We will be starting soon!

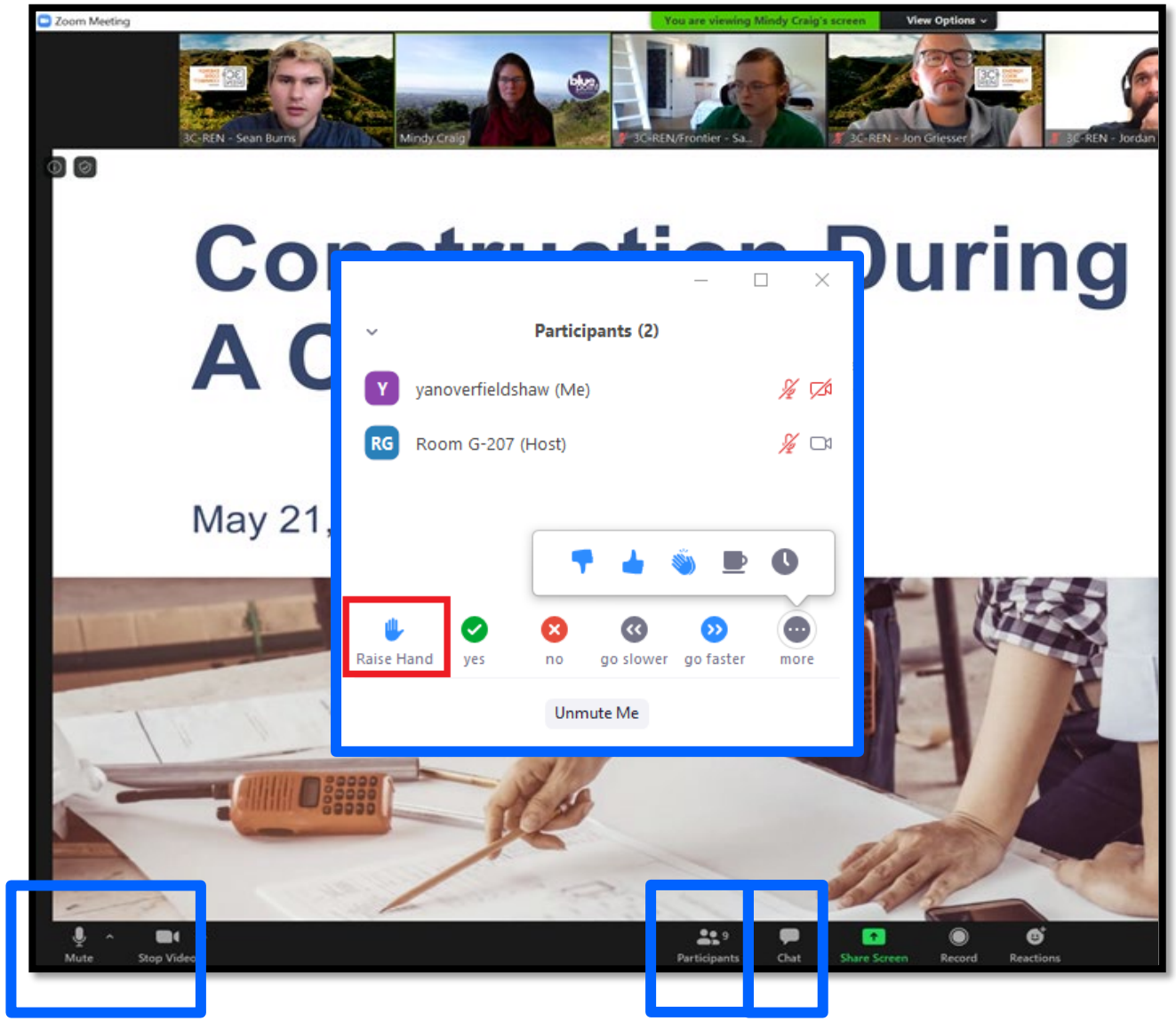
Thanks for joining us

Modeling All-Electric Homes in the 2022 Energy Code

Nick Brown – Build Smart Group

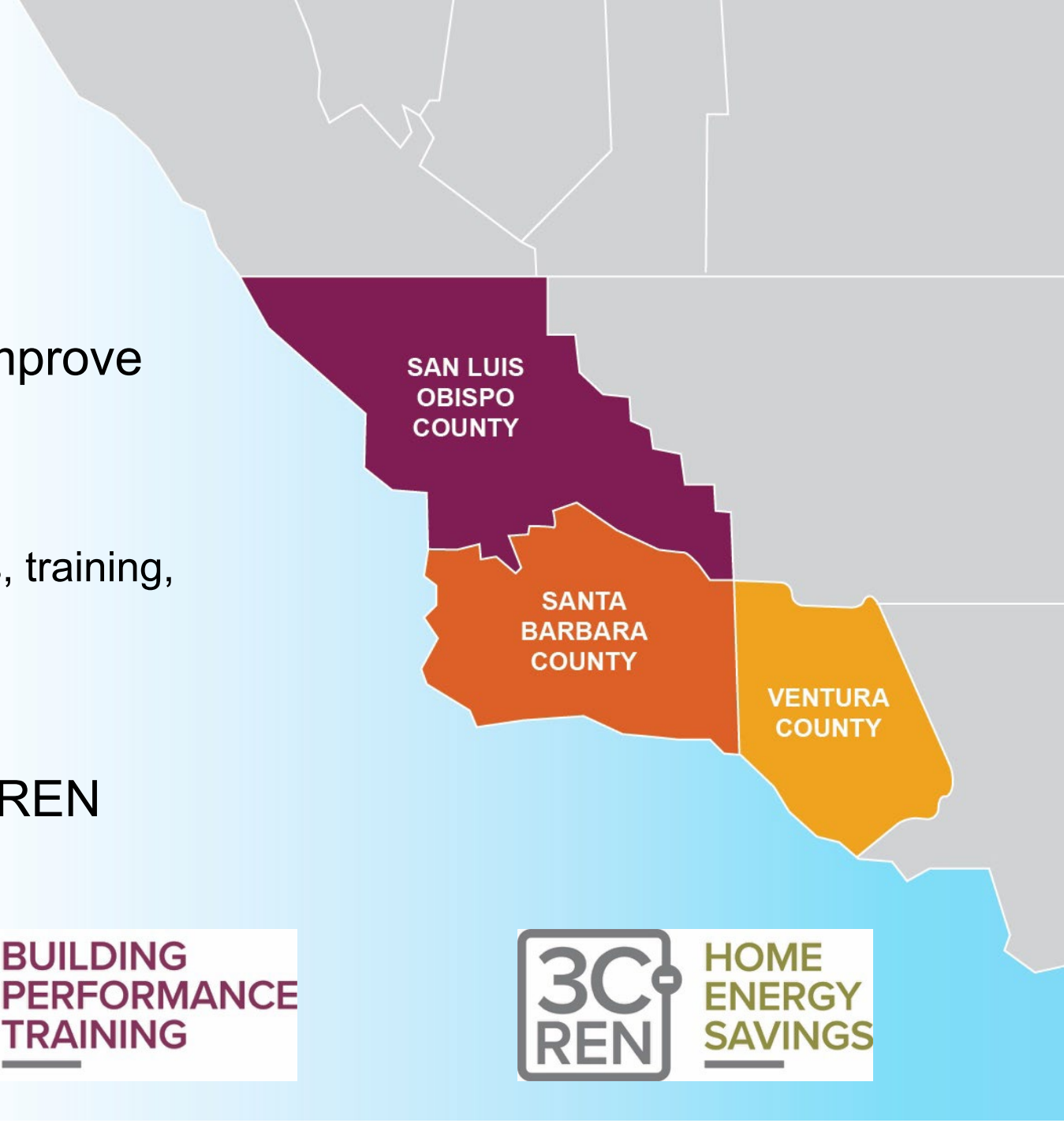
October 24, 2023

- Please be sure your full name is displayed
- Please mute upon joining
- Use "Chat“ box to share questions or comments
- Under "Participant" select "Raise Hand" to share a question or comment verbally
- The session may be recorded and posted to 3C-REN's on-demand page. Feel free to ask questions via the chat and keep video off if you want to remain anonymous in the recording.



3C-REN: Tri-County Regional Energy Network

- Three counties working together to improve energy efficiency in the region
- Services for –
  - **Building Professionals:** industry events, training, and energy code compliance support
  - **Households:** free and discounted home upgrades
- Funded by ratepayer dollars that 3C-REN returns to the region



3C REN ENERGY CODE CONNECT

3C REN BUILDING PERFORMANCE TRAINING

3C REN HOME ENERGY SAVINGS

3C REN ENERGY CODE CONNECT

- Serves all building professionals
- Three services –
  - **Energy Code Coach**
  - **Training and Support**
  - **Regional Forums**
- Makes the Energy Code easy to follow

Energy Code Coach:
3c-ren.org/codes
805.781.1201

Event Registration:
3c-ren.org/events

BUILDING PERFORMANCE TRAINING

- Serves current and prospective building professionals
- Expert instruction:
  - **Technical skills**
  - **Soft skills**
- Helps workers to thrive in an evolving industry

Event Registration:
3c-ren.org/events

3C REN HOME ENERGY SAVINGS

Multifamily (5+ units)

- No cost technical assistance
- Rebates up to $750/apartment plus additional rebates for specialty measures like heat pumps

Single Family (up to 4 units)

- Sign up to participate!
- Get paid for the metered energy savings of your customers

Enrollment:
3C-REN.org/contractor-participation

Modeling All-Electric Homes in the 2022 Code

October 24, 2023

How to model an all-electric home that is: healthier, safer and more affordable, efficient, comfortable, and resilient

Please sign into the chat and tell us where you are from and what you would like to learn today!

NICK BROWN

President
Build Smart Group
Long Beach

BUILD SMART

OUR TIME TOGETHER

Why Electric Homes are Important

Lower GHG Emissions & Utility Costs, Incentives

Energy Code Requirements that Encourage Electrification

Electric Ready, PV, Ventilation Requirements, VCHP & HPWH Compliance Credit

How to Model All-Electric

In EnergyPro & CBECC-Res

How All-Electric Performs vs Gas

Compliance Comparisons in New Construction SF & MF, SF Alteration Projects

Lessons from the Field

Smooth HERS Verification Process, Installation of HPWH, Electrical Panel Space

Why All-Electric Homes are Important

ECONOMIC REPORT OF THE PRESIDENT

TRANSMITTED TO CONGRESS | APRIL 2022

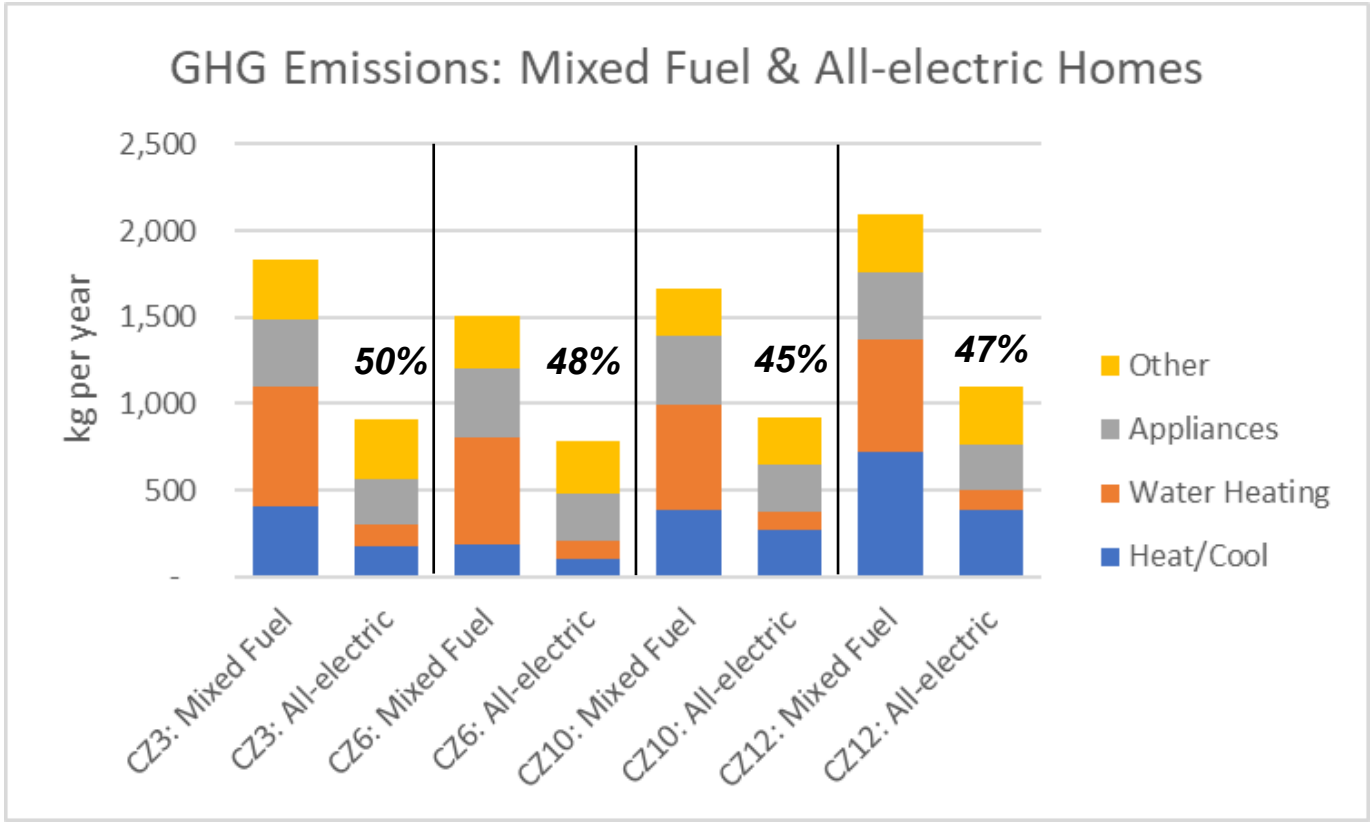
TOGETHER WITH THE ANNUAL REPORT
OF THE COUNCIL OF ECONOMIC ADVISERS

Chapter 7

Accelerating and Smoothing the Clean Energy Transition

Completing this transition by mid-century would constitute a transformation of the energy system at a pace without precedent, and mark a giant achievement in human history, given the scale of the avoided damage to current and future generations

All-Electric Designs Reduce GHG Emissions ~50%



Source: CBECC-RES 2022 modeling of new 1751 sqft home with standard efficiency gas furnace/heat pump; gas tankless/heat pump water heater; gas & electric appliances

Utility Bills Better All-Electric

	Standard PV			Add 1 PV Panel	% Savings Over Conventional with Standard PV
Conventional Gas/Electric	Gas $452	Electric $169	Total $621	Total $607	0
Conventional Heat Pump	Gas $276	Electric $444	Total $720	Total $583	9%
VCHP, High Efficiency, T24	Gas $276	Electric $306	Total $582	Total $445	28%

- Modeling parameters:
- Conventional Gas/Electric: 14.3 SEER2, 80 AFUE, ducts in attic
- Conventional Heat Pump: 14.3 SEER2, 7.5 HSPF2, ducts in attic
- VCHP High Efficiency Under Title 24: same as conventional HP with 5% cooling and 12% heating savings and ducts in conditioned space

- Data based on study completed by Nick Brown of Build Smart Group in 2020 using CBECC-RES modeling software to compare energy costs for a 2-story home in Climate Zone 10 under SCE rates.

