

Gridworks + Building Decarbonization Coalition
12.18 Roadmapping Session #3 - Sacramento, CA

These notes summarize the December 18 Building Decarbonization Coalition Roadmapping Session #3 facilitated by Gridworks. For a stakeholder list and presentations for this meeting (and for previous meetings), go to <https://gridworks.org/initiatives/building-decarbonization-coalition/> or contact Andrew Spreen at aspreeen@gridworks.org for more information.

Roadmapping Session Meeting Notes

Gridworks asks that you complete a feedback survey to help us continue to improve. [Survey available here](#) until 1.28.19.

Slides for this meeting are [available here](#)

Participation:

The following individuals participated in person:

- Tom Kabat - CFSV
- Kevin Clark - REEM
- Dave Weiskopf - NextGen
- Rick Brown - TerraVerde
- Kevin Wood - SCE
- Michelle Thomas - SCE
- Bob Raymer - California Business Properties Association
- Jan Berman - PG&E
- Panama Bartholomy -BDC
- Peter Turnbull - PG&E
- Aemee Bailey - Silicon Valley
- Sam Beeson - Mitsubishi
- Jenna Tatum - Building Electrification Initiative
- Armen Saiyon - LADWP
- Andy Bilich - EDF
- Mark Lessans - Ingersol Rand
- Jonathan Kevles - Ameresco
- Alejandra Meija Cunningham - Transcendent Energy
- Jennifer Gress- City of Sacramento
- Terra Weeks - CEC
- Obadiah Bartholomy - SMUD
- Katie Wu
- Merrian Borgeson - NRDC
- Nic Dunfee - TRC
- Anna Ferrera - School Energy Coalition
- Margaret Bruce - LGC
- Rachel Golden - Sierra Club
- Martha Brook - CEC
- Chris Walker - CASMACNE
- Tim O'Connor - EDF
- Scott Blunk -SMUD

The following individuals participated remotely:

- Kelly Murphy - Steffes
- Christine Tam - City of Palo Alto
- Steph Wang - California Housing Partnership
- Eric Truskowski - Bradford White
- Barbara Hernesman - WHPA
- Barry Hooper - San Francisco Department of Energy
- Owen Howlett - SMUD

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- Paul Ahrns - Sierra Business Council
- Heriberto Rosales - CEC
- Dominique Hargreaves - City of LA
- Ralph DiNola - NBI
- Courtney Kalashian - Rural Hard to Reach LGP Working Group
- Ben Granholm - California Association of Realtors
- Julia Benabente - City of San Jose
- John Supp - Silicon Valley Clean Energy
- Rory Cox - CPUC
- Rachel Bannon-Godfrey - Stantec
- Jennifer Kamphuis - SCE
- Bruce Severance - Mitsubishi Electric Trane HVAC

Agenda:

- 10:00-10:15 Introductions
- 10:15-11:00 Level-Setting
- 11:00-12:00 Defining Near-term Actions
- 12:00-1:00 Lunch
- 1:00-2:00 Prioritizing Near-term Actions (cont'd)
- 2:00-2:45 Case Studies
 - Soliciting case study input from the Coalition
- 2:45-3:00 Wrap Up/Next Steps

Brief Introduction from Matthew and Panama:

Expectation of the day is to evaluate the priority actions for the next 12-18 months, understand their current status and make sure that the overall specifications, status, and actors reflect feedback from the Coalition members with an opportunity for all to review on the next draft. Notably these are the near term actions and **not** an exhaustive list of actions to achieve decarbonization.

The current Roadmap reflects comprehensive input (2 sessions, nearly 100 stakeholders, 3 drafts, 21 priority actions, and 35 goals across 6 distinct areas), but today we are looking to strategize over the near term. Actions have not been taken off the table, but streamlined and refined.

General feedback highlight is that the existing Roadmap is somewhat redundant and should be streamlined. This feedback is being incorporated and the next draft of the Roadmap will reflect these comments.

