Why electrify?

- Methane: Global warming impact 84 times higher than CO$_2$ over a 20-year period
- Strong, rapid reduction in methane emissions would curb global warming and improve air quality
3 Main Opportunities to Electrify

- Heating and Air Conditioning
- Water Heating
- Appliances and Efficiency
Many Organizations Working on Electrification
Sample framing question:
What are the variables that impact the level of residential carbon emissions

- Home heating & cooling
- Weatherization
- Plug load consumption
- Landscaping
- Appliance energy consumption
- Electric car use
- Waste production
The Process

Stakeholder Workshop #1

Focus Group: Contractors

Focus Group: Homeowners

Stakeholder Workshop #2

Oct. 28

Dec. 1

Dec. 2

Dec. 9
## Stakeholder Workshop #1

**GOAL:** Look at primary parts of the system. Identify key players, opportunities, and barriers.

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<td>HVAC</td>
<td>Access to capital</td>
<td>Solar</td>
<td>Building trends</td>
<td>Permitting</td>
<td>Purchasing preferences</td>
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<td>Water heating</td>
<td>Rebates</td>
<td>Battery</td>
<td>Contractor and supplier behavior</td>
<td>Building codes</td>
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<td>Kitchen appliances</td>
<td>Tax credits</td>
<td>Resilience during power shut-offs</td>
<td>Price signals</td>
<td>Restrictions</td>
<td>Overall knowledge</td>
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<td>Electrical appliances</td>
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<td>Real estate trends</td>
<td>State law</td>
<td>Health concerns</td>
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<td>Ordinances</td>
<td>Attitudes about comfort &amp; convenience</td>
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**GOAL:** Discover barriers and opportunities to converting single-family homes from natural gas to electricity, especially heat pump water heaters.
Focus Group Ideas – Program Design

- Revamp rebate programs
  - They are currently inconsistent and uncoordinated
  - Consider product incentives AND outcome incentives
  - Instant rebates are popular

- Overcome emergency-driven choices and actions
  - Loaner program
  - “Cash for clunkers” rebate: extra incentive for early retirement of working appliances

- Support whole-home electrification
  - Combine technical & financing assistance through one central contractor & no extra charge to customer (e.g. supported by utility or county) (e.g. Boulder program)
  - Provide incentive for bundling/whole-house approach

- Simplify financing
  - Desire for simplified, accessible financing, including “on-bill” financing
  - One large contractor provides financing through Service Financing
Focus Group Ideas – Information & Education

- Enhancements to home advisor service
  - Knowledgeable about technologies, financing options, how to work with contractors, costs and “ripple” effects (e.g. needing upgrades to panel, changes to roofing material, ducting or plumbing changes, permitting requirements)
  - Would like a comprehensive “road map” of the full process and considerations of electrification
- Would like a directory of qualified contractors with customer ratings
- Create education sessions to help homeowners understand the process
Focus Group Ideas - Programs

- Group purchasing
  - Variation on Sunshares program - Maybe focus bundling on specific commodities like HPWH or electrical panel upgrades that don’t vary as much across customers segments
  - Target outreach to certain types of homes that are likely ripe for appliance upgrades (new homeowners who may plan to remodel, houses that are 8 to 15 years old)

- Create support networks
  - Contractors may like a LinkedIn group, lists of other vetted contractors, occasional Zoom sessions to share learning
  - Customers talk about an ambassador program so that people could talk with others who have done the work
Focus Group Ideas – Policy/regulatory

- Standardize permitting
  - Streamline installation and inspection process
  - Lower permitting fees, make them the same across cities

- Make permitting simpler
  - Allow copies of permit to suffice for rebates instead of waiting for final
  - Adjust CAS inspection requirements – only require in living space, not garage or not conditioned space
  - Create a special heat pump water heater permit, rather than separate plumbing and electrical permits

- Educate city councils. Foster consistency in messaging and priorities

- Offer a special, low electricity rate for all-electric homes

- Eventual or phased in ban on sale of fossil fuel appliances
Stakeholder Workshop #2

GOAL:

- Get to a list of prioritized “interventions” that would benefit from coordinated, collaborative action
- Identify key players that should be involved
- Designate a “first next step” for each intervention
# 4 Top “Interventions”

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<td>• Minimize paperwork with upstream rebates</td>
<td>• Incremental incentive for residents who replace water heaters that still work</td>
<td>• Financing instrument that emphasizes leveraging public/private partnerships to make it easier for customers to access</td>
<td>• Make it easier for contractors and residents to apply for building permits for electrification installations</td>
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<td>• Start with heat pump water heaters, then additional aspects of electrification</td>
<td>• Market to homeowners and contractors</td>
<td>• Use public capital to make private capital more affordable</td>
<td>• Goal: Statewide Electrification Program (like solar)</td>
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GOAL: Provide detailed cost information to help homeowners better understand the cost of decarbonizing their existing single-family home.

SCOPE:

- 10 case studies - pricing for future work
- Develop outline/template for electrification pathway document presented to homeowners
- Build on other guides, past pilots
Variety of Single-family Homes

- Variety of construction dates (align with Energy Atlas)
- Variety of locations (north county, south county, coast)
- Existing equipment
  - A/C or not
  - 100 amp panel +/-
  - Solar or not
  - Propane vs. natural gas
- Different circumstances (low-income, HOA)
Costs of Different Electrification Pathways

- Panel upgrade vs. not
- Solar (existing solar, add solar, add solar plus battery)
- Add EV charging
- Replace over time vs. whole-house retrofit
Thank you!

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