summary: Solutions to “Full” Panels

Task: Add a HPWH Circuit & a Couple More

- Option 3: Add a Subpanel

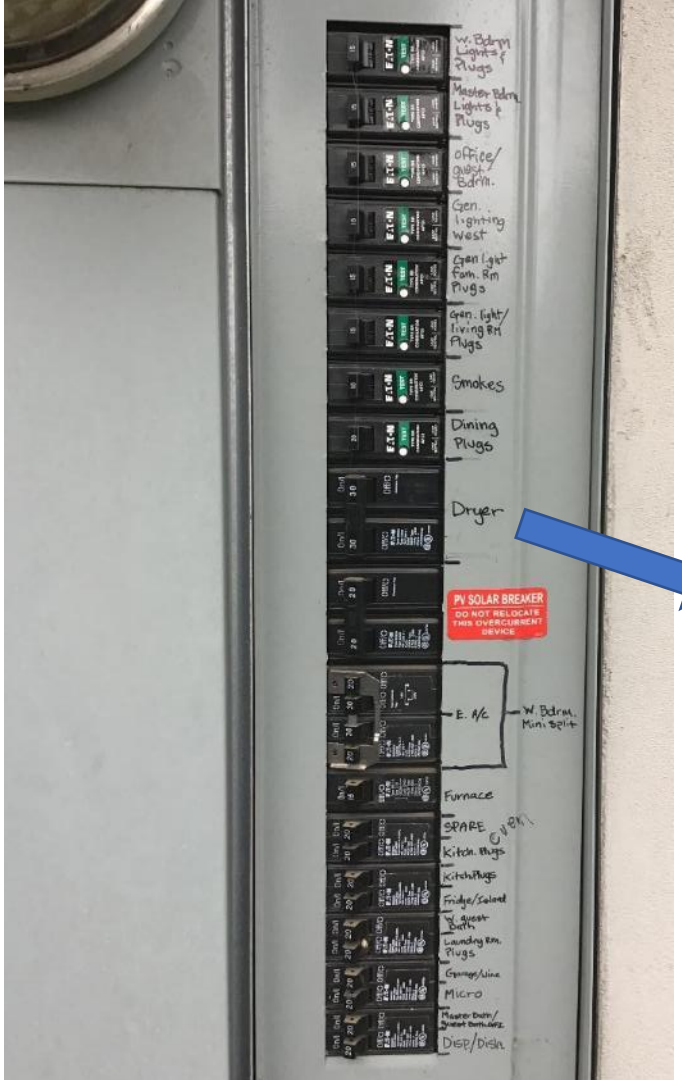
- Tip – add the neutral!

ELECTRIFY MY HOME

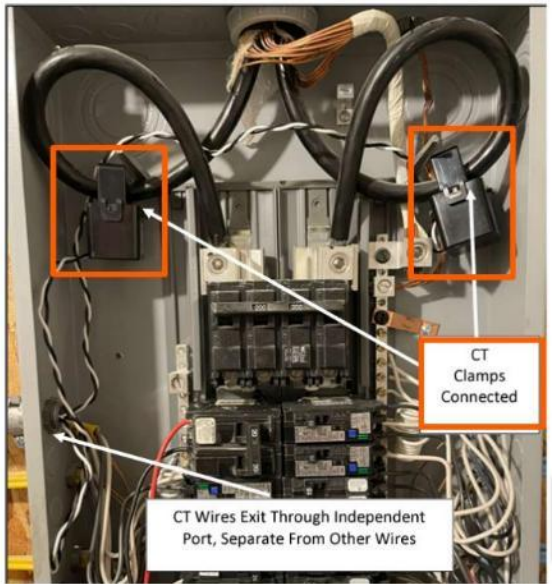
Solutions to “Full” Panels

Task: Add a HPWH Circuit

- Option 4: Circuit Pausing!



+



Summary:
Solutions to “Full” Panels

Task: Add a HPWH Circuit

(and much more)

- Option 5: Smart Panel

IMPORTANT: Knowing When to Call in Other Professionals

Electrical

- If you are unsure about how to expand the capacity of a panel
- If you need to run a sub panel that includes moving multiple wires out of the main panel
- Running large circuits to units or sub panels when you are not familiar with the process
- When you think the house needs a more comprehensive electrical upgrade like knob and tube

Home Performance

- When you see anything strange in the attic space like disconnected fans, missing flues, or signs of moisture, call someone who's BPI certified
- When you find insulation problems in the attic space that are above your understanding
- When the construction of the house leaves you wondering how you will approach electrification
- Call me, I'll walk you through it

ELECTRIFY MY HOME

Part 2, Quiz 4: Electrical Load Overview

1) What's the watt capacity of a 100 amp panel?

