



STAFF REPORT – PART 2 OF ELECTRIFICATION PETITION RESPONSE

This report was produced by staff from the Town's Office of Sustainability and Resilience

September 28, 2022

This staff report includes the following elements:

- I. Recommendation to Council
- II. Staff Responses to Questions Identified in [June 8, 2022 Staff Report](#)¹ for Council

I. Recommendation to Council

In response to the Environmental Stewardship Advisory Board's petition, in support of the goals of the Climate Action and Response Plan, and based on the information provided within this and the June 8, 2022 staff report, we recommend that the Council consider the following:

1. As part of an update to the [Council's Green Building Ordinance for Town buildings](#)² later this year, require that all Town-owned new construction use electricity and/or another clean, renewable energy source for heating purposes; and to the greatest extent possible and practical, require that significant building renovations (those where the combustion heating equipment is being replaced) do the same.
2. As part of an update to the [Council's Green Building Policy](#)³ Framework later this year—and where applicable to future updates of the Land Use Management Ordinance—encourage and/or incentivize new construction or major renovations (those where the combustion heating equipment is being replaced) to use electricity and/or another clean, renewable source for heating purposes.
3. Require that to the greatest extent possible and practical, the Town shall establish new leases for buildings that use electricity and/or another clean, renewable energy source for heating purposes.

If these are agreeable to the Council, we would then plan to return later in the year with an actionable ordinance amendment and resolution that show how these changes can be implemented.

¹ <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=5677943&GUID=6E9D7324-9CA4-44FD-A2E0-D2A705C88ADA&Options=&Search=>

²

https://library.municode.com/nc/chapel_hill/codes/code_of_ordinances?nodeId=CO_CH5BUBURE_ARTVIIENCODECONERETOB

³

https://townhall.townofchapelhill.org/agendas/2007/04/23/11/2007-04-23_r9.htm

II. Staff Responses to Questions Identified in June 8, 2022 Staff Report for Council

The following includes a list of three policy options (italicized language) that the staff presented to Council on June 8, 2022, along with a series of previously identified questions for which the staff has now included responses.

Tentative Options, with Questions and Responses:

1. *Require that all Town-owned new construction or significant building renovations (those where the combustion heating equipment is being replaced) use electricity and/or another clean, renewable energy source for heating purposes.*

Questions:

- Can we estimate as a percentage what the approximate greenhouse gas emissions reduction benefit would be for a new or typical municipal building?

Staff Response: A 2020 report by the American Council for an Energy-Efficient Economy (ACEEE) found that **electrifying the heating systems of commercial buildings in the US has the potential to reduce GHG emissions in those buildings by up to 44%**. They found the economics of doing so to be challenging and site-dependent, but in 27% of the floor area studies electrification could be done with a 10-year simple payback. Source: ACEEE, [*Electrifying Space Heating in Existing Commercial Buildings: Opportunities and Challenges*](#)⁴ (October 28, 2020)

- Can we estimate as a percentage what the total cost of ownership for all-electric heating equipment would be compared to combustion heating equipment in a new or renovated Town building?

Staff Response: The same ACEEE report referenced above analyzed the impact on electrification (at time of HVAC system failure) in more than 30% of all buildings in the Commercial Buildings Energy Consumption Survey (CBECS) database. CBECS buildings used different kinds of fossil heating systems, but the vast majority of the sample used natural gas. They compared total lifecycle cost impacts between replacing the system with a new updated fossil fuel system and a new electric heat pump system. **The report says that a median lifecycle cost savings of ~\$1.25 per square foot is expected for all-electric heating systems in offices.** Lifecycle cost savings in this analysis tended to be higher in the southeast, in non-energy-intensive buildings like offices, and those with relatively long operating hours (includes offices). This seems to be especially true for relatively small buildings (25,000 square feet or less). There are greater energy savings in the southeast and more temperate climates because winter temperatures are milder and don't require the units to use the more energy-intensive resistance heating function as often.

⁴ <https://www.aceee.org/research-report/b2004>

- What impacts, if any, would this policy have on Town operations within new or existing Town buildings? For example, would this require an adjustment to our temperature set points and programming?