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The following outline of the streamlined actions and their associated actors outlines the current points in the draft and served as an initiation point for discussion.

| Key Initiatives: | Building Decarb Coalition | Utilities | CCAs | Manufacturers | CEC | CPUC | Local Governments | Workforce Associations | Environmental NGOs |
|---|---------------------------|-----------|------|---------------|-----|------|-------------------|------------------------|--------------------|
| #1: Upstream Incentive Programs | | ● | ● | | | ● | | | |
| #2: Long Term Customer Incentives | | ● | ● | | | | ● | | |
| #3: Builder Support | ● | | | | | | | | |
| #4: All-Electric Development and Building Recognition Program | ● | ● | ● | ● | | | | | |
| #5: Contractor Support and Accreditation Program | ● | ● | ● | ● | | | | | |
| #6: General Marketing Campaign | ● | | | | | | | | |
| #7: Induction Cooktop Campaign | ● | ● | ● | ● | | | | | |
| #8: Building Electrification Finance | ● | | | | | | | | |
| #9: Electrical Panel Upgrade and Service Innovation Programs | ● | | | | | | | | |
| #10: Reach Code Support | ● | | ● | | | ● | | | |
| #11: Legacy System Evaluation | ● | | | | | ● | | | |

- Barry Hooper - Surprising that the CEC is not lead for more actions
- Julie Benabente - Seems like local governments have the opportunity to play a greater role in many of the actions
- Rory Cox - Seems reach code support should be CEC, not CPUC
- Christine Tam - Utilities should be involved in legacy system evaluation, and possibly panel upgrade programs
- Rachel Bannon-Godfrey - What category does the architecture and engineering profession fall under? We need to get them involved at the design and retrofit stage when decisions are being made about the utilities and equipment being designed into buildings
- Christine Tam - While Utilities may not be able to rate-base panel upgrade, they could offer rebates to help customers with panel upgrade, a key step to electrifying home appliances
- Merrian Borgeson- Environmental NGOs will need to play a key role in being involved on many of these actions.
- Martha Brook - There is space for more local and state level government intervention
- Jonathan Kevles - How are these actions being evaluated overall? Is market segmentation being considered in how these different actions are being addressed (residential/commercial/new construction/retrofit)?

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- Bob - Space for the CEC to take more action
- Matthew: Given the short term focus on many of these actions the CEC may be limited in their time to take action, but they will certainly be involved over the longer term.

Action 1: Upstream/Midstream Incentive Programs

- **Status: Square 0** - No programs currently being piloted or otherwise being considered right now.
- SCE - Partial or complete all-electric retrofits?
 - Difference between partial and all-electric can be a significant cost for retrofits vs new construction
- Martha - SB1477 → Emphasis on commercial/all building sectors in the action is ignoring that SB1477 is specifically about residential.
- Peter - Consider tiering incentives, partial-electric and all-electric conversion incentives
- Barry Hooper - Role for considering electric rates under action 1?
 - Agreement with edit on clarifying extent of this action (Commercial/residential all-electric/steps towards electric)
- Rory Cox - The SB 1477 is specific about CPUC being lead. I really agree with Peter's comment. How about "offering retrofits leading to all-electric buildings."
- Christine Tam - Is the Regional HPWH market transformation program that includes an upstream incentive to distributors covered under Priority Action #1? BayREN/StopWaste is leading the Regional HPWH market transformation program, with some funding from BAAQMD, but will need additional \$ to help pay for the upstream incentives
- CEC: Given the shorter time frame for these actions it may be better to keep this action narrowly focused on 1477 rather than wrapping commercial and "all electric" goals in as well

Action 2: Customer incentive program

- **Status: Square 1.1** - Very little in place, SMUD and some CCAs have programs that are looking to launch; San Joaquin Valley proceeding in 2019 as well
- Rick Brown: Prop 39 clean energy jobs act - tons of new HVAC and other jobs focusing in this area -potential for a focus on schools as a template to follow
- Rory Cox - Include CPUC language re:SB1477 funding since this is focused on customers/residential
- SCE - Need to be sensitive to ongoing costs and impact to customer bills
- **Benefits should be reviewed and clarified regarding who benefits: customers, utilities, other(?)
- CEC: Keep displacement in mind as well as replacement. The NE sees many heat pumps installed that are meant as supplemental systems

Action 3: Builder Support

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- **Status: Square 1** - Very beginning, minimal progress to date (Sunnyvale Green Building Program could be an example)
- Link between this and outreach/awareness in the broader context of the Coalition goals. Many builders will also need some backing for awareness.
- In many communities the legacy systems are being broadly installed for commercial use, residential is typically secondary
- Aimee - Sunnyvale has a program focusing on adding sq footage to the permits when built to a higher green standard
- Aimee - Recommendation to include commercial building support under this action as well (CEC concurs)
- Christine Tam - Many newer larger multifamily structures include commercial spaces on the ground/low level floors with additional residential floors above
- Alejandra - More descriptive policy actions (How do these things look in January?)
- Margaret - Realtors should be included as contributors as well

