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ecobee Comments on the Draft Amendments to the Load Management Tariff Standard

ecobee thanks the California Energy Commission (CEC) Commissioners and Staff for this opportunity to comment on the substantive amendments proposed in the Load Management Standards Rulemaking. ecobee continues to strongly support the opening of this proceeding and the proposed scope set forth in the CEC's draft memo of January 10, 2020. In these comments, ecobee's focus is on urging the CEC to actively utilize its authority under California Public Resources Code Section 25403.5(a)(3), which states that the Commission should specifically consider available options for "mechanical and automatic devices and systems for the control of daily and seasonal peakloads." We believe that a strong directive from the CEC for California's major distribution utilities to broadly deploy "cost-effective" and "technologically feasible" automation devices is consistent with PRC § 25403.5(b). Such an approach is also key to realizing the aims of more recent legislation like Assembly Bill 3232 and Senate Bill 49, which recognize that management of building load – especially through "smart" technologies – is key to meeting California's targets for reducing greenhouse gas emissions.

ecobee, a leading developer of smart thermostats and other smart home products and services that facilitate cost-effective load management, approaches this proceeding as a vendor of automation technology that, if broadly deployed, can jump-start residential load management by giving customers automated tools that don't require energy expertise or even active engagement. As described in our initial comments, ecobee has recently introduced a new software platform to facilitate cost-effective customer load management in response to time-varying or time-of-use (TOU) price signals.[1] This platform, eco+, is a software upgrade for consumers that is being pushed out to all ecobee smart thermostats to improve the energy

[1] ecobee Comments on the January 10, 2020 Draft Scoping Memo for the Load Management Standards Rulemaking (Jan. 24, 2020); *see also* https://www.ecobee.com/en-us/eco-plus.

performance of residential HVAC systems. The platform consists of algorithms for personalized time-of-use, demand response, and energy efficiency optimization.

A third-party evaluator, Demand Side Analytics, conducted a 2019 research study on the impacts of eco+ that is the largest of its kind, involving approximately 240,000 ecobee thermostats.[2] The study results show that the time-of-use optimization function from eco+ contributed *additional* savings of 8-19% on customer cooling expenditures across various climate zones through its out-of-the-box solution, in addition to on-peak savings and overall energy savings.[3] Customers in both Pacific Gas & Electric and Sacramento Municipal Utility District service territories experienced this level of incremental savings through automation coupled with TOU rates.[4]

These results show that eco+ is the exact type of tool, available in the marketplace now, that can enable automated customer load management in response to the type of real-time rates based on marginal costs contemplated in the draft amendments. Therefore, we believe this draft standard is heading in the right direction in its focus on taking advantage of today's technologies to automate load management. But for more technology providers to develop similar capabilities and venture into the marketplace, the CEC must establish a regulatory framework to address two obstacles to adoption of cost-effective technology for automation of load management.

First, our experience thus far with eco+ has revealed an important issue not fully addressed by these draft amendments: making the connection between an individual customer's rate and the device that can automatically respond to it. Our software will work with whatever time-varying rate a customer might be on. However, to accomplish that, a customer using eco+ is prompted to select the utility rate that they are on from a list of available options in their zip code as a key input to the software's optimization algorithms. But how many customers know and can correctly identify the applicable utility tariff, even from a pre-populated list of options? The answer seems to be: not the majority.

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[2] Demand Side Analytics, Eco+ Thermostat Optimization Pilot (Nov. 2019). The executive summary of the study is publicly available at https://www.ecobee.com/wp-content/uploads/2020/02/eco-EMV-Executive-Summary.pdf.

[3] *Id.* at Section 1.2 and Table 2. *See also* Nathan Shannon and Rob Kelter, *Opinion: Can smart technology shape rate design and drive consumer savings?*, Utility Dive (Mar. 16, 2020), *available at* https://www.utilitydive.com/news/can-smart-technology-shape-rate-design-and-drive-consumer-savings/573877.

