

Kicking Gas! Going All-Electric

for the Health of Your Family and the Earth



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Learning Objectives

After attending this presentation, attendees will be able to:

- Explain the benefits of electrifying homes to clients, friends, and family
- Understand how electrification supports resiliency goals
- Differentiate between the two electric alternatives to each of the four typical residential gas appliances
- Create a customized home electrification roadmap

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Definitions & Benefits

- Electric Upgrade Options
- Making a Transition Plan

Going All-Electric Means ...

- No “natural” gas or propane-fired equipment

100% ELECTRIC:

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



Benefits of Going All-Electric

Electrification benefits include:

- Less indoor air pollution
- Fewer kitchen safety risks
- Improved equipment
- Lower greenhouse gas emissions
- Avoided gas price increases
(e.g., 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 CO₂ per year**

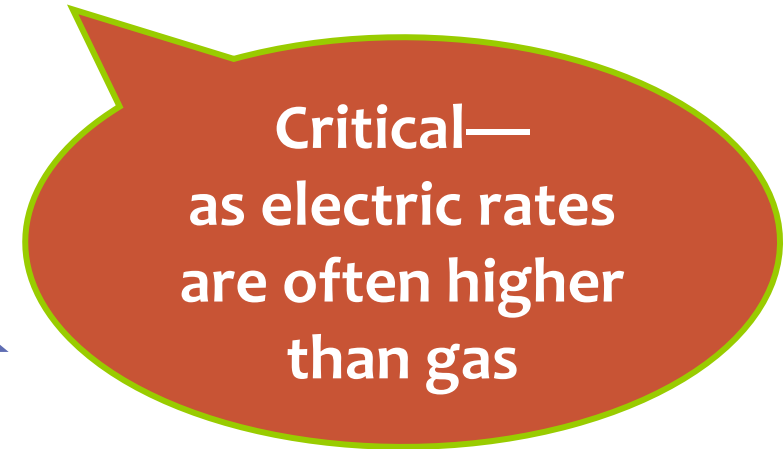
All-
Electric



But ... Efficiency First! (whenever possible)

Efficiency benefits include:

- Improved comfort indoors
- Reduced overall energy use



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

Efficiency + Resiliency Example



Thermal + Fire Resiliency—WALLS

- Remove deteriorated siding, then—

- Air seal  Dual benefit

- Install new cavity insulation  Efficiency benefit

- Add non-combustible continuous exterior insulation

- Install new, non-combustible siding  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!)

- Compression closing

Fire
safety

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

Electrification Improves Resiliency

Resiliency benefits of electrification include:

- Power restored faster after outages
- No onsite explosion risks



Electrification Improves Resiliency

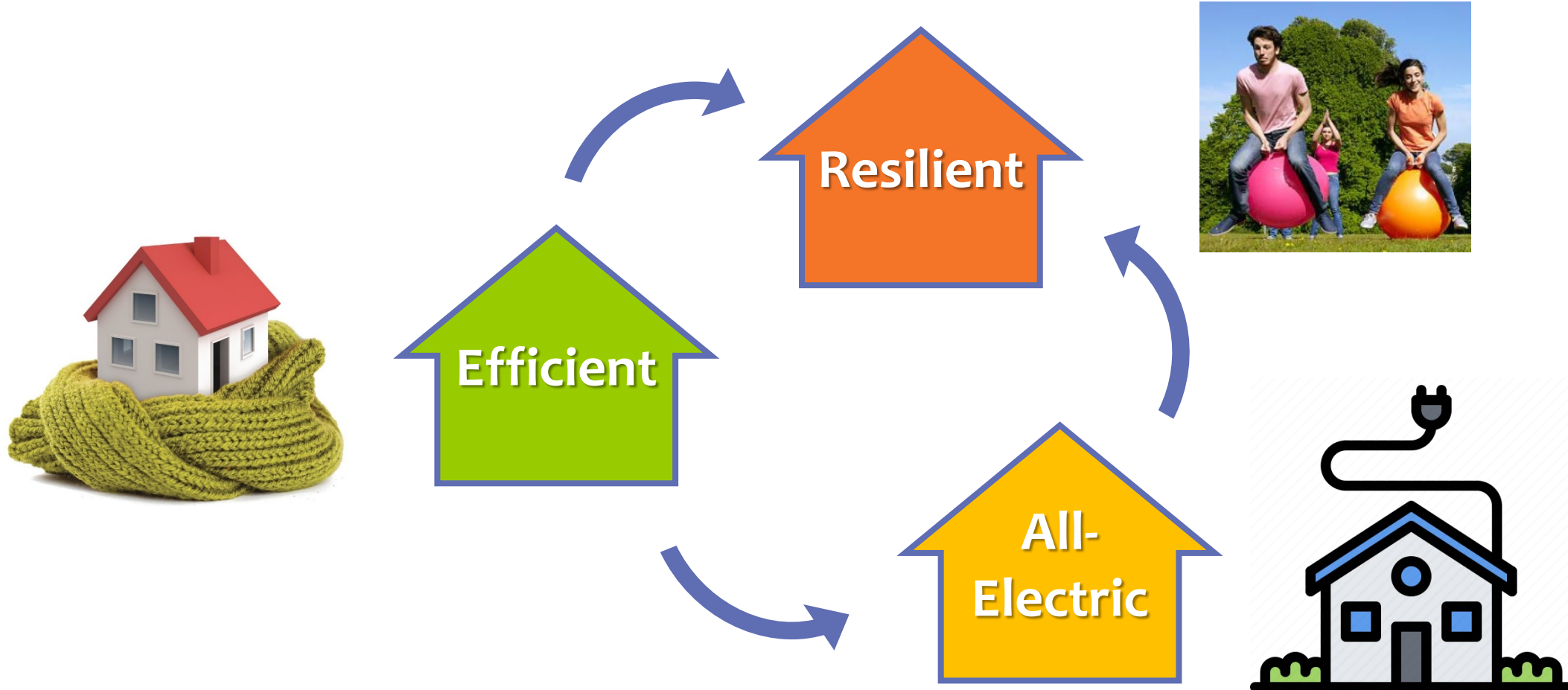
Electrification with **distributed energy resources** (e.g., solar + battery) yields *more* resiliency benefits:

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



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

WIN + WIN + WIN



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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, PassiveHouseBB 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 + installation 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 + installation 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
- Venting not required
- 50% less energy use
- \$1,100 - \$1,900

Fireplaces



Electric

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

OR
no fireplace
for better air
quality!

RESOURCE:

❑ [Modern Blaze](#)



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



Solar Thermal

- Glazed
- Unglazed

RESOURCES:

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

Renewable Energy

- Electric demand met by clean energy sources—
 - Onsite solar electric (photovoltaic) system *and/or*
 - Renewable energy provider
 - ✓ Utility
(usually premium service for 100% renewable)
 - ✓ Community choice aggregator
(<https://www.epa.gov/greenpower/community-choice-aggregation>)



Home Batteries

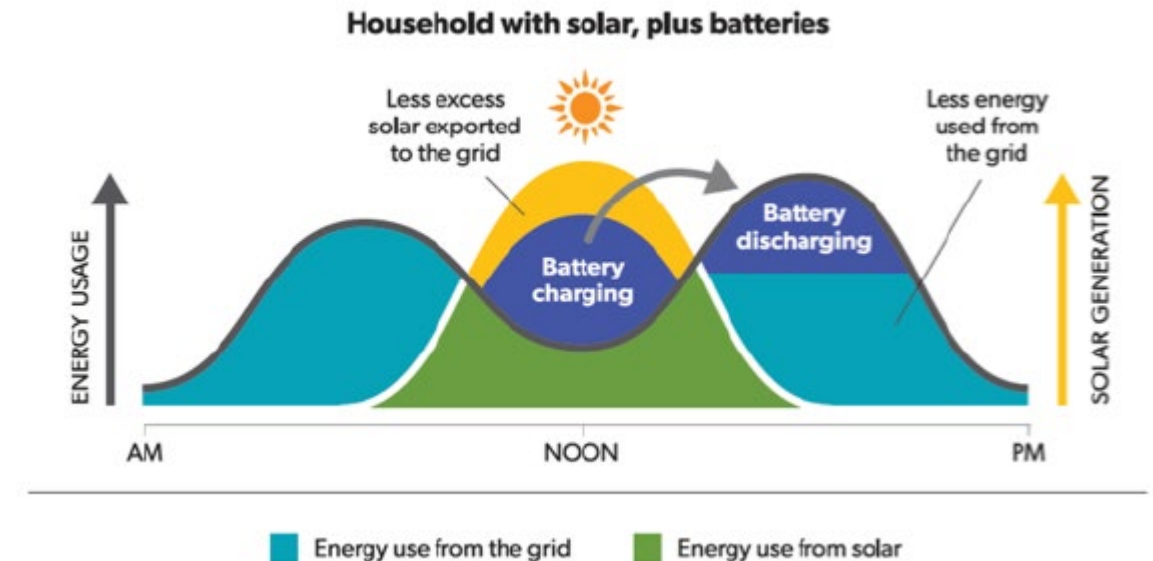
- **Backup power:** Use stored electricity when the grid goes down