Action 4: All-electric development and building recognition program

- **Status: Square 1** - LEED and Prop 39 (ZNE) can set examples, but minimal groundwork so far
- Alejandra - The scope of this action needs to be clarified for what the 18 month timeline/goal looks like
- Ralph NBI - Many activities (prop 39 school retrofit program includes a recognition program as well) - Scope, criteria, etc should be easily adaptable to this sort of program
- Anna - Public buildings may not have as much of an opportunity based on funding
- Remove "certify" from the action text - Peter Turnbull and Jonathan Kevles
- Anna - Schools require an OK from the Division of the State Architect before making changes.
- John Supp - How could this match with existing city Benchmarking initiatives? How about existing LEED/BuildItGreen/HERS certifiers?
- John Supp: IMT worked with the realtor associations on a "Greening the MLS" to include energy profile in home profiles. How about included "all-electric" designation or include the discussed award.

Action 5: Contractor Support and Accreditation

- **Status: Square 1.1** CEC has resources available for DERs via EPIC, some utilities have residential contractor assessments, CSLB has a similar program for solar contractors
 - Note from SMUD that many contractors are familiar with
- New York recently completed research in this area focusing around accreditation
- Christine Tam: Based on my previous outreach to CSLB, the C-46 permit can work on solar PV or solar thermal, but cannot do plumbing work such as water heater change outs. For a HPWH installation, CSLB currently recommends C36-Plumbing classification for the plumbing work, and a C10-Electrical contractor to install the 220V conduit. Most

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plumbers do not have a C-36 license. I meant most plumbers do not have C-10.

According to CSLB, C-46 can install a HWPB only if there's a solar aspect to the project

- Kelly Murphy: Great point - Aslo, PV crews rarely have a plumber on the crew - making a special category as a "tweener" or crossover would be beneficial
- Kelly Murphy: On Priority Action #5 - bullets #3 and #4 – how about utilizing the California Association of Building Energy Consultants - CABEC - non-profit that includes a voluntary Certified Energy Analyst (CEA) program as a component of the action?
- Chris Walker - CSLB has experience on the recognition side from the past solar initiatives

Action 6 - Marketing Campaign

- **Status: Advanced** - Such a need that the BDC is already moving on it. \$300k raised already to focus on research and developing the campaign. Fundraising ongoing and scoping currently in action
 - Currently looking at engaging with a variety of campaign actions
 - CARB as a source to work with going forward for grant making or other PR campaigns

Action 7: Induction Cooktop Campaign

- **Status: Square 1**
- PB: Called out specifically as home builders are specifically marking cooktops as a major sticking point
- Rachel: Folks are excited about new gadgets - **concerns are health**
- SCE is adding induction burners to loaning library
 - Sonoma Clean Power is continuing their loaning library program
- John Supp - The Kitchen Supply warehouses seem like a very important potential partner/lead for this action.
- Commercial quick serve chains could be a good entry point in new construction - minimizing the construction of legacy infrastructure for commercial use since that is a major driver of the development
- Need for cross-training that allows contractors to be a one-stop decarbonization - water/space heating, cooktops, other relevant items.

Action 8: Building Electrification Finance

- **Status: 1.0**
- Rick Brown: Needs to coincide with the development of rate cases
- Merrian: Current focus appears to be on addressing upfront cost, but this action is a segment of a broader and more ongoing goal.
- Alejandra: Agencies in the state building significant amounts of housing and they should look to engage with decarbonization

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- John Supp - What is the focus on this action? Could it include 3rd party ownership or other creative financing models?
- Jonathan Kevles: Look for co-benefits/related technology that can alleviate some of the upfront cost of decarbonization
- Anna: School bond coalition building (Will be ~\$9 billion overall funding) could likely engage with decarbonization of schools as entry points into neighborhoods/communities
- Tom - Retrofit or new construction focus for financing?

Action 9: Electrical Panel + Service Innovation

- **Status: Square 1.5** - Utilities currently have panel upgrade programs.
- Peter Turnbull: Concerns around potential for line extension/infrastructure upgrades in addition to the panel upgrade (up to the transformer)
- Scott (SMUD) - Potential for tech other than a panel upgrade to get around the existing limitations. Looking at load shift/battery capabilities
- Merrian: How many buildings would *need* to have their panel/service upgraded? - Where are the needs to make this happen? Missing the research in this area
 - Need to consider the rollout of EVs at the municipal level as well - changing the structure of demand and will likely increase load.
- Christine Tam: We may need to start looking into software solution to manage the circuit breakers to avoid the need to upgrade a panel beyond 200amp. One company that is currently in this space is **Eaton**.
- Include weatherization and other related programs, what other services could be added for improved cohesiveness in minimizing cost and maximizing customer benefit