A. 12,000
B. 24,000
C. 18,500
D. 240

2) To calculate watts, what data is required?

A. Amps & volts
B. ohms
C. Clamp meter
D. Ohm meter

3) A 30 amp 2 pole breaker trips above how many watts?

A. 3,000
B. 2,300
C. 1,850
D. 7,200

4) 1500 watt @ 240 volts = what amps?

A. 6.25
B. 15.00
C. 24.50

5) What is added to a watt load for a kitchen plug?

A. 300
B. 2000
C. 1500

6) What watt is high speed on a good hair dryer?

A. 500
B. 1500
C. 1800

7) TRUE OR FALSE:

____ Electrical planning is part of heat pump design
____ Knob and tube must always be replaced in every scenario

ELECTRIFY
MY HOME

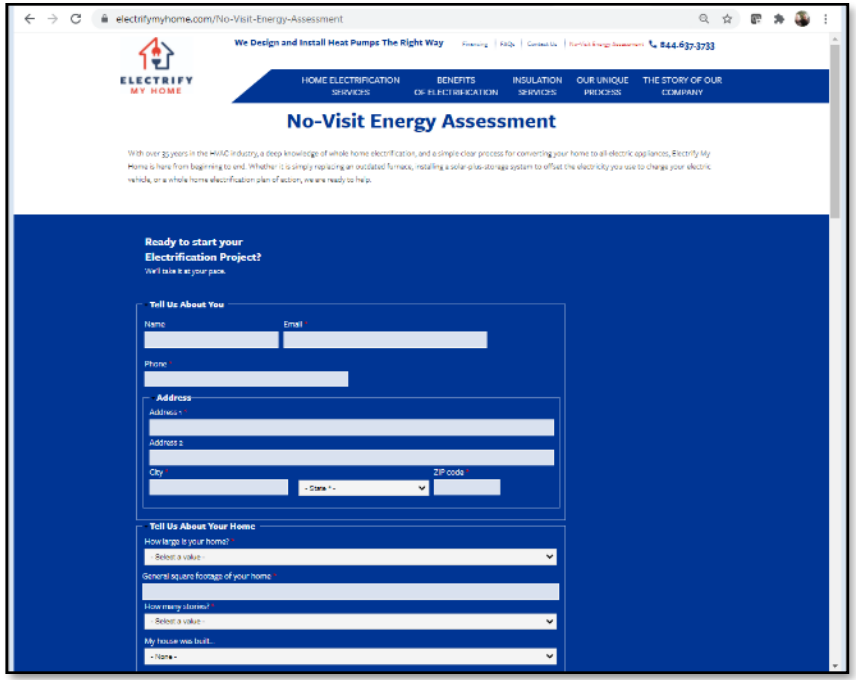
PROJECT PLANNING

- SEGMENT 4 -

Planning & Communicating the Project

The Electrification Roadmap:
Preparation, Expectations, and Execution

What is Your Company's Process for Sales? Site Visit?



We always start with virtual!

Planning the Project

- **Understand** options & mechanical abilities of products
- Conversation & **discovery** of customers needs
- Present solutions that **align** to customer's need
- **Be thorough,** as explained in the previous sections
- Find **deficiencies** in the existing installation and make notes that these must be taken care of
- Visually inspect the **insulation** to make sure that is up to par for a good thermal barrier
- Make note of the **register** locations and sizes.

ELECTRIFY MY HOME

Start Building Your Tool Box

- Scour the internet for **credible resources**
- Keep **template emails** of budget lay-out
- Capture **video** of your super-quiet operation systems to share with customers that are on the fence
- Put together **case studies**
- Install an **energy monitor** in your own home
- Document jobs that **did not go right** and how you fixed them

Image Source: https://bit.ly/3nWpyjM

Keep a Collection of Third-Party Articles

- HVAC and other **trade publications**
- Find videos from **reputable sources** that make your point, share links via email
- Put together a **one-pager email** to be sent to all prospective electrification customers explaining how and why you do it the way you do
- Feel free to use the **content in this training** as third-party material

Prepare Your Materials Before You Engage Your Customer

- Have equipment **catalogs** available and understand **how** the systems you sell can be installed
- You are welcome to use ElectrifyMyHome.com/resources
- Enlist your crew to **take pictures** of all your projects
- Get pictures of your systems installed in **various ways** so you can answer questions with examples
- Download the **submittal sheets** for the systems you are offering and send to your customer in the initial email

