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Sense Labs Comments on Request for Information

Additional submitted attachment is included below.

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July 3, 2024

California Energy Commission
715 P Street
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Re: Docket No. 24-FDAS-02 – Load Flexibility Policy & Planning

Sense Labs, Inc. appreciates the opportunity to provide these comments in response to the *Request for Information (RFI) and Feedback: Expanding Flexible Demand in California through Statewide MIDAS Data Delivery: A Comparison of Signaling Options*, filed May 29, 2024 in the above-referenced docket.

Sense's mission is to reduce global carbon emissions by making homes smart and efficient. We make it easier for people to take care of their homes and to actively participate in a cleaner, more resilient future. Founded in 2013, Sense uses innovative machine learning to analyze energy usage in the home, provide real-time intelligence on device behavior and enable a wide range of customer applications and grid services. Sense offers grid-edge computing software and real-time consumer applications that can be embedded as part of the next generation of advanced metering infrastructure ("AMI") deployments, with functionality that supports a range of relevant use cases for enabling load flexibility.

Thank you,

Colin Gibbs
VP, Energy Services
Sense Labs, Inc.

General Comment and Response

On page 11 of the California Energy Commission (CEC) Consultant Report "Expanding Flexible Demand in California through Statewide MIDAS Data Delivery: A Comparison of Signaling Options" ("Consultant Report" herein), it is noted that advanced metering infrastructure (AMI) is not a feasible means for communication pathways enabling load flexibility. Sense strongly disagrees with the conclusion that AMI is not a feasible mechanism to enable load flexibility and would like to provide our perspective on how and why load flexibility capabilities are enabled by software embedded in the latest generation of smart meters.

Fifteen years ago, California's largest utilities implemented first generation smart meters which are now reaching the end of their useful life and will need to be replaced. The first generation of smart meters were widely recognized as data collection devices, but the paradigm has shifted and the latest generation of smart meters (commonly referred to as AMI 2.0) represents a major technological leap from those first-generation meters. Most notably, AMI 2.0 meters are capable of hosting third party software, like Sense, on the meter and providing distributed sensing, controlling, and computation.[1] These meters also sample power tens of thousands of times per second, ensuring that the latest AMI meters provide greater than 1 million times more data than the first generation. These capabilities, along with upgradable software, ensures that there exists a range of use cases for not only allowing customers to engage with their real-time data, but also to communicate to customers opportunities for load reductions through programmatic and behavioral opportunities. The Consultant Report assumes that many California electricity customers will not have access to a communicating smart meter, but in fact, as older meters are replaced in the coming few years by the utilities with existing AMI, the technological standard of today's AMI 2.0 infrastructure is a communicating smart meter. Moreover, customers can now also have access to their real-time usage data through software embedded on such meters.

[1] US. Department of Energy. Pathways to Commercial Liftoff: Innovative Grid Deployment. April 2024. p. 78. https://liftoff.energy.gov/wp-content/uploads/2024/04/Liftoff_Innovative-Grid-Deployment_Final_4.15.pdf

Edge intelligence allows for a significantly high-resolution view of the composition of loads, load profiles, usage habits and preferences within a customer's home. With this, Sense's grid-edge computing software allows customers to see device-level usage in real time. The Consultant Report notes that some equipment might be too far from a meter to receive a signal. However, equipment does not necessarily need to be connected via a signal to a meter; rather, the meter and the equipment need to be able to communicate through either local or cloud application programming interfaces (APIs) by being connected to a network. Meters should provide the long-term flexibility to adopt emerging interoperability standards rather than prescribing a utility-centric standard today. This allows for more equipment to be considered for load flexibility than only smart equipment with integrated signaling capability.

The Consultant Report also notes that consumers must sign up for AMI signal reception through their utility. While it is true that meters are a utility-owned asset and their functionality is largely controlled by the utility, the latest generation of smart meters can be connected to WiFi or cellular networks (allowing them to communicate with third party applications) at the customer's discretion. With this, customers have access to Sense's consumer app and can rely on meter-based processing to relay usage information in real-time, for example, outside of a direct utility enrollment process.

One of the notable functionalities of Sense software on meters is the ability to connect consumers with their real-time usage information at the device level. This allows customers to gain insights into what is using energy at any given moment, evaluate what usage can be reduced or deferred, and measure their usage reductions through Sense's consumer app. By relaying information in real time, Sense's application puts customers, rather than utilities, in a controlling role over their load and its flexibility. This means that utilities are not forcibly in the role of flexibility market gatekeeper as the Consultant Report suggests. Further, there are insights and automation provided by applications like Sense that a consumer might opt into using for reasons beyond just energy flexibility. By 2030, Sense expects to have integrations with the majority of energy-consuming devices in homes and allow for automation by consumers.