California Has Strong Climate Commitment

- 40% GHG reduction by 2030

SB 32 (2016)

Electric sector:
- 60% renewables by 2030
- 100% carbon-free by 2045

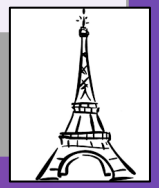
SB 100 (2018)

- Carbon neutrality by 2045

Gov. Exec Order (2018)

- 26% GHG reduction by 2025
- 1.5 deg C goal

PARIS (2016)



- 40% GHG reductions <u>in buildings</u> by 2030

AB 3232

- $200M/4yrs incentives for building decarb
- TECH/BUILD

SB 1477

- No ICE Car Sales by 2035

Gov. Exec Order (2020)

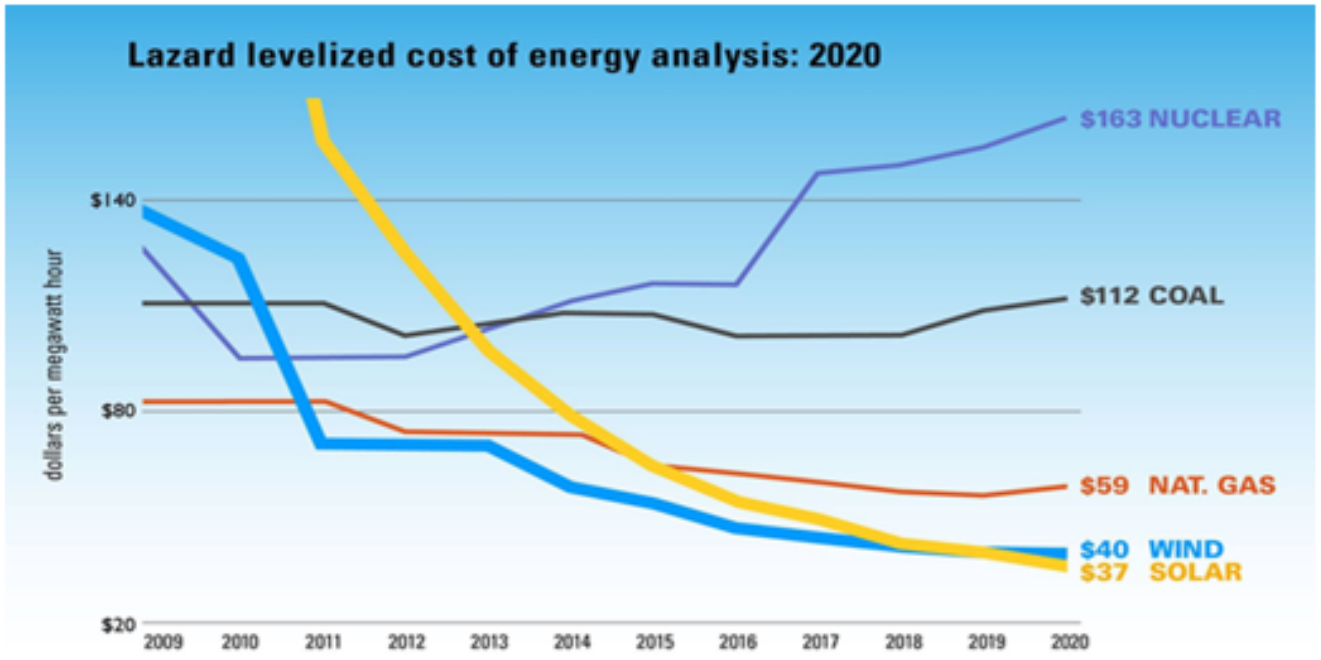
Defense Production Act
- Accelerate Clean Energy technologies

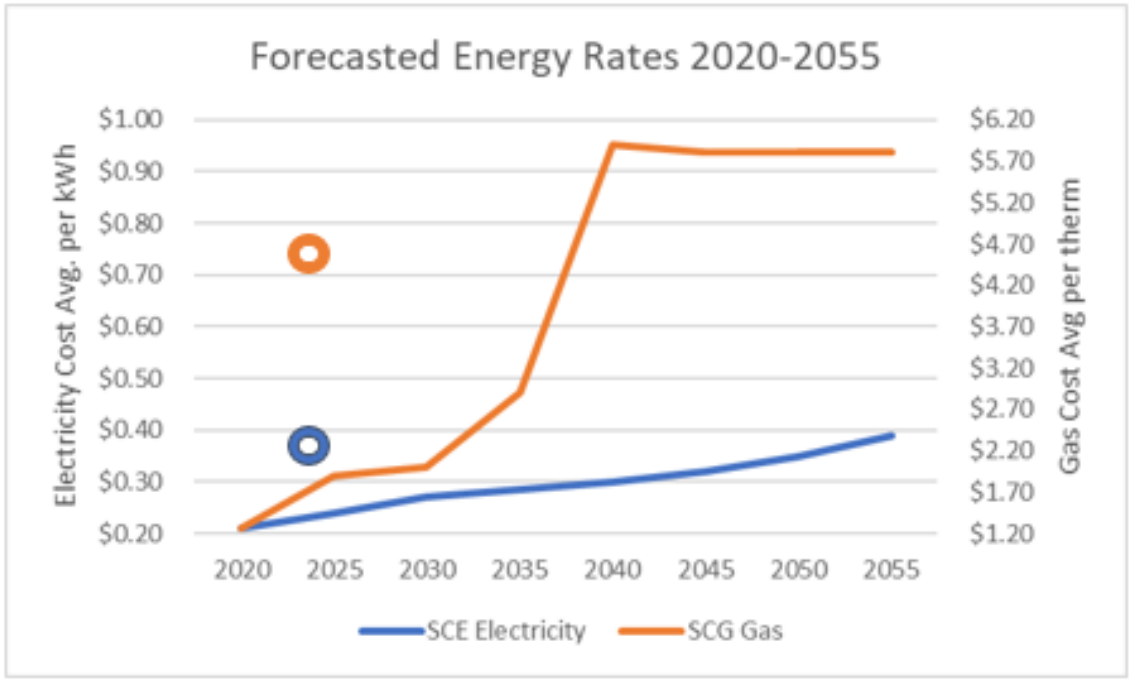
Executive Order (2022)

$369b Inflation Reduction Act
- 40% GHG reductions by 2030

U.S. Congress (2022)

It Works and is Less Expensive



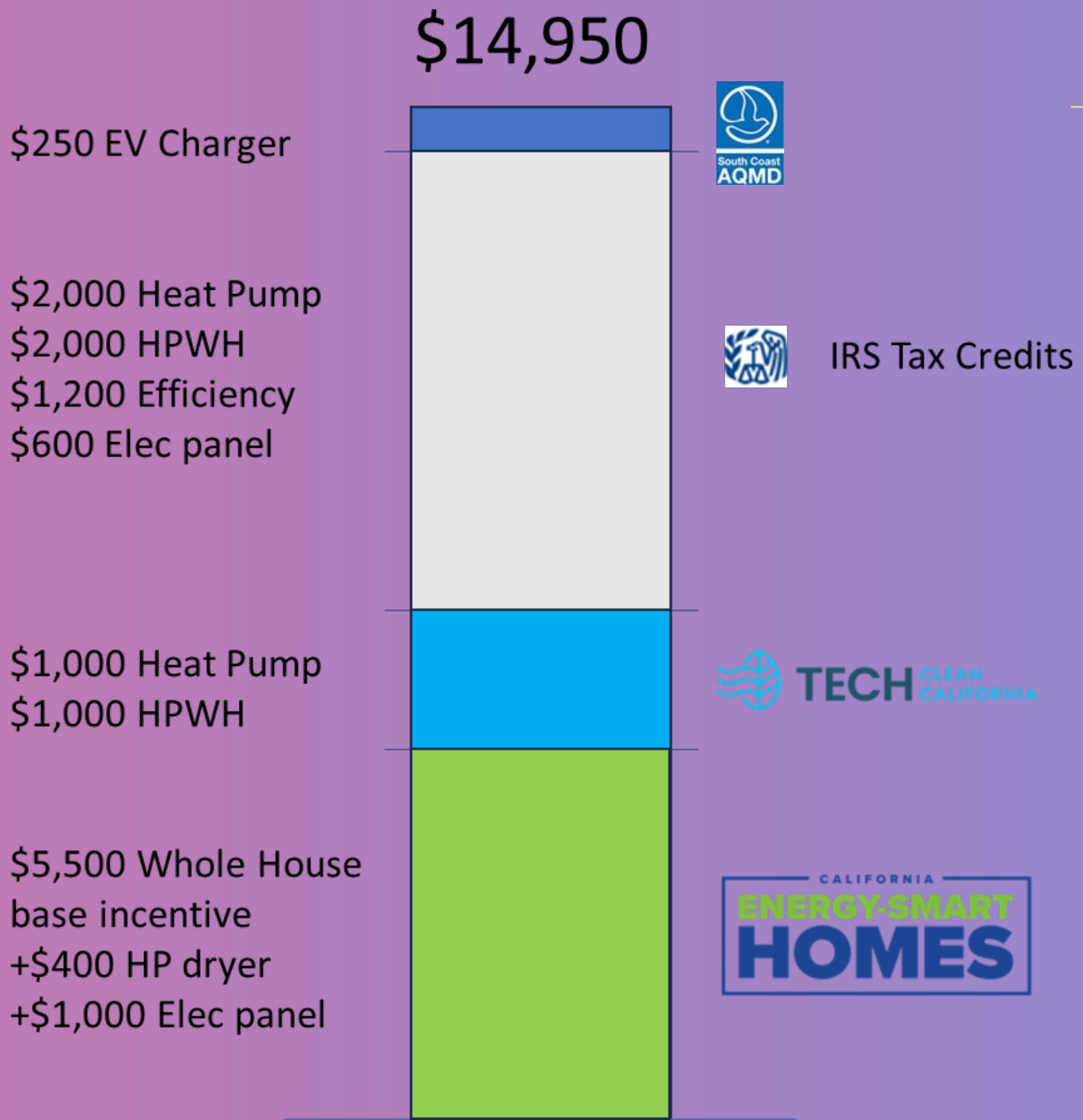


Source: 2021 IEPR & E3 2025 Energy Accounting presentation

Gas no longer the transition fuel -- other technologies have superseded gas.

