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February 21, 2023

Amy B. Mills and Rob Creamer
Presiding Officers
Maine Public Utilities Commission
State House Station #18
Augusta, ME 04333

Maine Public Utilities Commission Docket No. 2023-00019, *Inquiry Regarding Rate Structure for Standard Offer Service*

Dear Ms. Mills and Mr. Creamer:

Acadia Center appreciates the opportunity to provide written comments in response to the February 3, 2023 Notice of Inquiry in Public Utilities Commission (PUC) Docket 2023-00019, *Inquiry Regarding Rate Structure for Standard Offer Service.* Acadia Center is a non-profit research and advocacy organization incorporated in Maine and committed to advancing the clean energy future.

Acadia Center recommends that the Commission implement default time-of-use (TOU) rates, with an opt-out option, to ensure high levels of customer enrollment and to achieve the benefits that TOU rates can offer.

Rate design can be used to support a range of policy priorities, including promoting fairness and equity among all customer classes; maximizing the value of and supporting the deployment of clean energy resources; optimizing the use of system resources; reducing emissions; improving incentives for energy efficiency; preserving equitable access to clean energy; and maintaining protections for low-income ratepayers.

Acadia Center strongly supports the use of time-varying rates (TVR) for customers. Many of the grid and consumer benefits that electric vehicles (EVs), heat pumps, and other distributed energy resources provide cannot be fully realized without the use of time-varying rates. Time-of-use (TOU) rates, a category of TVR that uses a tiered pricing structure for pre-determined peak and off-peak time periods, can offer several benefits, including:

- Providing customers an opportunity to lower their electricity bills by adjusting their electricity usage throughout the day;
- Reducing peak demand and strain on the electricity system, especially as states move towards beneficial electrification; and
- Reducing the reliance on fossil fuel-powered generation to meet the periods of highest demand.

Background

In Spring 2021, the Maine Utility Regulatory Reform and Decarbonization Initiative (MURRDI) — a stakeholder group consisting of investor and consumer-owned utilities, current and former regulators, state agencies, municipal governments, consumer and environmental advocates, developers, and others — drafted recommendations to help

Maine plan, build, and operate an electricity grid that meets the state's aggressive climate and energy requirements while maintaining a safe, reliable, secure, and affordable grid. The MURRDI recommendations included moving the standard offer to a time-of-use rate. The final report included the following:

> Recommendation: Maine should move toward a more dynamic grid with more granular load flexibility capabilities in a concerted manner. As a first step, the Maine PUC should immediately look more closely at time-of-use rates and/or other dynamic rate structures that more accurately reflect the cost of producing and delivering power. It should also take into account how time-varying rate designs could help to meet the state's climate and energy requirements.[1]

Acadia Center, as a member of the MURRDI stakeholder group, supported the full report and the recommendation for "load flexibility enabled by dynamic rate designs."

Electric vehicles are a helpful example of why time-varying rates are important. Without proper incentives, the most natural choice for residential customers with EVs may be to charge a vehicle as soon as they get home, often in the late afternoon. From a system perspective, late afternoons are often peak hours. A simple on/off-peak TOU rate can provide an incentive to begin charging an EV later in the evening instead. TOU rates can help lower fueling costs for EV owners, given the lower electricity costs during off-peak hours. TOU rates can provide better economic incentives to reduce overall costs and provide customers with opportunities to save money by taking advantage of low-cost hours.

The following best practices should be considered when designing time-of-use rates:

- TOU rates must include a peak window that is narrow enough to motivate customer behavior change and to deliver the intended peak-shifting benefits.
- The ratio between on-peak and off-peak rates must be large enough for customers to see a noticeable difference in their bills and to motivate changes in behavior.
- TOU rates must help customers save money, improve system reliability, and prepare for the integration of distributed energy resources in the future.
- Transparent pricing is key for helping customers understand and act in response to different price signals. TOU rates must enable customers to have the necessary understanding and access to their energy usage data to make use of TOU rates in controlling their energy demand.
- TOU must ensure that data privacy and security protocols are sufficiently robust.
- Opt-out programs achieve higher levels of long-term customer enrollment than opt-in rates.
- Customer education and outreach programs are essential for ensuring the success of TOU.