ELECTRIFY MY HOME

Set Expectations Early. Sell on the Differences as the New, Better Way

- Do not install without **setting expectations**
- Prep your customer for the way the **new system will work**
- I have a **checklist** that I use during virtual assessment before I am done with the call
- I make sure customer **understands** and has no more questions about sizing, run time, how inverter works, sound, registers, airflow
- Let the customer know to **contact the utility** and tell them they have switched to electric heat

What is Your Method of Communication with the Customer

- High-performance heat pump systems are not a **one-call-close** unless you've installed many and have process down
- I have found a **virtual-first** process works extremely well
- Give your customers the opportunity to **share details of their home**
    - Helps avoid wasting time with customers that have no intention of utilizing your services
- Offer rough budget numbers and **add-on options** for IAQ upgrades etc
- Add some **buffer** to your price; these jobs take a while when your first doing them

A Note on “Good Electrification” System Materials

- Get your **materials** cued up some of the stuff is not off-the-shelf
- Make sure to order **custom plenums**. Off-the-shelf are not made for these
- Draw **plenum patterns** on graph paper and keep in a file for next time you use that particular size unit
- Slim duct units **vary in size** between capacity
- I always have a return plenum that easily adapts to a **media filter** box
- Plan the project and layout understanding you need a **large return air**
- On low-static systems, use **square-to-round** transitions at supply plenum
- On a slim duct 12,000 BTU unit you can use 3 PH one, supply boxes 8 x 14 x 8 to give you three 8 in.

ELECTRIFY MY HOME

Part 2, Quiz 5: Customer Roadmap

1) Correctly identify the three steps in creating a home electrification roadmap

A. Preparation
B. Set expectations
C. Invest in more marketing
D. Execution – communication and system materials

2) Name 3 examples of resources you should have at-the-ready to send to customers

_____

_____

_____

ELECTRIFY
MY HOME

MASTER THE VERNACULAR

- SEGMENT 5 -

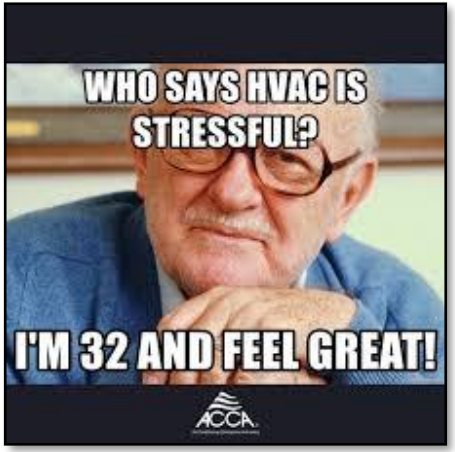
Master The Vernacular

INDUSTRY JARGON

{noun}

[in-duh-stree, jahr-gon]

Words or phrases used by people in specific professions to confuse those people not in the same profession.



ELECTRIFY MY HOME

Basement BTU's Low end Modulation rate

- The low-end modulation point for a inverter mini split. This number varies from system to system
- When installing a mini split with multiple heads, your basement BTU should be lower than the smallest single head
- Consider if your smallest head is 9,000 BTUs and the basement is 12,000 BTUs
  - When that Zone runs by itself, it will never be able to modulate down below its highest rating
- Indoor unit is less than the basement, BTU the capacity will bleed over

Blower Door Test

A blower door is used to:

- Measure a building's airtightness or air infiltration rate
- Locate air leakage paths
- Measure results of air sealing work

A blower door has a powerful fan that mounts into the frame of an exterior door. The fan moves air in or out of the house, changing the air pressure inside to exacerbate air leaks through cracks and other openings.

Building Decarbonization Coalition

- A coalition of industry professionals, experts, and insiders devoted to advancing California's climate initiatives towards building decarbonization

