We will be starting soon!

Thanks for joining us

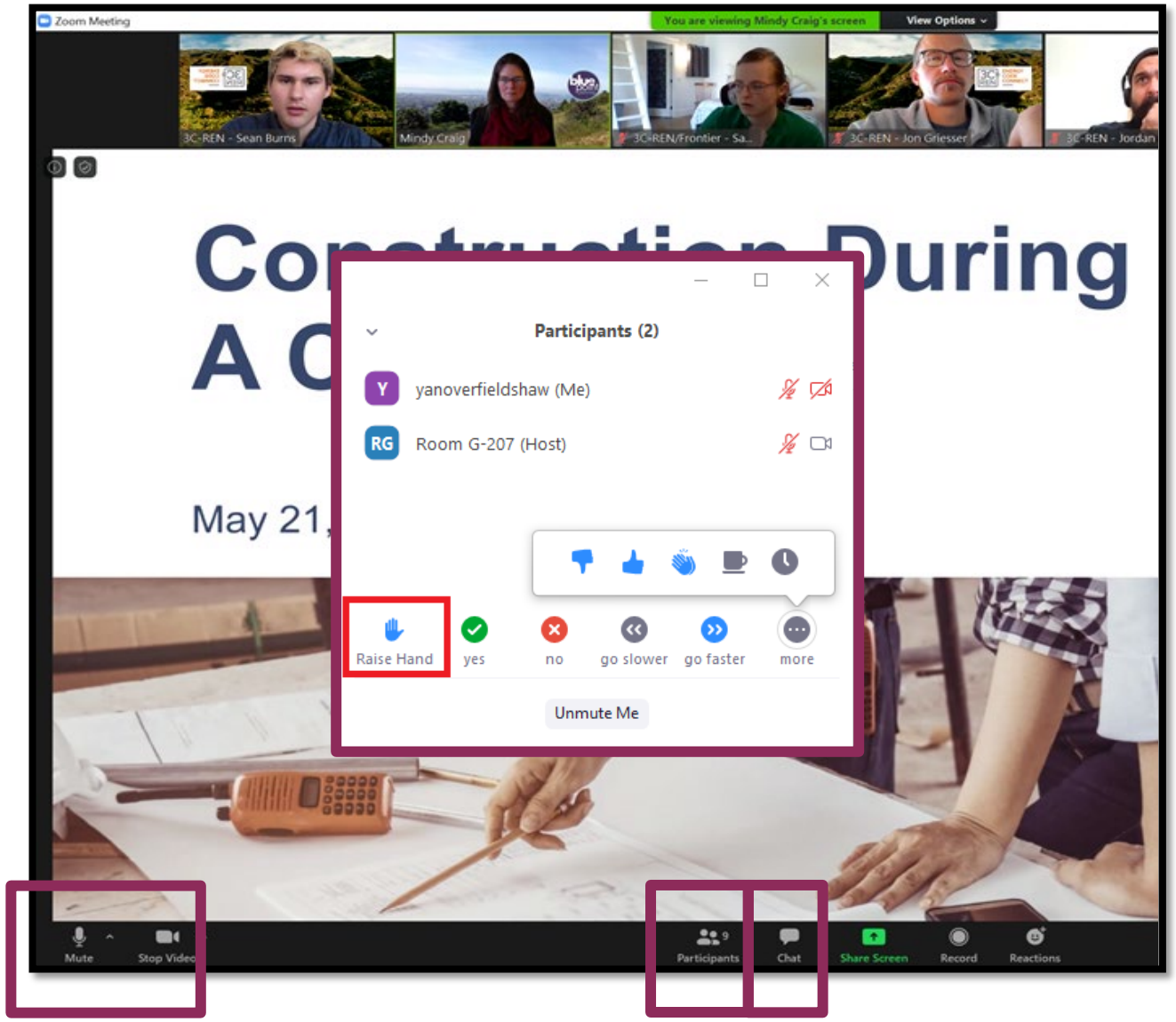
Home Remodeling:
Fire Resiliency & Electrification