Acadia Center Responses to Commission Questions

1. *Describe the potential risks and benefits to customers and/or the distribution system of offering standard offer TOU rates?*

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[1] MURRDI, "*Stakeholder recommendations to plan, build, and operate the electric grid that is needed to meet Maine's climate and energy requirements*," April 2021, available at: https://www.betterenergy.org/wp-content/uploads/2021/04/MURRDI-Stakeholder-Process-Summary.pdf, p. 20.

Time-of-use rates are a subset of the larger category of time-varying rates (TVR). TOU rates can reflect underlying system costs more accurately than rates that are not time-differentiated. Basic TOU rates can include two or more periods, with or without seasonal variation and with or without Critical Peak Pricing (CPP) and/or Peak Time Rebates (PTR). TOU rates use predetermined periods and price schedules, whereas Critical Peak Pricing and Peak Time Rebates can be more dynamic and responsive to changing grid conditions and prices. CPP and PTR involve advance notice to customers of periods of extreme stress during which customers will face higher prices, or can be rewarded with a rebate for decreases in demand.

TOU rates offer significant potential benefits. Well-designed TOU rates that reflect marginal costs can motivate shifts in demand, reducing the need for capital investments that are traditionally proposed to address periods of stress on the distribution and transmission system. By shifting customer demand toward off-peak periods, TOU rates can save customers money, while also reducing overall system costs by reducing the need for expensive peak generation. Shifting demand to off-peak periods reduces the need for peak period generation, which generally includes the most polluting sources of electricity.

Studies show that on average, every 10% increase in the peak to off-peak price ratio can lead to a 6.5% reduction in residential on-peak demand. With enabling technologies, every 10% increase in the price ratio can result in an 11.1% reduction in peak demand.[2]

TOU rates are one tool that can support greater load flexibility. As the final MURRDI report noted:

> Operating the electric grid to meet Maine's climate and energy requirements while maintaining safe, reliable, and affordable service will require flexible loads that can be aligned with renewable energy generation and managed to reduce demand peaks. Load flexibility can be achieved through consumer behavior changes enabled by intelligent and dynamic rate design, autonomous customer-owned devices, and/or active management of those devices. The group believes that load flexibility can substantially reduce the extent and cost of the infrastructure upgrades that would otherwise be required for beneficial electrification; for example, by smoothing out demand peaks throughout the day.[3]

For TOU rates to effectively meet policy goals, there must be sufficient pricing differentials between off-peak, shoulder, and on-peak periods. TOU periods must be short enough that they actually reflect underlying system costs during periods of stress. Shorter periods of higher costs are easier to understand and respond to in terms of changing energy usage. Periods that are too long (e.g. 5 hours or more) dilute price signals and are less effective at motivating behavior change. According to the Regulatory Assistance Project, in order to maximize peak demand reductions, TOU

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[2] Faruqui, A., "Modernizing Distribution Tariffs for Households," The Brattle Group, November 9, 2018, available at: https://www.brattle.com/wp-content/uploads/2021/05/14848_modernizing_distribution_tariffs_for_households_11-07-2018.pdf, p. 13.

[3] MURRDI, "*Stakeholder recommendations to plan, build, and operate the electric grid that is needed to meet Maine's climate and energy requirements*," April 2021, available at: https://www.betterenergy.org/wp-content/uploads/2021/04/MURRDI-Stakeholder-Process-Summary.pdf, p. 20 and 21.

periods must be sufficiently narrow and the annual average price differential between on-peak and off-peak should be at least 3:1.[4]

While the potential benefits of TOU rates are significant, they are not without risks. TOU rates with long on- and off-peak periods and with low price differentials that do not create enough of a price signal will not lead to intended behavior change and shifts in demand. TOU rates that are designed poorly can create undue burdens for customers who are less able to respond to price signals. TOU rates without meaningful price differentials may lead to additional costs without the anticipated benefits.

Benefits and risks associated with TOU rates vary depending on the specifics of the rates offered, including number of periods, their duration, seasonality, on and off-peak price differentials, as well as the level of coincidence between overall system peak and the period of peak demand for the relevant customer class.

2. *Describe whether and to what extent standard offer TOU rates might affect beneficial electrification, greenhouse gas emissions, and other related State policy goals.*

If designed well, TOU rates can help support the deployment of distributed energy resources, reduce emissions, lower peak demand, and enable more equitable cost allocation. By helping to smooth out periods of peak demand, TOU rates can help lower costs for upgrades on distribution circuits and other infrastructure that may be required for electrification. Shifting demand to off-peak periods reduce the need for peak period generation, which are generally the most polluting sources of electricity. But it is critical to understand the particular resource mix of the grid and which resources tend to run at which times of day in order to maximize emissions reductions.

