New Jersey 2019 Energy Master Plan (EMP)
Reducing Energy Consumption Stakeholder Meeting Discussion Points

Comments of Nest

Introduction

Founded in 2010, Nest is dedicated to reinventing home products like the thermostat and smoke alarm to provide customers with simple, beautiful and thoughtful hardware, software and services, thereby helping them reduce energy consumption and keep their families comfortable and safe. Nest's mission is to create a home that takes care of the people inside it and the world around it.

Nest was acquired by Google in 2014, and currently manufactures the Nest Learning Thermostat and Nest Thermostat E, which are equipped with sensors, Wi-Fi capability, and smart-phone grade processing, to help customers consume less energy. It learns their preferences, turns the temperature down when the house is empty, automatically lowers AC runtime when humidity conditions permit, thereby helping people lower their energy use without sacrificing comfort. Nest also has service offerings for utilities to help address their load management needs and works with over 100 utilities in North America.

Nest appreciates the opportunity to offer its insights on this very important topic. Efficiency of energy consumption is a key building block if the state is to achieve its goal of a conversion to 100 percent clean energy by 2050. The comments below correspond by number to the Questions posed in the September 14, 2018 "Reducing Energy Consumption Stakeholder Meeting Points".

1. What energy efficiency, peak demand reduction, and demand response programs and systems will assist in helping keep energy affordable to all customer classes, especially as technology advances in areas such as electric vehicles or heating and cooling, which will potentially increase electric energy usage.

Smart thermostats are a relatively new technology that helps residential and small commercial customers increase their energy efficiency, reduce their peak demand and participate in demand response programs. The U.S. Environmental Protection Agency (EPA) defines smart thermostats as:

"…a Wi-Fi enabled device that automatically adjusts heating and cooling temperature settings in your home for optimal performance."[1]

Typical features of a smart thermostat are:

- Ability to control remotely via smart phone
- Ability to automatically detect occupancy and reduce heating and cooling usage if no one is home

[1] https://www.energystar.gov/products/heating_cooling/smart_thermostats

- Ability to automatically create a schedule for the occupants that tracks their lifestyle, while minimizing unnecessary energy consumption.

There are currently 32 EPA Energy Star certified smart thermostat models.[2] Smart thermostats that are Energy Star certified have to reduce heating run time, on average, by at least 8% and cooling run time by at least 10%.[3]

Traditional energy efficiency programs for the residential sector have improved the *building shell* (insulation, windows) and improved the *efficiency of the appliances* (HVAC, refrigerators). Smart thermostats add a third strategy: better *control of energy*. As a result, smart thermostats are complementary to traditional residential energy efficiency measures, not in conflict. The Home Performance Coalition makes a similar point in the recommendations contained in its recently released report, "Redefining Home Performance in the 21st Century: How the Smart Home Could Revolutionize the Industry and Transform the Home-to-Grid Connection"[4] And, smart thermostats help reduce both heating in the winter and cooling in summer.

The energy efficiency characteristics of smart thermostats can help New Jersey residents save money on their electric and gas bills as well as contribute to the statewide policy goals contained in Executive Order 28. In addition, smart thermostats can also contribute to reducing peak demand and allowing residential customers to participate in demand response programs run by utilities or third-party aggregators.

Residential air-conditioning is one of the prime drivers of peak electricity demand in the PJM region. On the hottest days, air-conditioning works the hardest, thereby driving up demand on both the local electric distribution systems and in the wholesale PJM market. Because smart thermostats, unlike older traditional thermostats, are connected via the cloud, utilities across North America can and do use them to reduce demand on those hottest days.

Nest offers a service to its utility partners called Rush Hour Rewards (RHR). Utilities typically offer an incentive to their customers to voluntarily enroll in RHR. Then on the hottest days, the utility notifies Nest and Nest then sends a signal to the enrolled thermostats to pre-cool the house prior to the RHR event. Then, during the event, the thermostat allows the temperature set point to move up a few degrees, thereby reducing the total amount of energy consumed while still maintaining reasonable comfort. Customers can always override the signal if they have comfort needs but mostly they do not. Typically 85% of customers do not override during any particular event and on average each enrolled thermostat reduces peak load by roughly 1 kW.