Ann Edminster – Design AVEnues

September 28, 2022

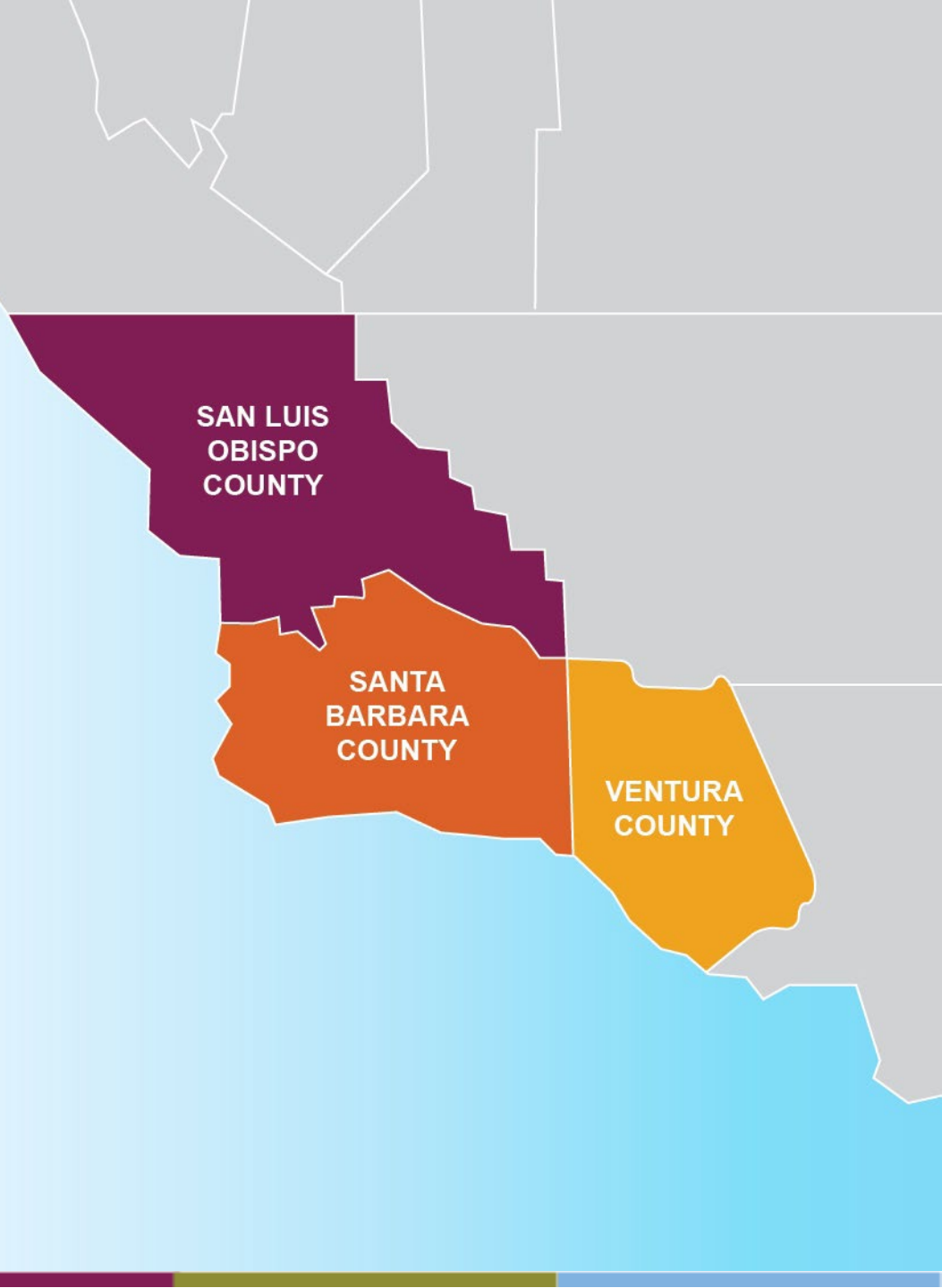
Zoom Orientation

- 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

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
805.220.9991

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

3C-REN
Staff Online

Home Remodeling

Fire Resiliency and Electrification

Image via One Sky Homes

ANN V EDMINSTER
DESIGN AVEnues LLC

POLL

Which best describes YOU?

A. Homeowner

B. General contractor

C. Architect

D. Other (explain in chat box!)

Home Remodeling

Fire Resiliency and Electrification

Definitions & Benefits

- Electric Upgrade Options
- Making a Transition Plan

Electrification Means …

- No “natural” gas or propane-fired equipment

100% ELECTRIC:

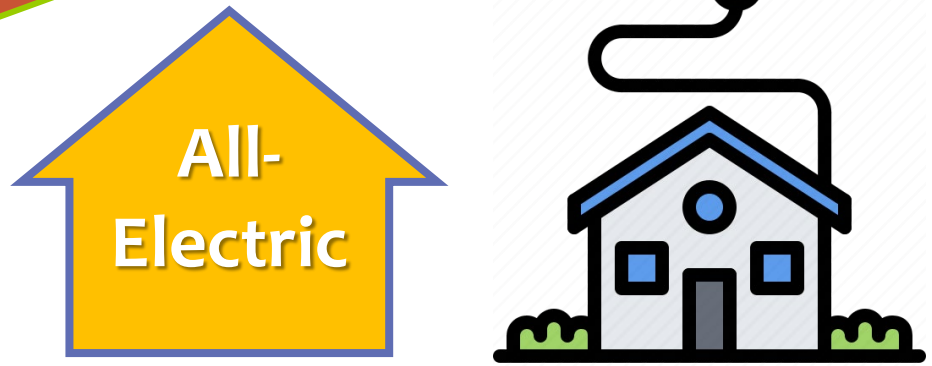
- Heating+cooling
- Water heating
- Cooking
- Clothes drying

Benefits of Electrification

Electrification benefits include:

- Less indoor air pollution
- Fewer kitchen safety risks
- Improved equipment
- Lower greenhouse gas emissions
- Avoided gas price increases
  (CA rates expected to double by 2050)

An all-electric home emits 40% less greenhouse gas than an equivalent home powered by natural gas, saving >1 ton of CO_2 per year**



** smud.org/en/Going-Green/Smart-Homes

But … Efficiency First! (whenever possible)

Efficiency benefits include:

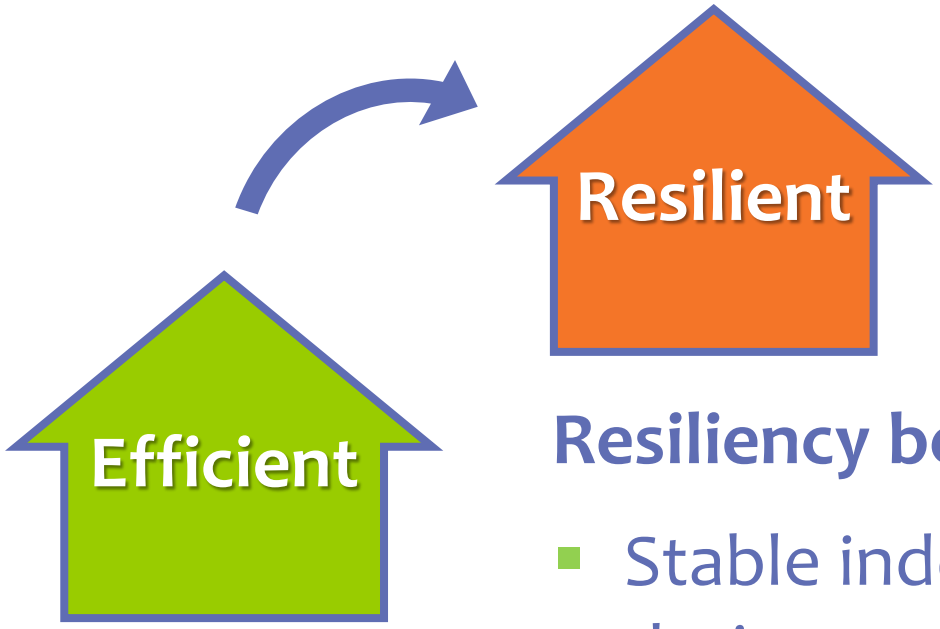
- Improved comfort indoors
- Reduced overall energy use

Efficient

All-Electric

Critical—
as electric rates
are often higher
than gas

… And Efficiency Begets Resiliency



Resiliency benefits of efficiency include:

- Stable indoor temperatures, even during power outages!
- Greater protection of indoor air quality
- Reduced wildfire vulnerability

A life safety feature!

Efficiency + Resiliency Example

Thermal + Fire Resiliency—WALLS

- **Remove deteriorated siding, then—**
- Air seal
- Install new cavity insulation
- Add non-combustible continuous exterior insulation
- Install new, non-combustible siding

Dual benefit

Efficiency benefit

Dual benefit

Fire safety

Efficiency + Resiliency Example

Thermal + Fire Resiliency—GLAZING

- **Replace large expanses of single glazing with new windows—**
- Dual-glazed — **Dual benefit**
- Tempered (both panes) — **Fire safety**
- Metal-clad (no vinyl!) — **Fire safety**
- Compression closing — **Dual benefit**

Efficiency + Resiliency Example

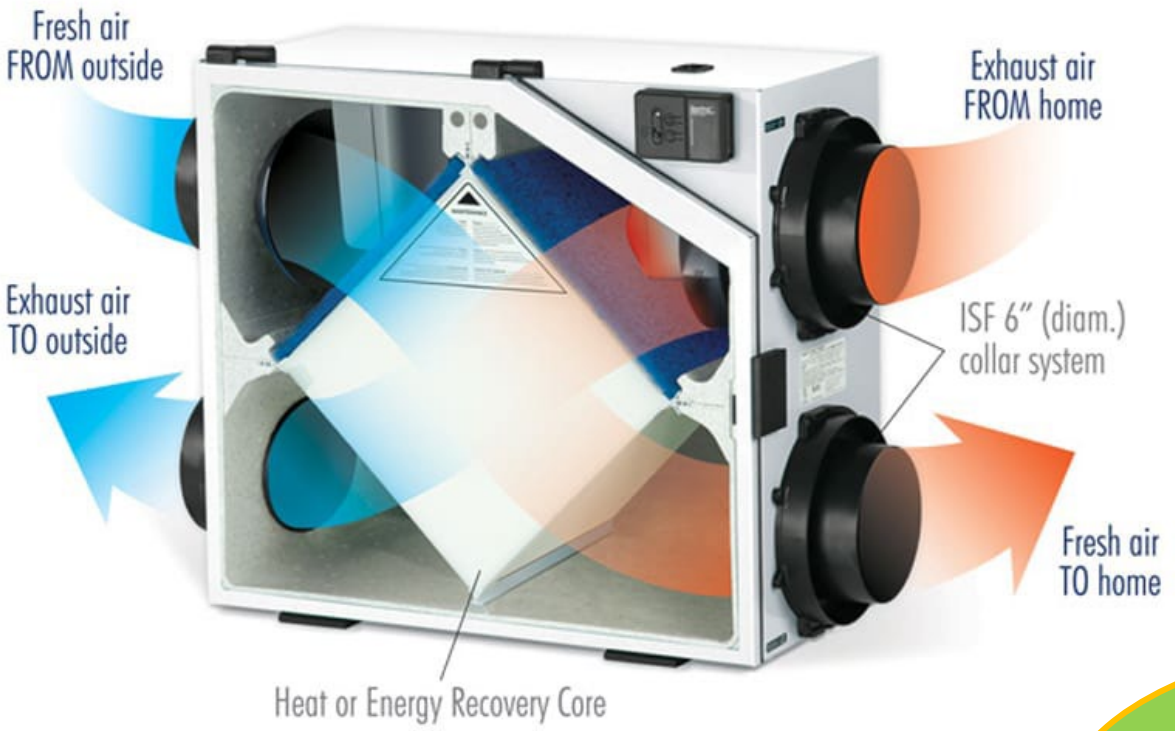
Thermal + Fire Resiliency—VENTS

- **Eliminate roof and crawl space vents—**
- Insulate at roof plane instead of ceiling
- Insulate crawl space walls instead of under floor
- Install new mini-splits & ducting in newly insulated attic & crawl space

Dual benefit

Efficiency benefits

Efficiency + Resiliency Example



Thermal + Fire Resiliency—VENTILATION

- Install heat- or energy-recovery ventilation system(s) in newly insulated attic and/or crawl space

Health benefit … especially during wildfire season!