- Established in 2017 by Panama Bartholomy, a noted energy industry expert

Panama Bartholomy

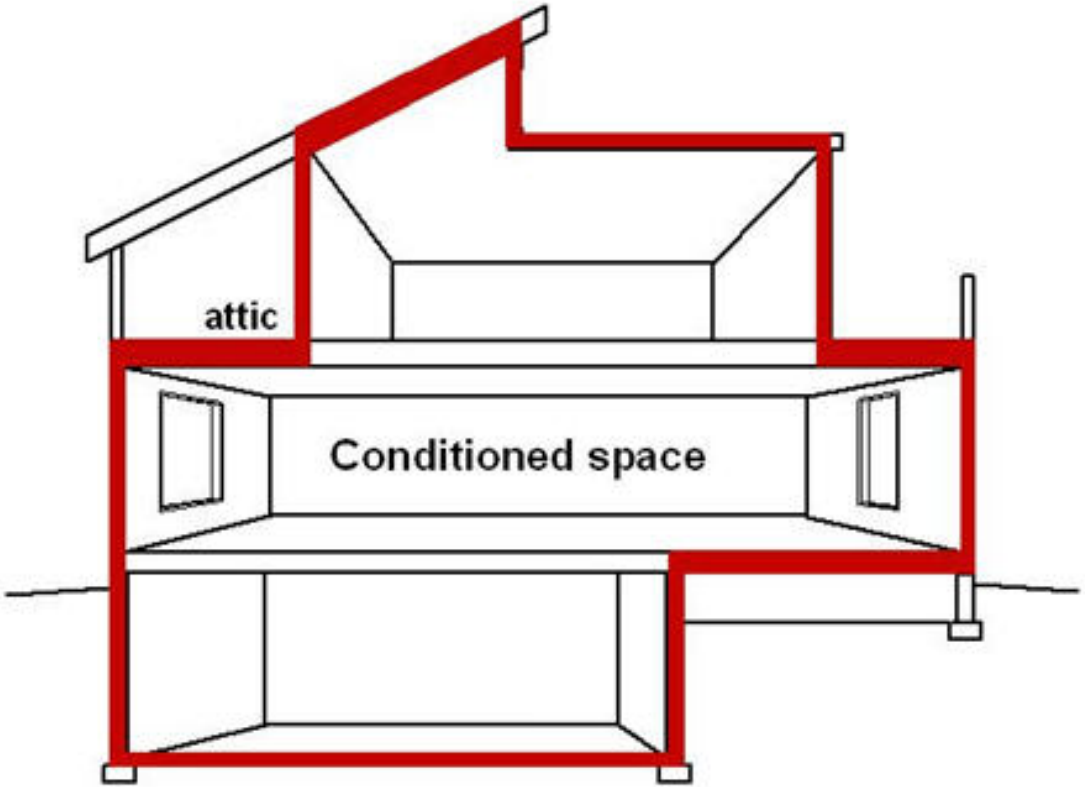
Coalition founder, visionary, and all around great Guy

BPI: Building Performance Institute

- BPI Certified Professionals solve home and building owners' trickiest problems. BPI offers certifications, standards, and programs
- BPI helps you develop your professional proficiencies and shape, or nurture, your career. For business owners, BPI enhances your offerings to meet the *real* needs of homeowners
- BPI is *the* source for certified contractors working on home energy efficiency, comfort, durability, health, and safety
- There are currently just 503 active bpi certified individuals in California.

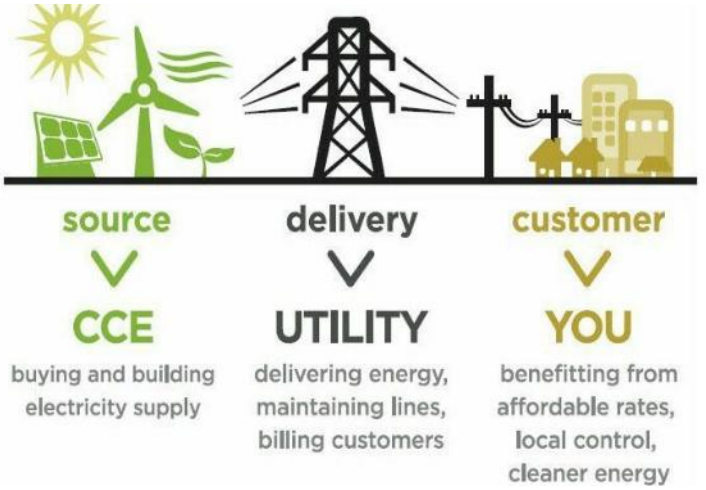
Building Envelope (or Enclosure)

- The assembly of elements comprising the exterior shell of a building, including walls, roof, foundation, windows, and doors



CCA: Community Choice Aggregation (or Aggregator)

- Community Choice Aggregators are local entities who choose and contract power generation resources on behalf of their customers in their communities. CCAs typically seek every opportunity to procure power through clean sources like wind and solar.
- Examples of the 24+ CCAs: Marin Clean Energy, Silicon Valley Clean Energy, Sonoma Clean Power, East Bay Clean Energy. Just to name a few.



CEC: California Energy Commission

- As the State's primary energy policy and planning agency, the CEC plays a critical role in creating the energy system of the future - one that is **clean**, is **modern**, and ensures that the fifth largest economy in the world **continues to thrive**.