Incentives Add Up

All-Electric Retrofit Available to All Income Levels

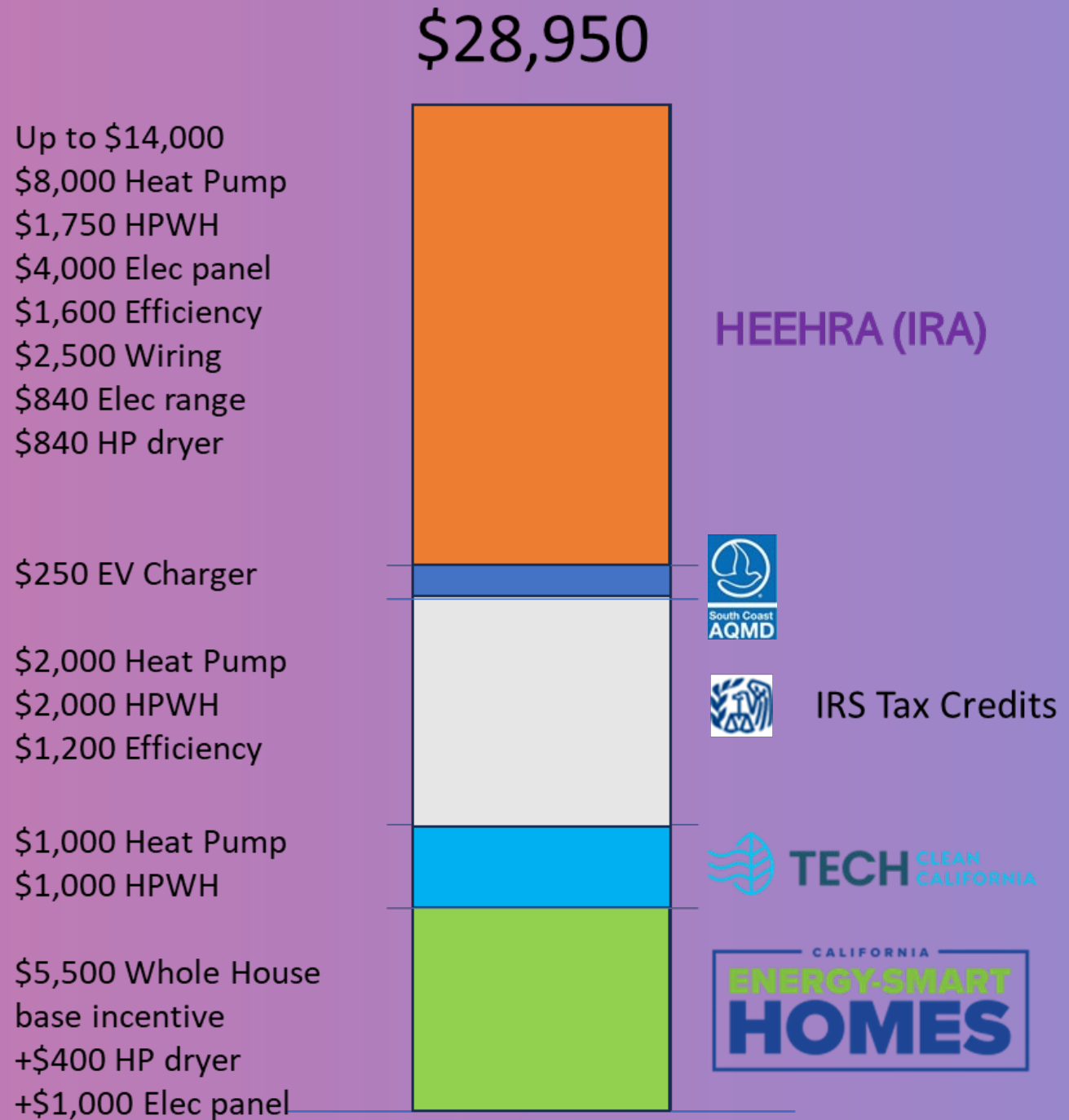


Incentives Add Up

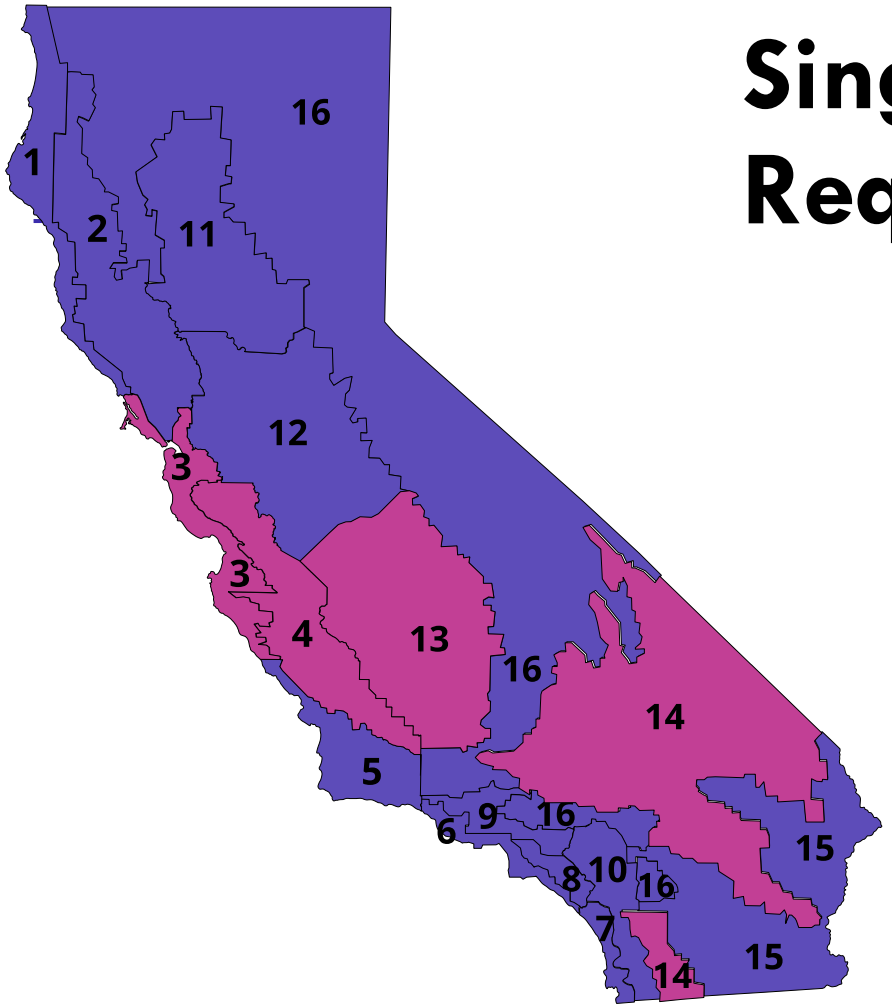
All-Electric Retrofit

Low-income

<80% median income



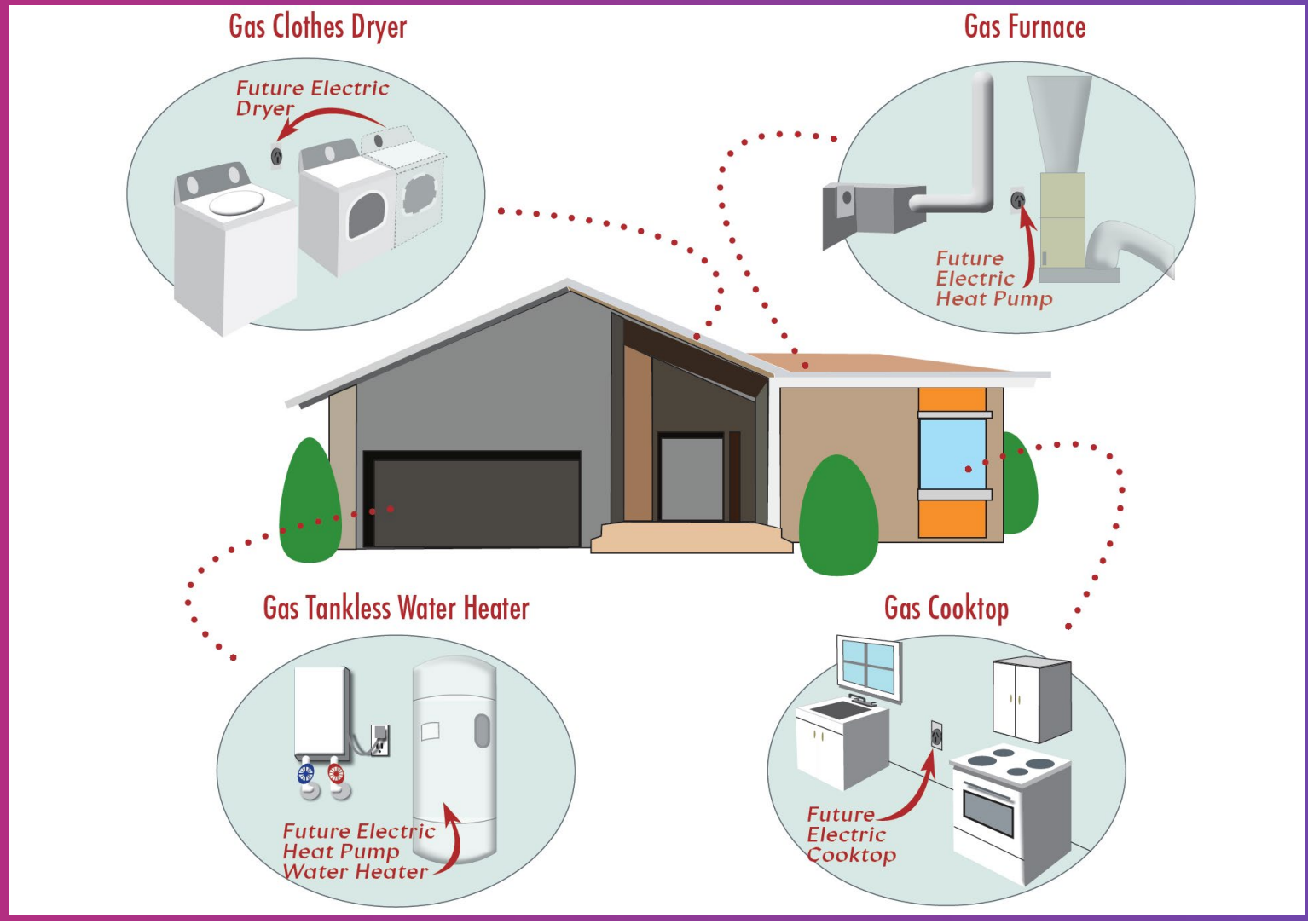
Energy Code Requirements that Encourage Electrification



Single-family Prescriptive Requirements for Heat Pumps

- Heat Pump Water Heater
- Heat Pump Space Conditioning

Electric Retrofit Ready



Range Hoods

New Standards Introduced for 2022

§150.0(o)1.G.iii

- Must meet requirements of Table 150.0-G by EITHER:
  - Capture efficiency (CE) *OR*
  - Air flow (cfm)
- Higher air flow and CE required for gas ranges.
- In all cases, max 3.0 sones applies via ASHRAE 62.2, Section 7.2

Dwelling Unit Floor Area (ft^2)	Hood Over Electric Range	Hood Over Natural Gas Range
>1500	50% CE or 110 cfm	70% CE or 180 cfm
>1000 - 1500	50% CE or 110 cfm	80% CE or 250 cfm
750 - 1000	55% CE or 130 cfm	85% CE or 280 cfm
<750	65% CE or 160 cfm	85% CE or 280 cfm

Evolving Building Energy Efficiency Ratings

For Residential Construction



Energy Code	New Construction	Additions	Alterations
2016	TDV	TDV	TDV

Time Dependent Valuation (TDV):

"TDV Energy" is the time varying energy used by the building to provide space conditioning, water heating and specified building lighting. It accounts for the energy used at the building site and consumed in producing and delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

Evolving Building Energy Efficiency Ratings

For Residential Construction

Energy Code	New Construction	Additions	Alterations
2016	TDV	TDV	TDV
2019	EDRe, EDRt	TDV	TDV

e = "efficiency" EDR metric

t = "total" EDR metric (also factors in PV and flexibility)

Time Dependent Valuation (TDV):

"TDV Energy" is the time varying energy used by the building to provide space conditioning, water heating and specified building lighting. It accounts for the energy used at the building site and consumed in producing and delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

Energy Design Rating (EDR):

An alternate way to express the energy performance of a home using a scoring system where 100 represents the energy performance of a reference design building meeting the envelope requirements of the 2006 International Energy Conservation Code (IECC). A score of 0 represents the energy consumption of a building that has zero net energy consumption. The lower the score, the better.

Evolving Building Energy Efficiency Ratings

For Residential Construction



Energy Code	New Construction	Additions	Alterations
2016	TDV	TDV	TDV
2019	EDRe, EDRt	TDV	TDV
2022	**EDRs**, EDRe, EDRt	TDV	TDV

New for 2022 s = "source" EDR metric

Enables measure of emissions in some form

Time Dependent Valuation (TDV):

"TDV Energy" is the time varying energy used by the building to provide space conditioning, water heating and specified building lighting. It accounts for the energy used at the building site and consumed in producing and delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

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An alternate way to express the energy performance of a home using a scoring system where 100 represents the energy performance of a reference design building meeting the envelope requirements of the 2006 International Energy Conservation Code (IECC). A score of 0 represents the energy consumption of a building that has zero net energy consumption. The lower the score, the better.

Source Energy Design Rating (EDRs):

A separate EDR metric based on "hourly source energy," which establishes a "carbon-proxy" analysis of the building in kBTU/sf-yr units to support decarbonization and electrification policy goals.

EDR as a Compliance Metric (2022)

Source EDR

a score representing the building energy efficiency expressed in terms of an hourly source carbon based metric

Includes energy used by:

- Envelope
- IAQ
- HVAC
- DHW
- Unregulated loads

Efficiency EDR

a score representing the building energy efficiency expressed in terms of a TDV energy based metric

Includes energy used by:

- Envelope
- IAQ
- HVAC
- DHW
- Unregulated loads

Total EDR

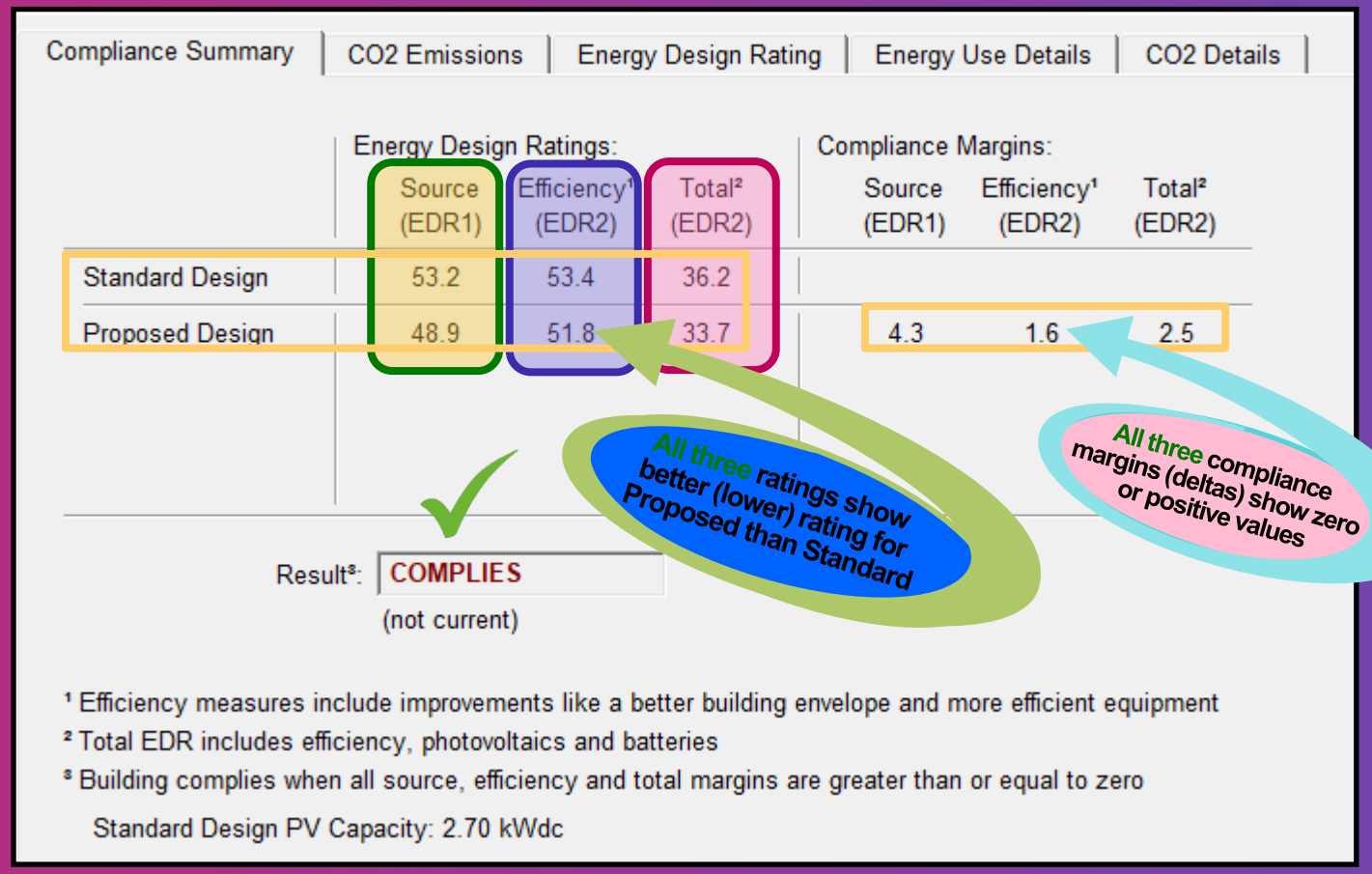
a score representing the building's Total TDV while also factoring in PV + Flexibility

Includes energy used by:

- Efficiency measures
- Photovoltaics
- Batteries
- Precooling

A building complies ONLY if **all three** compliance scores are met (**each** Proposed Design score is **lower or equal** to Standard Design score)

EDR as a Compliance Metric (2022)



Compliance Benefit of Heat Pumps & Heat Pump Water Heaters

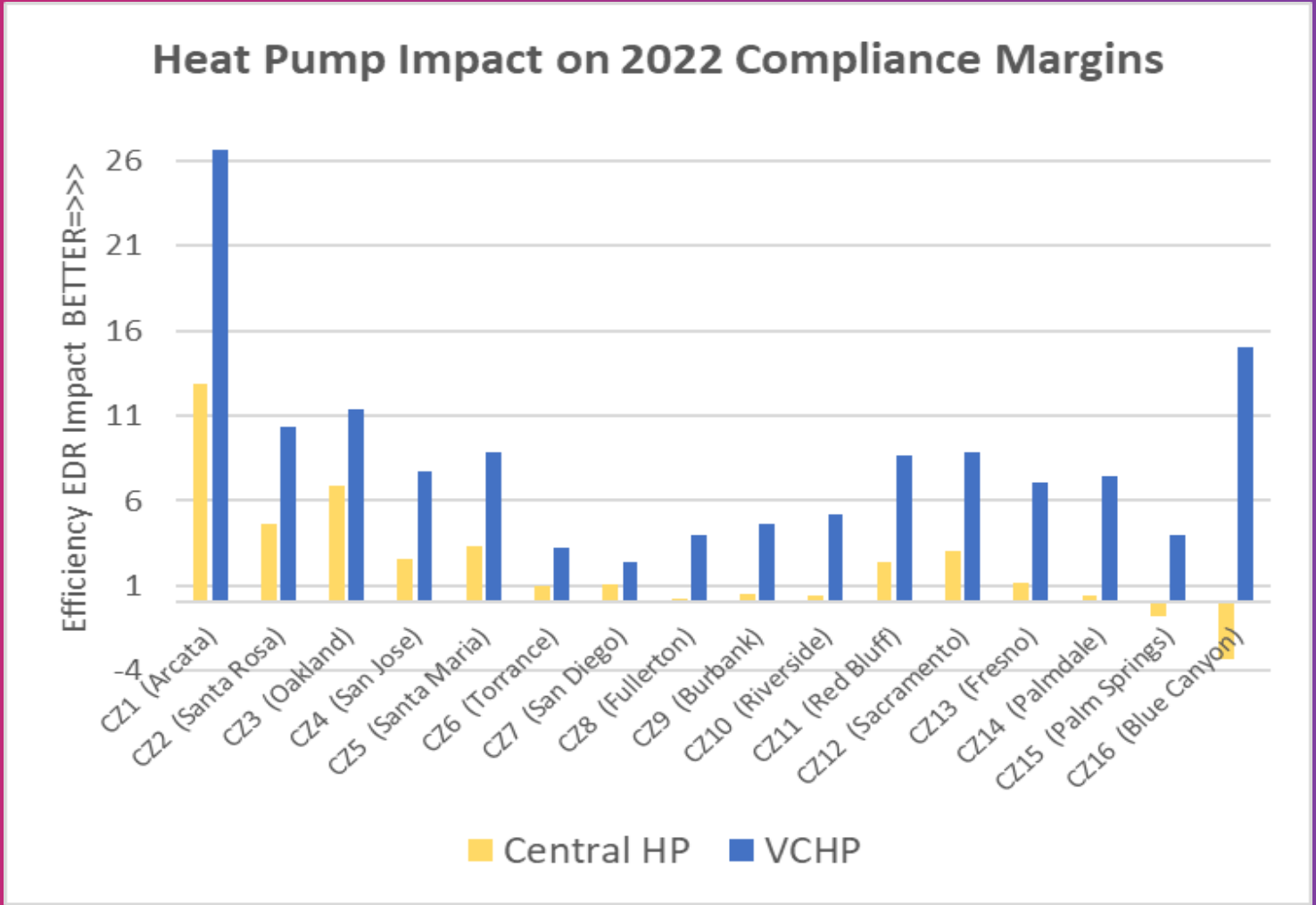
Heat Pump:

- Standard Central: 5% Efficiency EDR & 18% Source EDR
- Variable Capacity Heat Pump (VCHP): 17% Efficiency EDR & 24% Source EDR

Heat Pump Water Heater:

- Generic: 8% Efficiency EDR & 8% Source EDR
- NEEA Tier III: 10% Efficiency EDR & 10% Source EDR
- Specific Make/Model: 17% Efficiency EDR & 30% Source EDR

