City of Boulder – Xcel Energy Partnership

Building Electrification Working Group- Workshop

Date	February 12, 2022
Location	Zoom Virtual Workshop
Participants	Electrification Working Group • Pat Hillmeyer • Brynn Grunwald • Dennis Arfmann • Wayne Seltzer • Justin Brant • George Craft • David Kang Boulder Xcel Team • Iffie Jennings, Boulder County; Xcel Energy • Carolyn Elam, City of Boulder • Ann Kirkpatrick, Xcel Energy Institute for the Built Environment • Josie Plaut, Facilitator • Tom Hootman, Energy Consultant • Monica O'Reilly, Recorder (asynchronous)

Workshop Summary

Topic	Notes
Welcome, Introductions, + Agenda Overview	*Josie welcomed the group and provided an overview of the workshop's agenda.* The whole group introduced themselves and their role/perspective for this work. Introductions of Electrification Working Group • Pat Hillmeyer – representing single family homeowners that are interested in moving towards renewable energy on their personal funds

	• Brynn Grunwald – representing renters and those who have less control of what happens in their homes, personal interest in building electrification • Dennis Artmann – retired air quality attorney doing work for former governor Bill Ritter at The Center for New Energy Economy and Congresswomen DeGette's office on her Clean Enegy and Innovation Development Act • Wayne Seltzer – long-term homeowner and advocate for electrification; electrical engineer with former career in home automation • Justin Brant – homeowner in South Boulder who works at the Southwest Energy Efficiency Project • George Craft – longtime resident, homeowner, and landlord in Boulder. • David Kang- Vice Chancellor for Infrastructure and Sustainability at CU Boulder; wants to align the CU Boulder Energy Master Plan with the City's objectives
Framing the Fuel Source Conversation + Building Electrification Discussion	*Carolyn framed the conversation around electrification and why it is important for Boulder's renewable electricity goals. Below is a summary of the topics that were discussed by the group after Carolyn's presentation.* **Initial topics discussed:** • Enforcement mechanisms to assure buildings are actually decarbonizing. • Electrification considerations for older and especially historic homes. • Reference to SWEEP Heat Pump Study: https://swenergy.org/pubs/heat-pump-study-2022 • Electrifying a home results in fewer emissions in Colorado - even at a 28% renewable grid, there is a net emission reduction. For both new construction and retrofit application, greenhouse gas emissions are about half with a heat pump versus natural gas furnace. This doesn't include cooling. If you replace an inefficient air conditioner with an efficient heat pump, those savings would be higher. • Cost for new all electric homes is cheaper than putting in natural gas • Incentives for commercial buildings to electrify earlier and reach the "below 50 kBTU goal" before 2030 - tax breaks? Other incentive strategies? • Increasing need for cooling with global warming, decreasing efficacy of evaporative coolers, resulting in more energy demands. Ongoing focus on building energy efficiency will continue to be an important strategy.
Barriers & Opportunities	*Josie introduced Jamboard for participants share ideas. Below is a summary of the Jamboard outputs:* **Barriers** • Residential furnace + A/C replacement ○ Urgency of replacement timing

    - Most consumers do not understand differences between a “traditional” A/C replacement and a heat pump. How do we better educate to guide towards buying heat pumps?
- Emotional attachment to gas stoves
- Current natural gas rate structure- % that’s built into service/hook-up fee regardless of usage

Opportunities

- Incentives
    - Incentives for residential commercial buildings to electrify faster (BPS)
    - Regulations acting as incentives
        - Ex. Denver requiring a kBTU of 50/SF/Yr,
    - Specific incentives for landlords
    - Heat pumps providing both A/C and heat could incentivize those who need to replace their furnace who also do not have A/C to switch to a heat pump
- Financing opportunity through the Bipartisan Infrastructure Bill
- Envelop improvements
- New units available as a direct furnace replacement
- Prefab / Modular indoor construction factory
- Supporting Marshall fire rebuild with electrification:
    - education campaign (health, climate, and TCO)
    - off-setting higher initial building costs

Open Questions

- Data:
    - Do we have an analysis of the grid upgrade needed to accommodate load of building electrification and electric transportation?
    - Could Xcel provide us the data of gas BTU usage by Boulder customers to help us understand electrification priority/hierarchy?
    - Carbon taxes vs building codes to drive electrification. Do we know which will be more effective? [https://www.energypolicy.columbia.edu/research/report/comparing-clean-electricity-standard-and-carbon-tax]
    - What is Boulder's current data for commercial and industrial building standards?
    - Appliances (stoves & hot water) and health - how many homes?
- Health
    - How do we factor in health crisis from the methane leaks from gas stoves (even when they are off) and heating water in gas fired water heaters? requires significant energy.