CFM: Cubic feet per minute

- This measurement indicates how many cubic feet of air pass by a stationary point in one minute
- The higher the number, the more air is being moved - e.g., through the ductwork

California Public Utilities Commission

CPUC: California Public Utilities Commission

- The State government agency that regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies
- The CPUC also regulates ratepayer-funded energy efficiency programs

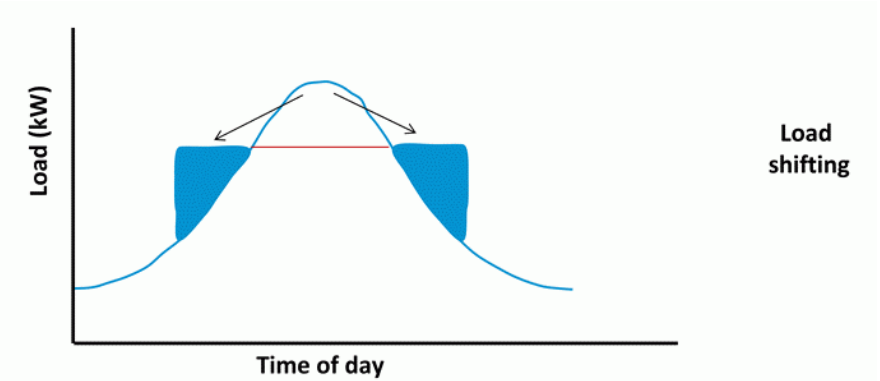
Cohort Program

As it pertains to **Tech Clean California** and **Electrify My Home:**

- A 3-month ongoing training opportunity at **no cost** to you or your company
- Weekly 2-3 hour learning calls where **we will help you** work through your Electrification projects.
- On-site company visits, installer, tech and sales **training**
- 3 months **support**
- Tech Clean California wants you to **succeed**

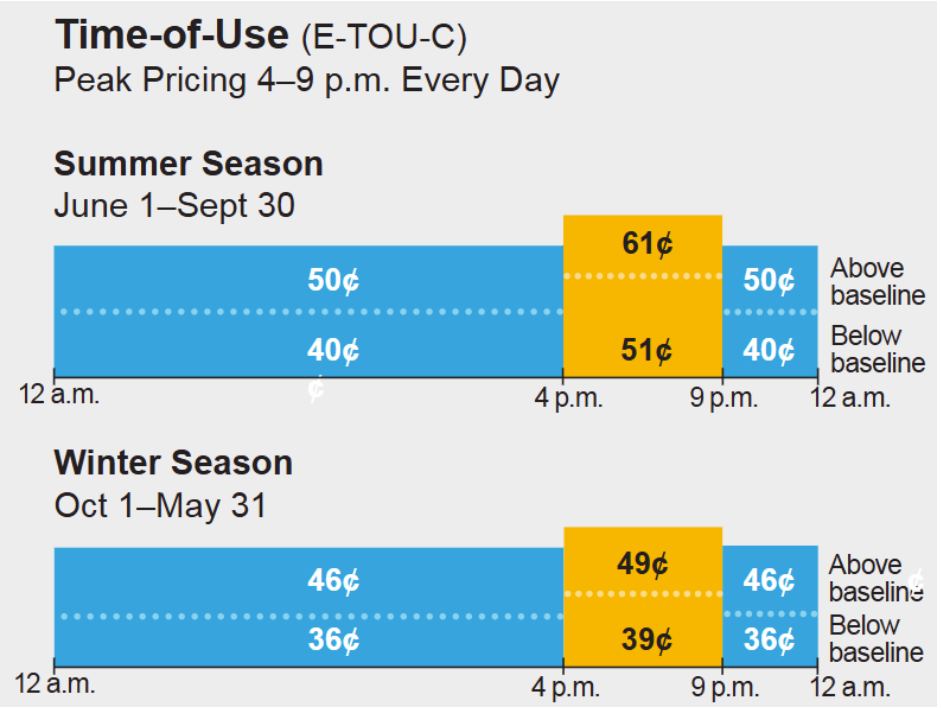
Load Shifting

- Changing the timing of electricity use in order to take advantage of cheaper, cleaner electricity
- And/or to avoid needing to operate traditional inefficient fossil fuel peaker electricity generation plants that turn on when electricity demand is high



