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Response of Google LLC to 2022 Load Management Rulemaking

Additional submitted attachment is included below.

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February 7, 2022

Submitted Via Email
California Energy Commission
Docket Unit
Docket No. 21-OIR-03
715 P Street, MS-4
Sacramento, CA 95814

RE: Response of Google LLC to the California Energy Commission's Notice of Proposed Action Issued in the 2022 Load Management Rulemaking, Docket 21-OIR-03

Dear Commission Staff:

Google LLC, on behalf of its Google Nest thermostat division, hereinafter "Google Nest," appreciates the opportunity to provide public comments to the Energy Commission on the proposed amendments to the Load Management Standards ("LMS") in the 2022 Load Management Rulemaking (Doc. 21-OIR-03)

Google Nest's devices include the Google Nest Learning Thermostat, the Google Nest Thermostat E, and the new Google Nest Thermostat. These products are each equipped with occupancy sensors, Wi-Fi capability, and smartphone grade processing, which together help our customers consume less energy. Google Nest thermostats learn occupant preferences, adjust temperatures to reduce energy consumption when the house is empty, and automatically lower air conditioning runtime when humidity conditions permit. All Google Nest thermostats currently on the market allow residential customers to participate in demand response ("DR") programs and future load flexibility programs administered by utilities or third-party aggregators.

Google Nest has also recently launched its "Nest Renew" program which will utilize Nest thermostats to shift household load to periods of low carbon emissions and reduce greenhouse gas ("GHG") emissions. The Nest Renew product allows users to adjust heating and cooling usage in response to real-time price and emissions signals. By enabling household load shift, Nest Renew will support the continued growth in renewable generation projects in California and thereby support lower emissions associated with electricity generation.

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Google Nest intends for its participation in this proceeding to assist the Energy Commission in developing updated LMS that enable widespread residential participation in dynamic rates and the seamless integration with mass market, grid-connected devices including Google Nest thermostats as well as new programs such as Nest Renew.

Google Nest is extremely supportive of the overall aims and direction of the proposed amendments. Google Nest proposes modifications and clarifications below with the overall goal of ensuring that the single statewide tool enables seamless and widespread access by third-parties such as Google Nest in a manner that maximizes grid and greenhouse gas emission benefits.

In summary, Google Nest provides the following recommendations:

1. Incorporate pathways for public input on future filings.
2. Accelerate the tariff deployment timeline.
3. Define GHG emission sources and costs and define how those will be incorporated into the total marginal cost.
4. Specify the information that the Market Informed Demand Automation Server ("MIDAS") will be providing, including the ability to pull electricity costs for a discrete time period as well as historical and forecasted values.
5. Clarify the role of the single statewide standard tool.
6. Use consistent language when referring to the tariff described in these proposed regulations that changes its rate at least hourly and charges customers the marginal cost of electricity.

A. Background on Nest Renew

Nest Renew is a new service from Google Nest that helps people play a part in the fight against climate change from home. By combining existing Nest thermostat programs with new user education tools, intelligent automation, nonprofit funding focused on clean energy equity and renewable generation support, Renew makes it easy to support a clean energy future.

For over a decade, Nest thermostats have helped automate energy savings and guided consumers toward more informed and efficient energy use—leading to a cumulative savings of over 80 billion kWh.[1] Nest Renew builds on Google Nest's experience in home energy management, including demand response programs with energy partners through Rush Hour Rewards ("RHR"). RHR is an existing residential demand response program that Nest provides through Distributed Energy Resource Management System ("DERMS") providers for energy companies and grid operators. In California, Google Nest currently operates nine RHR programs with utilities and third-party DR providers. Even as these RHR programs continue to grow, there

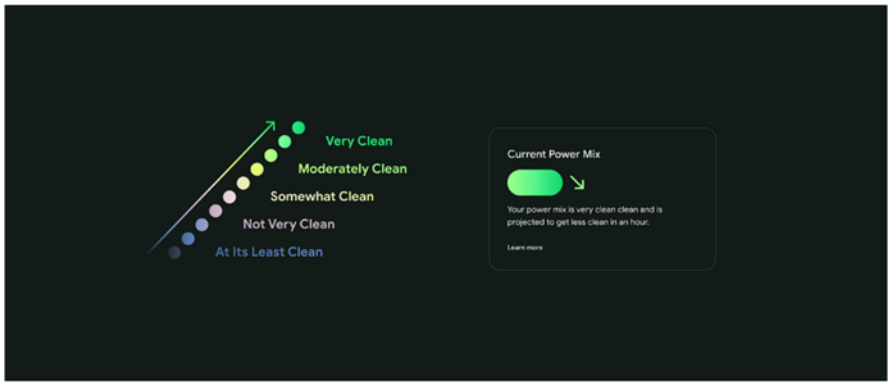
[1] For more info, see https://nest.com/thermostats/real-savings/.

are many customers who have purchased a thermostat and have yet to enroll in a program. RHR programs can now be surfaced to all Renew users in eligible areas making enrollment more accessible, decreasing friction, and enabling demand response programs to have an even greater impact on grid stability.