	○ What more can we do to address residential appliances like gas stoves and water heaters? Health seems like an important motivator. ○ How large is the opportunity? Does the City know how many homes have gas stoves, what water heating technologies are used, and are their strategies being taken to approach these issues? • How has Washington, Denver, perhaps other comparable cities, developed their EUI goals, incentives, financing, and enforcement? **Other Comments** • Summer cooling with heat pumps adn on-site solar is a win-win reducing grid load and transmission requirements when it's warmest • Concerns with people struggling to rebuild their homes who are concerned with the new building codes.
Commercial Buildings – potential initiatives	*Below summarizes the responses submitted on the second Jamboard page rebarding ideas for commercial building electrification:* **Data** • Deep dive needed into the state of Boulder's commercial buildings and where we stand on Building Performance Standards • Do we understand the hierarchy of energy use across building types? • CU could aid in studies and data collection that get these data gaps **Regulations & Incentives** • Questions: ○ Carrots: what would the value to building owners be to have their existing property rated as "one of the cleanest buildings in Boulder?" Compelling enough to move them to action sooner than later? ○ How might we use tenant choice to motivate upgrades? • Financial rewards ○ State-level tax credits ○ Tax credits / financial reward for commercial tenants leasing from a greener building (EUI rating?) • Electrification ○ Commercial electrification measure through the utility program ○ Buffer electrification requirements with support for commercial financing ○ Requiring Commercial and Multifamily buildings to consider or replace with Electric

    - Commercial green bank/fund? Low/zero percent loans to help commercial/multi-family develops offset upfront cost differences been electrified and non-electrification options
    - Put electrification on the table with energy assessments and rebate programs
- Regulation that dictates what types of equipment can be installed at time of failure.
- Building Performance Standards - Buildings over 25k SF

Education

- Workforce - Commercial HVAC engineering firms

Thermal Energy/HVAC as a Service Through the Utility

- Utility-owned and maintained district system

Partnerships & Voluntary Measures

- Questions
    - How do we support the school district/public entities?
    - What funding options might be available to upfit buildings? Maybe at the state level? Local bonds?
- Work with CU on specific opportunities that they can't quite afford - follow up between Dave King and Xcel
- Multi-family and income qualified apartments, CBOs
- Referendum to electrify the district including health benefits

District Scale Systems & Geothermal Options

- Pilot a commercial district
- Identify where there are shared ownership opportunities. Or a shared central plant. Neighborhood system?
- Can we explore district geothermal opportunities - enable studies?
- Help with geothermal surveys
- Explore waste heat capture from sewer lines

Strategic Opportunities

- Couple electrification with solar and storage, peak shift, overall grid pull reduction, lower transmission costs
- Thermal Heat Pump systems (Geothermal, sewage heat recovery): Opportunity for load reduction and bring down operating costs

Sectors

- How do we think differently about public vs. private entities? We may need to incentive different behavior for each sector.
- K12 – How do we make funding available for our schools to make changes? School districts are cash-strapped – could we explore