Efficiency benefit

Efficiency + Resiliency Example

Thermal + Fire Resiliency— SKYLIGHTS

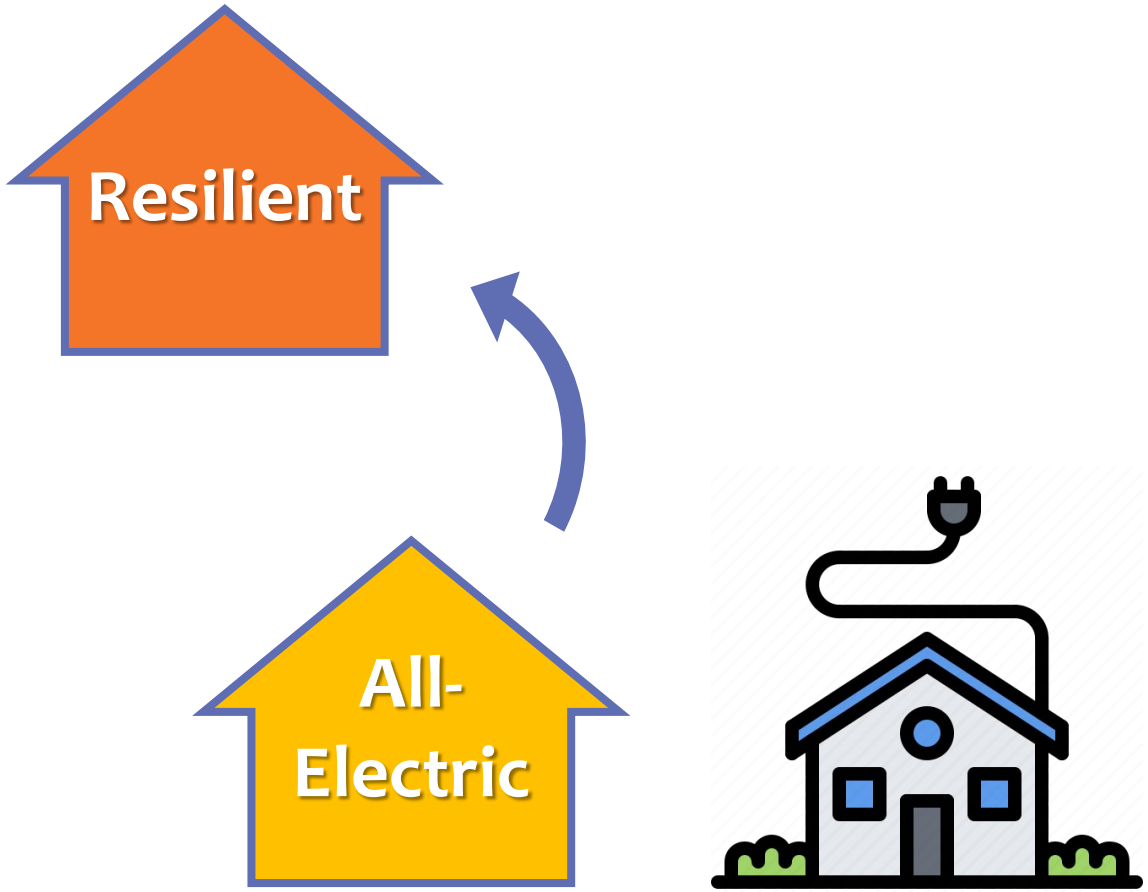
- If you are due for a roof replacement and/or adding solar—
- Consider eliminating/reducing skylights!

NEW CONSTRUCTION? JUST SAY NO!

Electrification Improves Resiliency

Resiliency benefits of electrification include:

- Power restored faster after outages
- No onsite explosion risks



Electrification Improves Resiliency

Electrification with distributed energy resources (e.g., solar + battery) **yields *more* resiliency benefits:**

- Utility savings month over month
- ~4% increased resale value*
- Clean, carbon-free energy
- Power when the grid goes down

