Building the All Electric City

Date: January 8th 2:00 - 5:00pm
Location: 25 Van Ness, Sixth Floor (San Francisco Department of Public Health's Offices)
Hosted by: Supervisor Mandelman and San Francisco Department of Environment (SFE)

Objectives for the meeting:

- Provide opportunities to learn from other cities in the Bay Area about eliminating natural gas from new construction.
- Understand the technology behind building decarbonization, electrification, and renewable electricity
- Ensure that equity and climate justice principles are maintained throughout the design and implementation of new legislation

Time	Topic
1:30-2:00	**Coffee, Registration, and Networking**
2:00-2:15	**Introduction** • Welcome – Supervisor Mandelman • Setting the stage for the day – Debbie Raphael, Director of SFE
2:15- 2:45	**Governance: How Cities are Eliminating Natural Gas** With concerns about natural gas's impact on climate change rising, many California cities have started passing bans on new natural gas hookups in commercial and residential buildings. Berkeley was the first, and San Jose was the largest city to eliminate the use of natural gas from new construction. This panel will look at how these cities got the job done and the different types of governance challenges around stakeholder engagement, policy and risk. • Ken Davies– City of San José • Billi Romain – City of Berkley
2:45-3:15	**Technology: Building all electric – What will it take?** Technology and design will play a leading role in decarbonizing energy, and many questions must be answered to ensure a successful transition. Implementing large-scale electrification (i.e., adding significant new loads) and decarbonization will add new challenges while also presenting big new opportunities. This panel will discuss what technologies will play a role in designing all-electric buildings and discuss market and regulatory barriers. • Stet Sanborne - SmithGroup • Hilary Noll – Mithun
3:15-3:45	**Labor and Equity: Ensuring decarbonization strategies enhance equity and provide a 'just transition' for workers** To reduce climate change threats effectively, cities must embrace a comprehensive approach that includes strategies that increase economic opportunities and advance the transition toward renewable energy sources. At the same time, these strategies must address legacy social, economic, and environmental inequality. This panel will discuss how we design all-electric city strategies that work for everyone. • Alex Lantsberg – San Francisco Electrical Construction Industry • Betony Jones – Inclusive Economics
3:45-3:55	**Break**
3:55-4:40	**Group Exercise: Activating Government, Business, and Community Based Organizations** Opportunities and Challenges for Governance, Technology, Labor, and Equity
4:40-4:50	Report back on group exercise
4:50 -5:00	Commitments and movement forward

Panel Speakers Biographies

Alex Lantsberg, Research and Advocacy Director, San Francisco Electrical Construction
Alex Lantsburg is the Research and Advocacy Director for the San Francisco Electrical Construction Industry, the labor-management cooperation committee of IBEW Local 6 & the SF Electrical Contractors Association. He holds a Master of City Planning from UC Berkeley and a Bachelor's in Finance from Northern Illinois University and brings nearly 20 years of experience at the intersection of environmental and economic justice, infrastructure, and workforce development.

Betony Jones, Founder, Inclusive Economics
Betony Jones is the founder of Inclusive Economics, a research and advising firm focused on the link between workforce and climate issues. She has written published several reports on the economic and employment effects of California's climate policies, including the recently published, "California Building Decarbonization Workforce Needs and Recommendations". Prior to starting Inclusive Economics, she was the Associate Director of the Green Economy program at the UC Berkeley Labor Center.

Billi Romain, Sustainability Manager, City of Berkeley
Billi Romain is the Sustainability Manager for the City of Berkeley. Mrs. Romain has over 20 years of experience in community engagement and outcomes-based environmental programs. She led the multi-year consensus-based process that resulted in the Building Energy Saving Ordinance, designed to meet the Climate Action Plan goal of accelerating energy savings in existing buildings. Her most recent work has focused on applying an equity analysis on building electrification projects to enhance resiliency while reducing greenhouse gas emissions. She is Co-Chair of the USDN Deep Decarbonization peer learning group and an active member of the Green Cities California Steering Committee.