	opportunities for partnerships with utilities? Or a campaign to electrify schools and educate kids about the health impacts of gas appliances? Schools seem like an ideal infrastructure to create a neighborhood grid **Industry Education & Motivation** • Help engineers, contractors, and installers advocate for seek electrification solutions. Offer commercial rebates and assessments. • Thoroughly explore commercial barriers and motivations to electrification. What is in it for building owners to electrify and be more efficient if they keep buildings occupied? • Potentially a labeling program for businesses marketing campaigns. • Benching marking and disclosure agreements allow for information to be available for tenets to consider energy costs. • Benchmarking in electricity costs and ways to monitor them for tenets • Tease out underlying assumptions and focus on reality of monetary standpoints - strategies to manage cost-effectiveness of operations • Rebates and incentives to change out appliances on both the residential and commercial side could be beneficial; Goals tied to emissions goals is going to drive behavior in commercial buildings; On the residential side, switching to electric is more complex than simply buying an appliance and costs can add up quickly • The things we can do to move electrification forward are piloting studies and providing data; Develop new program delivery models; Provide a source of learning for the rest of the state and country
Lunch	*The group took a 30-minute lunch break.*
Residential Electrification	*Below is a summary of the points submitted on Jamboard regarding residential electrification.* **Landlord Mandates** • Early replacement bonus so replacement is more likely to happen outside of emergencies, avoiding supply chain issues • Need to solve for unintended consequences of landlords passing BE costs to renters ○ From the utility perspective, it's not BE unless the heat pump is replacing a gas appliance. • Requiring per-unit energy billing/banning bundling utilities into rent • Modify the $500/lifetime cap on the federal energy efficiency tax credit • Clean energy currency to account for tradeoffs • Require that landlords pledge to replace with electric appliances and/or requiring electrification by a certain date

- Compiling a list of benefits for landlords to educate them
- incentivizing landlords to install solar and credit generation it to renters as a means of offsetting electrification cost

Renters

- Energy rating for renters to understand utility costs
    - Is energy use/sq ft a meaningful way to talk about this with all the stakeholders?
- Motivate renters to ask for green home leases
- Requirements for publishing heating/cooling technology in rental listings

Education

- Kids as a vector for change
- Workforce - Residential HVAC/plumbing(?) contractors - multi-family developers
    - Installer / contractor's ability to answer questions and understand and promote rebates

Health

- Indoor air-quality data - home science projects

Financing & Incentives

- Group purchasing program
- Help homeowners with the cost of electric panel upgrades
- Reduce soft costs as much practical
- On-bill financing
- City backed volume purchases
- Loan options
    - Colorado Energy Office’s RENU Loan program. 2.75% for 15 years
    - Residential green bank/fund? Low/zero percent loans to help residential/ multi-family builders/ owners offset upfront cost differences
- Better advertise existing options
- Increased incentives for heat pump HVAC
- Options for temp/emergency fixes to buy time to do a longer-term electrification replacement when an unexpected failure occurs
    - Challenge - time to get loans with existing programs vs immediacy of need
- Reduce permitting costs for electrification-related upgrades

Equity

- Can existing funds focused on low-income be activated for electrification?
- Expand / grow existing low-income weatherization programs to include electrification

	Xcel/Rate Structure
	• Issue of who bears the cost of the utility upgrade
	  ○ Avoid burden of Xcel system upgrade costs falling on the last homeowner to upgrade their service.
	• Carbon tax - carbon credits
	• Restructure NG rate structure to reduce hook-up/facility cost (fixed monthly fee) and shift that into usage cost (consumption based) to better incentivize reducing NG usage
	  ○ Careful with possible tiered billing to not disincentivize EVs because those are an additive load at the residential level that previously had nothing to do with Xcel
	• Pro-electrification argument for Xcel - the NG sales go away, but they get the former gasoline $$$ in the long term
	Driving Proactive Decision-Making
	• Preparing for electrification when solar/storage installs are being done
	• Can we get contractors to start carrying heat pumps vice gas options?
	• Potential need to upgrade service when replacing appliances
	• Require making utility spaces electric water heater ready on any water heater reinstall, heat pump or otherwise.
	• Electrification-ready work in conjunction with solar.

Closing Remarks, Next Steps & Action Items	*Josie closes out the workshop by reviewing the topics discusses on the Jamboard.* **Next Steps:** • Create structure around proposed ideas • Organize idea by their richness and greatest potential impact • Dennis and George will prepare a report back to the Advisory Panel **Final Remarks from Xcel** • Wished there was more time to discuss education piece; It is overwhelming to think about all at once • How do we build a foundational understanding and language to communicate?
Resources	• Jamboard: https://jamboard.google.com/d/1p6WBlZJXhL-Sy5jY00kDrNpG8CTTZHfHYRWRs5bzmVY/viewer?f=0 • SWEEP Heat Pump Study: https://swenergy.org/pubs/heat-pump-study-2022