[4] *Id.*

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Both our own data from a third party evaluation study of eco+ that we confidentiality filed with the Commission on January 24, along with publicly available data regarding California's roll-out of default time-of-use rates, show that many customers can't identify what rate they're on or can only generically state that they're on a rate that varies by time.[5] Therefore, our first major suggestion in moving forward with the standard revisions is to also include a requirement that the utility work with all relevant load management providers to establish the broad capability for customers to automate their response to time-varying rates – including a mechanism for checking and if necessary, correcting, a customer's input to any load management device regarding their applicable utility rate and for populating a customer's rate when they don't know it. That is a vital step that the CEC should not overlook in ensuring that any time-varying utility rate results in automated and optimized load management for customers and the electric grid.

Second and more broadly, ecobee urges the Commission to expand on the proposed amendments to its load management standard in order to take advantage of the new opportunities for cost-effective load management through automation that have emerged based on recent technological advancements. These changes are necessary to achieve the full load management benefits available to customers – especially residential customers – through the sophisticated "mechanical and automatic devices and systems" available in the current marketplace, as contemplated in PRC § 25403.5(a)(3). Such technologies are technically feasible and cost-effective consistent with the requirements of that statute, and will also provide valuable tools for California's utilities in achieving state targets regarding reduction of greenhouse gas emissions and moving to default time-of-use rates. Accordingly, if the Commission implements a robust automated load management program that leverages currently available technologies, the benefits to customers can far exceed those available from

[5] For example, Southern California Edison (SCE) recently presented an analysis to the California Public Utilities Commission Time of Use Market Education & Optimization Workgroup indicating that close to half of residential customers are not sure what rate they're on. Additionally, the eco+ evaluation report filed confidentially with the Commission along with ecobee's January 24 scoping comments shows that, in regions with default TOU like SMUD, only 41% of customers identified and selected their rate. Of the 59% that did not identify their rate, 73% clicked, "I don't have a TOU rate." Confidential filing, Eco+ Thermostat Optimization Pilot (Jan. 24, 2020). This demonstrates a general lack of customer awareness around rates even in jurisdictions with widespread deployment of and customer education on TOU rates. This lack of knowledge and/or lack of specificity is a significant obstacle to maximizing the benefits of automation technology, given that a utility like SCE has three separate TOU rate plans alone (https://www.sce.com/residential/rates/Time-Of-Use-Residential-Rate-Plans).

the basic load control and load shedding programs adopted when the standards were last updated in 1982.

ecobee's two recommended additions to the proposed draft standard are set forth in the Appendix to these comments, with the overall aim of establishing the following: (1) a robust residential load management automation program that actively promotes the deployment of available automated control technologies in conjunction with all utility time-varying rates; and (2) a requirement for all utilities to make available a mechanism for an automated load management device to receive accurate information regarding the rates applicable to the customer using that device. These proposed changes are vital because the customer need for load management extends beyond marginal-cost-based rates. *All* time-varying rates (which are becoming the default for a significant majority of California ratepayers) provide a price signal that can be the basis for cost-effective customer load management. However, residential customers face two difficulties in responding to such price signals: a lack of enabling technologies to automate their response; and a lack of practical knowledge about what the price signal – i.e., their rate – even is. The CEC can play a key role in addressing both these issues, both by ensuring that utilities make cost-effective automated load management technologies broadly available to customers, and by establishing a mechanism to ensure those technologies are reacting to the correct rate for each customer.

Importantly, establishing a robust automatic load management program is an effort that can and should occur separately from the determination of marginal cost rates under Commission Staff's proposed amendments to Load Management Tariff Standard. As indicated by stakeholder feedback during the CEC's March 2, 2020 workshop, the latter task involves complex questions regarding consideration of long-term vs. short-term marginal costs, categories of costs, congruency with existing time-varying rate offerings, and more. Resolution of these questions, however, need not prevent customers from realizing the benefits of automation technologies coupled with existing time-varying rates. ecobee's eco+ software has the potential to optimize load management in response to a range of rates and price signals, including those available to residential customers now. Accordingly, ecobee proposes that the CEC promulgate standards that will promote the adoption of cost-effective automation technologies through a program for residential load management that California's major utilities

can design and implement in the short-to-medium term, rather than waiting for development of a specific rate or tariff.