Hilary Noll, Sustainability Integration Leader, Mithun Architects
Hilary is an architect and social-impact designer specialized in sustainability, combining exemplary design with building and site performance, human health and social equity. As a Senior Associate and Sustainability Integration Leader at Mithun, she works on multifamily housing, resiliency planning and the pursuit of regenerative, carbon-neutral projects. A background in environmental science and community organizing informs her design approach of working with local stakeholders in a participatory process to achieve place based, bioregional solutions.

Ken Davies, Deputy Director Climate Smart San José, City of San José
Ken Davies is the Deputy Director over Climate Smart San José with the City of San José's Environmental Services Department and has been with the department since 1999. His current assignment has him leading a dynamic group of passionate environmental staff doing their best to achieve a sustainable future. In his career path with San José, Ken has worked on a wide variety of environmental programming, including water conservation, recycled water, watershed protection, ISO 14001, regulatory compliance, emergency operations, and sustainability initiatives.

Stet Sanborn, Principal and Engineering Group Lead, Smithgroup
Stet Sanborn is a Principal and Engineering Group Lead for Smithgroup's San Francisco office. Having both an engineering background as well as his Architecture License, Stet focuses on the integration of high performance building enclosures with advanced building systems. He is a leading voice in statewide decarbonization efforts, Net-Zero Energy design and research into transformational technology allowing for grid optimization and electrification.

SAN FRANCISCO ZERO EMISSION BUILDING TASKFORCE

Building the All-Electric City Workshop

January 8, 2020

Panel Sessions Notes

1. Governance

Berkeley - Billi Romain

- Overall strategy changed recently from reducing natural gas use to replacing it
- Most important was education and having people understand the 'why,' it is difficult to discuss the 'how' until the why is clear. 75% emissions from residential sector natural gas.
- Current policy:
    - Gas Ban at entitlement
    - Electric-Preferred and Electric-Ready Reach code for projects that receive exemption from gas ban. (Exemption is generally to mitigate code or feasibility issues for specific systems, not the whole project.)
- Had difficulty with electric-preferred reach code in 2016 code cycle: Federal standards don't align with equipment currently on the market
- Building code as the sole tool was not enough. Need to start earlier in the process (during building entitlement) because when building permit designs are already drawn, can't easily adapt project to be all-electric
- Councilmember Harrison: Ban natural gas
    - Authority: Police Power - In entitlement process. Associated with land use (planning) permit rather than building permit. Federal standards are not relevant to this approach.
    - Benefit:
        - Ensure commitment to all-electric at the first point in the design process that the city is involved.
        - Provided flexibility for projects in the pipeline; the effect was approximately 1 year of warning/lead time, while projects applying for land use permits go through 1+ year process.
    - Keys:
        - Training/knowledge sharing support
        - Developers: How are you certain the grid is clean enough for electrification to reduce emissions.
        - Exemption/flexibility for energy code compliance issues.
- East Bay Community Energy (CCA) provided local developers with assistance, also planning to put together an electric food truck to demonstrate commercial use

- Figured out it would be difficult for high rise multifamily buildings to meet compliance – built-in an exemption to the prohibition based on state limitations
- Good to engage developers early: Most common concerns from developers were if the grid is/will be clean enough

San Jose - Ken Davies

- Current policy:
  - Gas ban for new low-rise residential
  - Electric-preferred & Electric-ready for all new construction (and EV Ready)
  - Direction to return to council for discussion of broader gas ban/limitations
- Used a "shaming" mechanism for Council to move – showed them what other cities were proposing
- San Jose, like San Francisco, missed its housing production goals last year, having difficulties producing housing in an expensive market.
  - Gathered/Shared lessons learned from all-electric projects to reduce obstacles (i.e. incorrect transformer sizes, etc. caused costs to go up)
  - Give and take on codes: San Jose adjusting on minimum parking requirements

Discussion:

- Outreach/readiness: (Billi) Outreach is key. The issue is clean energy and affordable housing for everyone. Solutions are the point, not bans. Provide technical services to developers to help them learn from experts.
- Housing affordability: (Ken) Developers came forward as the policy progressed. Biggest items:
  - Learning curves with cost of electric infrastructure added vs. gas infrastructure reduced.
  - Discussion of requirement for parking (and EV charging) - which led to San Jose considering reducing parking minimums.
- Cooking and Restaurants:
  - (Billi) Emotional connection to cooking is key to acknowledge. Understanding why to make the change - particularly the health & safety benefits (avoided asthma risk, carbon monoxide, ongoing heat exposure in commercial kitchen & worker burns). Familiarity is key.
  - San Jose:
    - Induction stove kit to check if your pots are compatible.
    - Developer feedback about viability of leasing commercial electric kitchen space; education has been key. Takes time.
- In multifamily high-rise with gas stoves, "benefits go to the tenant, rather than the owner" (in existing building).