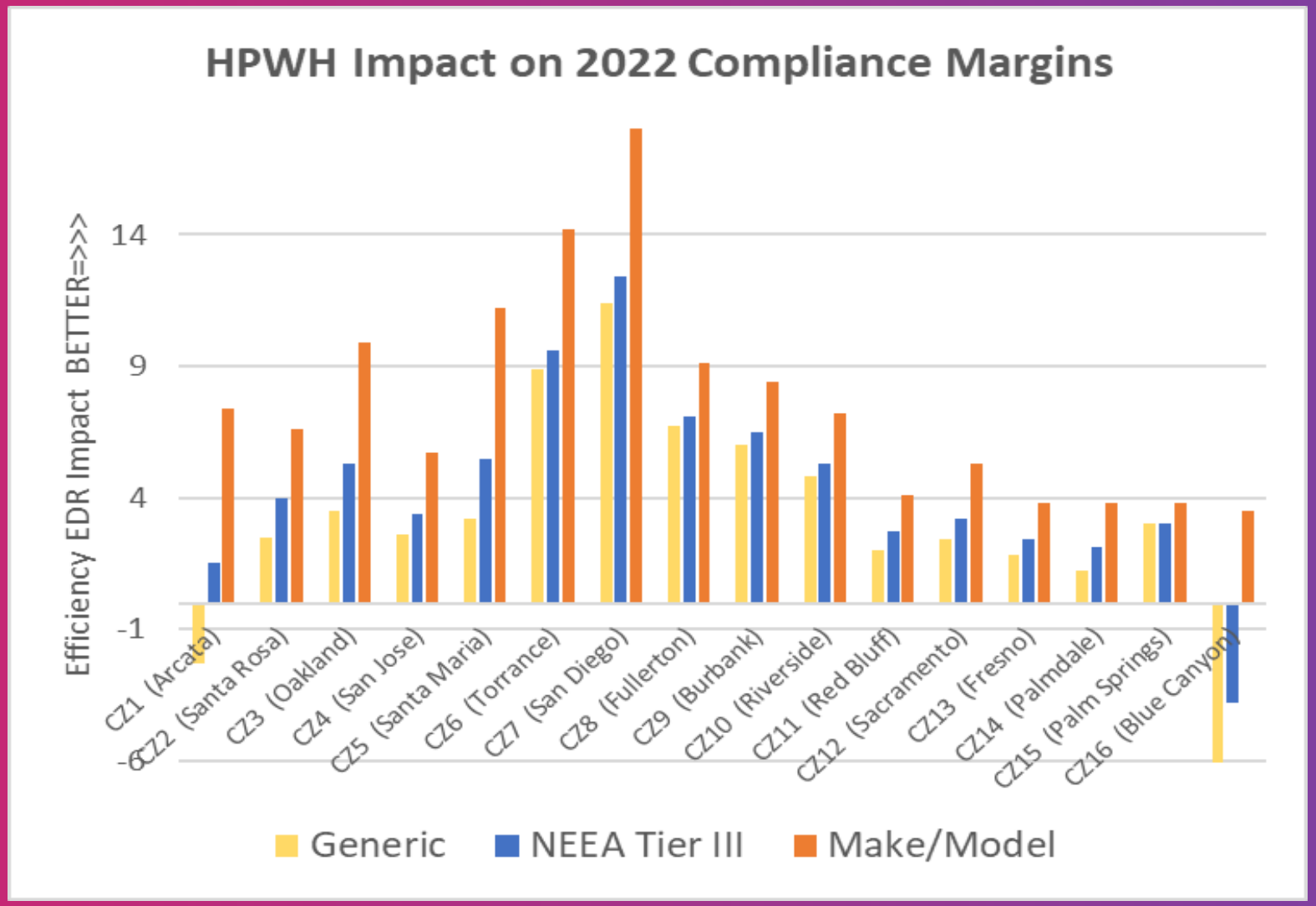
HVAC Heat Pumps Perform Well for Compliance



Average Compliance Impact:

- Efficiency EDR:
  - Central HP 2.3 (5%)
  - VCHP 8.5 (17%)
- Source EDR:
  - Central HP 8.2 (18%)
  - VCHP 10.5 (24%)

NEEA HPWHs Model Better than Gas



Average Compliance Impact:

- Efficiency EDR:
  - Generic 3.2 (8%)
  - NEEA Tier III 4.4 (10%)
  - Make/Model Specific 7.7 (17%)
- Source EDR:
  - Generic 10.0 (8%)
  - NEEA Tier III 10.6 (10%)
  - Make/Model Specific 11.6 (30%)

PV Required on all New SF and MF Buildings

§150.1(c)14

Table 150.1-C: *CFA and Dwelling Unit Adjustment Factors*

Climate Zone	A – CFA	B – Dwelling Units
1	0.793	1.27
2	0.621	1.22
3	0.628	1.12
4	0.586	1.21
5	0.585	1.06
6	0.594	1.23
7	0.572	1.15
8	0.586	1.37
9	0.613	1.36
10	0.627	1.41
11	0.836	1.44
12	0.613	1.40
13	0.894	1.51
14	0.741	1.26
15	1.56	1.47
16	0.59	1.22

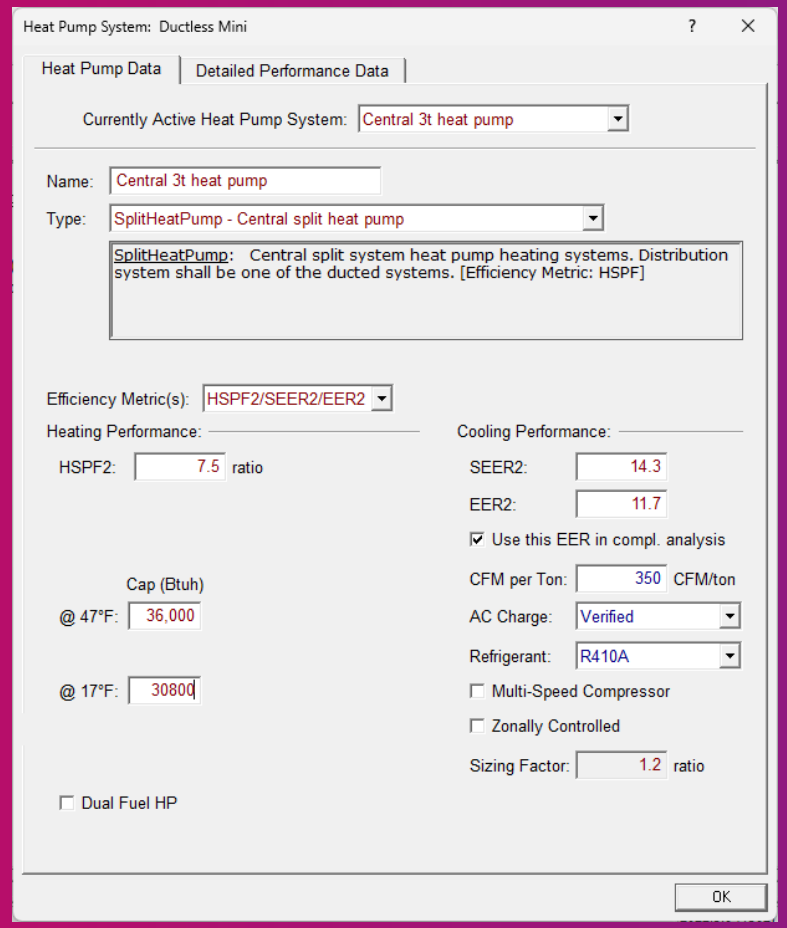
- **Prescriptive requirement** for PV system size is based on:
  - Size of home (conditioned square footage)
  - Solar Access Roof Area (SARA)
- Expressed as a kW (DC Rating)
- **DC Rating = (CFA x A) / 1000 + B**
  - **CFA** = Conditioned floor area
  - **A** = CFA adjustment factor from **Table 150.1-C**
  - **B** = Dwelling unit adjustment factor from **Table 150.1-C**

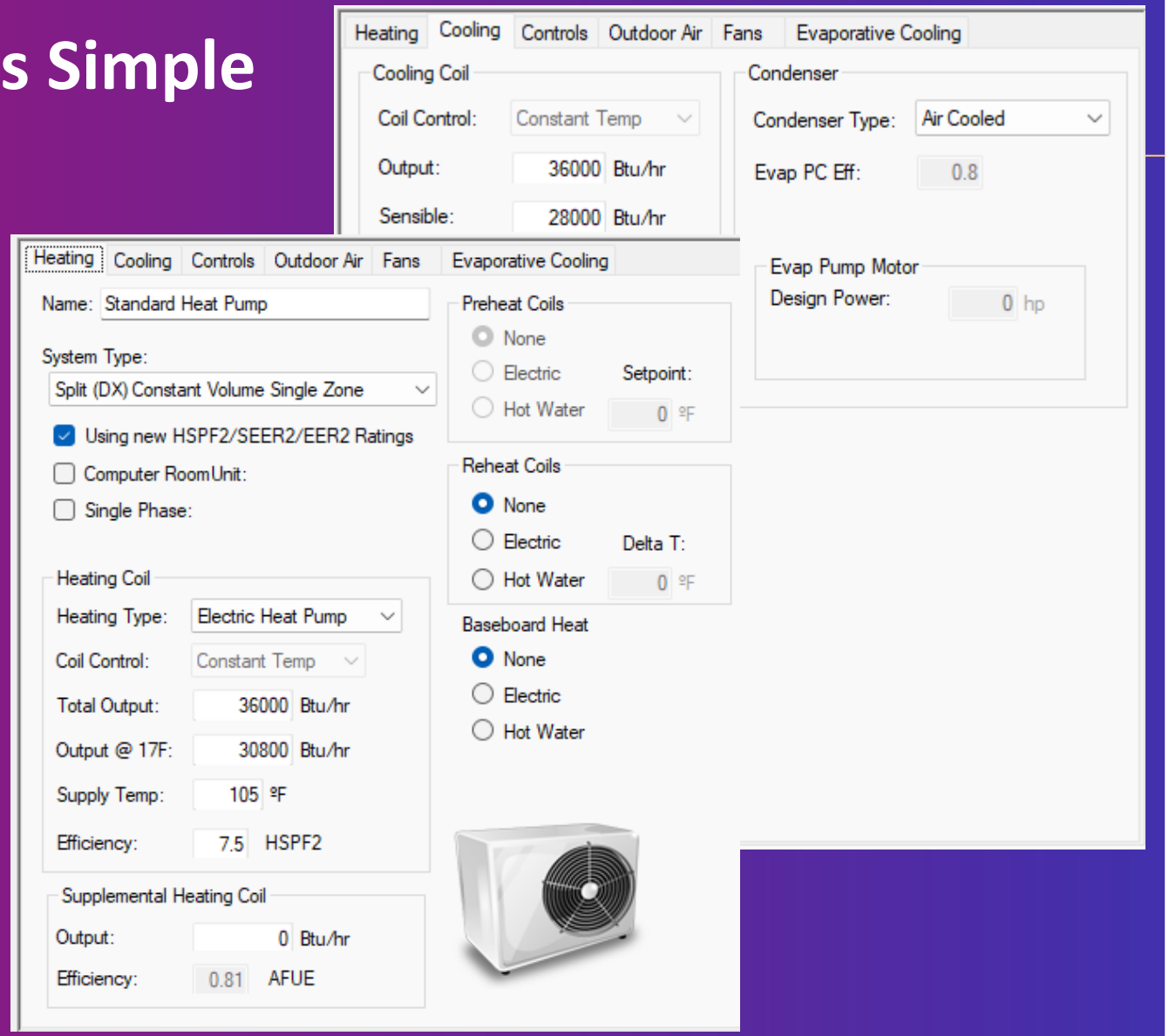
Variable Capacity Heat Pump (VCHP)

- Modulate heating & cooling to match load
  - Maintains comfort continuously
- Both indoor and outdoor units are quiet
- Equipment has long lifespan
- Can be 60%+ more efficient than typical equipment (SEER rating)
- The 2022 CA Energy Code (Title 24, Part 6) offers compliance credit for VCHPs
- Soon the software will extend the VCHP credit to a wider variety of ducted units

