



## Oakland Building Electrification Workshop

Thursday, September 12, 2019 3:00-5:00 PM  
Oakland City Hall (One Frank Ogawa Plaza, Oakland) – Hearing Room 3

Speakers: **Shayna Hirshfield-Gold and Daniel Hamilton**, City of Oakland  
**Panama Bartholomy**, Building Decarbonization Coalition  
**Nick Young**, Association for Energy Affordability

### Meetings Notes:

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#### Oakland's approach building electrification (Daniel Hamilton):

- City's approach is still being developed. Goals for today are to share market information, research on why this is timely, cost issues, infrastructure issues; hear more from community and discuss needs and potential; and talk about commercial kitchen.
- Scope for City: Building electrification is a big topic
  - Big Opportunities: Focusing only on new construction, we have enough data to consider reach code for all building types
  - Many cities talking about this in different ways (e.g. Berkeley, San Jose)
- Why we entertain this policy:
  - Health:
    - Public health research about the effects of natural gas in buildings is Oakland's main driver
    - Natural gas appliances leak from well sites and distribution systems to homes (60% appliances), mostly at point of stove. Ventilation is supposed to help but doesn't work well
    - Exacerbate asthma, emphysema for the young and the old
  - Costs:
    - What if you don't have to pay for service connection, meter, combustion safety testing: does that offset the costs?
    - Answer for Climate Zone 3 in all research was YES: it was cheaper to build and operate all electric buildings
      - Looked at 3 scenarios:
        - Electric appliances only
        - + solar PV

- + storage
  - Cost effective in every zone and building type for NC in Oakland
  - Safety
    - 50-60% of fires after earthquakes are from natural gas lines
- What we are considering:
  - Residential NC is ready to go all electric, both low rise and high rise
  - Unsure if commercial market is ready for electric-only pathway
    - We can show it works, but need to know from community whether we're missing any perspectives
  - Staff will propose a pathway based on research & stakeholder engagement; Council might propose additional or different pathway
- Electric Infrastructure
  - We coordinate closely with PG&E. They are in support of electrification ordinances and believe it works with their business model.
  - They are also in bankruptcy, haven't shown they can handle both electricity and natural gas (maybe they can do 1 well)

#### Questions:

- For residential all electric pathway, are we looking to model Berkeley via using police authority or via code?
  - *Staff will proposed policy based on research and stakeholder engagement; it's then Council's decision to accept or modify.*
- Should anything that gets built with gas now be built with the capacity to do all electric?
  - *It's an option, but doing so would put additional requirements on building staff/code-checkers/inspector*
- Will inspectors be able to check based not on what's there but what might be there?
  - *An important priority from City's perspective it to look at what's cheaper for applicants and City, & most efficient for permit checking*
- Distinction between residential as all electric and commercial with mixed-fuel pathway, what about mixed-use?
  - *Mixed-use buildings: the aim is to get everything to be all electric as soon as feasible. Several cities have exempted floor commercial from all electric. Oakland's pathway isn't defined yet.*
  - *There's an educational component here; we haven't seen any evidence that induction technologies preclude any types of cooking*
- Each induction burner is 25 amps – a big chunk of electricity; if you have an oven and 2 burners going at the same time that's a big addition to your load.
  - *[From Daniel and JP Ross, East Bay Community Energy] We don't anticipate any grid stress from building electrification: renewables and*

*storage are being added quickly, new construction comes online relatively slowly, and new buildings are relatively efficient per code.*

- Would any be retroactive to projects that have already submitted application?
  - *We are looking for 2019 code cycle which starts January 1, 2020; highly unlikely that requirements would be retroactive.*