Although these changes will expand the scope of the proposed draft load management standards, they will also expand their impact and benefits. A significant body of existing literature shows that "enabling technologies" offering technical tools for customer response to rates, such as automation, are important for achieving residential reductions to peak demand even where customers are enrolled in time-varying rates reflecting marginal energy costs. For example, a U.S. Department of Energy review of the results from 70 smart grid investment grant projects that implemented AMI data and customer system technologies concluded that automation through automatically controlled thermostats enabled greater peak demand reductions than manual responses.[6] Additionally, a comprehensive review of more than 60 utility time-varying rate pilots published in *The Electricity Journal* in 2017 found that the magnitude of demand response is stronger when a customer is provided with a smart thermostat.[7] Finally, a statewide, third-party evaluation of California's own rollout of opt-in time-of-use pilots specifically showed that "[s]mart thermostats appear to increase load reductions when automated through vendor support."[8]

These analyses are consistent with the results of the third-party evaluation of energy and peak demand reductions achieved by ecobee's eco+ automation software, which as discussed above shows that the software's automation algorithms significantly increase the energy and peak demand savings resulting from time-varying rates. They are also reflected in California's own experience in implementing default time-of-use rates; a recent Energy Upgrade California evaluation of that effort indicates that even after San Diego Gas & Electric has spent millions of dollars on customer education and engagement, a majority of customers surveyed do not understand the benefits of shifting their peak load or intend to take steps to do so.[9] Such information points strongly toward the importance of achieving broad adoption of automation

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[6] U.S. Department of Energy, *Results from The Smart Grid Investment Grant Program* at 6 (Sept. 2016), https://www.energy.gOv/sites/prod/files/2016/12/f34/AMI%20Summary%20Report_09-26-16.pdf.

[7] "A Meta-Analysis of Time-Varying Rates for Electricity," The Electricity Journal, Volume 30, Issue 10, December 2017, at 64-72, *available at* http://www.cpuc.ca.gov/uploadedFiles/CPUC_Website/Content/Energy/Energy_Programs/Electric_Rates/2017%20Arcturcus%202%200%20.

[8] Nexant, California Statewide Opt-in Time-of-Use Pricing Pilot - Final Report (March 30, 2018) at 6-7, 78-79, *available at* https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457172.

[9] Energy Upgrade California, Ipsos Statewide Evaluation Year 2, at 10-11 (attached).

technologies in conjunction with rates sending a price signal for peak demand reduction, in order to maximize customers' ability to manage load cost-effectively.

A move toward robust automation programs is well within the Commission's authority under the Warren-Alquist Act. In fact, a 2007 consultant report prepared at the direction of the Commission contemplated exactly this type of update to the load management standards.[10] The report outlined two main ideas for "reinventing the load management standards": (1) modifying default utility tariffs to transition to dynamic, time-varying rates that would "provide[] a sharply directed signal for lowering peak demand"; and (2) deploying "enabling technologies" that would provide an automated response to signals from utilities.[11] Although the Commission did not move forward with those ideas at the time, the California Public Utilities Commission (CPUC) has since mandated a transition to default time-of-use rates across the major utilities in the state. That leaves a large number of customers well-positioned to realize benefits from concurrent deployment of the enabling technologies that can increase the impact of such time-varying price signals in producing cost-effective load management benefits.

A strong Commission rule promoting widespread adoption of cost-effective automated load management devices is necessary. As the Commission found in promulgating its 2019 updates to the Title 24 Building Standards Code to require solar for newly built homes, the private market does not always drive customer adoption of the most cost-effective energy technologies.[12] That is especially true given the recent rapid changes both in load management technologies and in the prevalence and variety of time-varying rates. Residential customers often do not have the same expertise and resources that are available to the Commission and

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[10] Ahmad Faruqui & Ryan Hledik, The Brattle Group, *California's Next Generation of Load Management Standards, Final Consultant Report* (Sept. 2007), *available at* https://www.researchgate.net/publication/237555577_CALIFORNIA'S_NEXT_GENERATION_OF_LOAD_MANAGEMENT_STANDARDS.