The Consultant Report finishes its consideration of AMI by noting that “even if AMI were universally available in California, data protocols differ among utilities, so a single appliance standard could not address the entire state.” Sense agrees that interoperability standards are necessary for supporting connected devices on the system. Software integrations with smart devices in homes is key to driving load flexibility, especially moving beyond automated thermostats and HVAC systems.

Smart meters represent foundational infrastructure for the clean energy future and meter-embedded software creates a unique opportunity to further load flexibility and resiliency priorities in California. As utilities propose replacement meter investments, the CEC should push for the high-resolution data, edge computing support, and real time networking in new meters necessary to enable load flexibility opportunities, among other use cases and benefits, statewide. As these meters will be in operation for the next 15 years or more, implementing the right technology in meters and leveraging them to generate maximum benefit is most important to creating both short- and long-term customer value.

Responses to Docket No. 24-FDAS-02, Request for Information (RFI) and Feedback: Expanding Flexible Demand in California through Statewide MIDAS Data Delivery: A Comparison of Signaling Options

6. Voluntary utility and third-party programs for load flexibility (shifting) have typically had very low participation from end users. What alternate Load Flexibility program(s) would you recommend that maximize participation while being ubiquitous, cost-effective, equitable, and technically feasible without requiring or precluding participation from third parties?

RESPONSE: Appliances and smart devices in the home should provide interfaces to allow for automation and demand flexibility, and continuous monitoring for efficiency and lower maintenance. Sense's core philosophy is based on the premise that a real time consumer experience is needed to drive behavior and demand flexibility. Sense can play a role by engaging customers through our mobile application and using data and knowledge of the individual home to target the best homes and timing for adoption of these upgrades. While for some homes it may be worth it to replace an existing appliance proactively, but for others it may make more sense to wait until the existing appliance is nearing the end of life. The current situation is most people wait until things fail, and then finding a replacement becomes an emergency. Sense can not only make recommendations for energy efficient upgrades, but also expects to help consumers know when appliances may fail and help them have a plan for when it does fail.

While the current real-time Sense consumer experience can drive energy savings, there is the potential for much greater energy and carbon savings – estimates are that consumers could cost-effectively reach savings of 40-50 percent, with the potential to increase with utility incentives and programs. Sense can play a major role in supporting software interfaces to appliances and shifting behavior. By 2030, Sense expects to be using data to drive personalized functionality in our application and other communication channels to fully optimize how we help consumers make their homes more efficient, including through automation. This should include data to help

device makers and service providers work with consumers, such as HVAC and other appliance makers, efficiency service providers, installers, etc.

11. Provide a summary of your support for and/or rejection of any of the recommendations and conclusions offered in the report, along with a brief description of why for each.

RESPONSE: Sense would like to reiterate the importance of growing the flexible demand market in CA, and the enabling AMI infrastructure and software that can be coupled to extract customer and grid side benefits. Perhaps one of the most unique abilities of Sense's meter-embedded software and real-time engagement with consumers is the ability to create flexible demand by encouraging customers to use energy when the system is supported by large amounts of solar. Sense's consumer mobile app can notify customers when solar production is high (and presumably when there is excess capacity) and encourage them to use energy at that moment, like running the dishwasher, doing laundry, or charging their electric vehicle. This experience can be targeted or scaled depending on the utility's or state's conditions and needs. So while automation and communication platforms might be able to communicate when load shedding is needed, the ability to assist consumers in making smarter decisions about when to also consume more energy is true load flexibility.

Sense has also formed partnerships with demand response aggregators like OhmConnect to demonstrate in California the compounded benefits of having real-time usage data alongside demand response calls. During peak events, Sense nudges users with personalized notifications in the Sense mobile app to drive savings actions. Customers use this information to turn off items like their air conditioning, dryers, washers, water heaters, and dishwashers during events. After a successful pilot in 2021 which saw Sense users reduce home energy use by 18% during peak events, the Sense enrollment rate in 2023 was 25% higher than the average rate with other flexible demand partners. Sense also continued to see strong adoption of the option to connect devices for automation.

Next-generation smart meters with Sense's embedded edge-intelligence enable flexible demand administrators and participants to get data faster and more reliably, relieving customer frustration and rewarding them faster and more reliably. The ubiquity of these meters will also help ensure equitable benefits of flexible demand programs, allowing customers to participate and earn incentives even if they haven't adopted specific types of technology. We encourage the CEC to play a leadership role in developing technology standards and interoperability without stifling innovation.