    - Responses: Question is applicable to existing buildings; policy under discussion in workshop applies to new construction. Also, rebates are coming, and expected to help.
- Will reduction in gas use have equity implications:
    - Responses: Question is applicable to existing buildings; policy under discussion in workshop applies to new construction. In new construction, using electricity does not add to utilization of the gas system; does not affect utility investment in existing gas distribution infrastructure.
- Have you received any feedback about cost/risk? Developers have reported benefits in terms of insurance rates for reduced earthquake risk.
    - Berkeley prohibition listed seismic safety as a justification for removing gas piping from buildings

2. Technology

Hilary Noll – Mithun

<u>Electrifying multifamily affordable housing</u>:

- Mission-driven: Committed to higher performance and returns from this higher performance *must* have proven benefits to the residents
    - 6 urban infill locations, 6-9 stories of 100% affordable housing for different groups in SF, all include mixed use ground floor program
    - Targeted benefits: Housing for veterans incl. PV + battery system
    - Found for San Francisco affordable housing projects all-electric construction yields savings on construction costs compared to natural gas buildings
- Cross-cutting threads: using Maceo May as an example. 6 stories, modular construction, battery back-up (islanding capability) All projects are less than 20 EUI
- Money saved on energy can be used for services
- Largest proportion in multifamily is domestic hot water, followed by space heating
- Using a future-proofing point of view helps make the case

Stet Sanborne - SmithGroup

<u>All-electric commercial buildings</u>:

- Variety in clients include: higher education, K-12 schools, complex labs, civic/office
- Large portfolio groups are moving toward all-electric
- Looking at long term utility costs including escalation, insurance considerations
- Pairing with PV: 7-yr simple payback, better insulated from utility spikes (and associated costs)
- People talk about complex buildings being impossible – biological lab and research, computational support – not yet complete. No Bunsen burners. Integrated genomics lab is also all electric and complete (next door 60/40 lab/office split).

- All UC new constructions are transitioning to all-electirc

Discussion:

- Pay back?
    - Longer term utility costs/escalations, cost of PV is and has been dropping, good return on investments, resilience to reduce risk (other ways like this to reduce/offset immediate cost to go all electric)
    - Biggest leverage to shift the market
    - Future retrofits gains attraction
- Wildfires, blackouts… battery storage for resilience?
    - Hopefully we will continue to incorporate more battery storage systems (especially for things like cell phone towers, data/wifi needs, which is relatively affordable right now)
    - Think about more than just battery storage:
        - Shift how and when we use energy
        - Thermal sinks/ways buildings can retain temperatures/heat/cooling
    - Building stock can load shift in thermal storage, CEC needs to think about other types of storage beyond batteries

3. Workforce, Equity and Just Transition

Inclusive Economics - Betony Jones

- Research pertains to statewide workforce impacts, and not directly applicable to jurisdiction of city
- First looked at efficiency, electrification, change in demand & implications for systems, jobs associated with manufacturing new appliances, and new construction
- Jobs follow money. When money is spent, jobs are created. So where is spending shifting?
- New Construction
    - Data is sparse still. Slightly less expensive to build all-electric than mixed fuel in new construction.
    - Slight loss for plumber/pipefitter, slight gain for electrical. (Can't have a system where costs are same or lower, and both categories of labor increase.)
    - Electric generation increase would be necessary, particularly to serve wintertime heating.
    - Net loss of jobs in residential sector, unclear in commercial
- Energy efficiency: small loss in jobs to supplying energy to buildings because less is needed. Increase in electricity utility jobs, loss in natural gas jobs
- If planned over time, job loss can be managed

- Manufacturing/Installing new appliances: Electric panel upgrades, duct work, HVAC, sheet metal work
    - How can CA start manufacturing more locally to receive job gains from appliances (and training to work with equipment)
- Jobs are created when investments are made to accomplish work. For cities, it's important to think clearly about the leverage points to accomplish work, and act accordingly.