With Nest Renew, we are taking the next step toward simplifying energy management at home, putting innovative tools for supporting clean energy front and center with a new feature for compatible Nest thermostats called "Energy Shift."[2] Energy Shift helps users prioritize heating and cooling during periods of lower grid carbon emissions or lower cost electricity. This enables new emissions-based and time-of-use based energy management opportunities for users with Nest thermostats.

Emissions-based Energy Management: With Nest Renew, users will have access to a near real-time view of the estimated marginal emissions on their grid. This tool can help users understand how the carbon profile of the grid changes throughout the day, empowering them to adjust their electricity use in response. This can help users choose to reduce consumption when the grid mix is carbon intensive and run appliances and other larger loads when carbon-free electricity is abundant.

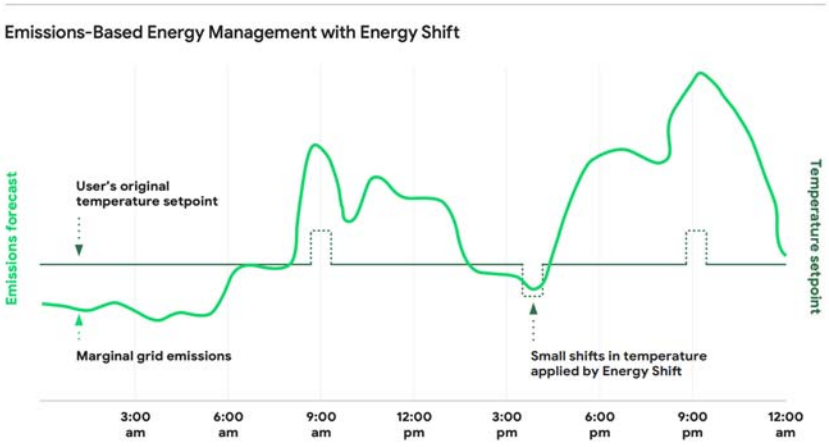
Figure 1: Real-time visualization of estimated marginal emissions through Nest Renew



Nest Renew will help users automate these changes by making adjustments in response to a forecast of the marginal carbon content on the grid, shifting electricity use to when the grid is cleaner. Small changes will be made to heating and cooling loads that balance impact with comfort. As always, users retain control and will be able to adjust their thermostats anytime.

[2] Nest Renew requires a third-generation Nest Learning Thermostat, Nest Thermostat E, or the newest Nest Thermostat, connected to a Google account (sold separately).

Figure 2: Illustrative example of Nest Renew's load shifting capabilities



Time-of-use-Based Energy Management: Nest Renew users will have the option to input their current rate plan. Then, for users on certain utility time-of-use rate plans, Renew can work with their Nest thermostat to help them automatically respond to price signals embedded in their utility rate, working to reduce usage when it's more expensive while balancing comfort and ease of use. Users always maintain control and can adjust their thermostats at any time.

Google Nest's goal is to make it simple and easy for users to find energy savings and prioritize usage of cleaner energy. After users enable Energy Shift, Renew will help the user by automating responses. Users will be able to see when these functions are working—through visual indicators on the thermostat, emails, and activity summaries available through the user experience.

Currently, in select US markets, customers who want to extend their impact can also support generation from wind and solar projects based in the United States with Nest Renew Premium. For Premium customers, Nest Renew will purchase renewable energy credits ("RECs") to match the estimated fossil-fuel portion of customers' electricity usage. Nest Renew has sourced its initial REC supply from renewable energy projects that have been, or will be, built to meet Google's ongoing commitment to match 100% of its global annual electricity use with renewable energy and support its goal to operate entirely on 24/7 carbon-free energy by 2030. In its clean electricity purchases, Google has committed to stringent requirements to ensure its investment results in a cleaner grid.

In this way, Nest Renew Premium can complement local carbon-free energy options, including rooftop solar and green tariff programs, many of which supply electricity directly to a user's local grid. Nest Renew provides the customer additional ways to support clean energy projects rather than replacing a user's utility company or electricity provider.