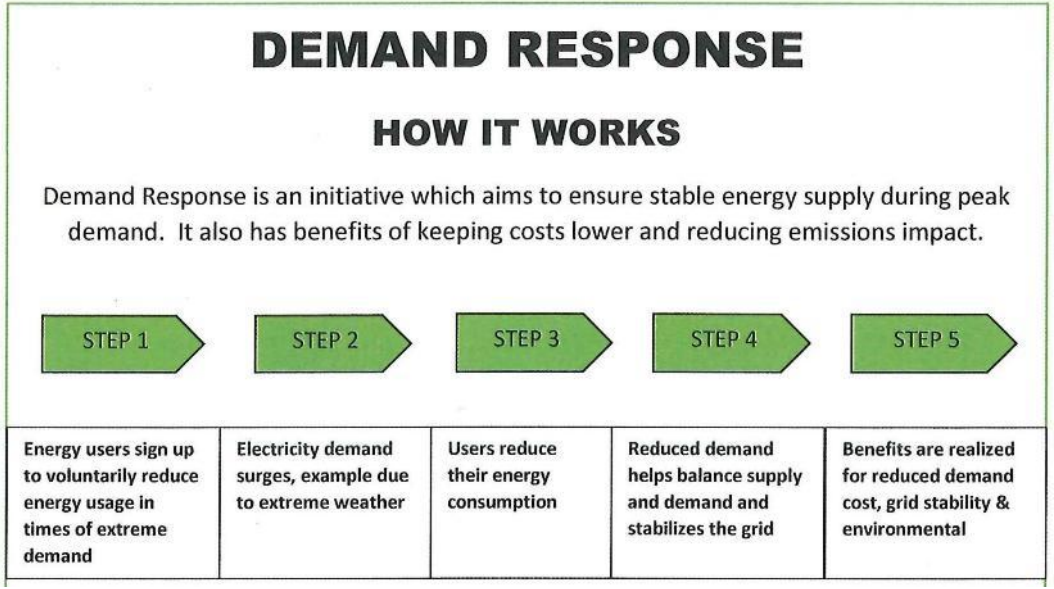
Time of Use (TOU) Rate

- TOU is a common time-varying rate for California customers and customers around the country
- Many California residential customers have been defaulted to a TOU rate or will be soon
- Residents on a TOU rate pay lower prices for electricity around the clock except during the evening (such as 4-9pm) when prices are higher and energy is from primarily non-renewable generation



Demand Response

- Change in electricity consumption in response to price signals or specific requests of a Utility [LBNL GEBs Glossary]
- With proper controls and program enrollment, can maximize savings and be rewarded with cash payments



Envelope as a Battery

- An inverter trickle-charges the house like a battery
- Longer run-times means the whole house gets up the temperature
- Unit slows way down and adds to the house as mother nature takes away

ELECTRIFY MY HOME

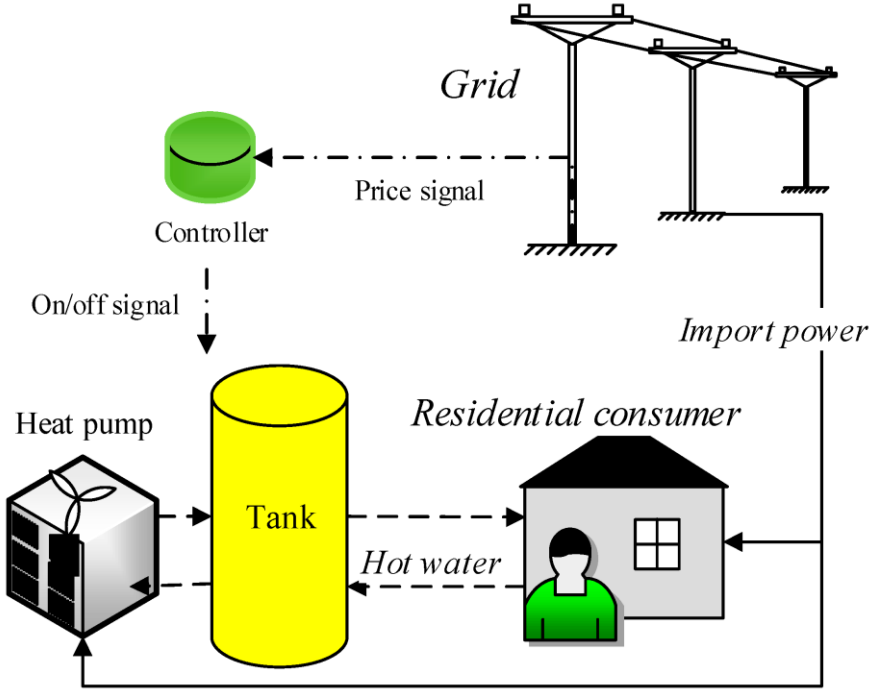
Flaring tool

- A specific tool designed to create conical connection points on metal tubing used with a flaring nut, the flaring tool must be the correct type for R410 refrigerant and system type
- Traditional flaring tools are not suitable for Mini Split systems
- Several companies make a battery-powered flaring tool that saves hours at the job sites