Action 10: Reach Code Support

- **Status: Square 1** - No direct action yet, but some localities are looking at developing their own codes that could be used as a model template
 - Terra: Several local governments are developing model codes currently
- Jenna: Reach codes will be politically challenging for local government change
- Tom: Local government staff will concerns regarding upcoming workload - make adopting reach codes easy
- Rick + Margaret: Local governments will face political pressure to push back from local staff from constituents. - Start with elected officials over staff
- Terra: Prioritize wildfire burn areas (rebuild triage)

Action 11: Addressing Legacy Systems

- **Status:** Not yet begun
- Merrian: Need a lot of background research focusing on impact, alternatives, and other approaches to addressing the systems. Happen before the CPUC opens proceedings?
 - ID pilot communities for transition opportunities?
- Rick Brown: Potential to feed into existing proceedings?

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- Andy Bilich: Need for strategic electrification planning. A lot of the information needed to regarding the potential for stranded assets will need to be brought together. Currently spread out across a variety of proceedings and it is difficult to put together.
- Margaret: Methane as a GHG and legacy/leaking could potentially be an offset source under cap and trade to possibly address some costs to legacy assets. CARB could be included in this. Potential to use legacy systems for biogas to prevent duplicate efforts
- Scott (SMUD) - Not saying “gas” anywhere in here. Treating it as an issue that cannot be named. We need to begin addressing it somewhere.
 - Scott (SMUD) - As the *Decarbonization* coalition we need to address decarbonization and not solely electrification. That means addressing legacy systems plays a key role in ensuring that this process doesn’t undermine the overall
- Martha - Legacy could be looking at buildings that we need to look at trying to electrify. Things that we don’t have a cost-effective solution for (heat-recovery chillers) or other key gas end-uses that we may not be able to solve for quite yet.
- Tim - Technical nature of the legacy gas system means that it has not been a particularly public determination. There should likely be some degree of public input/awareness that needs to be addressed through CPUC proceedings or other parts
- Merrian - Emphasizing on legacy system that the BDC alone take on a leading role? Or other close partnerships to address a major undertaking.
- Jonathan Kevles - RMI is looking at this question specifically
- Christine Tam: gas utilities should be included in the lead for action #11 (disclaimer: Palo Alto is a municipal gas utility, in addition to providing electric, water and wastewater utility services)

Eric Truskoski - I think it will be important to look at the prioritization of these items based on party (i.e. manufacturer, utility, state/local government, etc.). Then, it may be important to take a hybrid approach between what the different parties feel is important.

Survey: The meeting surveyed participants to get a sense of what among these 11 actions were highest priority.

- Rick Brown: There are a **lot** of things that aren’t on this list, there has already been some consensus that these actions are all important to the process. How can we bring the core focus of the BDC down to the *critical few* items that need to be done **specifically by the BDC**.
- Alejandra: Not all of these actions are specifically led by the BDC, which gives space
- Merrian: Many of these actions are pieces that tie into finding greater coherence with the contractor side of the equation
- Jonathan Kevles: Prioritizing to what end? Answers will vary depending on how you are pushing the others to act or the Coalition taking the lead.

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- Jennifer - Considering actions from a perspective of what needs leadership from the BDC rather than where the market is driving anyway
- Michelle - Code is not preventing infrastructure buildout, so it should be a priority.
- Merrian: Importance of architects/designers for making specs for the larger buildings
- Martha: Need for builder support, local groups can greatly stymie political adoption.
- Scott (SMUD) - This discussion was happening 15-20 years ago re: green building. But “green” is just mainstream and how we build now. Can we learn lessons from this?
 - Customers haven’t had to give anything up for going “green” but these are some lifestyle inertia that *must* be overcome
 - Michelle - CPUC has had ZNE 2020 as a target since ~2008 but the building industry has had minimal movement towards this goal so far.
 - Building industry in the LA area is likely to be against any upcoming climate change legislation due to costs
 - Bruce Severance - Most contractors don’t fully support/grasp the full tradeoffs for cost-effective ZNE construction.
- Eric Truskowski - I think it will be important to look at the prioritization of these items based on party (i.e. manufacturer, utility, state/local government, etc.). Then, it may be important to take a hybrid approach between what the different parties feel is important.
- Panama: Looking at structure like Gold Medallion for labeling/certification for added value
 - Ensuring that it is tied to information/education/awareness
- Owen Howlett - Market research will help shape other aspects of the overall approach

Priority for California but not the BDC?

