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PROJECT NO. 52373

REVIEW OF WHOLESALE ELECTRIC MARKET DESIGN § **PUBLIC UTILITY COMMISSION OF TEXAS**

PROJECT NO. 52268

CALENDAR YEAR 2021 – WORKSHOP AGENDA ITEMS WITHOUT AN ASSOCIATED CONTROL NUMBER § **PUBLIC UTILITY COMMISSION OF TEXAS**

COMMENTS OF GOOGLE

COMES NOW GOOGLE LLC and files these Comments in response to the Commission’s Questions for Comment filed in this proceeding on September 2, 2021.

Introduction

Google appreciates the opportunity to provide comments to the Public Utility Commission of Texas (“the Commission”) on residential demand response. Google Nest, a business unit of Google, creates products for the smart home that provide residential customers the capability to take control of their energy usage and participate in grid services such as energy efficiency and demand response. The Nest energy devices include the Google Nest Learning Thermostat, the Google Nest Thermostat E, and the new Google Nest Thermostat, which are equipped with sensors, Wi-Fi capability, and smart-phone grade processing, to help customers consume less energy. Google Nest thermostats provide both energy efficiency and demand response capabilities by learning occupant preferences, turning the temperature down when the house is empty, displaying informative notifications, automatically lowering air conditioning (“A/C”) runtime when humidity conditions permit, and enabling participation in utility or third-party aggregator demand response programs.

The market potential for demand response enabled by smart thermostats is enormous. As AEMA noted in its August 16 comments, over a million homes in Texas have installed smart thermostats, yet less than 10% of homes are actually participating in a demand response program.¹ Furthermore, based on the AEMA data, there are over 7 million homes with central heating and/or cooling systems that could utilize smart thermostats to provide grid services, but currently do not have one installed.² Given this

¹ See August 16, 2021 “Comments of Advanced Energy Management Alliance” in Project No. 52373, at p. 6.

² See August 16, 2021 “Comments of Advanced Energy Management Alliance” in Project No. 52373, at pp. 7-8.

extraordinary market potential, we are encouraged that the Commission is taking a close look at the mechanisms to further grow the demand response market.

Comments

1. **Describe existing and potential mechanisms for residential demand response in the ERCOT market.**
 - a. **Are consumers being compensated (in cash, credit, rebates, etc.) for their demand response efforts in any existing programs today, and if not, what kind of program would establish the most reliable and responsive residential demand response?**
 - b. **Do existing market mechanisms (e.g., financial cost of procuring real time energy in periods of scarcity) provide adequate incentives for residential load serving entities to establish demand response programs? If not, what changes should the Commission consider?**

Google has significant experience enabling residential demand response programs with its Nest thermostat product line, having partnered with dozens of utilities and energy partners to run over 70 “Rush Hour Rewards” smart thermostat-enabled demand response programs across the country, including some in Texas. These programs have proven to be highly effective and reliable at providing load reductions, primarily during summer season with air conditioning (“A/C”) loads, but also during Winter Storm Uri for thermostats connected to heat pumps.

Typically, to engage a customer in a Rush Hour Rewards program, Google will work with a utility or an energy partner like a demand response provider to provide a sign-up flow for the customer to enroll their Nest thermostat in the Rush Hour Rewards program. Customers are often incentivized to sign up for Rush Hour Rewards with one-time or recurring incentive payments. In exchange for signing up, the customer agrees that by participating in the program it will periodically allow the utility or energy partner to adjust its thermostat in a way that will reduce household load during an event (e.g. turn up the temperature when the house is running the A/C).

When a utility or energy partner triggers a Rush Hour event, customers receive advance notification both on the device and in the Nest mobile app. Nest will then set the thermostat to pre-cool the customer’s home up to one hour prior, again communicating this behavior through the device and the app. During the event, the thermostat behavior is optimized for each home based on its unique characteristics, with the end result a reduction in overall household load enabled by the toggling of the temperature or other thermostat settings. Customers always have full control over the thermostat and can manually opt-out of the event if they choose.

Smart thermostats programs have been highly effective at creating meaningful and consistent load reductions. Evaluations of thermostat programs in Indiana saw nearly 1 kW of load reduction per summer

event.³ Similar results were found for Portland General Electric’s program, which generated 0.80 to 0.89 kW of load reduction during summer events.⁴ Even smart thermostat programs in milder summer climates such as the program for Eversource and National Grid in Maine and Connecticut averaged 0.60 kW per event.⁵ The repeated success of the Rush Hour Rewards program and other similar thermostat programs clearly proves the potential effect that these programs can have in Texas.

Although Google has launched a handful of programs in Texas, as AEMA noted there are likely less than 10% of eligible households actually participating in a residential demand response program. Google has reached relatively significant scale with CPS Energy and Austin Energy, likely due to the unique financial and regulatory structure of Municipally Owned Utilities (“MOUs”) that allow them to launch and run demand-side management programs at their proper value. However, other smart thermostat programs outside of the MOU programs have lagged behind significantly in Texas, with the primary program differentiator being the lower incentive payouts. This strongly suggests there is room to grow if the Commission incentives to develop residential demand response programs are structured in a way that encourages utilities and aggregators to grow and expand their demand response offerings.