SF Building Trades Council - Alex Lantsberg

- Appreciation for inclusion of labor and workforce issues in today's panel, historically only hear from policy and products
- Concur with Betony - there are workforce impacts of any investment, so changing investment has an impact.
- At the level of specific crafts four types of workers influenced the most: Carpenter, plumber, sheet metal, electrician
    - Key to insure workers are skilled, trained to operate safely, trained to install & verify appropriate installation, have certifications and protections

<u>Discussion</u>:

- High Road and Low Road - depend in part upon the policy environment
    - High Road: Quality of the work is factored into the bid. Worker skill/qualifications matter to award. Supports a career trajectory/opportunity to advance.
    - Low Road: (More common in small/existing residential) Driven by low cost, not a return for investing in quality. High turnover and fewer opportunities to advance. But lower barrier to entry.
- How can High Road be supported?
    - Alex: Rules and money. Rule with no enforcement is sometimes worse than no rule at all.
        - Rules: Raise/align qualifications for installers, particularly for residential new construction.
        - Money:
            - SMUD incentive programs are a helpful example; SMUD electrification rebates come with requirements for qualifications. Has a stable of prequalified contractors supporting electrification retrofits.
            - Public funds can advance multiple items; i.e. affordable housing is a package of public policies (i.e. small business contracting, workforce development, green requirements) and

subject to a variety of requirements to support public policy goals, including relating to skills and training.

    - Betony: When spending public money, there are wage and skill standards/requirements. Local governments can provide these standards/requirements as resources to consumers/homeowners—who want to know how to find skilled workers/qualified contractors to do electrification work. Provide direction to skilled contractors, vetted based on training/skills/certification. Follow through on measurement and verification.
- How do your constituencies relate to racial equity?
    - Building trades are actively seeking diversity, particularly in apprenticeship programs (currently approx. 2/3 non-white). There is a need for dialogue between funding agencies and what they want to promote and the trades already doing this work
    - Job quality and job access in the short term are in tension. Unfortunate predicament that once you make jobs better, they then become less accessible to the people who need them. But you can't have equity without job quality. To provide high job quality to diverse people, access/entry to pre-apprenticeship/apprenticeship is key. Working with community organizations can expand access and target investment.
    - Local/State can have a lot of power with project labor agreements with specific targeted hire policies, labor agreements to meet targets
    - How to expand access to union trades? Data shows that unionized construction in CA is slightly more diverse than the general population. Trades are the rare point of access to middle class for people without a college degree.