- Bruce Severance - We are trying something fairly unprecedented. Current energy upgrades generally do not include electrification and we are doing 11k per year - one 1000th of the housing stock. We need to increase the volume 50-fold in a few years to reach 500k homes per year by 2025. The work is not easy. Most general contractors refuse to do energy upgrades. So there is very little workforce for the volume of work to be performed. We need to mobilize an army, create a new business model and a new financing model. Current rebate programs are a drop in the bucket.
- Andy - Addressing legacy systems
- Alejandra - Upstream incentives
- Jenna - Recognition programs (should be run by the state). Reach codes would be another example for local actors.
- Katie Wu - All actions are priorities, but priorities may change as market research/knowledge matures and advances over the next few months
- All actions are a bit different and on somewhat different timelines.

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Case Study Input: Stakeholders provided input on what solutions may be highlighted based on their observed success and comparability to the actions being considered by the BDC. Input included:

- Rick Brown - **Prop 39 program** overcame multiple barriers (financial, cultural entrenchment[awareness] - schools now do energy savings planning) - Potential \$\$ from CEC for communication on the successes of Prop 39
 - Anna - Potential to outline the scale of impact ([DSA 7x7x7](#)) in forward projections. Website provided access to location specific projects and outlining both energy savings and cost savings
 - San Francisco Unified plan to revamp their heating system
- Scott (SMUD) - Google as an organization looking to go zero carbon by ~2020(?)
 - [Current framework for 24x7 Carbon Free power at Data Centers](#)
- Tim O'Connor SMUD created an incentive program and should have some data, even if it is currently preliminary
 - Scott (SMUD) - Still creating the data, but will be open to sharing the available information
- Kevin Wood - Clean Energy Optimization Pilot \$15-20 million plan. Overcame incentive and other barriers. Nothing installed yet.
 - Transportation Electrification (SCE) applications - Rate design, financing, customer communication, tons of barriers that needed to be overcome
- Peter Turnbull - Options outside of energy - Look at tech diffusion/adoption (seat belts)
- Aimee- Stanford system that eliminated emissions from space and water heating. Probably mostly technical barriers as a novel system construction
- Jenna - Frontloading washing machines, LEDs, on-demand water heaters. Boulder, CO + Summerville, MA + Burlington, VT on programs
- Andy Bilich - SCE shared City Ventures business model on building electric and the benefits specifically to the utility
 - June Flora at Stanford - City of Fremont working with Girl Scout Troops for outreach on decarbonization measures
- Martha - Air Quality Districts - Best Available Control Technologies for an enforcement mechanism should be looked at as a model or potential partnership
 - Tim O'Connor - Talk to the Air Boards on facility registration data.
- Jonathan - City of Hayward - All electric library (book library, not tool library)
- Jan - Refrigeration in general (driven by policy, codes, manufacturing). Recycling, landfill reduction policies. Screening criteria looking at where policy had a major role in driving the change.
 - Rick Brown - Look at an instance where something is working but needs to be replaced (LEDs, refrigeration)
 - Courtney Kalashian - Redwood Coast Energy Authority. LED leadership specs

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- John Supp - MidPen Housing: they have built several all-electric buildings for Senior housing. Safety/liability benefits.
- Aimee - Sunnyvale - Didn't include funding, focused on new construction. Increase sq footage when the construction was built to a higher green building standard.
- Any building larger than 2 stories has to have all-electric heat. Policy change that affected significant alterations.
- Jonathan Kevles - Hot water heaters also being used to load shift (grid management benefit).
 - Alejandra - Some rural co-ops are doing this, but primarily resistance heating
- Ralph DiNola - NEEA market transformation theory. Their methodology may be useful to look at. NBI may have a solution to building preemption
- Panama: UC Carbon Neutral Commitment, NEEA and NEEP Specs, Maine Low-income HPWH, Bill Bradley terminal LAX
- Peter Turnbull - PG&E loan program about something... Happened during high interest rates and made ~1 million loans

Next Steps:

| | |
|-------------|---|
| December 18 | Roadmapping Session (3/3): Trade-offs, Strategies, and Priorities |
| January 7 | Draft Roadmap #3 |
| January 14 | Final Stakeholder Feedback Due |
| January 21 | Final Roadmap Available |
| January 28 | Final Opportunity to Sign-on as Formal Stakeholders |

Panama: 1/28 Roadmap statement - Everyone gets a week to digest the final draft to state their interest/vesting in the final product.