ELECTRIFY MY HOME

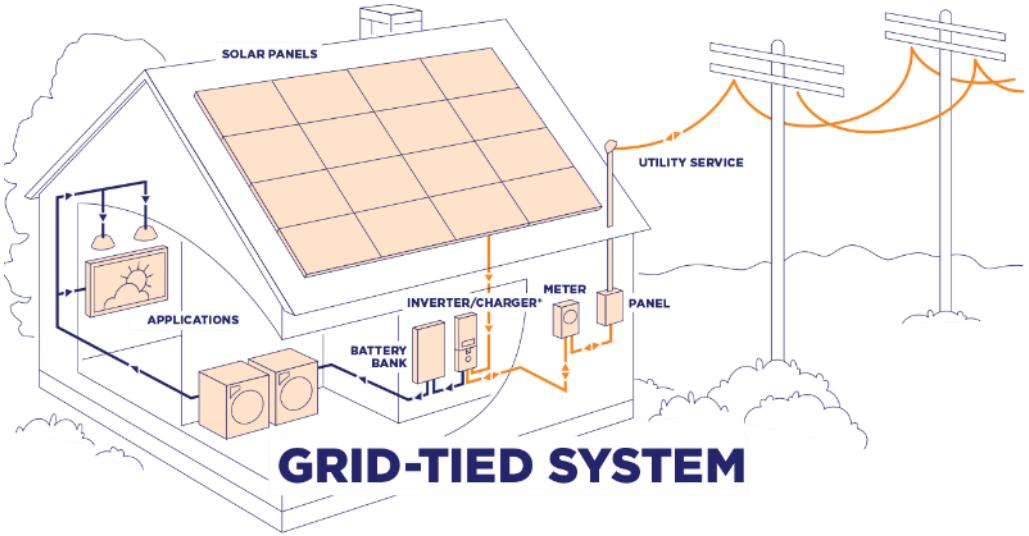
Grid-Connectivity

- Smart appliances such as a HPWHs set up to respond to operational signals
- Utility DR program sends signals to cycle a HPWH to increase grid resiliency
- AKA grid-interactive appliances
- Grid-interactive appliances provide demand flexibility to the grid



Grid-Tied

- A grid-tied system is the most common and least expensive of all residential solar systems
- It allows you to use your own solar-generated electricity to save energy and reduce costs
- The power you do not use goes back into the grid to help power your neighbors' homes
- At times when the solar system isn't producing, electricity is provided by the utility company's grid



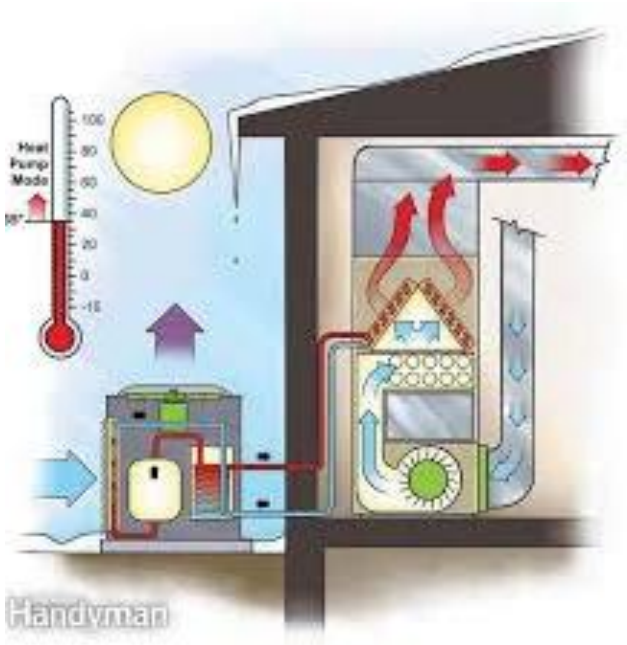
Dual Fuel (Hybrid) System

The MFG definition:

- "A comfort system that pairs an electric heat pump with a gas furnace, providing an energy-efficient alternative to the conventional furnace/air conditioner combination"

My definition:

- An impressive-sounding solution from the 90's to sell an unsuspecting ratepayer a albatross of discomfort
- Something unnecessary in most California climate zones
- A great way for a technician to say he sold a heat pump but without the requisite design, research, or homework
- Often sold by technicians that don't have the confidence or knowledge to design a high performance system



Furnace Backup/Resistance Backup

- When it might make sense: customer has a new furnace. Or in mountain climate zone.
- Check with manufacturers for coil matchups/compatibility.
- Setup: make sure to prioritize heat pump operation whenever possible.
- Balance point: temperature where heat pump capacity can no longer keep up with demand, requiring gas furnace to take over. To calculate, plot the 17°F and 47°F capacities from AHRI/data sheet.