Building the "All Electric City" - Small Group Feeback

				GROUP			THEME							
NOTE ID	Comment	Opportunity	Challenge	Governance (a)	Technology (b)	Labor & Equity (c)	Timing, Phasing, Applicability	Enforcement & Exceptions	Implementation: Process	Education, outreach, documentation of benefits/disadvantages	Financing	Resiliency	Other/ Doesn't Fit	N/A
1 (ex)	The ordinance will present challenges for large new development in the entitlement process		1	1			1							
2 (ex)	Induction stoves doesn't last as long as natural gas stoves		1			1				1				
3 (ex)	Construction of high rise condos with central heating system might not work with electrification		1		1			1						
1b	Distributed energy and grid/community energy resilience	1			1							1		
2b	Rapid product development: battery storage & central HPHW	1			1					1				
3b	Improve cost effectiveness and indoor air quality (IAQ) for affordable units	1			1	1				1				
4b	Improved indoor air quality within buildings	1			1					1				
5b	Energy equity	1			1	1			1	1		1		
6b	Educational opportunities lie with technological advantages via media (ie: cooking shows with induction stoves, home remodel show & heat pumps)	1			1					1				
7b	Pre-qualifying hardware supplies (cost, quality, warranties)	1			1				1					
8b	Newer technologies to become more financially accessible over time (like PV has seen, with more to come)	1			1					1				
9b	Healthier environments	1			1	1				1		1		
10b	Safer environments (fire/earthquake risks)	1			1					1		1		
11b	Set example for other jurisdictions and accelerate (good) change	1		1	1				1	1				
12b	Resilience: particularly the ability to come back faster from an event like an earthquake	1			1					1		1		
13b	Induction is better & safer & widespread	1			1					1				
14b	Electric fireplaces are much better looking than before	1			1									1
15b	Sharing success (Seattle)	1			1					1				
16b	Gamification (AIA competition)	1			1					1				
17b	To reduce carbon	1			1					1		1		
18b	Link to resilience and energy independence/reliability	1			1					1		1		
19b	Pair with storage	1			1				1			1		
20b	Increased market for heat pumps/induction stoves/ etc.	1			1		1							
21b	Ability to move markets beyond Bay Area/CA and support innovation	1			1					1				
22b	Simplification of building systems for operations & maintenance (no gas; pv vs. solar thermal systems)	1			1				1	1				
23b	Flatten the duck at individual meters	1			1				1					
24b	Mandate future climate safe & no regret systems (ie: the systems should perform better with climate shifts)	1		1	1				1			1		
25b	Connections to the public health and health care sectors on improved health outcomes from all-electric buildings	1			1					1				
26b	Benchmarking performance	1			1			1		1				

27b	Implement 24/7 time of use emissions technology	1			1				1					
28b	Plan for district heat pumping in dense areas	1			1				1					
29b	Addressing transformer hidden losses	1			1				1					
30b	Existing construction: replacing aging/dead equipment with electric	1			1		1		1					
31b	City incentives to support new technologies focused on supporting fuel switching	1		1	1		1				1			
32b	Allowing utility bans on incentives of certain energy efficiency projects due to involvement of fuel switching	1		1	1						1			
33b	Funding/costs	1			1						1			
34b	Resident health and comfort (IAQ)	1			1	1				1				
35b	Electrification alignment with solar PV standards	1			1				1					
36b	Education/awareness/buy-in	1			1					1				
37b	Dual benefits: heating and cooling	1			1					1				
38b	Confirm benefits in areas of: Health & Safety, Resilience, Long Term Economics, Climate	1			1					1				
39b	Public education/training awareness	1			1					1				
40b	Design/planning benefits	1			1								1	
41b	Commissioning engagement	1			1					1				
42b	Connecting the building industry with the right technologies and solution providers	1			1					1				
43b	Future: climate; economics/costs	1			1									1
44b	Co-benefits: Health, resilience $, climate	1			1					1				
45b	Architecture 2030 compliance is now separating energy reduction and carbon reduction	1			1					1				
46b	Resilience & future proofing	1			1							1		
47b	Electrification (with clean grids)	1			1									1
48b	Housing crisis: streamlined permitting	1		1	1	1	1							
49b	Stacking up future retrofits	1			1					1				
50b	Strong market and economy	1			1					1	1			
51b	Consumer demand	1			1					1				
52b	Virtual CA map showing all electrical & gas systems (with PG&E, Southern Edison, & SMUD)	1			1								1	
53b	VR visualization of smart grids & buildings (plus IoT data capture and AI forecasting)	1			1								1	
54b	Technology innovation (Tech + MFG [manufacturing] = Innovation)	1			1								1	
55b	PG&E: where does it make sense to retire infrastructure? Starting their first- is there a regional/hyper local approach?	1			1				1					
56b	CSU & CC training programs (tied in with education)	1			1					1				
57b	Market not fully transformed; Swell of projects happening NOW; will set precedent, public opinion, etc. Solution: learn from DOE LED market transformation to protect & ensure quality work and be radically inclusive & HONEST		1		1		1		1					
58b	Expensive and limited selection of hardware (heat pumps, induction cooktops) due to small market size. Solution: policy certainty stability can incentivize manufacturing investment & market expansion		1		1		1		1					