B. Google Nest Proposed Modifications to the Draft Language

Google Nest is extremely supportive of the intent and direction of the Energy Commission's proposed amendments to the LMS Regulations ("Draft Language"). Today, users enrolled in Nest Renew respond to carbon signals on a voluntary basis, which generally results in a more conservative approach to load shifting. By attaching a clear price signal to grid carbon emissions, users will be more likely to be tolerant of increased or more frequent load shifting.

However, we believe certain areas of the Draft Language could be improved in order to set a foundation for widespread residential participation in dynamic rates. Below, we offer several suggested updates to the language that we believe will help conform the regulation to the goals of the Commission and enable products like Nest Renew to support the tariffs. We'd also like to offer the general principles that we believe should guide the creation of the updated LMS:

1. Customer participation on the dynamic tariff should directly reduce greenhouse gas emissions by shifting electricity demand.
2. Customer participation on the dynamic tariff should indirectly reduce greenhouse gas emissions by enabling renewable generation to grow in California without adding strain on the grid.
3. The dynamic tariffs should promote equity by being accessible to all residential customers and not preventing or harming participation in other programs.
4. The dynamic tariffs should encourage the widespread utilization of DERs that can automatically control participant load.
5. The supporting technology, including MIDAS and the single statewide standard tool, should be accessible in a digital, machine-readable format according to national standards and best practices.

Our recommendations below reflect these principles.

1. <u>The LMS Regulations should include additional pathways for public input on required filings.</u>

Third-parties, including the original equipment manufacturers ("OEMs") and the other third-parties that will provide customers services associated with the Load Management Tariff (hereinafter "third parties"), such as Renew, will be integral to the success of these dynamic retail rates. However, the Draft Language as written provides no established opportunities for third parties or any other member of the public to provide input on the required utility filings, or on the tools and programs that are intended to enable those exact third parties to provide relevant services.

For example, in § 1621(d), each utility is to submit a plan to comply with the LMS within six months, including compliance with the Load Management Tariff Standard. The Load Management Tariff Standard requires critical interactions between third parties and the utilities,

such as the publication of machine-readable electricity rates to MIDAS, the single statewide standard tool that links devices to rates published in MIDAS, and a list of load flexibility programs that presumably can and should include any cost-effective third-party programs. Yet, as currently written, the regulations do not include any stakeholder comment on these filings. Similarly, there are no opportunities for public comment for the proposal to create a single statewide standard tool (§ 1623(c)) or on the list of load management programs (§ 1623(d)). This risks codifying a process whereby the utilities develop tools or programs that are intended for widespread use by third parties *without* any opportunity for third party input. Although we anticipate significant efforts will be made to coordinate load management programs and services between third parties and the utilities, given the importance of these voluntary rates being successful, and given the vast number of utilities subject to the LMS regulations, we suggest that it would be prudent to establish public notice and comment opportunities in the LMS regulations.

The solution is to add a reasonable process for public input for each of the filings identified above that does not unduly delay the development and implementation of these rates. We encourage the Commission to do so, and have provided redlines accordingly as an appendix to this document.

2. **The LMS Regulations should accelerate the timeline for enabling customer participation in marginal cost rates and programs.**

The Draft Language currently specifies that a marginal cost rate, or equivalent program, must be available to customers within three years. This prolonged timeline is unnecessary because novel platforms that assist customers on these tariffs are available today. Nest Renew has already begun rolling out a Renew Basic offering as an early preview. Furthermore, a timeline of this length risks exacerbating the already-strained conditions of the California grid, which has faced several reliability challenges due to peak evening demand in the last two years. We believe that the Commission should set a goal of rate or program launch within 18 months, and a rate launch within 2 years, based on the current technology and products that already exist today.

In addition, we urge the Commission to clarify its expectation that the utilities should be filing for rates that are applicable to all customer classes and segments. As written, it is possible that a utility could comply without ever developing a marginal cost rate tariff for residential customers. For example, a utility could file a plan with the Executive Director that targets small and medium-sized commercial customers, but does not include a residential marginal cost rate tariff, and that plan would be compliant so long as it is received within six months of the effective date of these standards. To bridge this gap, we recommend that the Commission specify that the plan must include a strategy to seek regulatory approval for marginal cost rate tariff(s) that are available and usable to any customer, including residential customers.