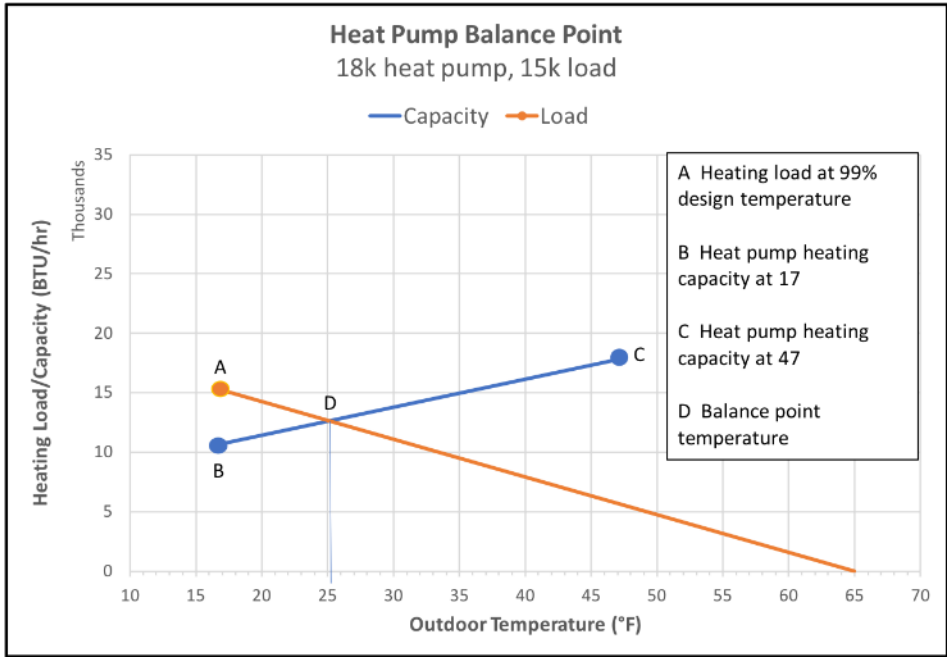
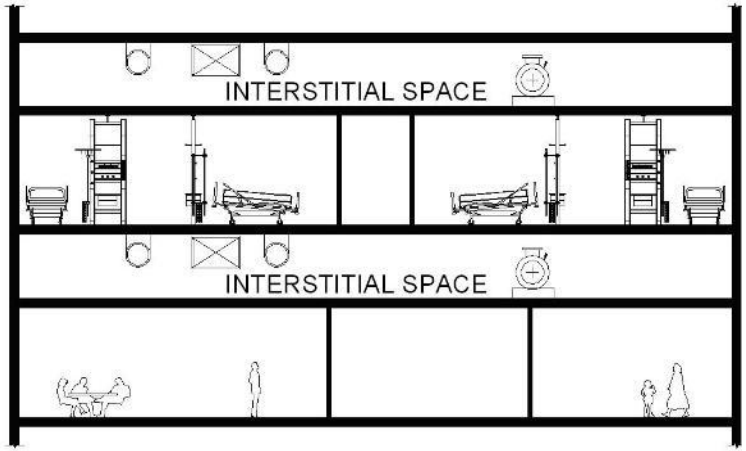


Image Source: https://www.energyvanguard.com/blog/simple-way-calculate-heat-pump-balance-point/



Interstitial Wall Cavity

- A framing cavity between unconditioned space and conditioned space, e.g., a duct chase adjoining an attic
- Interstitial wall cavities allow unconditioned air to influence the thermal performance of the building envelope

Solar Inverter

- The device that takes the DC power created by solar panels and inverts it to AC power to be used in your home

Thermal Equilibrium

- The point at which your home reaches saturation temperature and the modulating system starts slowing down

Tempering

- When the heat pump is working to steadily get the house up to temperature

Thermostatic Mixing Valve (TMV)

- A TMV is a device installed within a plumbing system that mixes hot and cold water to ensure consistent hot water temperature output
- TMVs are sometimes specified in codes and standards to prevent scalding
- For the purposes of demand response programs, TMVs allow tanks to store energy in the tank (with hotter-than-normal setpoints) without any discernable changes to the water temperature to the user

ELECTRIFY MY HOME

Questions?

Turn it on. Relax. We've got you covered.

Larry Waters

401 Railroad Ave
Suisun City, CA 94585

707-840-3411
www.electrifymyhome.com
larry.waters@electrifymyhome.com
info@electrifymyhome.com