Staff Response: The ACEEE report referenced states, “These analyses suggest that in the commercial sector, **the most promising electrification opportunities may also be in new construction, warm and temperate climates, and the small share of buildings currently using fuel oil or propane.**” As a result, we have modified the first recommendation above to state that electricity and/or clean, renewable energy should be required for the heating associated with new construction and that it be strongly preferred—“to the greatest extent possible and practical”—for significant building renovations (those where the combustion heating equipment is being replaced). This allows for the possibility that some projects do not yield significant emissions reduction benefits and leaves open the possibility that green hydrogen can become a commercially viable alternative in the future.

2. *As part of an update to the Council’s Green Building Policy Framework, encourage and/or incentivize new construction or major renovations (those where the combustion heating equipment is being replaced) to use electricity and/or another clean, renewable source for heating purposes.*

Questions:

- What is the latest on how our electric utilities are preparing for the increase in electricity demand from heating and vehicles over time, and what changes can ratepayers anticipate?

Staff Response: Duke Energy’s [Carbon Plan](#)⁵ says the following about utility pricing: “**limited cost impacts in next two years and about 1.9% - 2.7% annually through 2035.**” The plan also projects that the electric vehicle sector will make up 5.5% of all vehicles in the U.S. by 2035. Some analysts believe this projection is too low, particularly as EV sales in the Southeast increased by 49% in 2021 ([Southern Alliance for Clean Energy](#)⁶).

- For a typical household and based on ratepayer projections under the draft Duke Energy Carbon Plan, how do the annual utility costs of combustion heating compare to electric heating?

Staff Response: A [2018 report from the Rocky Mountain Institute](#)⁷ (RMI) stated the following: “**For newly constructed homes, heat pumps are usually the lowest-cost option**, particularly since a heat pump provides both heating and air conditioning, and these homes avoid the cost of both

⁵ <https://www.duke-energy.com/our-company/about-us/carolinas-carbon-plan>

⁶ <https://cleanenergy.org/blog/year-end-data-shows-electric-transportation-is-full-speed-ahead-in-the-southeast/>

⁷ <https://rmi.org/insight/the-economics-of-electrifying-buildings/>

furnaces and air conditioners. **For retrofits of existing homes, heat pumps can be lower cost than replacing both furnace and air conditioner separately.** For homes currently using natural gas heating and only needing to replace a gas furnace, it is usually more expensive to electrify than to stick with gas.”

- Are there instances where an upgrade to electric space heating should be done in conjunction with other measures like weatherization and/or rooftop solar?

Staff Response: Based on conversations with local housing partners Orange County Housing Preservation Coalition partners, we have learned that there are concerns that **electrification, by itself, does not always improve affordability** (i.e., lower monthly bills) – and this is of particular concern for low-income residents, where there are risks based on current pricing. However, we’ve also learned that if there is money and time to weatherize a home, along with making any necessary repairs, electrification can improve affordability. For these reasons, **the decision to electrify a home should be evaluated on a case-by-case basis.**

- What reason, if any, would a developer or builder have for not installing all-electric heating equipment?

Staff Response: In addition to information provided in the two responses directly above, we have also learned that **homeowners will sometimes state a preference for the “hot air” and “quick blast” feeling of combustion heating** (e.g., natural gas fired furnace) versus the more gradual and subtle heat of an electric heat pump.

- As part of the Council’s Green Building Policy Framework update, is an incentive needed for all-electric heating in new construction and, if so, what would work best?

Staff Response: **Through the development review process, we are now seeing mostly all-electric or electric-ready building designs for new construction.** This has been particularly effective when an applicant is asked to consider all-electric design during the early stages of a conditional zoning application. Several states, including California, Washington, Colorado, and Massachusetts have electrification policies which may help to inform local land use and incentive options, especially for existing buildings or developments that do not require a rezoning. This is an area we will continue to explore, particularly as more federal money is deployed for climate action.

3. *Require that to the greatest extent possible and practical, the Town shall establish new leases for buildings that use electricity and/or another clean, renewable energy source for heating purposes.*

Question:

- What are some leasing scenarios where it could be challenging for the Town to

meet such a requirement and why?

Staff Response: If the Town had to temporarily relocate a major service operation (e.g., Police), **there could be limited leasing options that meet the needs of such an operation.** In that case, the Town would want the flexibility to find a space that best suits the short-term needs of the operation in order to maintain reliable service.