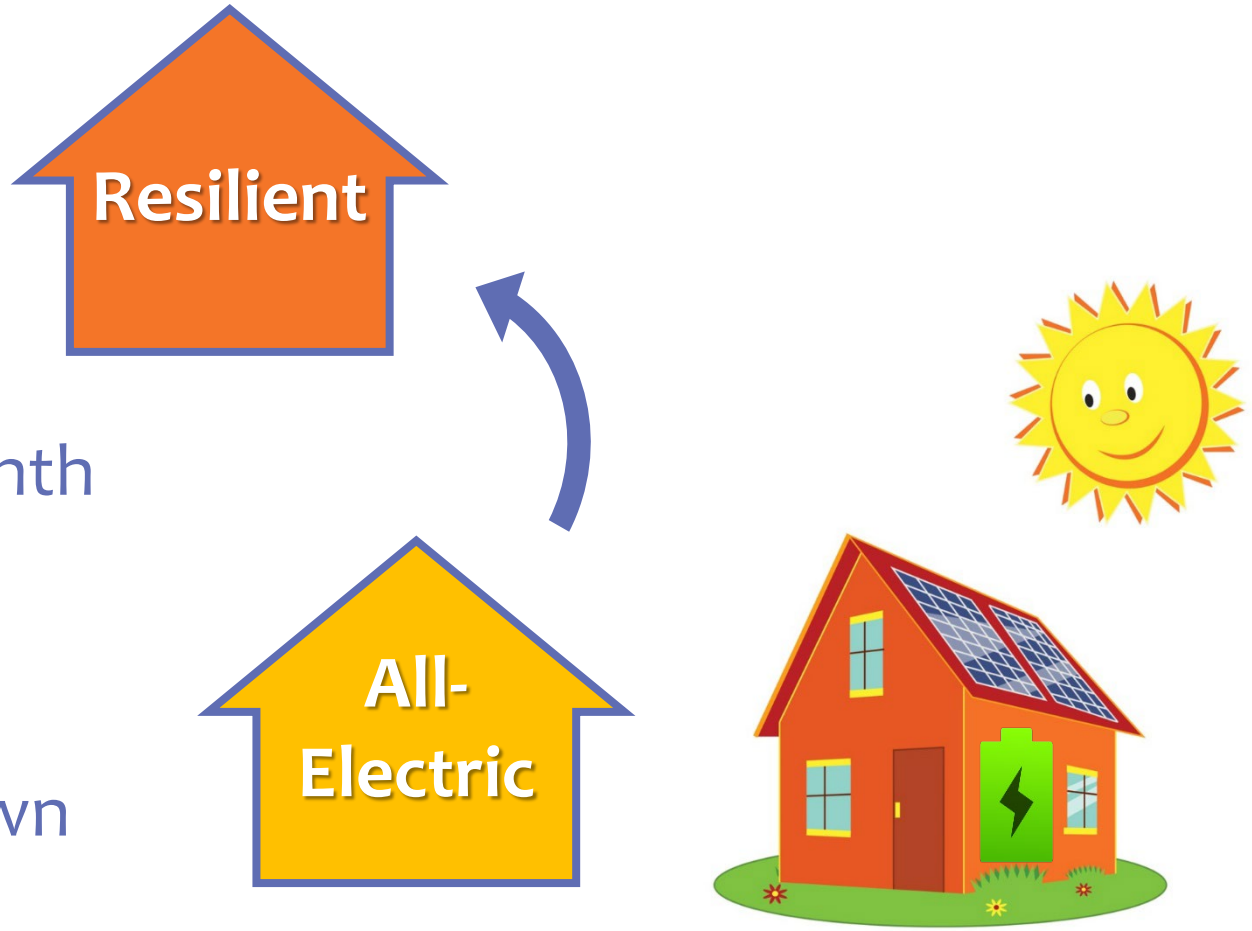


Image Xana_UKR via iStock

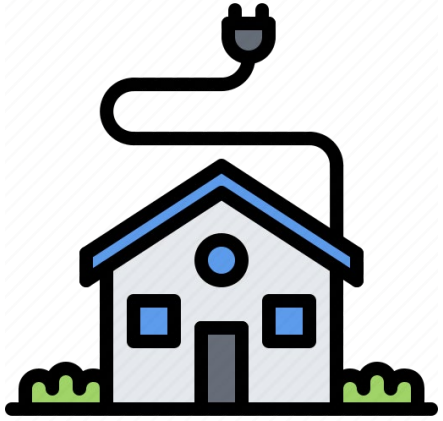
* money.com/home-value-solar-panels/

WIN + WIN + WIN

Efficient

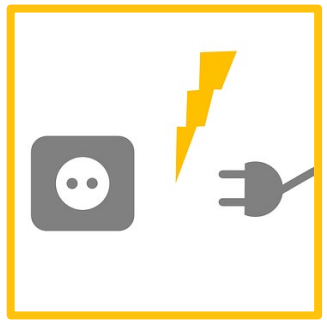
Resilient

All-Electric



Home Remodeling

Fire Resiliency and Electrification



- Definitions & Benefits
- **Electric Upgrade Options**
- Making a Transition Plan

Electric Space Heating

Mini-split heat pump

- Ducted or ductless
- Good for efficient homes & small spaces
- $1,000 - $5,000 + labor

HEAT PUMPS provide efficient, quiet heating *and* cooling

One Sky Homes contractor, PassiveHouse BB architect, Treve Johnson Photography

Standard heat pump

- Ducted
- Good for larger & less efficient homes
- $2,000 - $8,000 + labor

Electric Water Heating

Heat pump water heater

- Needs more air space around it than a conventional unit
- Larger capacity is recommended
- $1,800 - $2,500 + labor
- Incentives available from some utilities

HEAT PUMP WATER HEATERS are ~300% efficient and can save $hundreds per year in utility costs

Tankless

- Most compact option
- Much less efficient than heat pumps
- $200 - $3,000 + labor

RESOURCE:

City of Berkeley heat pump water heater page

Induction Cooking

Induction range / cooktop

- Uses ***magnetic*** technology
- Requires steel/iron-based cookware
  (copper bottoms OK)
- There's a learning curve – heats much faster!
- $1,000 - $4,000

INDUCTION RANGES

- Cleaner
- Safer
- Better control
- Cooler

Electric Clothes Dryers

Standard electric

- Faster drying time
- $350 - $1,900

All dryers look pretty much the same

Heat pump

- *Much* longer drying time
- Lower heat, gentler on clothes
- Don’t require venting
- Use ½ the energy
- $1,100 - $1,900

Fireplaces

OR
no fireplace
for better air quality!

