

From Josh Morse, Public Buildings Commissioner

At the Newton Early Childhood Program project open house, I was asked why is it so important to electrify our buildings and not use fossil fuels as the heating source.

Why is building electrification so important?

- Lower upfront costs
- Lower utility costs
- Comparable maintenance costs
- Reduces our carbon emissions
- Better indoor comfort



What does it mean to “electrify” our buildings?

Most of our school and municipal buildings use natural gas for heat. To help combat climate change, the City of Newton has a goal to become carbon neutral by 2050, and to meet that goal we must eliminate our use of fossil fuels.

Using natural gas in our buildings contributes an enormous amount to Newton's total greenhouse gas emissions. To reduce emissions, we can electrify our buildings by switching to air source or ground source heat pumps, such as ductless split (aka mini-split) systems, heat pump rooftop air handling units, heat pumps (aka reversible chillers), or ground source heat pumps (aka geothermal).

Isn't it very expensive to buy and install these systems?

This industry is changing rapidly. The United States is way behind much of Europe on this front. The cost of the equipment has come down significantly over the past decade. For example, we just completed the Newton Early Childhood Program project which is fully electric. The cost to install the electric heating and cooling systems, including the incremental increase in electrical system costs, was less expensive than installing a high efficiency gas fired boiler system.

Isn't it very expensive to operate these systems?

When you couple heat pumps systems with an efficient building envelope, the operating costs are less expensive. This has been proven by our projects here in Newton, and around the country.

Electricity is generated using fossil-fuels. How does this help us reach our carbon neutrality goals?

The electricity which is generated in New England is roughly 20% renewable, 30% nuclear, and the majority of the remaining 50% coming from fossil fuel sources. (Data source [here](#).) While 20% may not seem like much, it is increasing every year. As an aside, nuclear power does have a much lower carbon emission footprint, but I won't debate the merits here. Furthermore, a massive sea change, pun intended, is coming in the form of another 5.7 gigawatts of offshore wind by 2027. This will represent another ~5.8% of additional renewable electricity coming into the Massachusetts grid. When our buildings are electric, their carbon footprints decrease each year as new renewable electricity generation is added to the grid. In addition to the renewable energy coming from the electric grid, the City of Newton purchases renewable energy credits which amount to an additional 10% of renewable energy for our buildings, and we are on a path to continue to increase this. When you couple this with our onsite solar photovoltaics systems, we are able to achieve net zero buildings which allows us to really achieve carbon neutrality. If our buildings are using fossil fuels, we can never achieve our carbon neutrality goal. When our buildings are fully electric, we have multiple paths to achieve carbon neutrality.

What is the future for fossil fuels, and why is this important to Newton?

It's a trick question. There is no future for fossil fuels. Regardless of what you may think, the transition away from them is a certainty. The war in Ukraine has been a huge wake-up call to the European nations and to all of us about the impacts of geopolitical pressures on the natural gas markets. The only saving grace has been the unusually

mild winter we're having. Nevertheless, energy independence has screamed to the forefront of every leader's mind over the past year. The only way to be truly energy independent is for the country to be fully electric and able to renewably generate all the power we need to meet the demand. Partnerships with allies for imported renewable energy is also part of the solution.

Why is converting to electricity better for our long-term financial health?

Converting to fully electric buildings helps avoid future utility market uncertainty and yields better long-term budgetary sustainability. Geopolitical pressures, wars, declining inventories, government regulations to protect the planet, and so many other factors are creating tremendous uncertainty in the fossil-fuel markets. Projecting inflation decades out for a finite resource is nearly impossible. The conversion to fully electric buildings is an essential step for our planet, and for the future of our bank accounts. Fossil-fuel heating equipment will begin to be phased out as the demand drops. Repair parts for fossil-fuel equipment will become harder to find. As demand drops the fossil-fuel industry will start to fracture. The refining and distribution systems for the various fossil fuels will break down. All of these will result in rapid spikes in fossil fuel prices. Meanwhile, electric generation will continue to become more renewable. The increasing electric demand has, and will continue to, result in investments in expanded electrical generation and distribution infrastructure. This will result in electricity becoming a more stable, financially predictable, energy source.

How does converting to electricity help the students, staff, patrons, and staff within our buildings?

Converting to fully electric buildings is also an opportunity to update the heating, cooling, and ventilation systems in our schools and municipal buildings. Adequate temperature control within our classrooms, offices, and other spaces is one of the most important things we can do to make our facilities great places in which to work, teach, and learn.