The Case for All-Electric New Buildings

Why All-Electric Buildings?

Buildings are the largest source of greenhouse gas emissions in New York State. There is no pathway to meeting New York's legally mandated greenhouse gas emissions reductions without dramatically decarbonizing buildings. Energy and policy experts worldwide agree that beneficial electrification of heating and appliances with energy efficient technologies such as heat pumps and induction stoves is the best and most cost-effective pathway for decarbonization of the building sector. These technologies reduce greenhouse gas emissions while also providing building occupants with immediate benefits in terms of health, safety, and comfort.

The All-Electric Building Act is a common-sense first-step strategy for decarbonizing buildings. It ensures that new buildings are constructed without fossil fuels, starting with smaller buildings in 2024 and larger buildings by 2027. This is the same timeline already adopted last year by New York City. RMI analyzed the impacts of this proposed policy and found that a statewide policy would save an additional 4 million metric tons of CO2 by 2040 beyond the reductions already expected from NYC — the equivalent of keeping 870,000 cars off the road for one year.

Are heat pumps appropriate for upstate?

Yes. In some ways upstate is a more attractive market for heat pumps because electricity prices are lower. Multiple new buildings are already being built with heat pumps upstate including apartment complexes, office buildings, hotels, airport terminals, grocery stores, affordable housing and single-family homes ranging from tiny homes to mansions. Here is a list of 150 buildings in Upstate NY that heat without fossil fuels.

People all over upstate New York successfully heat their homes with heat pumps today, and many are saving money doing so - especially those who were previously using fuel oil, propane, kerosene, or electric resistance heating. Heat pumps also provide inexpensive air conditioning, which adds to their cost-effectiveness.

"Many Long Islanders could reduce their carbon footprint and save a lot of money heating their home with a heat pump—especially those with oil or electric resistance heat, new construction, or customers desiring to retrofit a home for air conditioning." - Long Island Power Authority

"The cost of heating and cooling your home with a heat pump is typically less than oil, propane, or electric resistance." - New York State Energy Research and Development Authority (NYSERDA)

It is important to know that not all heat pumps are equal. Households living in cold climates need geothermal or a good quality, cold-climate air-source heat pump specifically designed for the harsh winters we experience in upstate New York. Geothermal heat pumps are the most

efficient systems available and can operate in all climates because their main energy source is the constant temperature maintained by the earth below the frost line. The low-temperature performance of cold-climate air-source heat pumps has improved greatly in the past decade, enabled by inverter-driven compressors, flash injection technology, and other advances. That is why there are many New Yorkers today who are successfully heating and cooling their entire homes with cold-climate heat pumps. For more examples, we see this video briefing by Renewable Heat Now or this video by NYSERDA.

What will happen if there is a power outage?

All modern heating systems, whether gas, propane, oil, kerosene, coal, or wood pellets rely on electric power to operate (wood stoves are the only exception). A widespread power outage during winter is a situation that needs to be planned for regardless of the kind of heating systems we're relying on. New buildings built to current energy codes are the most resilient in the event of a power outage because they will retain heat for longer.

While some very old and inefficient fossil-fueled furnaces can operate during a power outage, modern gas furnaces require power for the electric ignition to function, the gas valve (which is a safety mechanism) not to automatically close, and for the blower fan motor to work. New fossil fueled furnaces cannot operate without electricity, so a new fossil fueled furnace is no more reliable than an electric heat pump in the case of a power outage.

Homes in areas with frequent power outages sometimes already have backup systems in place for such situations, like wood stoves or generators, that pair well with heat pumps. Battery storage is also becoming more prevalent. The All-Electric Building Act would not prohibit the use of fossil fuels for emergency backup or for any use for which an all-electric solution is found to be technically infeasible.

Can New York's electric grid handle the increase in load?

The short answer is yes for many years to come. Our electricity grid currently experiences peak use during the summer and has excess capacity during the winter. Heat pumps primarily use the most energy in the winter. According to the Long Island Power Authority, adding heat pumps to the grid actually will help bring down the per kilowatt cost of electricity because they level out electricity use, which improves grid utilization.

New buildings that have to be built to higher energy standards than most of our housing stock will be very efficient to run using electric heat pumps and will not add significantly to peak energy demand for years to come. In the future, more renewable power generation, improved infrastructure, improved distribution, and storage will be needed to provide sufficient electricity to heat all NYS buildings and power all electric vehicles. This is part of the phased energy transition that is being described in the Climate Action Council's scoping plan, modeled by NYISO, and planned for by state agencies. To the extent that geothermal heating systems and thermal energy networks are used to electrify buildings (instead of relying primarily on air-source

heat pumps), peak electricity demand will be flattened in a way that is beneficial to everyone because they are an extremely energy-efficient way to heat homes.

How does the cost of a new all-electric home compare to a new fossil-fueled home?

According to an October 2020 analysis by RMI: “In every city we analyzed, a new all-electric, single-family home is less expensive than a new mixed-fuel home that relies on gas for cooking, space heating, and water heating.”

Many other studies also show that the cost of all-electric building construction is significantly lower than the cost of constructing with fossil fuel systems. Here is an example from LIPA:

Figure 4: For a Newly Constructed Single Family Home on Long Island, Electrification Saves Customers Money and Reduces Carbon Emissions

	Natural Gas	All-Electric Home
Heating and Cooling	Gas Furnace and Central Air-Conditioning	Cold Climate Heat Pump
Water Heater	Gas Water Heater	Heat Pump Water Heater
Clothes Dryer	Gas	Heat Pump
Equipment, Connection, and Installation Costs	$22,973	$22,418
LIPA Rebates	—	$5,950
Net Cost with Rebates	$22,973	$16,468
Upfront Savings		**$6,505**
Annual Bill Savings		**$765**
Home Carbon Footprint (2022)		**-21%**
Home Carbon Footprint (2040)		**-100%**

Image Source: LIPA Fact Sheet "Building Decarbonization on Long Island and the Rockaways"

What is the cost of inaction?

New Yorkers are paying for the cost of inaction already with our health, high energy costs, and the effects of the climate crisis. New York leads the nation in premature deaths from the nitrous dioxide and particulate matter pollution caused by burning fossil fuels in buildings. Meanwhile, the costs of fossil fuels and fossil fuel infrastructure are increasing, making it more and more difficult for people to be able to afford to heat and cool their homes and keep the lights on. The gas utilities funding the campaign to undermine our transition to renewable alternatives have no leg to stand on when they claim to be protecting energy affordability for New Yorkers.

A new federal report details the staggering cost of climate disasters to New York State. Between 2000 and 2021, New York State experienced 51 billion-dollar disaster events due to the climate crisis. Just in 2021 alone, the total cost of climate disasters was $10-$20 billion.

The latest International Panel on Climate Change (IPCC) report, which is based on thousands of global reports, details why scientists are confident that climate change has already damaged many of our ecosystems all over the world in irreversible ways, and worse than we previously knew. Climate change has caused some species to migrate to places they've never lived before, and some to die out entirely. The IPCC report is a warning to us that the deterioration of ecosystems has and will continue to have negative consequences for society, including profound impacts on our health, wellbeing, and personal finances. We cannot afford to delay climate action any longer.

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