[11] *Id.* at 26.

[12] As the Commission explained in codifying a requirement for solar installations for certain new residential construction as part of its 2019 Building Energy Efficiency Standards, "[t]he Standards mandate the use of specific technologies and equipment to assure that buildings always meet minimum, cost-effective efficiency requirements whether the prescriptive method (pursuant to Sections 140.0 and 150.1(c)) or the performance method (pursuant to Sections 140.1 and 150.1(b)) of compliance is used. If these proven, simple, highly cost-effective, long-lasting energy saving technologies and equipment were not mandatory, they could be 'traded off' against measures that have not been documented to save energy as persistently, simply, or cost-effectively." CEC Docket No. 17-BSTD-02, : 2019 Title 24, Part 6, Building Energy Efficiency Standards Rulemaking, Final Statement of Reason Parts 1 and 6 (Oct. 2, 2018) at 49.

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the CPUC to determine optimal energy choices in that evolving marketplace. Moreover, the Commission has long had a cooperative relationship with the CPUC in providing complementary decisions aimed at maximizing customer benefits from new energy management technologies – for example, in driving toward zero net energy homes through its codes and standards in conjunction with utility energy efficiency programs providing incentives for residential new construction, and of course in implementing the PRC § 25403.5 load management standards as well.[13]

Overall, this proceeding presents a significant opportunity for the Commission to move customer load management to the next level in California by facilitating the broad adoption of cost-effective automation technologies. ecobee therefore respectfully requests that the Commission adopt the attached proposed rule amendments pursuant to its authority under PRC § 25403.5.

Respectfully submitted,

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[13] *See, e.g.* CPUC Rulemaking 09-11-014, *Order Instituting Rulemaking to Examine the Commission's Post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement, and Verification, and Related Issues*, Decision 12-05-015 (May 10, 2012) at 13 (directing "IOUs to propose Residential New Construction program incentive levels to improve the support provided by the program to Title 24 codes and standards updates" enacted by the CEC to require "Zero Net Energy" homes); CPUC Application 84-12-015, *In re San Diego Gas and Electric Company*, Decision 85-12-108 (Dec. 20, 1985) (approving funding for certain peak load management programs required by CEC order); CPUC Application 82-12-57, *Re San Diego Gas and Electric Company*, Decision 83-12-065 (Dec. 20, 1983) (considering CEC order pursuant to PRC § 25403.5 in authorizing utility load management programs).

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Appendix: ecobee Proposed Draft Amendments to the CEC Load Management Rules

Additions to the draft load management tariff standard and proposed new rule provision underlined.

§ 1623. Load Management Tariff Standard.

(a) This standard requires that retail electricity providers develop rates based on marginal costs, submit such rates to its rate-approving body and to the CEC, and make them publicly available for access by customers and their devices. Fixed charges, rebates, and taxes associated with electric service are not subject to this standard. The purpose of this standard is to provide granular economic signals that enable increased demand flexibility through customer automation of loads, with the goal of moving electric demand away from system load peaks, and toward times of surplus renewable power.

(b) Marginal Costs and Rates. Marginal costs are defined as the cost ($/MWh) of serving the next increment of electricity demand in the relevant load area, consistent with existing grid constraints and generators' ability to deliver energy to meet that demand.

(1) Retail Electricity Rates. To ensure efficient economic signals required for optimal load management, all retail electricity rates shall be based on the marginal cost of electricity, and shall recover the costs associated with the set of customers who elect that rate.

(2) Real-time Tariff. For the purpose of this standard, a real-time tariff is one that incorporates a retail electricity rate that updates at least hourly based on (i) a day-ahead or real-time energy market prices, and (ii) electric distribution conditions to reflect marginal costs at the ZIP code [or secondary transformer] level. Prior to July 1, 2022, each electricity provider shall submit at least one real-time tariff per sector: electric vehicle, residential, commercial, industrial, and agricultural.