Shifting demand to off-peak can lower emissions if the primary generation sources during those times are less polluting than those during peak hours. However, it is important to be aware of potential unintended consequences with TOU rates depending on the resource mix. For example, early in California's Self-Generation Incentive Program, price signals for battery storage devices were such that charging during the night was cheaper than charging during the day. Program implementers had intended for storage devices to charge during the day when generation was significantly cleaner thanks to California's large solar resources. As originally designed, however, the program resulted in increased nighttime charging when emissions were higher than during the day. While the mechanics were eventually fixed, unintended consequences like these should be considered.[5]

The role that TOU rates can play in supporting or hindering electrification depends on the details of the rate design and the extent to which it is accompanied by complementary components.[6] For example, a lower volumetric charge for off-peak periods, if combined with a significantly higher fixed charge may deter electrification efforts if the fixed charge is set too high. While a slightly increased fixed charge may be necessary with lower volumetric rates during off-peak periods, any change in fixed charges must ensure that there is no unfair burden on low and moderate income (LMI) customers. The financial benefits of a lower volumetric charge for off-peak periods may be undone if the fixed

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[4] *Time-Varying Rates in New England: Opportunities for Reform; A Look at New England Rate Design: Issue Brief #4*. David Littell and Joni Sliger, RAP. October 2020.

[5] CPUC, Decision 19-08-001. Approving Greenhouse Gas Emission Reduction Requirements for the Self Generation Incentive Program Storage Budget. August 9, 2019.

[6] *Heat Pump–Friendly Cost-Based Rate Designs*. Sanem Sergici, Akhilesh Ramakrishnan, Goksin Kavlak, Adam Bigelow, and Megan Diehl, The Brattle Group. January 2023.

charge is too high, especially for customers with lower-than-average demand who cannot respond to changing price signals as easily as other customers.[7]

Seasonal TOU rates can further support electrification and emissions reductions given differences in demand, as well as prices, between summer and winter. In its Docket 2021-00325 stipulation, Central Maine Power committed to exploring seasonally differentiated distribution rates in an updated marginal cost of service study.[8]

TOU rates can work alongside other programs, including peak time rebates and direct load control, to further motivate changes in demand that lower peaks and reduce emissions.

The usefulness of basic TOU rates, however, can be limited by their relatively simple design. Maine ratepayers may benefit from more granular and dynamic time-varying charges and real-time pricing that more closely correlates the temporal cost of providing energy with customer demand. Acadia Center urges the Commission to investigate the use of more granular real-time pricing. More sophisticated time-varying rates would align with one of the key recommendations made by the Maine Utility Regulatory Reform and Decarbonization Initiative (MURRDI).[9]

3. *What are the financial and behavioral impacts of TOU electricity rates on vulnerable households? To what degree should they have access to additional assistance or be considered separately in time-of-use rate design?*

A recent RAP study shows that low- and moderate-income households can save money with TOU rates through reductions in their bills.[10] A Maryland TOU pilot showed that LMI customers saved between 4.4% and 9.6% on their monthly bills.[11]

Acadia Center cautions against overly relying on increase fixed charges as a tool for recovering costs, given the disproportionate burdens they can create for LMI customers. High monthly fixed charges can reduce customers' control over their energy bills and reduce incentives for customers to invest in energy efficiency, which will continue to be a vital energy policy even, and especially, as Maine electrifies its buildings and implements TOU.

Pilots and shadow billing can be useful tools for growing awareness and educating customers on the potential bill impacts of TOU rates.

4. *If the Commission were to offer standard offer TOU rates, should those rates be optional (i.e. opt-in), default (i.e. opt-out), or mandatory? Should the polices be different for residential and non-residential rate classes?*

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[7] *Guidance for Utilities Commissions on Time of Use Rates: A Shared Perspective from Consumer and Clean Energy Advocates.* Colgan, et al. Electricity Rate Design Review Paper No. 2. July 15, 2017.

[8] Maine PUC Docket 2021-00325. Investigation into Transmission and Distribution Utility Rate Design to Promote State Policies.

[9] MURRDI, "*Stakeholder recommendations to plan, build, and operate the electric grid that is needed to meet Maine's climate and energy requirements*," April 2021, available at: https://www.betterenergy.org/wp-content/uploads/2021/04/MURRDI-Stakeholder-Process-Summary.pdf, p. 20 and 21.

