Carbon Free DC by 2050 – Building Electrification
9/28/20

When in a building's lifecycle are the best opportunities to electrify? To do efficiency + electrification together?

- Construction – to do efficiency and electrification
    - As early as possible to get the best return on investment
- Major remodeling
- Ownership change
- When equipment reaches end of life or you are preparing for a systems upgrade – that's when people consider what's available
    - When HVAC needs to be replaced, preferably both heating & cooling
    - Failure replacement is tricky because of scale
- After analyzing an existing building's emissions

What are the biggest barriers to being able to transition heating and cooking off fossil fuels by 2035?

Housing and construction costs continue to rise

- Cost – both operational and first-costs
- Consumers' knowledge and understanding of electric options and advantages of electrifying
- Cultural habits, preferences and perceptions, especially for cooking (both individuals & restaurants/commercial kitchens)
- User experience – cooking, way heat feels
- Reliability, especially for winter
- Coordinating changing systems across a number of units is challenging, compared to replacement in, for example, multi-family buildings with central systems
- Particular high heat needs
- Increase in amperage

What solutions could address these barriers? (policy needs, technical support, resources, etc.) What must we have in place to support electrification at these junctures?

- Education
    - Consumers – re: how electrification makes their lives better (health, comfort) to make sure this is done with them, not to them; first vs. operational costs and benefits
    - Sales force – re: appliances
    - Workforce – re: installation, esp. for heat pumps and new technologies
    - "Hands on" lab (like in CA) to overcome product stigma and public outreach to allow people to see what/why/how (Hudson Yards, NYC)
- Costs / Financing
    - Buy down the first cost of equipment so buyers don't have to wait for rebate
    - Role of DC SEU and Green Bank in subsidies or low-cost loans
    - Lessen subsidies for gas compared to electric appliances
    - Way to incorporate savings from electrification + efficiency into a form of loan security
    - Restructuring electric rates for those who have converted significant loads

- Require electric-only new buildings (also cost-effective)
- Policies with benchmarks for source & site emissions, clean energy fuel mix
- More storage capacity
- Solutions for hard-to-electrify buildings
    - Role of other fuels – renewable natural gas, hydrogen, to support decarbonization, such as in combined heat and power systems
    - Economies of scale for producing and distributing biofuels in pressurize tanks, rather than having to upgrade the whole piping network for those buildings who may need RNG, etc., for high-heat applications or legacy systems

What else is needed to achieve the vision we started with? Blue skies: what's the one thing you'd do to get us to our goal?

- Treat climate change like we do health and safety in the building industry: where green building and energy codes are equal in importance to structural and fire codes
- Change consumer perceptions and shift focus to improvements (health, indoor air quality), not what they're losing
- Tax surcharge to finance electrification + storage to overcome all or most of the cost concern
- Better understanding of existing operating costs compared to customer economics
- Technologies:
    - Storage – battery & thermal storage
    - Variable frequency drivers in HVAC systems, to save energy + improve air quality
- Some coordinating mechanism to identify and seize opportunities to electrify a whole area in lieu of gas pipe replacement
- Carbon reduction relies on also greening our electricity and refrigerants, which have a significant burden and rely on correct waste disposal/recycling to control
    - Refrigerant management plan of some type

For new construction, the Clean Energy DC plan calls for net-zero energy codes by 2026. What are the barriers to building new homes & buildings without on-site fossil fuels at scale by then?

- Training/Education
    - Certification program & training for architects and builders, who aren't currently well informed or trained in net-zero designs
    - Contractors re: installation
    - Consumers: re: costs – real or perceived
- How to scale up from what we're already doing this in the region. Some of the buildings closest to net-zero are affordable housing (e.g. Habitat's 15+ Passivehouse units)
- Follow movement at 2021 IECC

What solutions could address these barriers?

- Density bonuses for passive and other high-efficiency standards