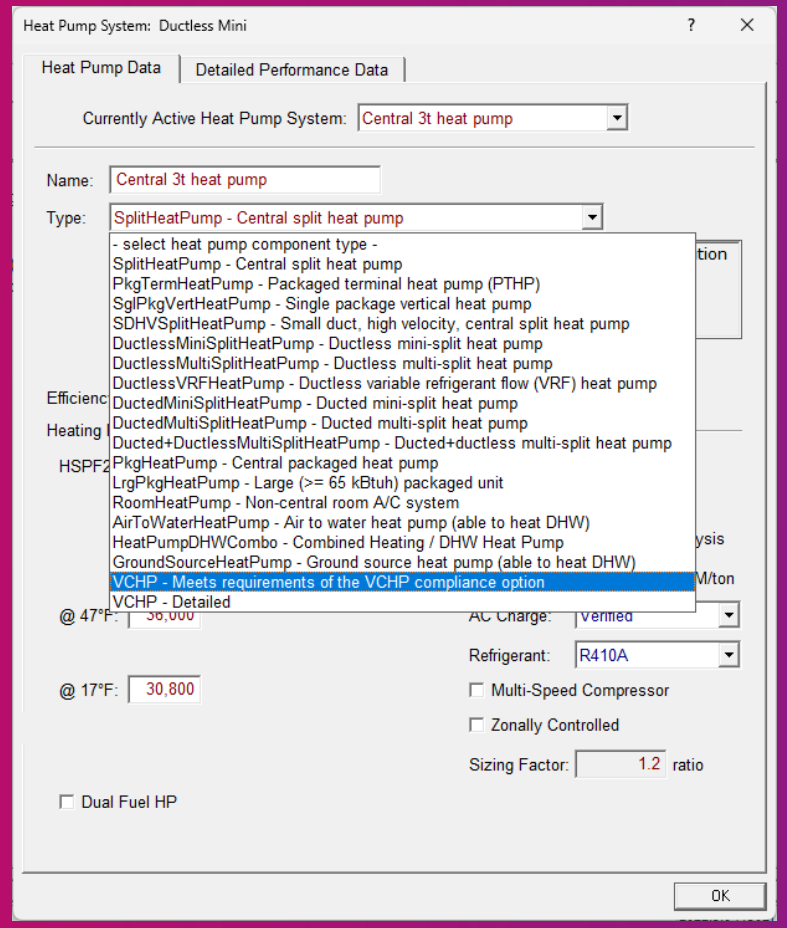
How to Model All-Electric

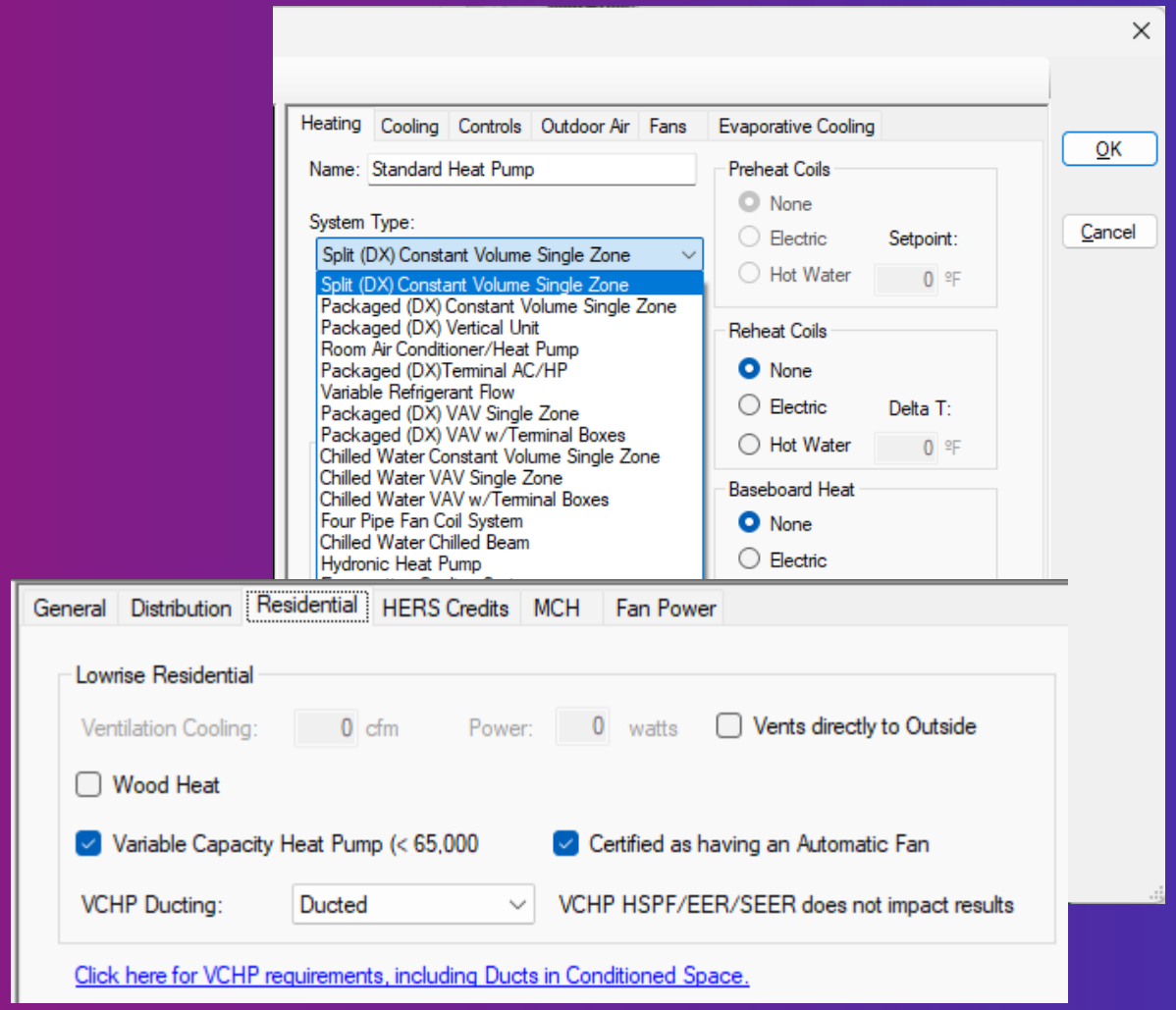
Specifying a Heat Pump is Simple



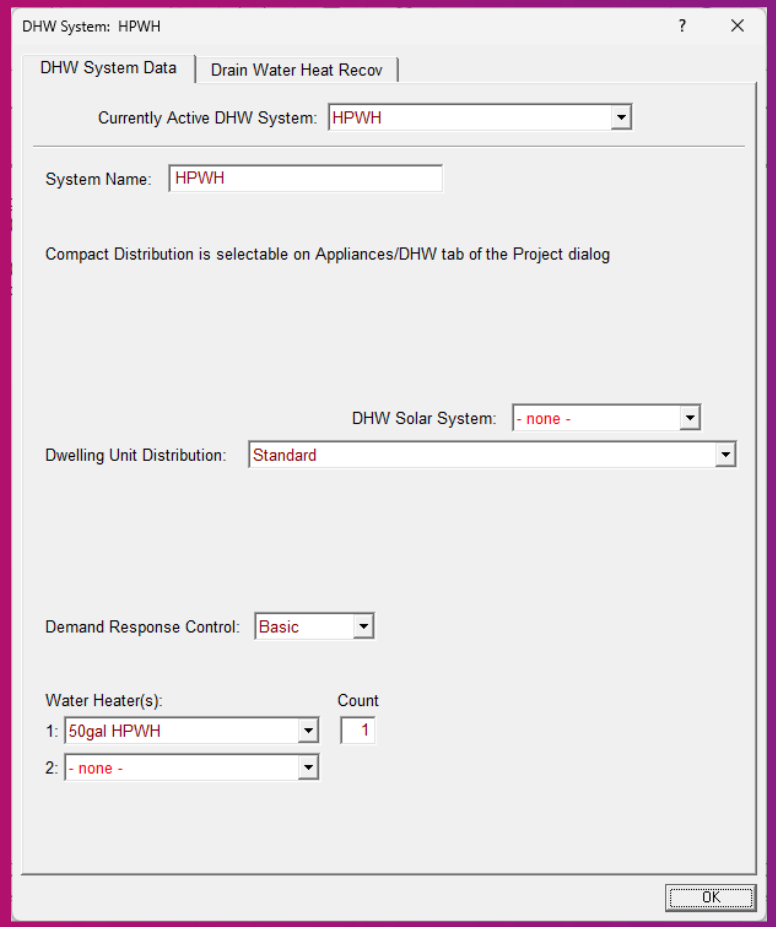


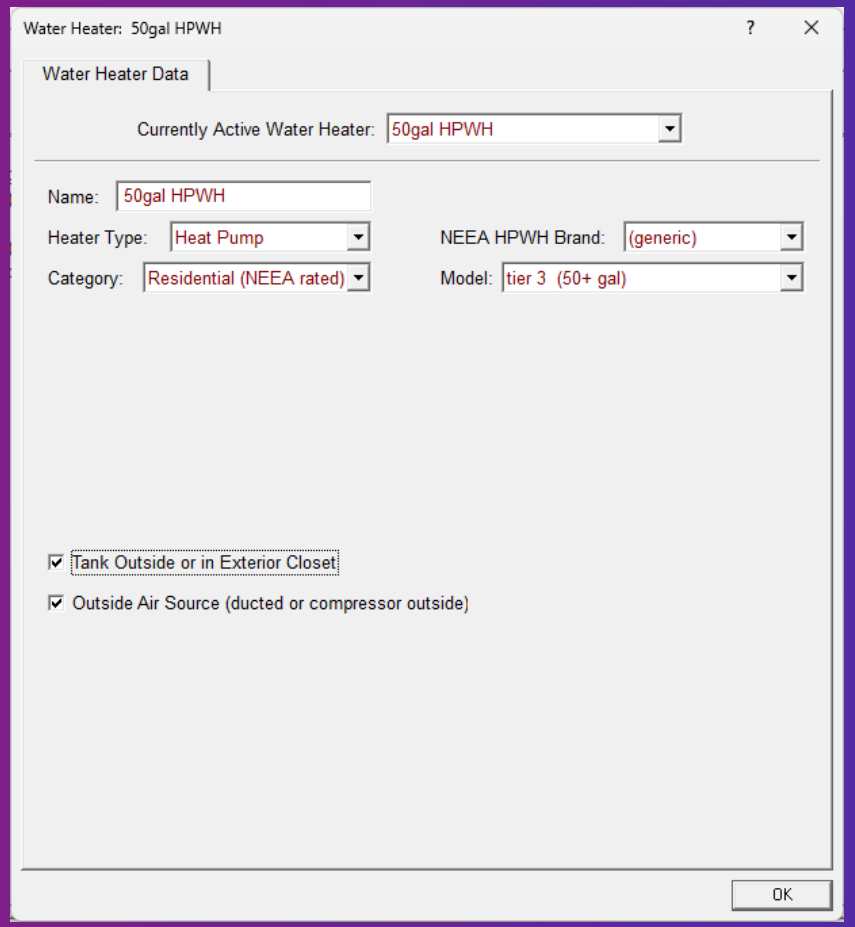
Other Configurations Supported



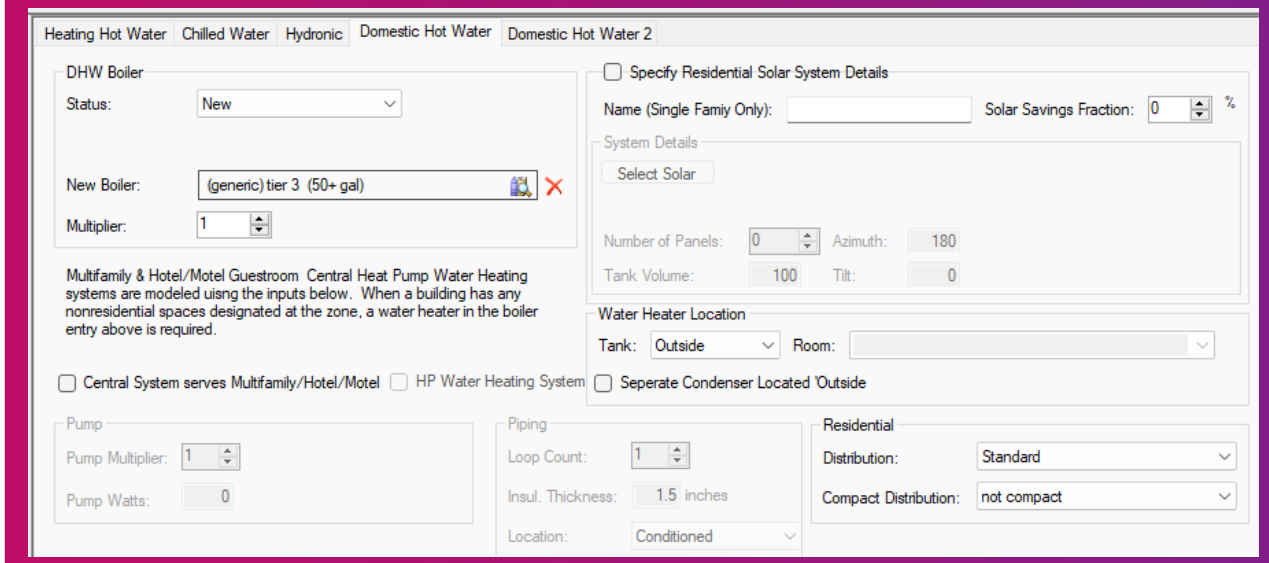


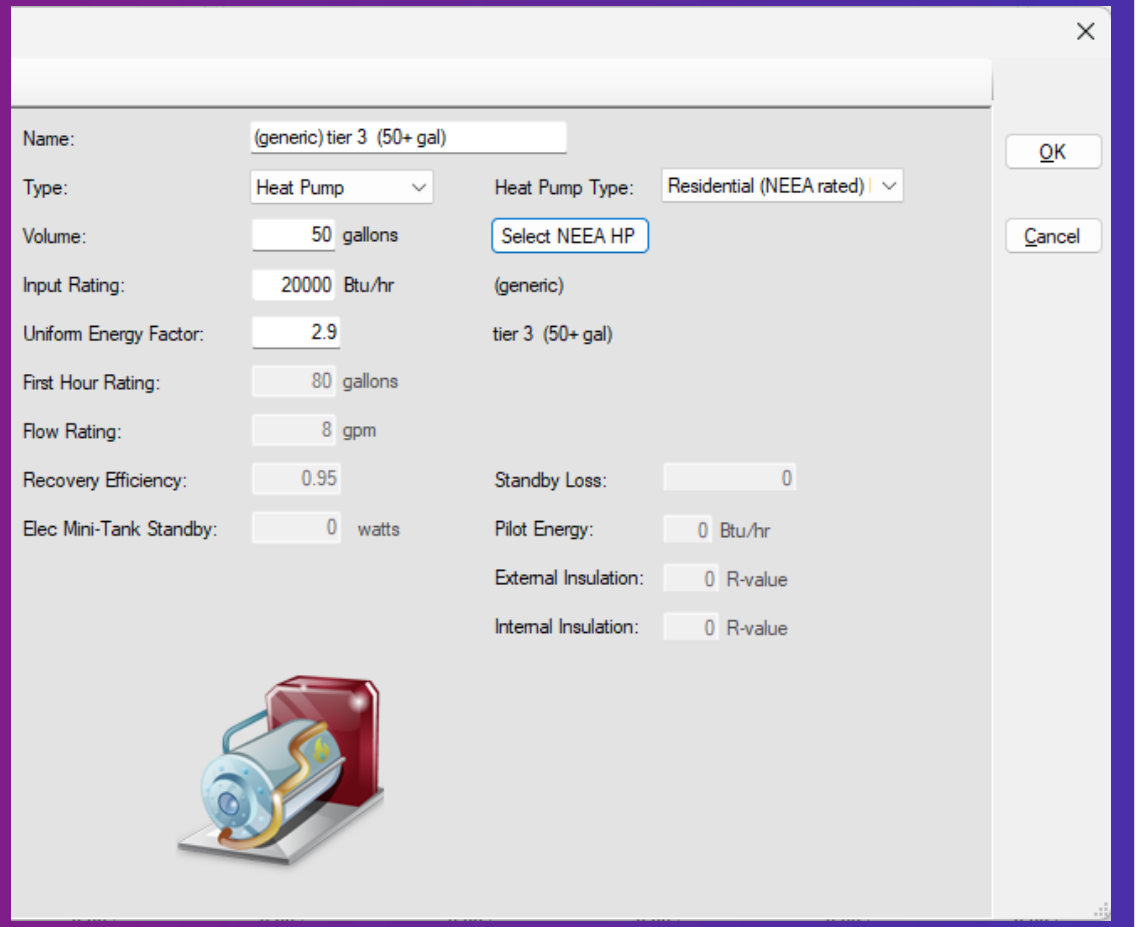
Specifying a Heat Pump Water Heater - CBECC-Res



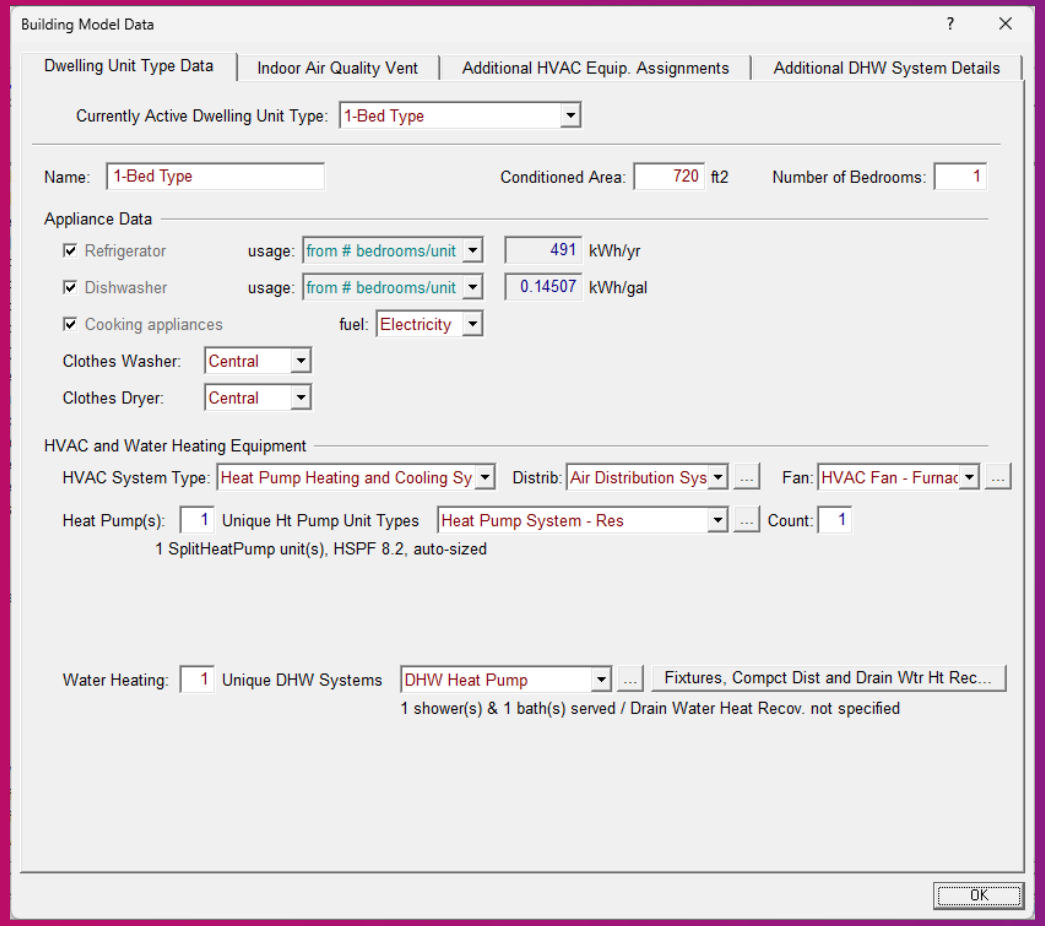


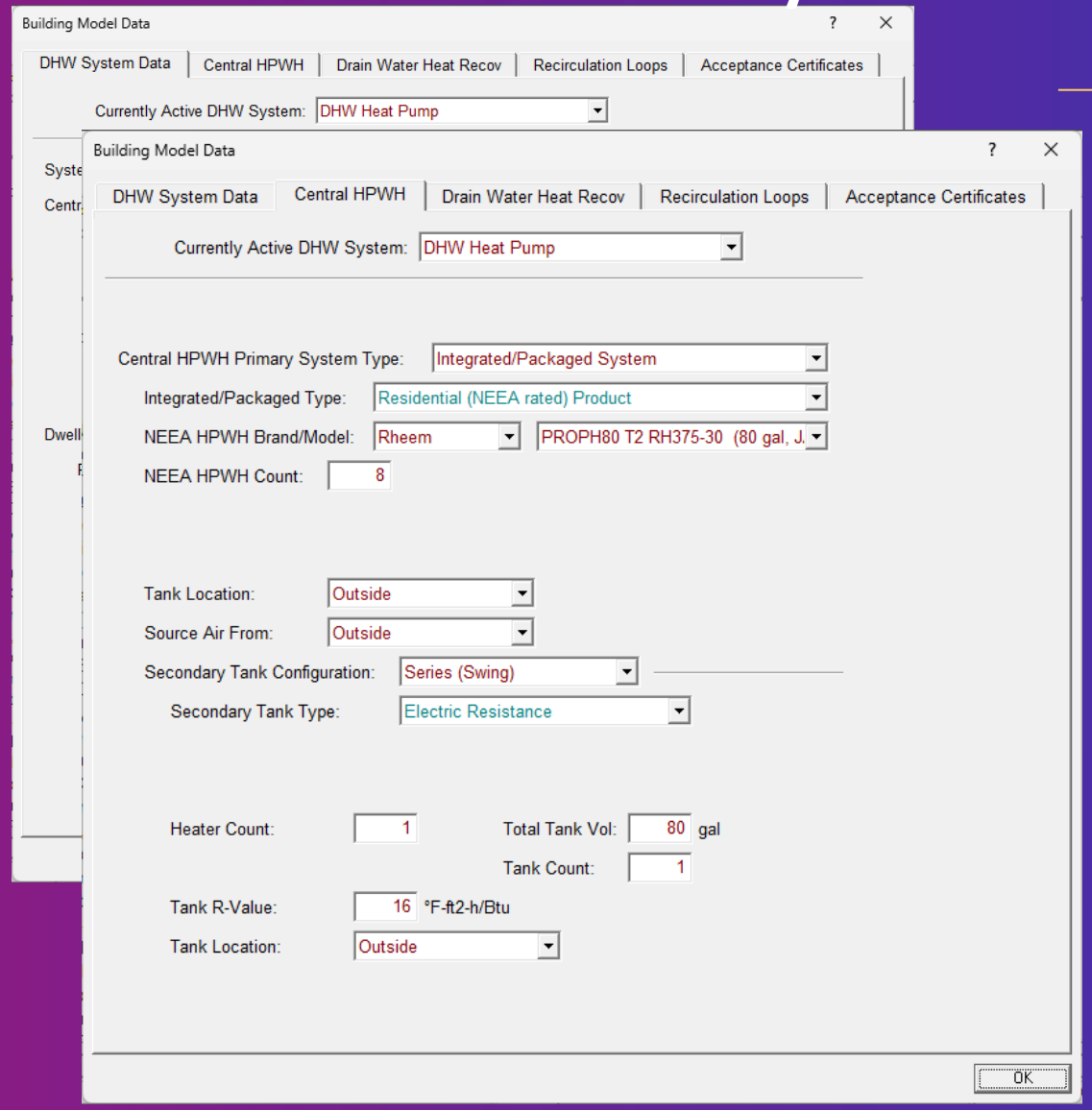
Specifying a Heat Pump Water Heater – Energy Pro