- 2. What market design elements are required to ensure reliability of residential demand response programs?**
 - a. What command/control and reporting mechanisms need to be in place to ensure residential demand response is committed for the purpose of a current operating plan (COP)?**
 - b. Typically, how many days in advance can residential demand response commit to being available?**

Google Nest thermostats are effective at enabling reliable demand response programs due to their communicability and responsiveness. Through the Rush Hour Rewards program, utilities and energy partners are able to call on the Nest thermostats over Wi-Fi to respond in a matter of minutes. The thermostat will then immediately adjust its temperature and settings to reduce household load caused by running the heating, ventilation, and air conditioning (“HVAC”) system.

³ See April 11, 2019 “Smart Cycle Program 2018 Evaluation Report Prepared for: Vectren Energy Delivery of Indiana”, at p. 2, available at <https://midwest.centerpointenergy.com/assets/downloads/planning/irp/IRP-2018-smart-cycle-evaluation.pdf>.

⁴ See September 9, 2020 “Bring-Your-Own Smart Thermostat Demand Response Pilot Program Draft Evaluation Report Prepared for: Portland General Electric”, at p. 3, available at <https://edocs.puc.state.or.us/efdocus/HAH/um1708hah16326.pdf>.

⁵ See April 1, 2020 “2019 Residential Wi-Fi Thermostat Direct Load Control Offering Evaluation Prepared for: Eversource MA, Eversource CT, National Grid MA, and Unitil MA”, at p. 5, available at <https://ma-eeac.org/wp-content/uploads/2019-Residential-Wi-Fi-Thermostat-DLC-Evaluation-Report-2020-04-01-w-ith-Infographic.pdf/>

The number of days in advance the Nest thermostats are committed to a demand response event is ultimately up to the Rush Hour Rewards partner. We generally see our partners plan for events between one day and up to 15 minutes prior to the beginning of the event. Usually more lead time is better, as the house will be able to pre-cool and minimize any resident discomfort.

Partners are able to build reliable programs by crafting a *portfolio* of thermostats (anywhere between thousands to hundreds of thousands) that will in aggregate provide predictable demand response. Through the use of a portfolio aggregation, partners are able to allow individual customers to remain in control and occasionally opt out of events without seeing material impact on the aggregate performance. Partners are able to determine statistically, just as the studies cited above indicated, the expected average performance based on number of customers, average number of participating customers, weather, and other factors, therefore ensuring performance certainty to the utility and grid operator.

Finally, we would add that another way to impact command and control is not through increasing requirements for DR providers or the underlying technology, but rather by developing DR programs that additionally provide dispatch control to ERCOT. For example, the Commission could seek to integrate ERCOT's Energy Emergency Alert levels to DR programs, such that an Emergency Alert Level 1 or above should also trigger all demand response programs.

- 3. How should utilities' existing programs, such as those designed pursuant to 16 TAC §25.181, be modified to provide additional reliability benefits?**
 - a. What current impediments or obstacles prevent these programs from reaching their full potential?**

The single greatest impediment to the growth of residential demand response is that both the current TDU program economics and the ERCOT ERS economics do not provide sufficient compensation for the load that is being delivered. In absence of this sufficient compensation, partners and program implementers are unable to offer any meaningful customer incentive.

As a first course of action, the Commission can consider expanding the budgets for the TDU demand response programs and the ERCOT ERS. Several stakeholders supported these budgetary increases in comments submitted on August 16th, 2021. Budget increases would enable greater aggregator participation and potentially increase the incentives that can be paid out to participating customers, making program participation more attractive.

- 4. Outside of the programs contemplated in Question 3, what business models currently exist that provide residential demand response?**
 - a. What impediments or obstacles in the current market design or rules prevent these types of business models from increasing demand response and reliability?**

In addition to the short-term solution of expanding the existing budgets, the Commission can also develop two longer-term projects to provide more stability and growth potential to the market for demand response.

First, Google Nest suggests that the Commission explore the development of a day-ahead ancillary services product that will take advantage of the full stack of value and energy market products that smart thermostats and other enabling technologies are able to provide. This ancillary services product could incorporate demand response along with load shifting and other advanced forms of demand flexibility.

Second, Google Nest encourages the Commission to undertake a Potential Study for residential demand response in Texas. We are cognizant that the Commission likely wants to understand the true market potential for residential demand response, but due to the disaggregation of demand response programs, program administrators, and enabling devices, it is extremely challenging for any one stakeholder to articulate exactly how much system-wide demand response is available and will be available in the future. An independent study will enable the Commission to both understand the magnitude of potential demand response, the various products that enabling devices can provide, and also how different market or policy changes might increase the potential for demand response.

5. What changes should be made to non-residential load-side products, programs, or what programs should be developed to support reliability in the future?

Google Nest has no response at this time.

Conclusion

Google appreciates the opportunity to provide these Comments and looks forward to working with the Commission and other interested parties on these issues.

Respectfully submitted,

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