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3. **The LMS Regulations should define GHG emission sources and costs and further define how those will be incorporated in the total marginal cost.**

The outcome of this proposed regulation is to reduce greenhouse gas emissions. However, "greenhouse gas emissions" as an input to the total marginal cost is not clearly linked or defined, which could create the unintended consequences of 1) the use of different greenhouse gas emission sources of data across utilities and 2) the potential exclusion of greenhouse gas emissions from the total marginal cost calculation. We believe the Draft Language could be strengthened by adding more definition behind the "greenhouse gas emissions" term.

First, we suggest that the CEC add a definition of "greenhouse gas emissions" to the General Provisions (§1621(c)) that identifies the "source of truth" that utilities should use for the greenhouse gas emissions attributable to the utility's electricity supply. This "source of truth" could be the values published by the local balancing authority or an aggregated grid emissions intensity from a third-party source. The key is that the "source of truth" should be *consistent* across all the utilities.

Second, we suggest that the CEC explicitly derive a time-varying value for the cost of greenhouse gas emissions per MWh (i.e., the emissions rate) and then incorporate that cost of greenhouse gas emissions to the total marginal cost calculation. We believe this is envisioned in the marginal cost rates calculation in Draft Language § 1623(a), but the current text does not make this link explicit.

Finally, we urge the Commission to ensure that incorporating the other components of the total marginal cost outside of the wholesale cost, such as the marginal capacity cost, does not distort the rate in a way that undervalues renewables. It would be an unintended but detrimental consequence if the marginal cost rate devalued the exact kinds of resources, such as renewables, that California intends to bring online to meet its climate goals.

4. **The LMS Regulations should specify that MIDAS will provide an actual cost of electricity for a discrete time period as well as historical and forecasted values.**

Access to the marginal cost rate (i.e., the actual cost of electricity being charged to a customer for a specified and discrete time period) is fundamental to the success of this proposed regulation. Without access, third-party device manufacturers and implementers cannot automate and optimize a customer's load around the time-specific marginal cost of electricity. Google Nest believes the CEC's intent is to require the utilities to provide these *time-specific* pieces of information, such as the actual cost of electricity (and associated inputs), through MIDAS. However, to date, the Google Nest team has been unable to validate that MIDAS operates as intended during our testing efforts.

Google Nest also suggests that MIDAS be required to provide a historical record of this data for each time interval and, critically, the future projected values of at least 24 hours. An optimization algorithm is strengthened when it can intelligently plan for future states. Without

future projected values, customers and their implementers will have no indication of how the price and carbon intensity is expected to change over time, making it difficult to optimize DER performance.

For example, with future projected values, an optimization engine could determine the best time to pre-cool a home based on whether there is an expected increase in cost later in the day, leading to increased savings during the high-cost period. This is akin to current RHR functionality in California, where thermostats pre-cool homes in anticipation of peak periods of demand to maximize savings during the desired time window. We note that WattTime, who we understand is providing data to MIDAS, is already capable of reporting a forecast of 24 hours in advance and an array of five-minute values. We also recommend the forecasted data include error bands to indicate the relative confidence of the forecast. Finally, we recommend that the notification of a forthcoming Flex Alert or any future emergency notification also be provided as a proactive notice as part of the forecasted data.

Our interpretation based on existing MIDAS documentation and the Final Staff Report is that, to receive these values, a third party would pass a set of parameters to MIDAS that includes the LSE, the rate code (or RIN), the datetime, and a datetime range (e.g., 24 hours). MIDAS should then return, for that datetime the price for electricity, the total marginal cost, the locational marginal cost of associated greenhouse gas emissions, and any other applicable social costs and the underlying inputs. It should also include the forecasted future values for the datetime range entered by the user.

To assist with evolving MIDAS from a beta product to a generally available, live service, we suggest that the Commission form a technical working group that includes engineers from the MIDAS platform and third parties who plan to integrate with the MIDAS platform. Google Nest would be willing to serve on this technical working group and to assist with testing and debugging the MIDAS platform.

5. <u>The LMS Regulations should clarify the role of the single statewide standard tool.</u>

Google Nest believes that the role of the single statewide standard tool (§1623(c)(1)) is not clearly defined vis-a-vis MIDAS and neither is the functionality each tool is supposed to provide. This current lack of clarity could lead to the development of a tool that would fail to provide third parties with adequate information to properly link devices to electricity rates and respond to price and emissions signals.