59b	Lack of knowledgeable contractors/installers		1		1		1		1					
60b	Retrofit of existing housing (building envelope & water issues)		1		1				1					
61b	Lack of education/understanding of technologies and their design, costs, & maintenance Solution: examples are out there now and advocates/experts/regulators are willing to learn shore their knowledge		1		1					1				
62b	Fast transition to all-electric Solution: work on ALL fronts at local to international level stick & carrot necessary		1		1		1		1					
63b	Overcoming public resistance to all electric/natural gas ban		1		1					1				
64b	Willingness to convert/fear of new technology		1		1					1				
65b	Education: via popular TV/youtube, retail events, fairs, for contractors	1			1					1				
66b	Food service transition Solution: healthy electric food expo & celebration		1		1		1		1	1				
67b	Awareness of the NEC load connection calc for all electric buildings		1		1					1				
68b	PG&E's unwillingness/inability/lack of interest at helping to right size transformers and locate them Solution: public power or state legislation/CPUC direction		1	1	1			1						
69b	Tenant cost burden		1		1	1	1				1			
70b	Lack of qualified contractors		1		1		1		1					
71b	Stakeholder engagement / owner & developer buy-in		1		1					1				
72b	Turn over skeptics in industry		1		1					1				
73b	Market transformation (affordability, options, etc.)		1		1					1				
74b	Education of end users		1		1					1				
75b	Timely responsiveness from utilities		1		1		1							
76b	Infrastructure readiness to support the all electric demands		1		1		1							
77b	Workforce & suppliers' familiarity with the systems		1		1		1		1					
78b	Utility allowances		1		1				1	1	1			
79b	Education and access to skilled, knowledgeable workforce (humans are creatures of habit; out of the box thinking & a willingness to try; when a issue arises, who will provide support?		1		1					1				
80b	Title 24 all electric pathway and remove penalties for heat pump HW		1	1	1			1						
81b	Fear of change and inertia of history		1		1					1				
82b	Cost of fossil fuel gas vs renewable electric		1		1		1				1			
83b	D-B subs and other consultants without familiarity		1		1					1				
84b	Lack of competitive market		1		1		1		1					
85b	Increased service load for small/mid size projects -> absorbing the cost of transformers		1		1				1					
86b	Oil & gas lobbying		1		1								1	
87b	Stakeholder engagement		1		1					1				
88b	Plan for the post 7.9 "build back electric" "new" building (major retrofits)		1		1								1	
89b	Misperceptions (cooking, cost, equity) in era of fake news		1		1					1				
90b	Missed opportunities with already permitted but not constructed buildings		1	1	1		1							
91b	Brokers		1		1								1	
92b	Resiliency & dependence on a grid with shutdowns a reality		1		1							1		
93b	Support for development of on-site renewables & battery back up. Potential to be one of the largest opportunities if approached comprehensively and not just fuel switching	1		1	1		1		1	1				
1a	Housing crisis as focus points to messaging	1		1			1			1				
2a	Can expand beyond new buildings	1		1			1							
3a	Building financing mechanisms for stranded gas assets. EDF has done research into this	1		1					1		1			