### **Global perspective on building electrification (Panama Bartholomy)**

- Building Decarb Coalition: diverse membership, working on market and policy solutions
- Gas Infrastructure Costs:
  - [NAHB's Priced Out report](#) looked at 350 metropolitan areas and impact on ability of average family to buy average house
    - For every \$1000 of increased costs added to home construction, about 10,000 families are priced out
  - What about appliances?
    - CA Building Industry Association: electric vs gas appliances in CA (climate zones, costs, building experience): major finding is that electric appliances are similar or less expensive to operate compared to gas
- Utility costs of gas are volatile & likely to increase
  - CA produces 15% of gas that we use in the state, we have very little control over how the rest is extracted, shipped, priced, etc.
  - SoCal Gas is proposed 40% rate increase over next few years
  - Gas prices going up at 6%/year, and electricity going up 1.7%/year
- Public Health:
  - We have advanced pollution control on power plants, but not on our buildings
  - Lawrence Berkeley Labs studied Gas Burners: half of homes when cooking had levels of pollutants that if found outside would be illegal
  - NOx emissions in CA = leading cause of asthma
  - Formaldehyde is released by burning gas, and is a leading cause of childhood and pet leukemia
- [Food Service Technology Center](#) in San Ramon, global leader for electric cooking, paid staff to help builders help restaurants find ways to incorporate induction cooking
  - Major chefs switched to induction for power and control
  - Can boil a pot of water in 1/3 time of gas stove
  - Consumer Reports love induction cooking (durability, performance, cleanability)
- Berkeley first city in nation to ban new gas hookups
- Projections are that 50+ CA local governments, 40% of CA population, by end of year will live in jurisdiction adopting a policy to eliminate/reduce gas.

## **The nuts and bolts of building electrification (Nick Young)**

- Will speak to multifamily and mostly affordable housing with tight budgets and all sorts of funding challenges, have been some of first movers to choose to build all electric even without incentives
- We Must Electrify. How to do it:
  - Main systems that use gas in CA:
    - Water heating, space heating, stove tops, clothes dryers, pools
- Heat Pump Basics:
  - Moves heat from one place to another using refrigerants, just like an air condition or refrigerator (fridge moves heat from food to kitchen)
  - We like them:
    - Hyper efficient, 4-5x more than equivalent gas products
    - Can use onsite solar PV and thermal battery
    - Improve air quality
    - And improve safety
  - Heat Pump Water Heaters
    - Heat Pump + Tank (either separate or together)
    - Commercial or central heat pump water heaters, lots of models available in all sizes for all types of spaces
- Key Considerations:
  - Have to be designed differently than natural gas water heating
  - Optimal sizing will have more storage because we want to keep some electricity ready to avoid demand spike
  - Need smaller heat pumps and larger storage tanks
  - Engage with manufacturers on sizing appropriateness
  - Larger systems need outside air
  - Point of use electric water heaters
- What About Renewables
  - Solar PV or Solar Thermal
  - Solar PV is generally best approach for an all electric building
- Space Heating – Heat Pumps
  - Building with heat pumps allows for cooling (single unit = furnace+AC)
- Induction – SMUD and Frontier heat control
- Carbon Neutral by 2045 (CA goal)
- Costs of maintaining CA's aging gas distribution system will be shared by fewer & fewer ratepayers, who will have to pay more

