

June 30, 2020

E4TheFuture would like to introduce a study we commissioned, prepared by Synapse Energy Economics.

[The report](#) looks at various adoption scenarios for strategic electrification from heat pumps and electric vehicles, and the corresponding impacts on the electric grid within ISO New England's territory. The goal of the study was to identify if, when, and how electrification could disrupt the operation of the region's electric grid.

High-level conclusions we found in the report are presented below.

Note: The report was completed prior to the impact of COVID-19 on the energy and electric use in the region. Adoption of electrification technologies is particularly uncertain at this moment. After accounting for disruptions we have observed to-date, we expect the report's results and conclusions to remain largely the same with a few minor caveats.

We examined ways in which the three heat pump adoption scenarios could be impacted. It is possible that the business-as-usual (BAU) scenario (which looks at existing state-sponsored energy efficiency plans) may face implementation delays. The BAU results could more accurately represent a 2021-2030 timeframe (rather than a 2020-2029 timeframe) if the energy economy rebounds relatively quickly. The implications for the policy scenario (which looks at state energy plans and policy directives) are more difficult to predict. State policy-makers may find it more challenging to meet their policy goals for electrification as a result of COVID-related budget constraints, but we urge them not to deprioritize the essential transition to low carbon technologies. The report shows how existing policy-based trajectories are well below what is required in this decade to meet state-by-state greenhouse gas (GHG) reduction goals. Any move to further slow the policy directives is counterproductive to the region's long-term goals. The final adoption scenario, the climate scenario (which assumes all states hit their GHG reduction goals), will remain the same as it is illustrative in nature and not subject to external factors. Lastly, long-term work-from-home patterns or other COVID-related shifts in energy usage could alter the expected energy use per system.

Electric vehicle (EV) adoption will also be affected by the pandemic and resulting economic impact in ways that were not considered during the writing of this report. New vehicle sales have declined overall due to pandemic-related shutdowns, and sales are likely to continue to remain below typical levels if the economy continues to slow. The result could be reduced EV sales in the short term for the duration of the economic downturn. Perhaps an even larger threat to long term EV adoption is that automakers could reduce spending on EV development due to financial constraints. However, there has been little sign thus far that automakers have decided to significantly delay their EV plans. And as the technology continues to improve and compete with internal combustion vehicles, we may reach a tipping point in the vehicle market where automakers have little choice but to maintain their EV investments and grow their EV offerings.

This report focuses on the mid to long term transition toward EVs, and over these timeframes this analysis remains an important tool for policymakers. Due to the rapid improvement in EV technology, market share seems likely to continue along its upward trajectory in the mid to long term. And due to the threat of climate change, we cannot afford to let this progress stall. The full impacts of transportation electrification will not be felt for years due to the slow turnover of the vehicle fleet, and regardless of economic disruptions today it is essential that policymakers remain focused on increasing EV adoption and implementing incentives for managed charging. As this report shows, the

grid can support additional EV load over the next decade, particularly if charging is managed. That provides some time to determine how to accommodate the full EV load coming after 2030, and policymakers would be wise to utilize it and start planning now.

Key Conclusions:

1. The report indicates that one of the most critical shortcomings of our clean energy policies is that current state-by-state goals for the electrification of buildings and vehicles is significantly lower than what is needed to meet climate goals established by governors and legislatures.
2. The report indicates that even if the region were to electrify at an aggressive enough rate to remain on track to achieve its climate goals, the combined impact of both heat pumps and EVs will not exceed the capability of our energy supply and transmission system. Instead, the region should take advantage of the next decade to plan effectively for the decades to follow, in which large-scale changes will likely be necessary to handle a more drastic increase in load from electrification. Distribution system impacts need more detailed analysis and may require modification within the next ten years.
3. The analysis of EV charging impacts significantly demonstrates the difference between unmanaged charging (which is currently the case) compared to managed charging (using time of use rates, special EV charging rates, or Active Demand management for EV charging). Compared to managed charging, unmanaged charging may increase demand by up to a factor of eight. This argues for greater efforts to introduce managed charging to avoid a much more significant impact beyond 2030. The level of our readiness to manage our electric grid is influenced by no other factor of greater importance. Fortunately, even today, many companies exist that are capable of managing charging on a “real time” basis to assure that whatever issue is important to the reliability of our electric system, our grid operators will be up to the challenge. That said, it will be vital to see support from ISO NE and utilities to get this capability into our residential communities, public spaces and office parking lots to assure this amazing resource may reach its potential to help manage the grid and maximize the electric vehicle experience for consumers.
4. The continuation and expansion of energy efficiency efforts will play a significant role in mitigating any negative impacts of more aggressive electrification as we move into the next decade or even in the short term at the distribution level.
5. Lastly, the most concerning scenario is if there is a “polar vortex” event like the one in 2018. The competition of natural gas supply for heating buildings and generating electricity could increase with electrification, triggering the need for massive amounts of oil to be used for electric generation. However, if New England procures additional clean energy resources for winter as planned--such as energy efficiency, demand response, and generation resources like offshore wind and/or hydroelectric power--a repeat scenario could be mitigated or eliminated.