New Jersey can encourage the adoption of smart thermostat technology in a number of ways through its utilities or directly by providing rebates, supporting the creation of online energy efficiency marketplaces, on bill financing, and direct install programs for some populations.

[2] https://www.energystar.gov/productfinder/product/certified-connected-thermostats/results
[3] https://www.energystar.gov/products/heating_cooling/smart_thermostats/key_product_criteria
[4] http://www.homeperformance.org/sites/default/files/HPC_Smart-Home-Report_201810.pdf, p. 30.

Simply put, smart thermostats are an important new energy efficiency measure which can save customers money on their electric and gas bills while at the same time building a platform for managing a portion of system load to minimize peaks and disruptions.

Finally, the advantages of smart thermostats are available today; no need to wait until 2030 for this technology.

6. What advances in technology should be considered as part of a strategy to reduce energy consumption? What technologies could complement and advance existing energy efficiency efforts?

As stated above in the response to Question 1, smart thermostats are a relatively new technology that should be a part of New Jersey's efforts to increase energy efficiency and to manage demand on the grid. Smart thermostats complement traditional energy efficiency efforts in housing by adding a smart control strategy to the traditional improvements in building envelopes and equipment efficiency. This technology is available today from a variety of manufacturers.

10. How can the state play a strong role in reducing its energy consumption?

New Jersey should make sure that utility financial interests align with New Jersey's energy efficiency public policy goals by providing a financial incentive for utilities to do a good job at promoting energy efficiency to their customers. Utilities traditionally have made their profit by investing in large capital projects such as power plants or pipelines and then getting a guaranteed return on those investments by selling electricity or gas. Investments in energy efficiency programs by contrast are generally recovered as operating expenses with no profit and the loss in sales from successful energy efficiency actually penalizes the utility financially. The BPU should provide utilities performance incentives for doing a good job on energy efficiency and full revenue decoupling so that success does not penalize them. This would align utility financial interests with the policy goals of the state.

This is not a simple change and will require deliberation by the BPU but there are a number of models and states that have done this. The Regulatory Assistance Project has a number of publications on this topic that could be useful to the BPU in its deliberations.[5]

18. What are some examples of existing or potential advanced building energy standards or metrics? How could these be implemented in New Jersey to accelerate greenhouse gas emissions reduction in new and existing residential and commercial buildings?

New Jersey should modify its building code to require the installation of EPA Energy Star certified smart thermostats in all new residential construction. As noted earlier, they save consumers on their electric and gas bills while at the same time providing a platform for managing demand on the grid. Such a requirement would not require builders to change any of their building practices. They would simply install a smart thermostat instead of a traditional thermostat. No additional materials are involved, no additional labor. While smart thermostats cost a little bit more initially, they pay for themselves in reduced electric and gas bills. Nest

[5] https://www.raponline.org/knowledge-center/?_sf_s=Decoupling

estimates that on average smart thermostats, purchased at full retail price, pay for themselves in about 2 years depending on a variety of factors. Builders purchasing at wholesale will create even faster paybacks.

27. What efforts are most successful towards making clean energy and energy efficiency measures affordable and accessible to all?

Energy poverty is a significant problem in New Jersey and America. That is why Nest launched the Power Project to both raise the visibility of the issue and make a contribution toward reducing the problem.[6]

Low income consumers are unlikely to spend their own money to upgrade from a traditional thermostat to a smart thermostat. As a result, Nest believes the best way to reach this demographic is through weatherization assistance programs run either by state or local agencies or utilities. Nest has committed to providing special pricing to these types of programs.

Two recent pilots, one in Colorado and one in Louisiana, indicate that low-income households can save energy and money through the use of smart thermostats and that such thermostats can easily be integrated into existing weatherization delivery mechanisms.

Here in New Jersey, PSE&G started an important pilot project in 2017 to study the benefits of installing smart thermostats in approximately 1000 multi-family, low-income housing units. The pilot is being performed by MaGrann Associates using Nest Thermostat-E units. Assuming that pilot goes well, all weatherization efforts in the state, whether through the federal Weatherization Assistance Program, or through utility programs, should be encouraged to add smart thermostats to the toolkit of measures they can provide to low-income households.

Conclusion

Thank you for the opportunity to comment on these important policy questions. Do not hesitate to reach out if you have questions or want more information on the benefits of smart thermostats.

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[6] https://nestpowerproject.withgoogle.com/