## Discussion (All)

- How will retail spaces respond in an all-electric world?
  - *Scott Shell (architect): 60% of full service restaurants in Florida are all-electric, we know it can be done, chefs who have them like them. SMUD study said 75% were skeptical, then tried it and 80% liked it.*
- If there's ground floor retail, then it will be a hard sell. Education is important. We have a lot of empty retail. Can definitely be done technically but what about education?
  - *Tech companies are all over it, universities are doing it*
- What about can you rent it?
  - *Building will last 40-80 years, don't want to strand gas infrastructure investment*
  - *Hanover: 200 amp at 208 type service, going to all electric, that's a significant increase to the load and how that impacts downstream infrastructure (Hanover is all electric except for hot water and retail and some have BBQs on site )*
- What happens when you run into service capacity issue?
  - *Andrea Traber (engineer, Integral Group): Talk EARLY and OFTEN with utility; you can most often bring it within capacity, may need some service upgrades. Harder to retrofit existing buildings.*
  - *Can use energy storage and load management systems*
  - *Onsite PV is super helpful to store energy and shift loads*
  - *But it IS hard to get access to PG&E in early stage, they need to give more to design community to help figure this out*
    - *Shayna: Please let City know if you're having trouble coordinating with PG&E.*
- Fire pits and BBQs?
  - *There are electric BBQs (student housing often has them)*
- Food Service Tech Center (FSTC) allows for electric cooking benefits peak load which drives electric service size, they have expertise with that
  - *Staff will send information re: October 2 FSTC tour*
- Hanover: What about PEVs?
  - *You have to be capable of simultaneously charging every space in Parking lot for EVs (doubled transformers in this Hollywood project)*
  - *Statewide Study included ZEV issues, as well as PV and PV + storage*
- JP Ross, EBCE: Design assistance is available from EBCE/AEA
  - *Shayna: Outreach to restaurants?*
    - *JP: Plan is in formulation but will basically be a farmer's market type campaign, so anyone can test it whether they own a commercial kitchen or just own a home*

- Hanover: Is PG&E really ready for this?
  - *JP Ross: PG&E is profit driven, they need to be ready for this*
  - *Sarah Moore, City of Berkeley: They are making public statements and supporting cities pursuing electrification*
- Going through entitlements, if Oakland is going to require retail space for restaurants use, and require all electric, and then PG&E can't follow through/infrastructure is not there, will City help us work through that as far as rezoning the building?
  - *Daniel: Expectation of Title 24 is that PG&E will be able to provide requested service to all land use types, we have communicated our expected types to PG&E and they haven't expressed any concern*
- Panama: Consider holding facilitated discussion with PG&E.
- Hanover: Heat Pump Water Heating vs Gas Style Central Boiler, Can you do a central heat pump water heater?
  - *Nick: Currently this difference can't be modeled. CEC is working to model central heat pump water heating; there are some work arounds, a modeling software that will be released in next month or so that should be able to model central just fine, modeling capability will be ready by start of next building cycle*
    - *If you pull the permit on January 1<sup>st</sup> 2020, which is the 2019 code cycle, CEC does want this to be possible and don't want to be an impediment*
  - *Daniel: If you have permits you're expecting to pull Jan 2020 we will have conversation with you we don't want to slow you down*
- Sarah Moore: Trigger for Berkeley's natural gas ban applicability is land use permit application; they're also looking at building permit application
- Daniel: Non-Res Projects, if we were to push what would problems be?
  - Hanover: We model hit to rents, will be hit to retail rent which is a social problem, probably not a technical problem
  - Matt Guidi: Modeling financial with rent on the commercial side, if you have a leasable space and you want to dedicate least amount to electrical room, the idea of bringing in a new service in the future to an already existing space; see the conversion of electrical space as a problem but more of a rent issue
    - Physical constraints to an existing space
- Vast majority of non-res can go all electric today, but how do we organize the exceptions/appeals process? Will this prohibit ability to build in Oakland?
- Will developers be incentivized to not build ground floor retail? This is an issue from neighborhood development point of view.
  - Shifra (Jack London BID): City could provide incentives, redevelopment funds; one step beyond education, appliance incentives, considering additional costs to getting new equipment appropriate for appliances

- Staff timeline to look at retrofits of EBs?
  - *Daniel: No established timeline. Concern is contractors (plumbers, electrical engineers, etc.)*
    - *BayREN and EBCE developing contractor training*
    - *If we see contractors aren't having problems and tech is available then we may move forward with considering existing buildings in about 2020/2021*
  - *Nick: Cap and Trade is funding retrofits to existing low income homes; CPUC amended obscure rule that unlocks over \$2 bil of EE program dollars to do electrification starting Jan 2020 or sooner, every existing EE program that exists will start bringing electrification/fuel switching into programs*
  - *Daniel: This will all come from an equity perspective in Oakland*