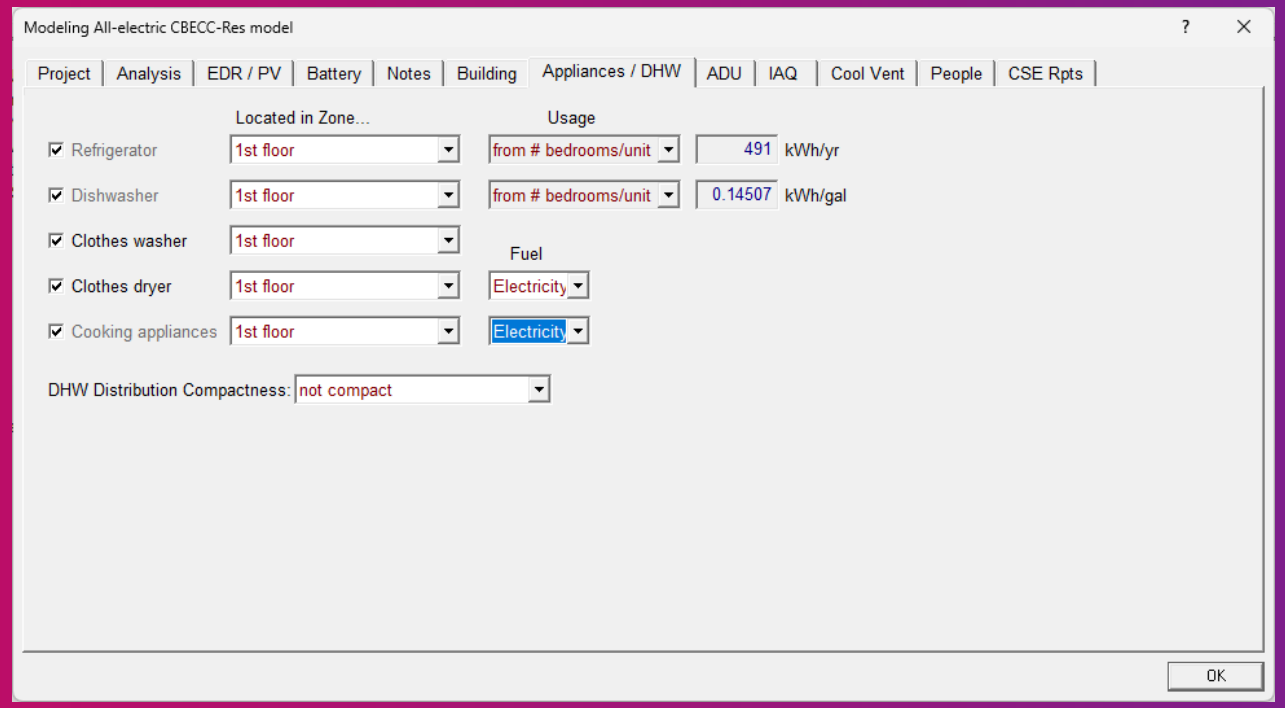


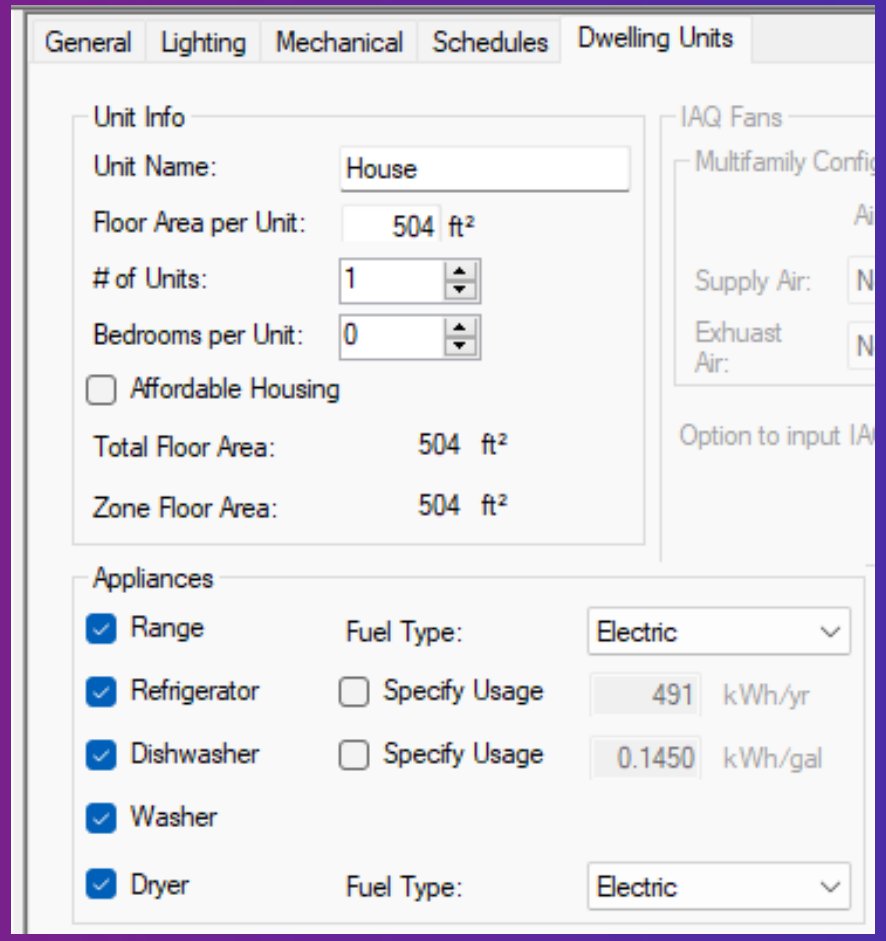
Specifying a Heat Pump Water Heater in Multifamily-CBECC-Res





Specifying Appliances

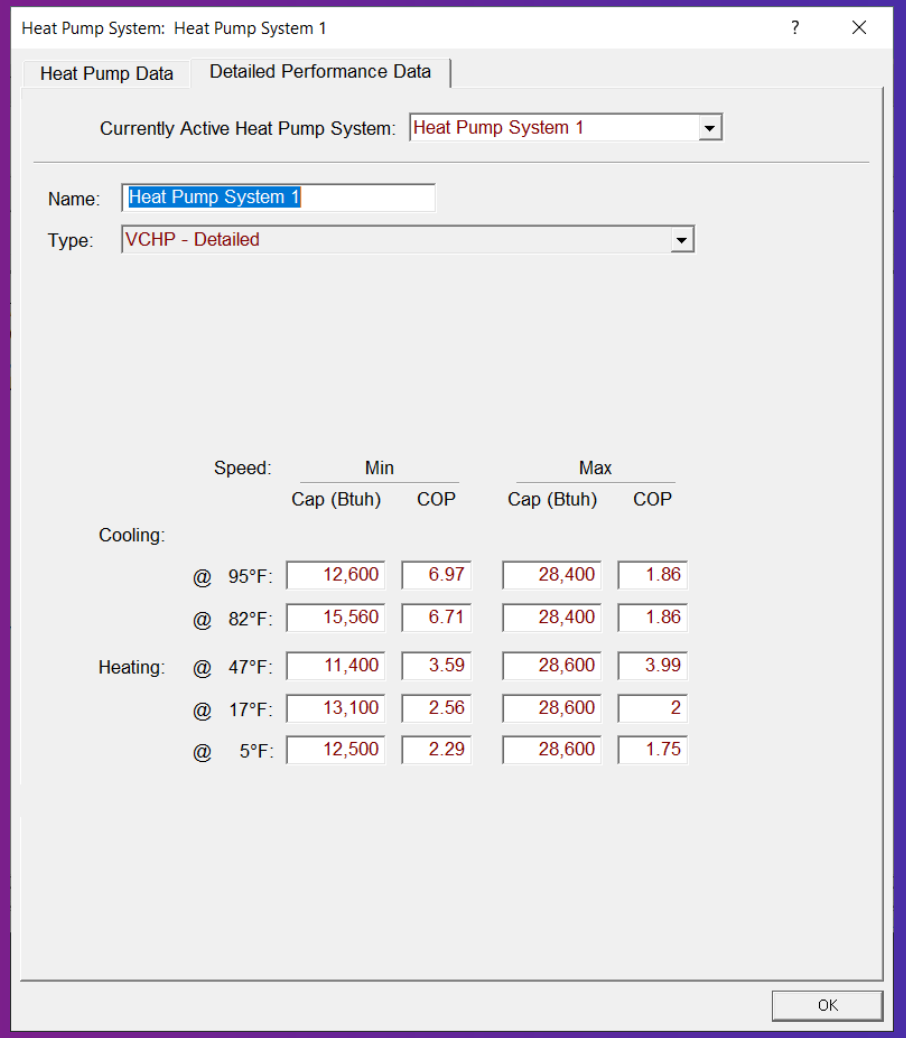




Energy Code Encourages All-Electric More than Ever

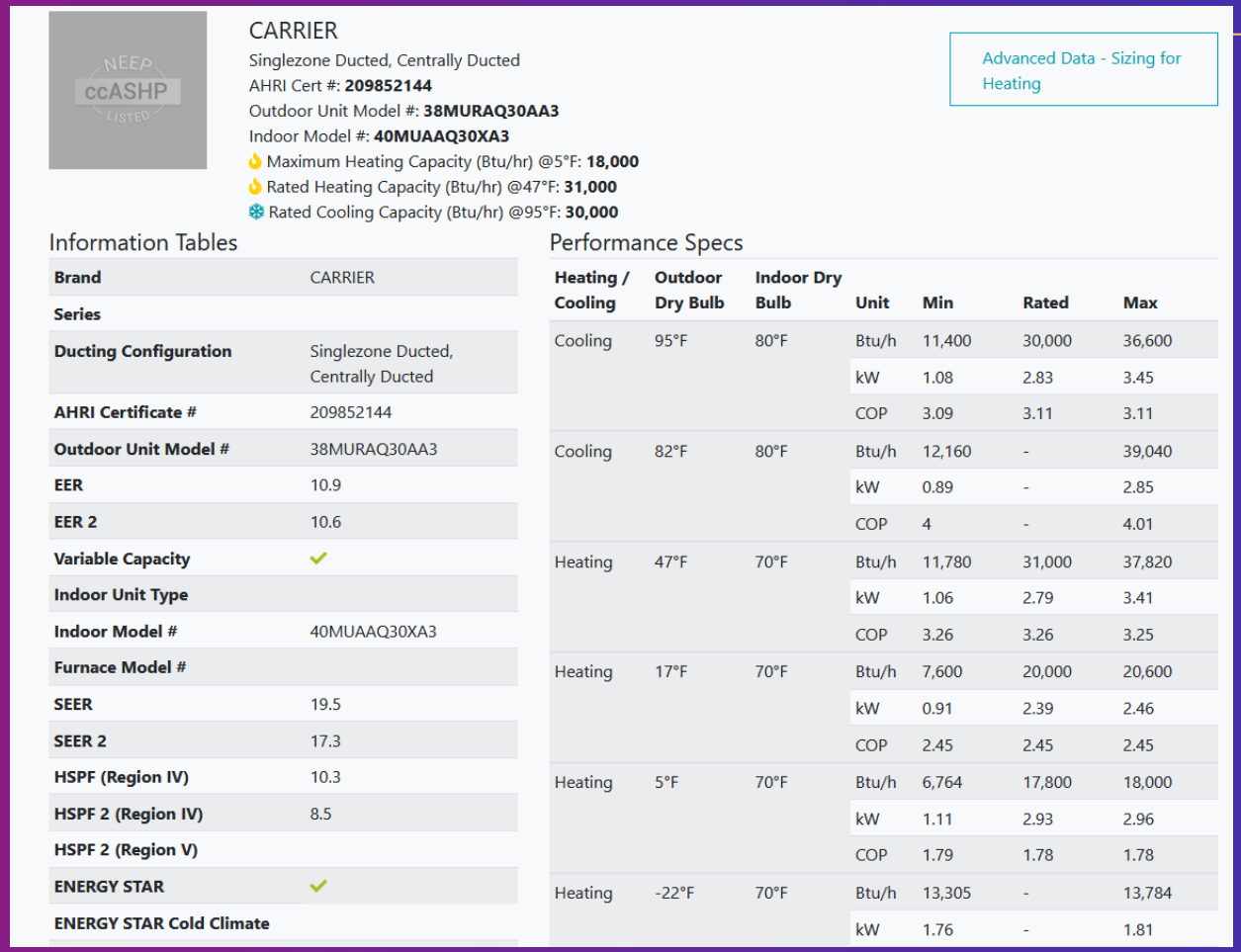
Compliance credit soon possible with advanced heat pumps (Detailed VCHP credit)

- *Extends VCHP level compliance credit to ducted minisplits*
- *Not yet active in software – still in beta testing*



Detailed VCHP

- NEEP website has detailed performance specs
- Allows for Ducted Minisplits to help compliance
- Eliminates requirement that all VCHPs be low-static models



CARRIER

Singlezone Ducted, Centrally Ducted
AHRI Cert #: **209852144**
Outdoor Unit Model #: **38MURAQ30AA3**
Indoor Model #: **40MUAAQ30XA3**
Maximum Heating Capacity (Btu/hr) @5°F: **18,000**
Rated Heating Capacity (Btu/hr) @47°F: **31,000**
Rated Cooling Capacity (Btu/hr) @95°F: **30,000**

Advanced Data - Sizing for Heating

Information Tables

Brand	CARRIER
Series	
Ducting Configuration	Singlezone Ducted, Centrally Ducted
AHRI Certificate #	209852144
Outdoor Unit Model #	38MURAQ30AA3
EER	10.9
EER 2	10.6
Variable Capacity	✓
Indoor Unit Type	
Indoor Model #	40MUAAQ30XA3
Furnace Model #	
SEER	19.5
SEER 2	17.3
HSPF (Region IV)	10.3
HSPF 2 (Region IV)	8.5
HSPF 2 (Region V)	
ENERGY STAR	✓
ENERGY STAR Cold Climate	

Performance Specs

Heating / Cooling	Outdoor Dry Bulb	Indoor Dry Bulb	Unit	Min	Rated	Max
Cooling	95°F	80°F	Btu/h	11,400	30,000	36,600
			kW	1.08	2.83	3.45
			COP	3.09	3.11	3.11
Cooling	82°F	80°F	Btu/h	12,160	-	39,040
			kW	0.89	-	2.85
			COP	4	-	4.01
Heating	47°F	70°F	Btu/h	11,780	31,000	37,820
			kW	1.06	2.79	3.41
			COP	3.26	3.26	3.25
Heating	17°F	70°F	Btu/h	7,600	20,000	20,600
			kW	0.91	2.39	2.46
			COP	2.45	2.45	2.45
Heating	5°F	70°F	Btu/h	6,764	17,800	18,000
			kW	1.11	2.93	2.96
			COP	1.79	1.78	1.78
Heating	-22°F	70°F	Btu/h	13,305	-	13,784
			kW	1.76	-	1.81