Electric

- You can't make s'mores
- $300 - $6,000

Outdoors

- It's really *FIRE!*
- $100 - $500

Pool & Spa Heating

Heat Pumps

- Run on photovoltaics (PV)
- Adult supervision required! ☺

Pool heating is evolving – new analysis suggests that PV + heat pump most cost-effective approach

RESOURCES:

- ❑ CleanTechnica article, 2013 (not 100% up-to-date, but some good info)
- ❑ Webshop article, 2018 (more current, but EU-focused)

Solar Thermal

- Glazed
- Unglazed

Renewable Energy

- **Electric demand met by clean energy sources—**
  - **Onsite solar electric (photovoltaic) system**

  and/or

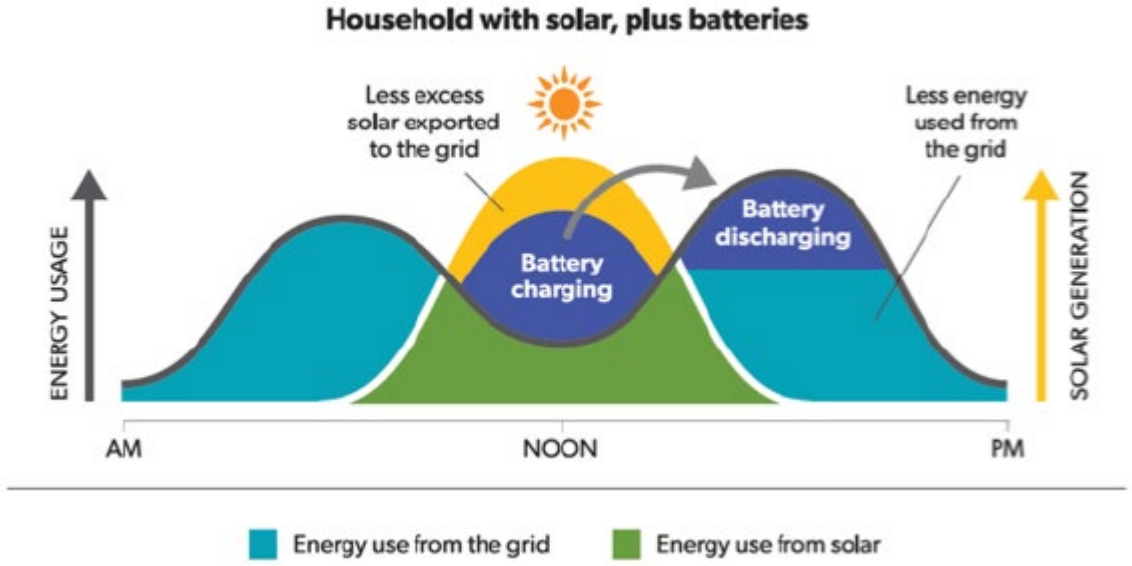
  - **Renewable energy provider**
    - ✓ Utility
      (100% renewable is usually a premium service)
    - ✓ Community choice aggregator
      (https://www.epa.gov/greenpower/community-choice-aggregation)

Home Batteries

- **Backup power:** Use stored electricity when the grid goes down
  - Critical loads
  - The whole home

Keep on cookin'!

- **Solar self-consumption:** Store excess daytime production, use during high-demand, high-cost periods
  - Good for the grid
  - Good for the pocketbook



Home Remodeling

Fire Resiliency and Electrification

- Definitions & Benefits
- Electric Upgrade Options
- **Making a Transition Plan**

1

Plan Ahead:
List All Electric Wish List Items

New equipment?

+

Electric vehicles?

+

Battery storage?

2 Reduce Demand: Update Electric Equipment & Appliances

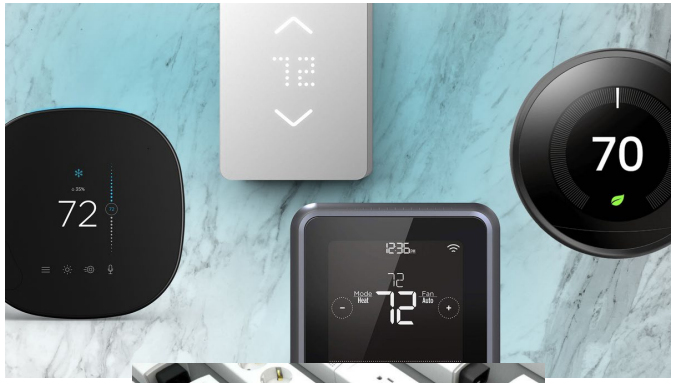
- Select "best in class" lighting

RESOURCES:

California Lighting Technology Center, UC Davis

- ❑ Residential Lighting
- ❑ Liberty Lighting Guidelines for Zero Net Energy Communities

- Install smart thermostats & power strips



Save energy *and* water!