4a	Avoid installing gas infrastructure that will not be needed or fully utilized in the longer term	1		1			1			1				
5a	Grid interactive/ Microgrids/ Load shape and shimmy	1		1			1					1		
6a	Make people feel like they personally can do something (e.g testify at a hearing or tell their neighbors what they are learning)	1		1						1				
7a	Reduced bills with additional solar	1		1							1			
8a	All electric new construction as key part of solution to housing crisis	1		1			1			1				
9a	Expanding the range of ways electricity is provided can replace redundancy of two fuel system	1		1			1					1		
10a	Talk to friends and neighbors about the "why" of getting rid of gas	1		1						1				
11a	Successful execution in new buidings will pave the way for future movement on renovating existing buildings	1		1			1							
12a	Understand insurance benefits	1		1						1	1			
13a	People are eager to take action and want to mobilize around climate	1		1			1			1				
14a	Our power systems need to be improved with limited resources. Ilt's make one great, strong, and reliable.	1		1								1		
15a	Electric Induction training at culinary academies	1		1						1				
16a	Provide market for equipment needed for electrification	1		1					1		1			
17a	Huge public health benefits and disproportionatly affect under served communities	1		1		1				1				
18a	People are ready to galvanize and collaborate	1		1						1				
19a	Cooking: EBCE all electric food trucks, demonstrations at farmers markets, work with culinary academies to train chefs, demonstration program with signature restaurants, get the message out about health impacts, rebates, have tech companies show thier kitchens	1			1					1				
20a	Addressing housing crises through lower cost of construction	1		1		1					1			
21a	Innovate new businesses creating new products	1		1	1					1			1	
22a	House more people without a rise in city greenhouse gas emissions	1		1						1				
23a	Education for home chefs, education and training for commercial chefs, not many electric commercial kitchens to visit		1	1						1				
24a	Affordable, predictable, stable electric rates with a suitable plan for gas rates for remaining customers		1	1		1					1			
25a	Educating the public ni a massive way about benefits of all electric		1	1						1				
26a	Fear of grid's reliability. Solar and storage not feasible in every household/building		1	1						1		1		
27a	Stranded gas assets as we get to a majority electric equity issue		1	1		1				1	1			
28a	Smart home/tech friendly. Positioning all-electric as most advanced and desireable option.		1	1	1					1				
29a	Time of use rate and cost uncertainty		1	1							1			
30a	"Hard to Reach" communitites		1	1		1			1					
31a	Inconsistency in state's direction		1	1				1						
32a	Retrofitting existing buildings		1	1					1					
33a	Finding the funds to help people afford it and education to show why they should want it		1	1							1			
34a	Inevitable hiccups in executing a new set of technologies. Training for contractors and subs to understand and feel comfortable with a new way of doing things		1	1	1				1	1				
35a	What percent of emissions are we actually reducing by this? Fear of electrical grid shutdowns		1	1						1				
36a	Resilience policy responding to extreme heat and air quality	1		1								1		
37a	Make explicit connections between renewable energy policy requirements and electrification, reduce overall complexity	1		1				1		1				

38a	District heating/cooling plant should be created in new developments because of high road jobs, thermal energy storage will help with transmission issues, and it can bring about economies of scale	1		1	1		1							
39a	Compliance pathways for high rises	1		1				1	1					
40a	Electric readiness is legally vetted and CEC compliant	1		1				1	1					
41a	Ammending the current electric preferred reach code to require electric ready to ensure that the buildings in the pipeline are going to be easily electrified in the future	1		1				1	1					
42a	Having the ability to shift new construction at 4th,5th,and 6th street to electric	1		1			1							
43a	Lower utility bills if the number of all electric buildings increase	1		1							1			
44a	Safer infrastructure, engaging normally marginalized groups, risk management, job creation	1		1		1				1				
45a	More affordable housing (costs less to build)	1		1							1			
46a	Just transition education careers for those plumbers and pipe fritters whom might be most affected by the electrification		1	1		1				1				
47a	Ineffective stakeholder engagement, engaging labor effectively for equity, advancing "high jobs", ensuring creation of good jobs		1	1		1				1				
48a	Can we simplify compliance/permitting/inspections for 1 fuel vs 2?		1	1	1			1	1					
49a	Helping those that didn't know, they have some down the wrong path		1	1						1				
50a	Sending clear signals early in the planning/construction review process		1	1			1							
51a	Developers who have an outsized influenceand interest in the status quo		1	1				1						
52a	Education and training in response to the fear of the unknown		1	1					1	1				
53a	Socialization of all electric cooling we be number 1. Many people resistant to all electric becuase of history of electirc cook tops		1	1						1				
1c	Need for skilled labor force, new jobs and new products	1				1	1							
2c	- A cleaner environment - A safer environment	1				1				1				
3c	Increase in demand for plumbing jobs, i.e. recycled water, etc. Also PG&E dual fuel utility, won't be a big job loss here	1				1	1							
4c	Workforce development programs	1				1	1		1					
5c	New development and affordable housing based on clean energy--> GHG free homes accessible to all	1				1	1							
6c	Improved indoor air quality	1				1								
7c	Big opportunity to create a pipeline to transition folks into higher wage trade jobs	1				1	1		1					
8c	Improve indoor air quality, health and safety benefits	1				1				1				
9c	Maintenance and upkeep jobs	1				1			1					
10c	Cleaner air overall in areas that have highest toxic emissions lecels in the city since 75% of new development is happening there (only if you have no high rise exceptions)	1				1	1							
11c	Create well- paying jobs for communities that have been subject to pollution and shut out from the labor movement	1				1	1							
12c	Providing cooling through heat pumps	1			1	1				1				
13c	Give individuals in affordable units opportunity to take part in clean energy transition	1				1	1		1					
14c	Opportunity for more skilled labor with family-sustaining wages	1				1	1		1					
15c	Seed the market with high skill, high performing workers with strategic investment	1				1	1		1					
16c	Improve health outcomes in marginalized communities that have been subject to gas combustion pollution	1				1	1		1					