[10] *Time-Varying Rates in New England: Opportunities for Reform; A Look at New England Rate Design: Issue Brief #4*. David Littell and Joni Sliger, RAP. October 2020.

[11] *Time-Varying Rates in New England: Opportunities for Reform; A Look at New England Rate Design: Issue Brief #4*. David Littell and Joni Sliger, RAP. October 2020. p. 13.

Acadia Center recommends default TOU rates with an opt-out option to protect customers who may not be able to shift their usage and may be burdened with higher rates.

5. *What is the likely expected uptake of TOU supply rates? How could standard offer TOU rates be structured to maximize adoption?*

Default opt-out TOU rates would result in the highest levels of customer participation. Existing opt-in time-varying rate options have resulted in very low customer participation levels.[12]

6. *How would the rate option be communicated? Whose responsibility would it be to communicate the rate option to customers? How would the customers best suited for such rates be identified?*

Default TOU rates should be accompanied by extensive customer education programs and integration with software that can enable customers to manage their load to take advantage of price signals and not be caught off guard by unexpectedly high bills. TOU rates must be easy to understand to encourage customer acceptance.

7. *Is there technology available that could assist end-users with beneficially scheduling their load (i.e. shifting their consumption off-peak)? Is this technology widely and inexpensively found in the marketplace?*

Automatic controls for heating and cooling, as well as other programmable technologies and devices that enable load shifting, are widely available. Autonomous customer-owned devices can help to maximize the benefits that TOU rates can offer and support greater load flexibility overall.

8. *To what extent should the standard offer periods be aligned with ISO-NE system peaks, the distribution system peaks, or some other usage pattern?*

While TOU rates can more closely align with ISO-NE system peaks and wholesale prices than non-time differentiated rates, real-time pricing offers much more granular and dynamic pricing that can adjust based on wholesale electricity costs. Critical Peak Pricing and Peak Time Rebates can be effective tools for more closely aligning customer rates with wholesale prices and motivating behavior change during periods of high stress.

Customers in Maine have already contributed to the cost of deploying Advanced Metering Infrastructure. By implementing TOU rates, the Commission can help to make sure that AMI technology is being used to its full capacity and that its capabilities are not going to waste.

9. *Is it necessary or preferable for standard offer TOU periods to be aligned with T&D TOU periods? What would be the impact if the supply TOU periods did not align with wholesale market peak and off-peak hours?*

It may be possible to implement standard offer TOU periods that are asynchronous with T&D TOU periods if the result is not overly complicated for customers. The overarching goal in any TOU rate structure is clarity for customers in terms of accurate price signals for when to use power.

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[12] *Time-Varying Rates in New England: Opportunities for Reform; A Look at New England Rate Design: Issue Brief #4*. David Littell and Joni Sliger, RAP. October 2020. p. 9.

10. *If the Commission were to offer TOU supply rates, should suppliers responding to the standard offer RFP be required to offer both a time-differentiated bid and a non-TOU bid, or rather, should a provider be permitted to offer only a TOU bid or only a non-TOU bid?*

If the Commission determines that TOU rates are in the public interest and support a number of policy goals, including beneficial electrification, GHG reductions, among others, then suppliers should be required to offer a time-differentiated bid. If TOU rates are in the public interest according to the Commission, non-time-differentiated rates would seemingly undermine the efforts made by the Commission to shift customers towards rates that respond to temporal changes on the grid.

11. *Is it possible for a supplier to bid a fixed price (non-time-differentiated) but have the utility offer a TOU standard offer rate? If so, please provide a detailed description of how would such a structure work?*

See response above.

12. *Describe whether and to what extent the utilities' metering and billing systems can accommodate a standard offer TOU rate. What changes would be required to either the metering or billing system? What is the estimated timeline and cost for implementing such changes?*

Implementing default TOU rates may require upgrades to utilities' metering and billing systems. In its stipulation in Docket 2021-00325, Central Maine Power agreed to explore the metering and billing system updates that may be required to fully implement TOU rates. In its stipulation in the same proceeding, Versant noted that it is currently working to upgrade its meter data management and billing systems, scheduled to be completed in 2023.

13. *In addition to the data typically provided in conjunction with the Commission's standard offer request for proposal, what other data would suppliers require to adequately inform a TOU supply proposal?*

[N/A]

Sincerely,

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