- 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



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- 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: Replace Dated Lighting & Appliances

■ Select “best in class”

- Lighting
- Appliances
- Electronics

100%
LEDs



TheLEDlight.com

RESOURCES:

California Lighting Technology Center, UC Davis

- ☐ [Residential Lighting](#)
- ☐ [Liberty Lighting Guidelines for Zero Net Energy Communities](#)

Listings at:

- energystar.gov/products/most_efficient
- cee1.org
- choose.enervee.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



GE GTE18GTHWW
GE - 17.5 Cu. Ft. Frost-Free
Top-Freezer Refrigerator

★★★★★ (2,096)

\$75 rebate

PRICE
DROP!

\$578

See all 12 offers

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



 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P) 0.30	Solar Heat Gain Coefficient 0.30
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance 0.51	Air Leakage (U.S./I-P) 2

**Choose appropriate
values for your climate!**

RESOURCES:

- ❑ [Energy Star window specs](#) (good)
- ❑ [LEED for Homes specs](#) (better/best)

4

Check Electrical Capacity: Upgrade 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: Avoid an Electric Service Upgrade

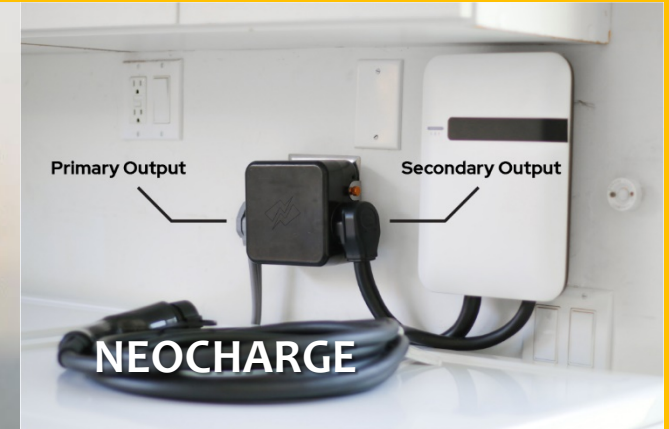
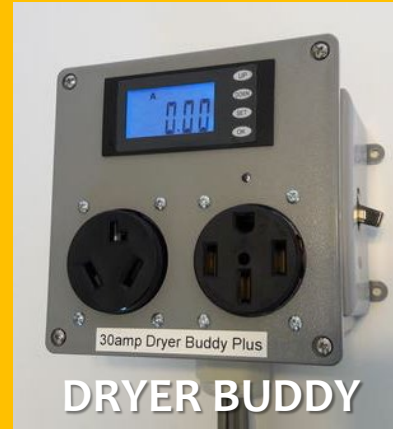
Go on an “Amp Diet” with:

- **Plug-sharing devices**

- Dryer + EV
- Two EVs, etc.

- **Low-amperage equipment**

- Combined condensing washer-dryer
- Low-amperage heat pump water heater



5

Improve Performance: Upgrade Heating & Cooling Systems

Install new, high-efficiency
ELECTRIC HEAT PUMP

PLUS:

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

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

Insist on getting an
ACCA* calculation

*Air Conditioning Contractors of America



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 26% 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!**

Phasing: What To Do When?

REPLACE EQUIPMENT BEFORE FAILURE:

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

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

Find serial #s
and look up
appliance age
<https://www.building-center.org/>



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



*Thank
you!*



AnnEdminster.com

- Zero energy consulting
- Design team facilitation
- Writing, research, advocacy