17c	Exapnd jobs in City's teaching institutions e.g. City College	1				1			1	1				
18c	Creating high road job opportunities for environmental justice + other low-income communities	1				1	1		1					
19c	Create successful story of just transition in SF and model for other places	1				1				1				
20c	Health and safety benefits	1				1				1				
21c	Creative incentives programs	1		1		1	1							
22c	New/Increased workforce development programs	1				1	1							
23c	Build policies around race and equity	1		1		1	1							
24c	Partnership with labor	1				1	1							
25c	More work	1				1			1					
26c	More local economic benefits accrue from investments in low-income housing (it's a good place to start)	1				1				1				
27c	Increased requirements for education specialists explaining the reasons, processes, and projected outcomes of electrification	1				1				1				
28c	For incentive eligibility, qualify equipment (heat pumps, induction, etc.) based on criteria including 10-year minimum warranty and service guarantee	1			1	1				1				
29c	Opportunities for multilingual advocates to form the "bridge" betweens "laws" and the hopeful outcomes	1		1		1								
30c	Labor	1				1	1							
31c	Who pays?		1			1	1							
32c	Coastal city decarb goals might not be compatible with optimal statewide planning		1	1		1								
33c	Utility poverty as the change to electrification progresses		1			1	1							
34c	Low road contractors - Cut rate - No labor standards - Underground economy - Unsafe to workers and end users		1			1	1		1					
35c	Plumber/Pipefitter job loss		1			1	1							
36c	How to transition low road workers to high road jobs		1			1	1							
37c	Cost to replace all cookware to those that function on inductive ranges		1		1	1				1				
38c	How do we plan to take care of the workforce that will be loosing their jobs from switching to electrification from natural gas?		1			1	1							
39c	Lack of incentives for owners who rent out, incentives for residents		1			1	1		1					
40c	High rise exception continues to disadvantage least healthy and most vulnerable and most disadvantaged communities		1			1	1							
41c	Most of the new construction in SF is occuring in the eastern corridor		1			1	1							
42c	Black and Brown folks most likely to be in low road jobs so restrictions without specific regs forcing them into high road transitions		1			1	1							
43c	Cost of electricity and price spikes		1			1					1			
44c	Enforcement of skilled labor and PLA		1			1		1						
45c	Cost of new technology		1		1	1								
46c	Who pays for the transition? Don't want to leave some behind to pay more in gas rates and future electrification costs		1			1	1				1			
47c	Loss of jobs in natural gas sector		1			1	1							
48c	How to get utility participation		1			1								
49c	Transition will take lots of $		1			1					1			
50c	Under status quo, low-income and marginalized communities will be stuck paying for stranded gas assets as well-off communities electrify		1			1	1							
51c	Resilience and access to power during a shutoff		1			1						1		
52c	Need longer warrantees and reliable products (e.g. induction stoves, heat pumps)		1		1	1				1				
53c	Increased cost to build affordable housing with more mandates		1			1	1				1			

54c	How to ensure that jobs are high road? How to ensure access to these jobs is for diverse populations?		1			1	1							
55c	Getting affected unions to engage in productive, forward-thinking planning		1			1	1							
56c	Induction stoves are expensive, and warranty is only for one year (wears out quicker than natural gas)		1		1	1								
	Totals	120	85	66	106	71	63	12	47	88	22	17	8	3