Using the Software Output

Modeling All-electric CBECC-Res model

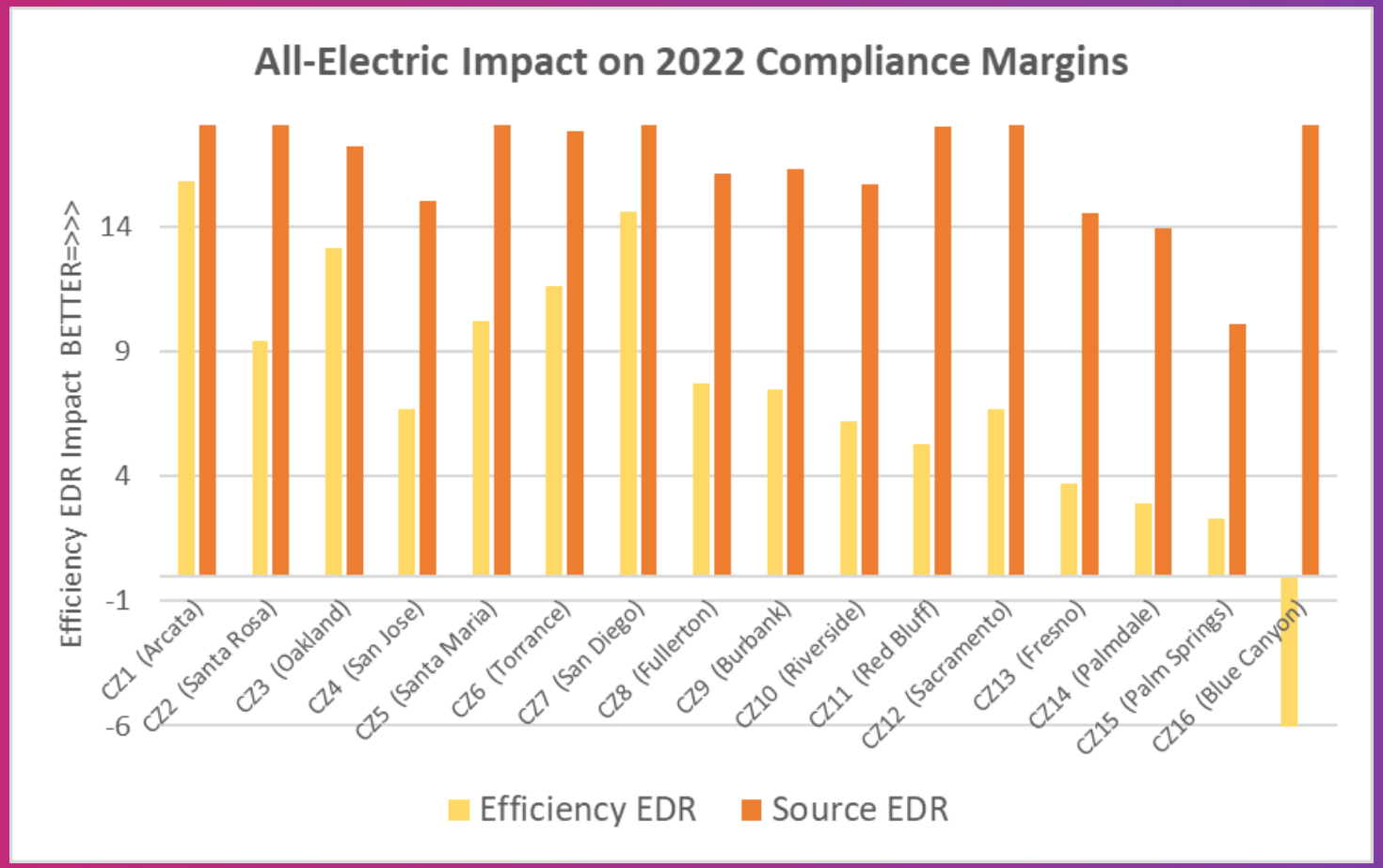
Energy Use Details | Summary | CO2 Details

End Use	Standard Design: Site (kWh)	Site (therms)	EDR2 (kTDV/ft²-yr)	Proposed Design: Site (kWh)	Site (therms)	EDR2 (kTDV/ft²-yr)	Compliance Margins: EDR2 (kTDV/ft²-yr)
Space Heating	77		5.91	358		26.92	-21.01
Space Cooling	12		2.12	1		0.27	1.85
IAQ Ventilation			0.00			0.00	0.00
Water Heating	889		60.14	863		57.87	2.27
Self Util/Flexibility Credit							
Compliance Total			68.17			85.06	-16.89
Photovoltaics				-3,307		-141.74	-24.8 %
Battery						0.00	
Flexibility							Result:
Inside Lighting	89		7.13	89		7.13	FAIL
Appl. & Cooking	1,556		106.66	1,538		105.54	
Plug Loads	1,335		94.06	1,335		94.06	
Exterior	142		11.01	142		11.01	
TOTAL	4,100		287.03	1,019		161.06	

Garage to ADU Conversion, 410 sqft, CZ5 (e.g., San Luis Obispo) with 2 kW PV array

How All-Electric Performs versus Gas

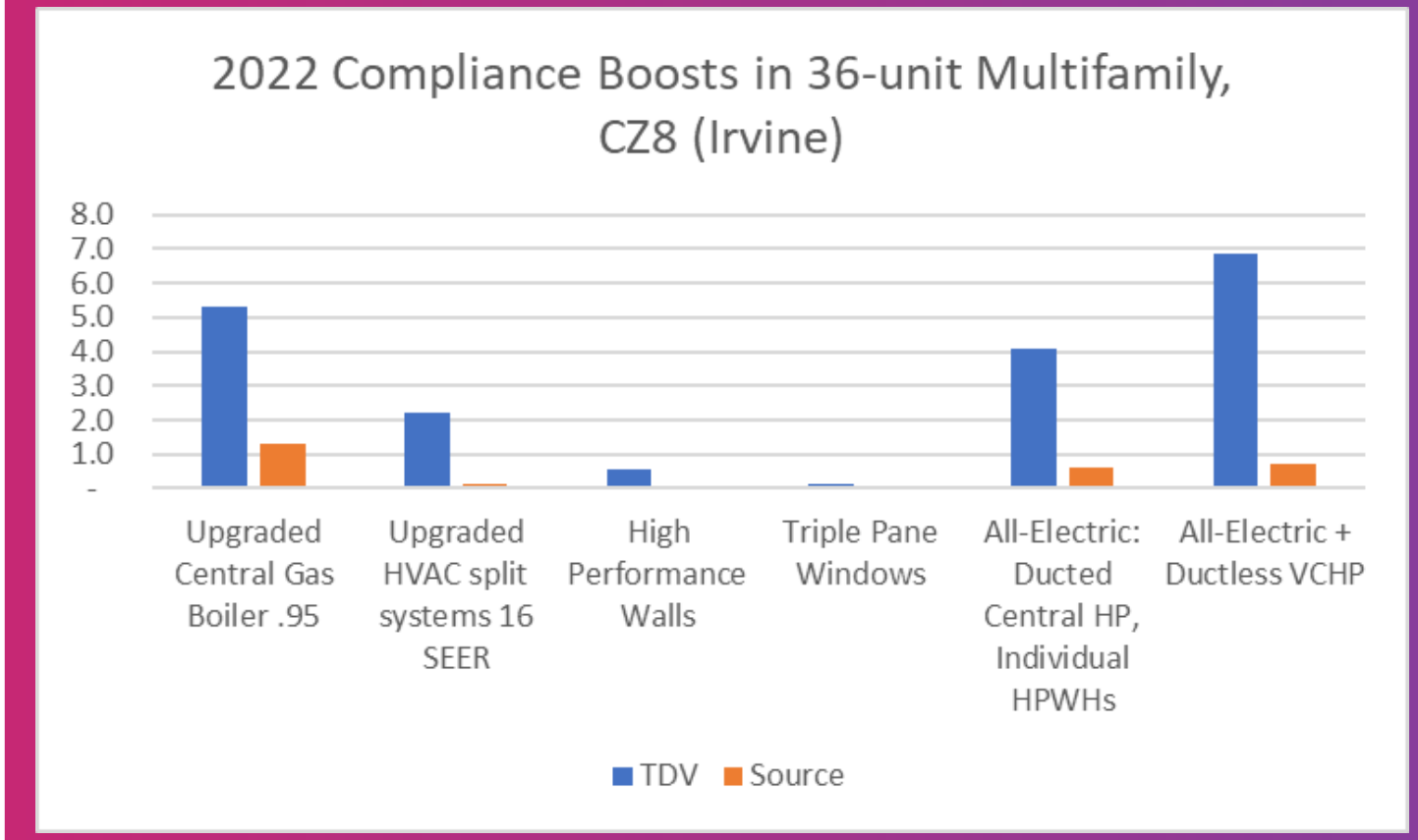
All-Electric Makes Compliance Easier Everywhere



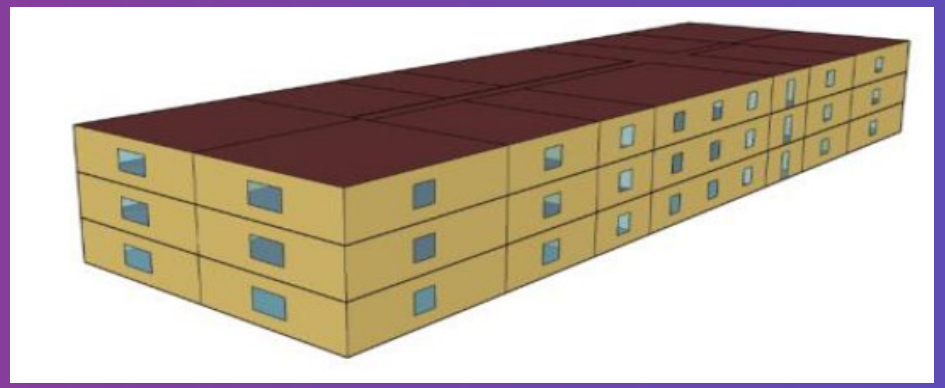
Average Compliance Impact:

- Efficiency EDR: 7.3 (16%)
- Source EDR: 19.1 (50%)

Easier Code Compliance – Multifamily Edition



- In a 36-unit Multifamily building in Climate Zone 8 (Irvine):
  - All-electric with VCHP helps energy code compliance most
  - Only upgraded central boiler with solar thermal system provides bigger boost



Gas vs Electric Comparison 2022 Code

Dual Fuel

Compliance Summary | CO2 Emissions | Energy Design Rating | Energy Use Details | CO2 Details

	Energy Design Ratings: Source (EDR1)	Efficiency¹ (EDR2)	Total² (EDR2)	Compliance Margins: Source (EDR1)	Efficiency¹ (EDR2)	Total² (EDR2)
Standard Design	36.1	39.8	26.9			
Proposed Design	47.0	43.6	29.4	-10.9	-3.8	-2.5

Result³: DOES NOT COMPLY

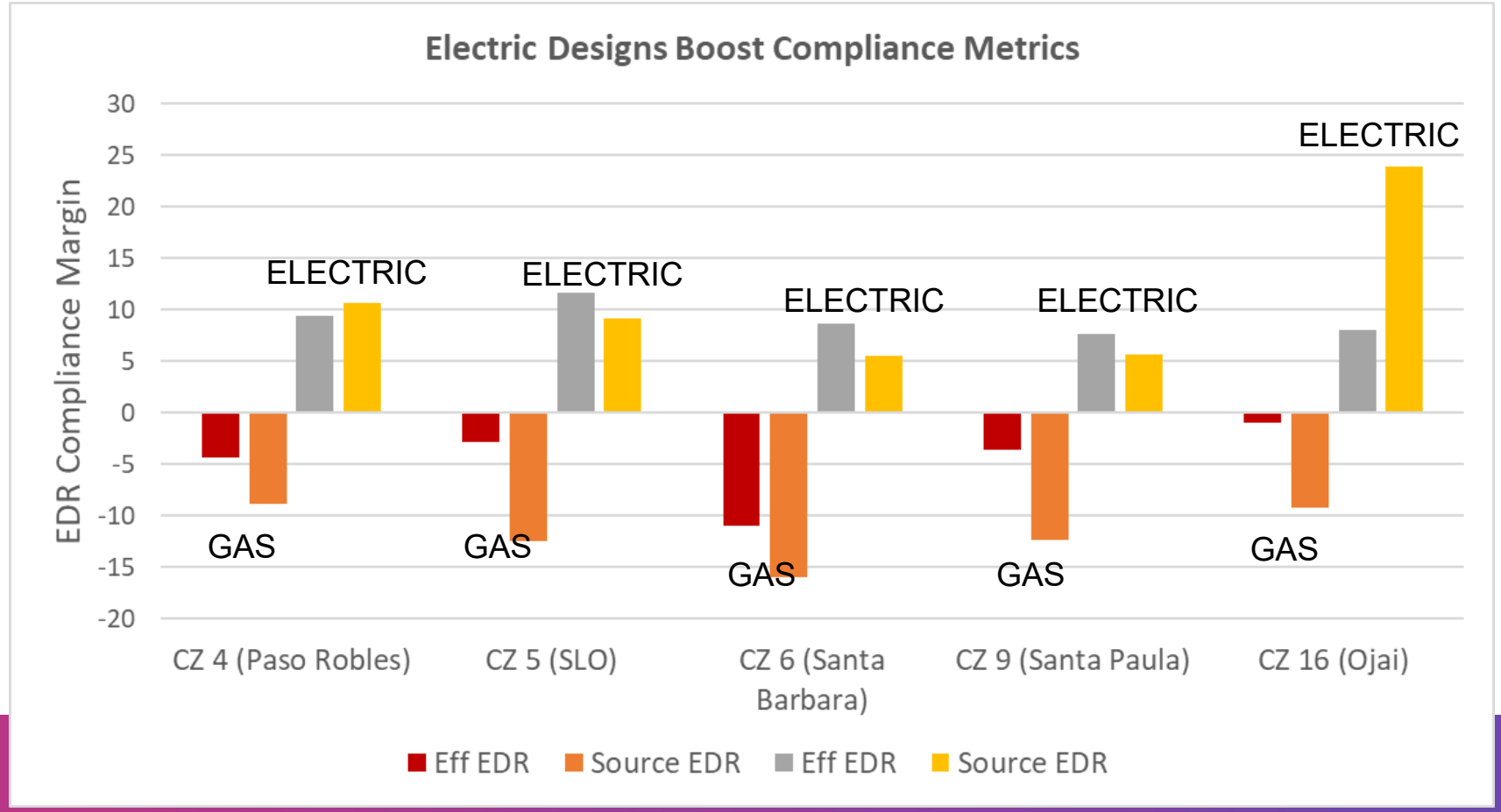
All Electric

Compliance Summary | CO2 Emissions | Energy Design Rating | Energy Use Details | CO2 Details

	Energy Design Ratings: Source (EDR1)	Efficiency¹ (EDR2)	Total² (EDR2)	Compliance Margins: Source (EDR1)	Efficiency¹ (EDR2)	Total² (EDR2)
Standard Design	33.3	39.8	28.9			
Proposed Design	28.5	37.4	27.5	4.8	2.4	1.4