(3) Universal Real-time Tariff. Before July 1, 2023, each electricity provider shall submit a real-time tariff that can be offered universally to all customers in all sectors. Compliance with this paragraph fulfills the requirements of paragraph (2).

(c) Public Information. Electricity providers shall ensure that information regarding existing and future rates is accessible to the public and their devices.

(1) Data and Methods. Prior to the fifth business day of each month, retail electricity providers shall submit to the CEC, for aggregation and publication, a current database of prices and calculations for all approved rates.

(2) Communications. Electricity providers shall publish all non-tiered, time-dependent rates using the January 2020 version of OpenADR 2.0b (IEC 62746-10-1 ED1), unless the CEC adopts by rule a later version.

(3) Public Campaign. Within 30 days of adopting a real-time tariff, electricity providers shall launch a public information campaign to inform customers why real-time rates are needed and how participants on real-time tariffs can save money.

(d) Compliance. Review and approval of submitted tariffs and data shall be carried out in accordance with the provisions of § 1621(d). The electricity provider shall implement its tariffs within 30 days of approval by the CEC and the provider's rate-approving body.

(e) Automation. Each of the electric utilities specified in § 1621(b) shall provide a mechanism to ensure that residential customer devices with the capability to automatically respond to available time-varying rates or demand response signals receive accurate information as to the tariffs and rates applicable to the customer using the device.

§ 1626. Residential Load Management Automation Program.

(a) Application. The provisions of this section are applicable to devices providing automated control of customer space heating, cooling, and hot water heating in response to all or most utility rates ("automated residential load management devices").

(b) Automation Program. Each of the electric utilities specified in § 1621(b) shall offer, to all residential customers on an opt-out basis, automated residential load management devices that

can provide significant control of the customer's daily and seasonal peak loads ("Automation Program"). The utility shall include all devices in this program that the utility determines will provide cost-effective load management.

(1) Each utility shall submit a proposed program consistent with this provision to the CEC for review and input within 180 days of adoption of this rule. In developing the proposed program, the utility shall cooperate on an ongoing basis with the Commission Staff in evaluating the relative merits of alternative devices, in determining the optimal approaches for obtaining maximum customer participation in its automation programs, and in improving and refining methodologies for calculating the cost-effectiveness of automation programs.

(2) Each utility shall propose a program consistent with this provision to its respective rate-approving body within 30 days of receiving input from the CEC.

(3) Any program proposed under this provision shall include a customer rebate or other financial mechanism to encourage customer adoption that the utility determines will be cost-effective. Each utility shall work toward a goal of adoption of automated load management devices by at least 30% of residential customers enrolled on a time-varying rate within 2 years of commencing its Automation Program.

(c) Utility Progress Reports. Each utility shall submit an annual Progress Report to the Executive Director. These Reports shall specify the number and type of devices deployed under its Automation Program in the prior calendar year, and an evaluation of the observed impacts, if any, of these devices on customer energy usage and associated greenhouse gas emissions, as well as on customer bills. Commission Staff shall establish a standardized format and annual filing deadline for these Progress Reports within 180 days of the effective date of this provision.

(d) Executive Director's Report. Within 60 days of receipt of the Utility Progress Reports, the Executive Director shall submit to the Commission a Report on the Automation Programs containing the following:

(1) An evaluation of the information contained in the utility's Progress Report; and

(2) The Executive Director's recommendations with respect to alterations or expansion of the utility's Automation Program.

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(e) Long Range Programs. Within two months after it receives the Executive Director's Report on a utility's Automation Program, the Commission shall hold a public hearing to review the utility's Progress Report and the Executive Director's Report. Following this hearing, the Commission may undertake one or more of the following actions:

(1) Direct a utility to expand the targeted adoption of automated residential load management devices to a level which the Commission determines to be feasible and cost-effective;

(2) Direct a utility to terminate the Automation Program for any automated residential load management devices that do not provide net benefits to customers;

(3) Direct a utility to continue implementation of its Automation Program; or

(4) Undertake such additional actions which the Commission determines to be necessary and practical to implement the utility's Automation Program.