It is our understanding based on the Final Staff Report that the tool should, at a minimum, provide rate information at an individual customer level such as the rate the customer is on (i.e., the Rate Identification Number), an estimate of the *annual* bill amount, and the ability to move the customer to a different eligible rate with the customer's permission. However, as Google Nest notes previously, the critical information utilities must provide in order for this regulation to meet its goals is the actual cost of electricity for that customer in a given time interval. If the actual cost of electricity is to come through this single statewide tool, it must be specified in the

language. If rate information is supposed to be provided through MIDAS, as Google Nest believes is the intent, further clarification on this aspect of MIDAS is required and the relationship between the single statewide tool and MIDAS should be made clear.

In addition, we strongly suggest that the Commission take a prescriptive approach regarding what information should be provided by third parties to the single statewide standard tool in order to either access the information or modify the customer's rate. We appreciate that the Commission proposes in the Draft Language for the tool to both "Ensure cybersecurity" and "Minimize enrollment barriers," but are concerned that this could result in an extremely onerous process for customers. We recommend that the tool utilize electric utility service addresses, which will balance the need for cybersecurity and minimize customer fatigue.

6. **The LMS Regulations should use consistent language when referring to a tariff that changes its rate at least hourly and charges customers the marginal cost of electricity.**

Google Nest believes that the Commission has defined the desired tariff in multiple ways, and suggests that to avoid unintentional confusion the Commission create consistency in the regulations by aligning all definitions of the tariff.

Google Nest's understanding is that the Load Management Tariff should consist of a marginal cost rate that varies at least hourly, reflects the wholesale marginal cost of electricity, and the social cost as defined in § 1623(a)(1). In addition, and as defined in § 1621(c)(6), the load management tariff consists of "time-dependent values that vary according to the time of day to encourage off-peak electricity use and reductions in peak electricity use," and therefore include the entire definition of "time-dependent rate" as defined in § 1621(c)(13). For consistency, we suggest that the Commission use the phrase "Load Management Tariff" wherever possible in the regulation because this phrase is inclusive of "marginal cost rate" and "time-dependent rate."

C. Conclusion

Google Nest thanks the Commission for this opportunity to provide comment on the proposed regulations. We look forward to working with the Energy Commission to deliver energy savings to Californians while reducing greenhouse gas emissions.

Sincerely,

/s/

Aaron Berndt
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Google

APPENDIX A
(Proposed Redlines)

§ 1621(d)(1) Each utility shall submit a plan to comply with Sections 1621 and 1623 of this article to the Executive Director no later than six (6) months after the effective date of these standards. **The public will be provided notice of the submission of the utility's plan to the Executive Director and will be provided an opportunity to comment on the submitted plans for no less than fourteen (14) days following such notice.**

§ 1623(a)(1) Total marginal cost shall be calculated as the sum of the marginal energy cost, the marginal capacity cost (generation, transmission, and distribution), **the social cost of energy including any associated greenhouse gas emissions,** and any other appropriate time and location dependent marginal costs on a time interval of no more than one hour. Energy cost computations shall reflect locational marginal cost pricing as determined by the associated balancing authority, such as the California Independent System Operator, the Balancing Authority of Northern California, or other balancing authority. Marginal capacity cost computations shall reflect the variations in the probability and value of system reliability of each component (generation, transmission, and distribution). Social cost computations shall reflect, at a minimum, the locational marginal cost of associated greenhouse gas emissions.

§ 1623(b) addendum

(c) Availability and Continuous Updating of Machine-Readable Marginal Costs. Each utility shall upload to MIDAS no later than five minutes before the time interval begins the latest marginal cost rates defined in 1623(a)(1). Each utility shall upload to MIDAS the forecasted marginal cost rates at least 24 hours into the future and provide continued access to historical marginal cost rates dating back to rate inception.

§ 1623(c)(2) The utilities shall submit the single statewide standard tool developed pursuant to Section 1623(c)(1) to the Commission for approval at a Business Meeting.

(A) The tool must be submitted within a year of the effective date of these regulations.

(B) The Executive Director may extend this deadline upon a showing of good cause.

(C) The public will be provided notice of the utilities' submission to the Commission and will be provided an opportunity to comment on the submitted plan for no less than thirty (30) days following such notice.

§ 1623(d)(1) No later than eighteen (18) months after the effective date of these standards, each utility shall submit to the Executive Director a list of load flexibility programs deemed cost-

effective by the utility. The portfolio of identified programs shall provide any customer with at least one option for automating response to MIDAS signals indicating marginal prices, marginal greenhouse gas emissions, or other Commission-approved marginal signal(s) that enable automated end-use response. **The public will be provided notice of the list of load flexibility programs submitted to the Executive Director and will be provided an opportunity to comment on the submitted lists of programs for no less than fourteen (14) days following such notice.**