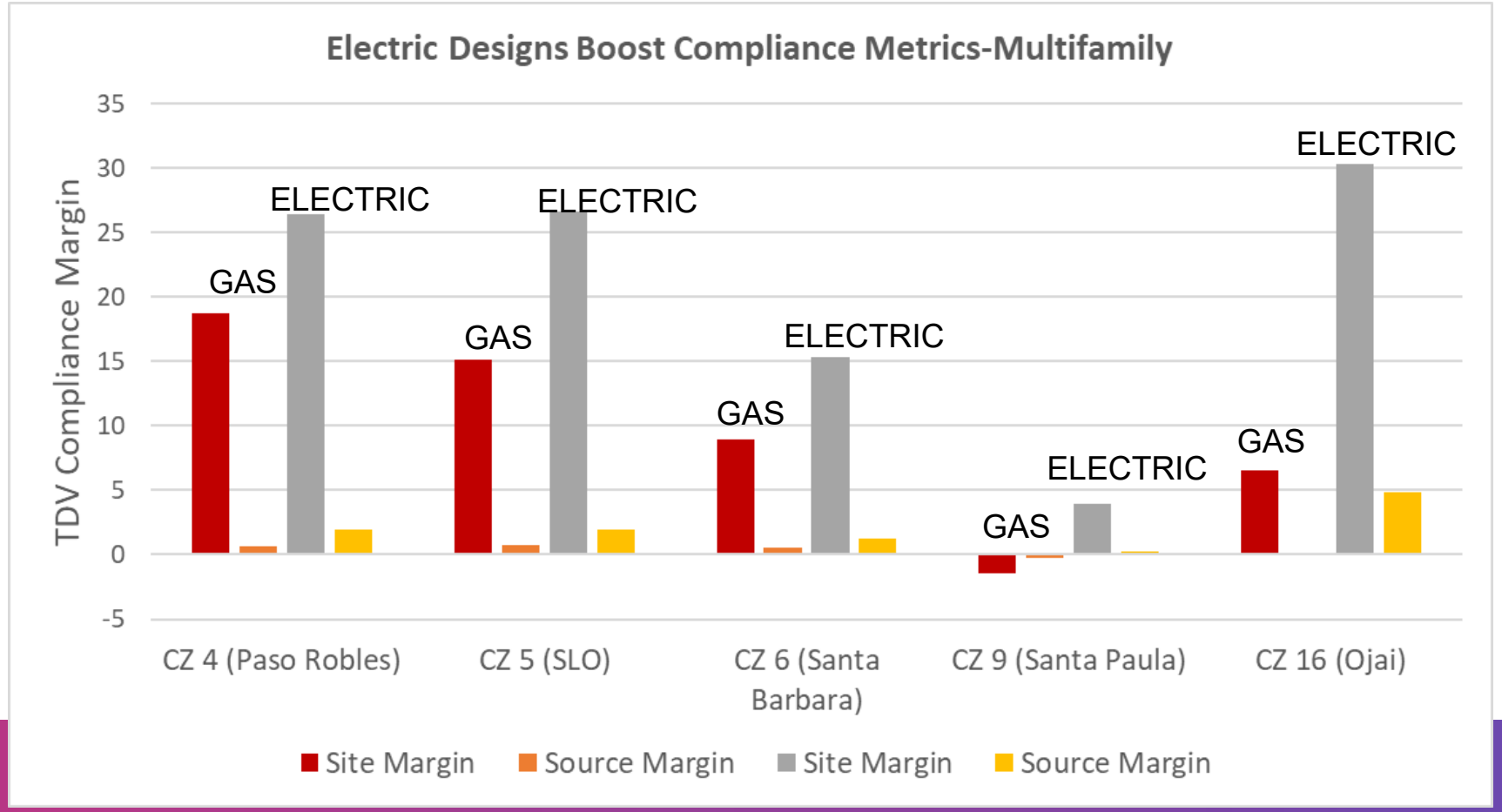
Result³: COMPLIES

Case Study: New Single Family Home



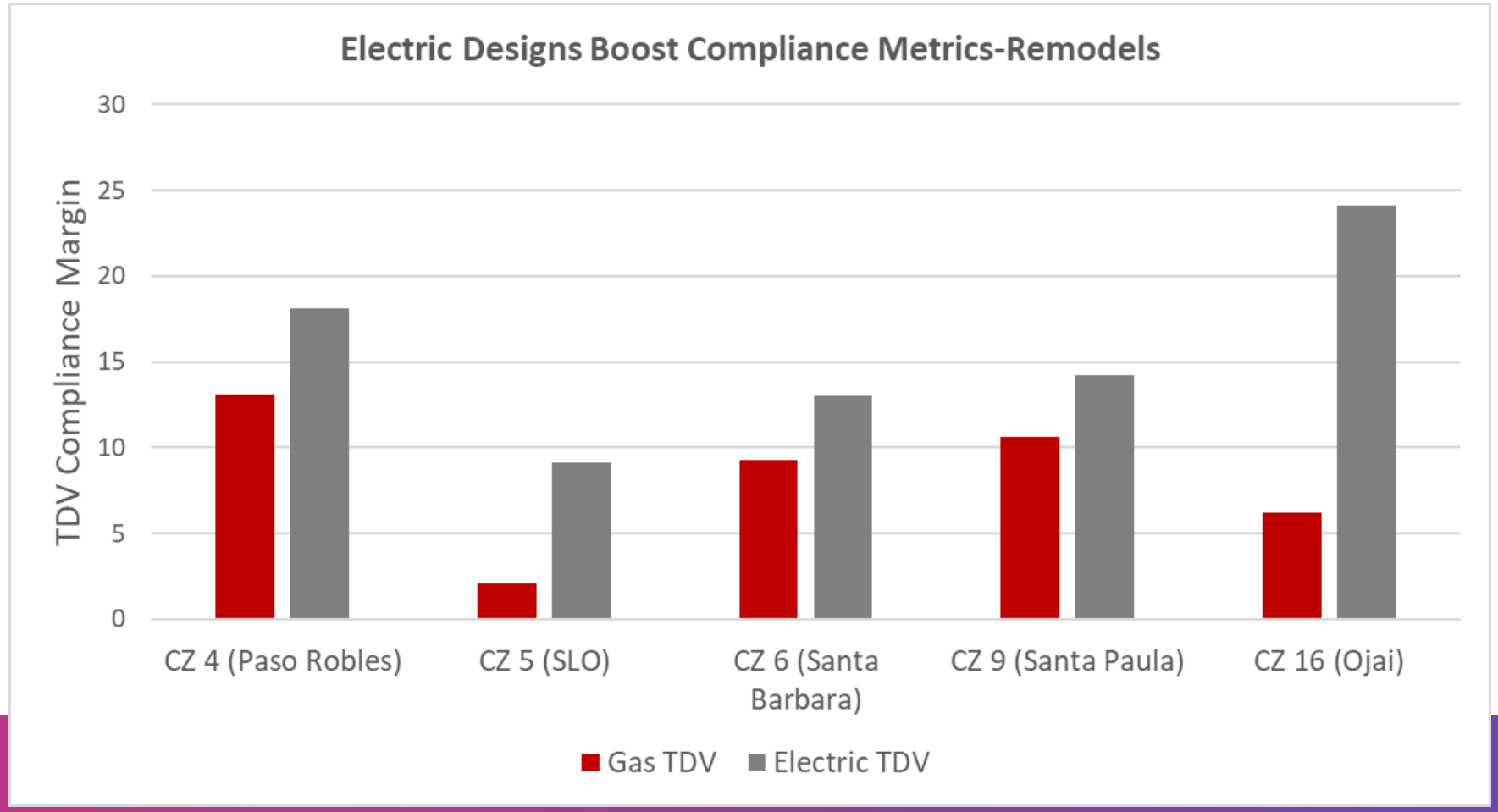
2,100 sqft new home with code minimum gas systems and code minimum electric systems

Case Study: New Multifamily 8-unit Building



8-unit new multifamily building with code minimum gas systems and code minimum electric systems

Case Study: Single Family Addition



940 sf home with 588 sf addition with code minimum gas systems and code minimum electric systems

Lessons from the Field

All-Electric & HERS Verifications

How Heat Pumps are Different from Gas Furnaces

HERS verified heat pump capacity

VCHP HERS verification

Each outdoor unit can link to multiple indoor units, ducted and ductless

CF1R

- Incomplete HVAC information

HERS registry

Architect sends plans back for revisions

- HVAC units installed are different

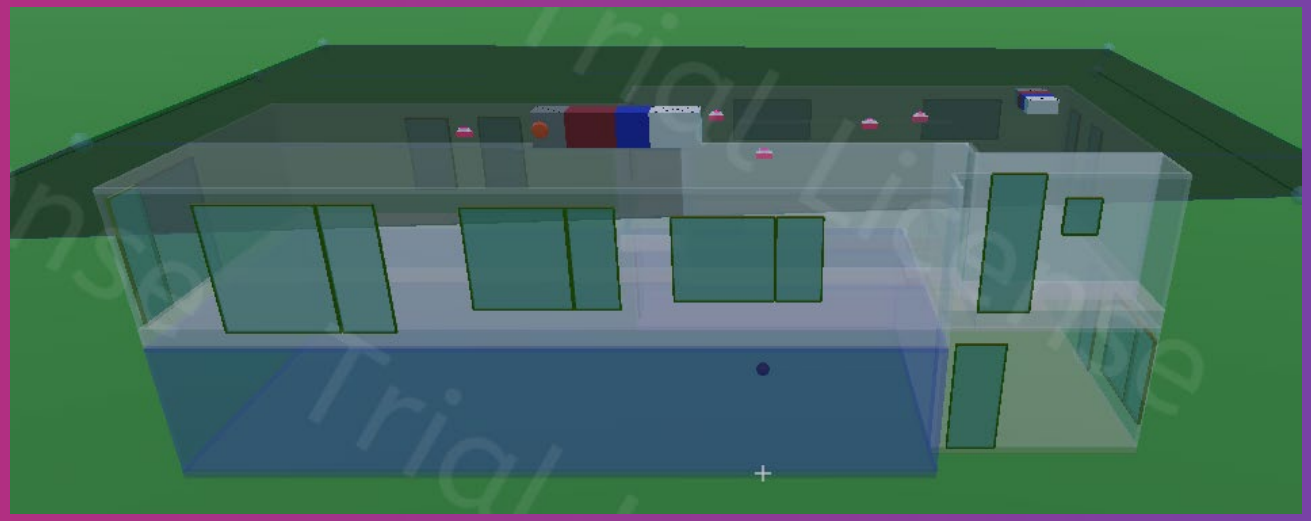
- HERS verifications

Final Inspection

Specifying VCHPs Without Boomeranging

1. Size them right
2. Get # of systems right
3. Get ducted/ductless right
4. Get SEER2/EER2/HSPF2 right

1. Energy Pro load calcs; Kwik Model; what about CBECC-Res
2. Force architect to talk to HVAC installer
3. Force architect to talk to building owner
4. Code minimum or energy consultant specifies equipment



Watt Diet

Helps You Fit into Your Panel

- Establish your base load (e.g., lighting and plugs often on)
- Enter your other loads and power requirements from tech sheets
- Watt Diet calculates the panel you need
- Allows for circuit sharing
- *Watt Diet Calculator*

3. Determine "Watt Diet" and Panel Size

Use the drop down menu for the type of products and volts, amps and the circuit size will autofill. Many product will use less than their rated circuit amperage, refer to the "Product Data" tab to see specification sheets for products show in the drop down menu. If you do not want to select a device, choose the ""Select Device"" option in the dropdown.

Panel Baseline Assumtions	
Utility Service Volts (120, 240, 240 is most common)	240
Base Energy Use (defined by electrical code) (Watts)	5,573

3a. Device Selection: Use the drop down menu to determine each device, the voltage, rated amps and circuit size will autfill with your selection. If you want to remove the selection, choose "Select Device"

	Device	Select with Dropdown Menu	Volts	Rated Amps	Circuit Size (Amps)	Calculated Power (Watts)
Baseline Loads (specified by NEC)	Lighting+Plugs 3W/square					5,850
	Kitchen Countertop Circuits					3,000
	Laundry Circuit *(note: laundry circuit must be 1500*					1,500
Laundry *(note: if specified power is under the baseline, the baseline value is used.)*	Washer (or combined)	Washing Machine: LG	120	-	10	1,200
	Dryer	Heat Pump Dryer: Miele (120V)	120	-	15	1,800
Kitchen	Fridge	Fridge: Frigidaire 20.4 cuft	120	6	-	720
	Optional: Garbage Disposal	Garbage Disposal: GE	120	4	-	480
	Optional: Dishwasher	Dishwasher: Frigidaire	120	-	10	1,200
	Optional: Kitchen Hood	Kitchen Hood: Broan	120	1.4	-	168
	Optional: Microwave	Microwave: Frigidaire (built-in)	120	9.2	-	1,104
	Range (oven and cooktop)	Range: Frigidaire Induction	240	41.6	-	9,984
	Oven	No Device	-	-	-	-
	Cooktop	No Device	-	-	-	-
Water Heating	Water Heater	Heat Pump Water Heater: Rheem 30 Amp	240	21	-	5,040
Heating, Cooling and Ventilation	User Defined Heat Pump (Selected On Tab 2)		-	-	-	1,810
	Air Handler Fan (for central ducted system)	Air Handler Fan: General	120	4.6	-	552
Electric Vehicle Charging	EV Charger	EVSE Level 2 (high)	240	32	40	7,680

3b. Power Management Selection: use the drop down menu to choose what strategy of power management you would like to use. The selections are representative of real products. An example of how it works: when selecting "car to dryer" the EV charging will pause when the dryer runs, therefore the lesser power draw of the two will be subtracted from the Watt Diet.

Power Sharing	Circuit Sharing Device	No Device	-	-	*Watts Saved*	-

"Device" Watts: Total Watts (before coincidence calculation) 40,588

"Panel" Watts:

	Coincidence Factor	Watts
Baseload Watts	1	5,573
Heat Pump Watts	1	1,810
EV Charging Watts	1.25	7,680
Remaining Watts	0.4	25,526
Total Panel Watts		27,193
Total Panel Amps		113
Minimum Panel Size		**125**
Allowed Watts		66,641

Watt Diet Example: 125 amps

3. Determine "Watt Diet" and Panel Size

Use the drop down menu for the type of products and volts, amps and the circuit size will autofill. Many product will use less than their rated circuit amperage, refer to the "Product Data" tab to see specification sheets for products show in the drop down menu. If you do not want to select a device, choose the ""Select Device"" option in the dropdown.

Panel Baseline Assumtions	
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	Device	Select with Dropdown Menu	Volts	Rated Amps	Circuit Size (Amps)	Calculated Power (Watts)
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	Kitchen Countertop Circuits					3,000
	Laundry Circuit *(note: laundry circuit must be 1500*					1,500
Laundry *(note: if specified power is under the baseline, the baseline value is used.)*	Washer (or combined)	Washing Machine: LG	120	-	10	1,200
	Dryer	Heat Pump Dryer: Miele (120V)	120	-	15	1,800
Kitchen	Fridge	Fridge: Frigidaire 20.4 cuft	120	6	-	720
	Optional: Garbage Disposal	Garbage Disposal: GE	120	4	-	480
	Optional: Dishwasher	Dishwasher: Frigidaire	120	-	10	1,200
	Optional: Kitchen Hood	Kitchen Hood: Broan	120	1.4	-	168
	Optional: Microwave	Microwave: Frigidaire (built-in)	120	9.2	-	1,104
	Range (oven and cooktop)	Range: Frigidaire Induction	240	41.6	-	9,984
	Oven	No Device	-	-	-	-
	Cooktop	No Device	-	-	-	-
Water Heating	Water Heater	Heat Pump Water Heater: Rheem 30 Amp	240	21	-	5,040
Heating, Cooling and Ventilation	User Defined Heat Pump (Selected On Tab 2)		-	-	-	1,810
	Air Handler Fan (for central ducted system)	Air Handler Fan: General	120	4.6	-	552
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Total Panel Watts		27,193
Total Panel Amps		113
Minimum Panel Size		**125**
Allowed Watts		66,641

Panel Upgrades

How Your Electrician Thinks

- Electrical Code governs panel sizing based on all the loads in your home
- Exceed the rated capacity and you'll need an upgrade
- Better to have too much power

How to Manage Your Electrician

- Show them your monthly electric usage for the past 12 months
- Give them the power requirements of your new electric systems
- Ask them to show you their calculations
- Think of the future: EV charging, PV panels, batteries, pool equipment and consider upgrading your panel

Panel Upgrades

Why You Have More Power than You Might Think

- If you already have A/C, a Heat Pump provides heating with no extra power
- A Heat Pump Water Heater and Heat Pump Dryer can get by with only the power of a lighting circuit (120V 15 amps)
- Existing homes have more power allotted to lighting that can be used elsewhere

How to Make it Work Without a Panel Upgrade

- Circuit sharing devices allow for loads never to run together (such as EV charger and Stove)
- Combined Washer-Dryer
- Channing Copper Induction Range only 120V, 15 amps instead of 240V, 50 amps
- EV chargers at 20-30 amps, not 50 amps

HPWH Dos and Don’ts

DO Provide air flow

DO Upsize tank size

DON’T leave high flow fixtures

DON’T allow recirc pump to use all the hot water

All-Electric Retrofits

Lessons I Learned

- Heat Pump: Locate Outdoor Unit and Indoor Unit(s)
- HPWH: Locate based on Power and hot water line locations
- Cooking: upgrade electrical circuit
- Dryer: may need 240V, but 120V units also available

Keep in Touch

Email me with further questions:

nick@buildsmartgroup.com

Visit our Website:

www.buildsmartgroup.com

Follow us on LinkedIn:

https://www.linkedin.com/company/build-smart-group

If you are interested in future classes, click on the link below to sign up for updates:

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Closing

- Continuing Education Units Available
  - Contact shuskey@co.slo.ca.us for AIA and ICC LUs
- Coming to Your Inbox Soon!
  - Slides, Recording, & Survey – Please Take It and Help Us Out!
- Upcoming Courses:
  - October 26 – HERS Registries
  - October 30 – November 3 - Passive Design/Build Boot Camp with Emu Passive - Hands On Training and Exam (FREE!)
  - November 7 - Residential Compliance Forms for Permitting
  - November 8 - Carbon Free Homes: Features, Benefits, Valuation
  - November 14 – The Power of Existing Buildings
  - November 29 – Residential Compliance Forms for Occupancy
  - December 5 - What Energy Consultants Need To Know About HERS Measures

Thank you!

For more info:
3c-ren.org

For questions:
info@3c-ren.org

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