- Replace showerheads & faucets with EPA WaterSense models

2

Reduce Demand:
Update Electric Equipment & Appliances

Appliance listings at:

- energystar.gov/products/most_efficient

Most Efficient 2019 ENERGY STAR www.energystar.gov

- cee1.org
- marketplace.pge.com

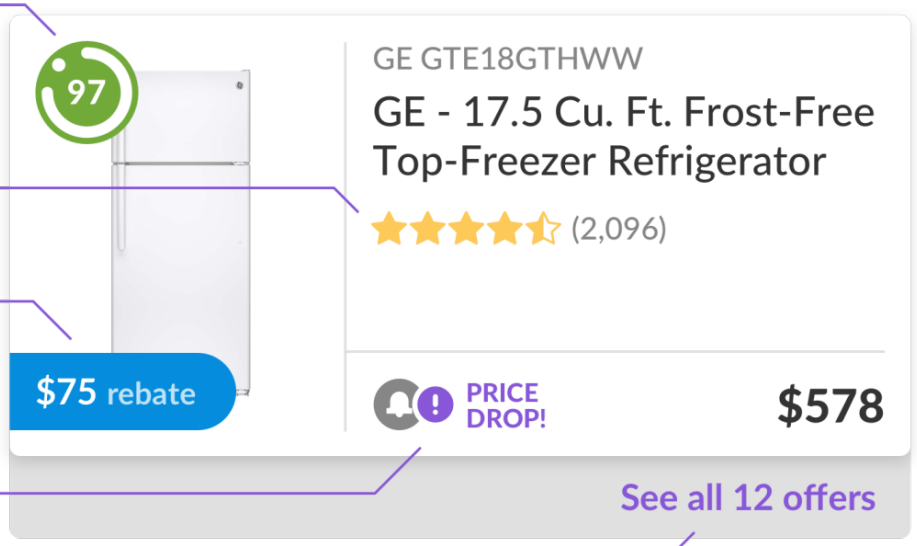
Enervee Score shows energy efficiency 0-100

User reviews from all major retailers

Utility rebates

Email price alerts

Daily offers from hundreds of retailers



3

Reduce Demand:
Improve Enclosure Efficiency

EVALUATE & CONSIDER:

- **Air sealing attics, crawlspaces, & other gaps**
- **Upgrading insulation**
  - Attics
  - Below floors
  - Walls

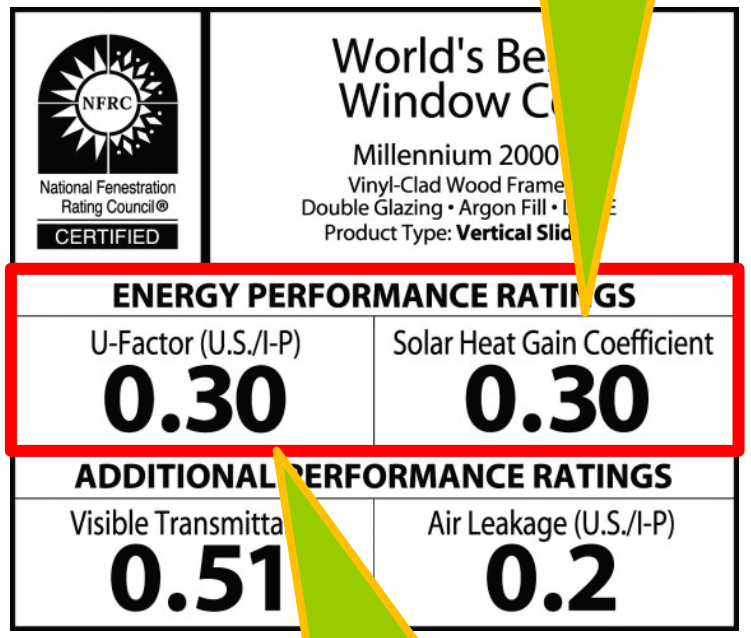
Poorly installed insulation is the NORM!

3

Reduce Demand:
Improve Enclosure Efficiency

EVALUATE & CONSIDER:

- **Replacing older windows to reduce heating need**
  - Single glazing, aluminum frames, leaky/drafty units
  - Select appropriate U & SHGC values
- **Adding shading devices to reduce cooling need**



SHGC ≤ 0.30 = less heat gain

U-factor ≤ 0.30 = less heat loss

4

Check Electrical Capacity:
Ensure Adequate Electric Service

Add enough capacity, circuits, and outlets for everything planned:

- Heat pump (heating/cooling)
- Electric water heater (heat pump or tankless)
- Electric dryer
- Induction range
- EV charger
- Photovoltaics
- Battery system

OR ...

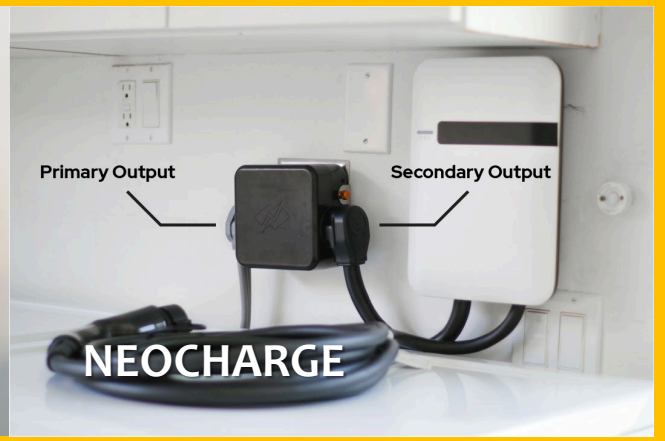
4

Check Electrical Capacity:
Ensure Adequate Electric Service

Go on an "AMP DIET" with:

- **Plug-sharing devices**
  - Dryer + EV
  - Two EVs, etc.
- **Low-amperage equipment**
  - Combined condensing washer-dryer
  - Low-amperage heat pump water heater

DRYER BUDDY




Washer-dryer


15 Amps

5

Improve Performance:
Upgrade Heating & Cooling Systems

Install new, high-efficiency ELECTRIC HEAT PUMPS for space & water heating

PLUS:

- Make sure equipment is sized properly
- If possible, locate air handlers in heated area of home ("conditioned space")
- Test duct system and airflow and improve, if needed

Insist on getting an ACCA* calculation for heating & a/c

*Air Conditioning Contractors of America

System-wide improvements can double performance & cut demand in half

6

Power Up:
Choose Renewables &/or Batteries

INSTALL SOLAR ONSITE:

- **Have a vendor estimate the size and cost of a solar/battery system that will meet your needs** (including 30% federal tax credit!)

OR:

- **Choose local utility provider's 100% clean electricity plan** (if available)

RESOURCES:

- ❑ Energy Sage: using the federal tax credit for solar
- ❑ Energy Sage: using the federal tax credit for batteries
- ❑ Green Change: home battery guide

Tax credit available!

7

Phasing:
What To Do When?

REPLACE EQUIPMENT BEFORE FAILURE:

- **Determine age & life expectancies of appliances**
- **Avoid failures – replace early!**

Find furnace, a/c, water heater age at https://www.building-center.org/

Appliance	Average Life Expectancy	Replace After Years
Gas water heater	13	10-12
Gas furnace	18	15-16
Air conditioner	10-15	8-10
Gas range	12	10
Clothes dryer	13	10-12

7

Phasing:
What To Do When?

ANALYZE BENEFITS OF DOING THINGS TOGETHER:

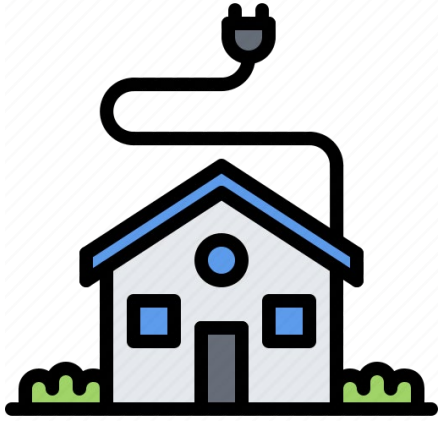
If you …	then consider …
Will have an electrician onsite	Is it cheaper to have some changes made before you need them?
Plan to buy an electric vehicle in the near future	Could fuel savings help offset the cost of upgrades?
Want batteries along with a solar electric system	Will they help you save on peak afternoon & evening electric rates?
You're doing any other remodeling	Are there performance improvements that can easily be made at the same time?

WIN + WIN + WIN

Efficient

Resilient

All-Electric



POLL

Which of the following should you do FIRST?

A. Install solar panels

B. Replace your furnace with a heat pump

C. List all the electric items you plan to get in the future

D. Replace your old appliances

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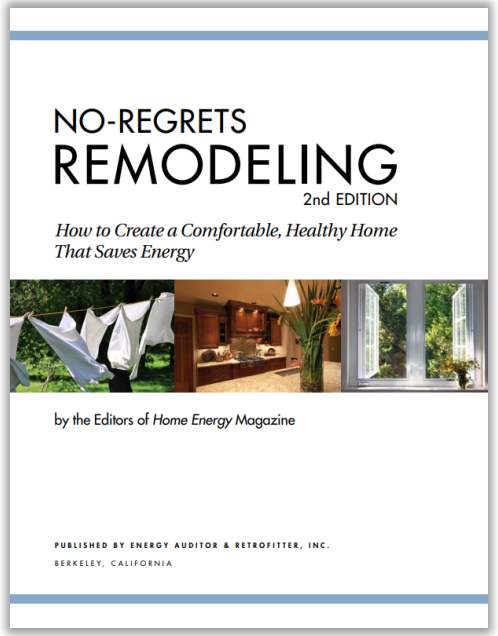

No Regrets Remodeling

Download here

Thank you!

All-Electric Home Retrofit Guide

Download here

ZNE Primer for Architects

Download here

AnnEdminster.com

- Green building consulting
- Design team facilitation
- Writing, research, advocacy

The Switch Is On

Visit here

Closing

- Continuing Education Units Available
  - Contact shuskey@co.slo.ca.us for AIA LUs
- Coming to Your Inbox Soon!
  - Slides, Recording, & Survey – Please Take It and Help Us Out!
- Upcoming Courses:
  - Green Real Estate Marketing (9/30)
  - Solar PV: Technology and Valuation (10/3)
  - Water Heating Distribution Best Practices (10/4)
  - 2022 Energy Code: Existing Buildings, Additions, and Alterations (10/6)
  - Certified Passive House Tradesperson (10/10 – 10/14)
  - Carbon Free Homes: Features, Benefits, Valuation (10/17)
  - 2022 Energy Code: Accessory Dwelling Units (ADUs) (10/20)
  - Selling High Performance Homes (10/24)
  - HRVs and ERVs for Passive House Applications (10/25)
  - Communicating the Value of High Performance (Ongoing Invitation)
  - Become a HERS Rater (Ongoing Invitation)

Thank you!

For more info:
3c-ren.org

For questions:
info@3c-ren.org

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TRI-COUNTY REGIONAL ENERGY NETWORK

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