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Comments of the Sacramento Municipal Utility District on IEPR Commissioner Workshop on Renewable Integration

Comments of the Sacramento Municipal Utility District on IEPR Commissioner Workshop on Renewable Integration and Electric System Flexibility.

Additional submitted attachment is included below.

STATE OF CALIFORNIA
BEFORE THE CALIFORNIA ENERGY COMMISSION

In the matter of:	)	Docket No. 18-IEPR-06
	)	
2018 Integrated Energy Policy Report Update (2018 IEPR Update)	)	SMUD Comments on IEPR Commissioner Workshop on Renewable Integration and Electric System Flexibility
	)	
	)	July 5, 2018

Comments of the Sacramento Municipal Utility District on IEPR Commissioner Workshop on Renewable Integration and Electric System Flexibility

Thank you for the opportunity to provide comments on the 2018 Integrated Energy Policy Report ("IEPR") Commissioner Workshop on Renewable Integration and Electric System Flexibility ("workshop").

The ability of renewable energy sources to integrate cost-effectively into the grid relies on the grid's ability to accept the energy they produce. This can be achieved in three ways: 1) making new or increased electrical loads available at the same time that renewable energy sources are generating power; 2) adjusting the generation profile of renewable power plants, and 3) reducing the generation of hydro or fossil plants to make room for renewable generation. These comments focus on the first method: maximizing the available load at times renewables are generating, by electrifying buildings, by controlling shiftable loads, and by providing thermal and battery storage. In SMUD's view, these demand-side responses are superior long-run strategies for renewable integration because they capture greenhouse gas-free power from California's investments in renewable energy. Method 2 above is what California wants to avoid not only because generally lower cost solar and wind generators cannot adjust output to match load without losing generation, but because curtailment is a costly waste of the potential of our fleet of renewable power plants. Method 3 is what California is trying to achieve, while economically maintaining sufficient capacity from fossil plants to meet resource adequacy requirements.

At present, the most cost-effective way to provide these loads is with residential electric water heating and space heating, both of which are mature, low risk technologies that include the potential for thermal storage as well as beneficial electrification.

Thermal Storage Heat Pump Water Heaters Largely Operate on Carbon Free Energy, Recharging During Peak Solar Production. Electric heat pump water heaters using resistance elements and with thermostatic mixing valves ("thermal storage heat pump water heaters") can maintain an identical consumer experience to traditional gas while operating largely on carbon free energy by recharging during peak solar photovoltaic ("PV") production. Further, these water heaters can shift their use of energy without impacting the production of hot water. In other words, the water heater can wait until there is an optimal grid benefit to heat the water, usually during peak PV production. The water heater uses the mixing valve to increase the capacity of stored electrical energy while minimizing fluctuations in the customer's delivered water temperature. This reduces the need to heat water during the afternoon peak energy demand. When the water heater does start heating water, it can do so in resistance mode when renewable energy is cheap and plentiful or in the more efficient heat pump mode at other times. Typically we assume that the heat pump is the "best" choice because of its high efficiency, but at times of excessive generation, the resistance elements may be used instead. With the adoption of 2019 Title 24 measures, great strides have been made allowing the use of water heaters in new and existing buildings; however, the CEC has stopped short of promoting their deployment. If the CEC receives funding to pursue an electrification program using Senate Bill No. 1477 ("SB 1477") funds, we think a substantial portion of those funds should be spent to increase consumer awareness of thermal storage heat pump water heaters.

Space Conditioning Can Similarly Shift Energy Usage to Help Integrate Renewables. Space conditioning energy demand can also be shifted for cooling, as well as heating, with the deployment of heat pump space heating equipment and connected thermostats. Space conditioning energy usage can be shifted in much the same way as water heating – for example by pre-cooling a home or business when there is abundant solar generation. The amount of energy that can be shifted is highly dependent upon the amount of insulation, air leakage, window performance, overhangs, building orientation, etc. Newer buildings – buildings built to high energy standards – will be able to float longer without the consumption of energy while maintaining occupant comfort. Although the quantity of energy that can be shifted will vary for each building; using electric heat pump space heating and cooling along with good building envelopes and connected thermostats allows these buildings to interact and cooperate with the grid to maintain maximum grid resiliency. We think the CEC should prioritize a major, manufacturer-independent study of residential and commercial building load shifting potential, effectiveness, and cost. This is a highly complicated research question that is very difficult for individual utilities to take on.

SMUD is also reiterating comments that were submitted on June 28, 2018 in the 18-IEPR-09 docket on the IEPR Commissioner Workshop on Achieving Zero Emission

Buildings, because SMUD believes the recommendations there are relevant to long-term increases in grid resiliency and ability to integrate renewables of California's electricity system. These actions would be helpful for utilities in developing and implementing flexible, grid interactive electrification programs, which in turn will allow more and more zero-carbon generation integration.

Include Cost of Gas Infrastructure in Title 24. At present, gas measures in Title 24 do not include the additional cost of the required installation of gas infrastructure to a building. Providing electricity to a building is a given – people need electrical power for their plug loads and providing additional electrical capacity for heating, water heating, etc. comes at a minimal cost. However, the gas service line from the street to the house, the gas meter, and the gas piping inside the house are all discretionary costs that should be justified if gas devices are to be installed in the house. In practice, the cost of a gas service line from the street and the gas meter does not fall on the homeowner or even (usually) on the developer. Instead, it is normally paid for by the gas corporation and socialized across all gas ratepayers. Nonetheless, this cost is a real societal cost that should be assessed for all gas measures in the next Title 24 code cycle.

Initiate a "Pruning the Tree" Pilot. The cost of replacing aging gas distribution pipes is extremely high – typically higher than the cost of electrifying the neighborhood affected. Various groups have proposed an approach known as "pruning the tree" (https://heetma.org/energy-shift). This approach, with the support of the affected community, decommissions selected gas pipes in place while electric infrastructure is upgraded, and homeowners receive upgraded all-electric home appliances, which result in lower utility bills. Leftover funds (i.e., avoided costs) could be spent in disadvantaged communities to reduce their utility costs. The CEC and/or the California Public Utilities Commission ("CPUC") should coordinate to plan an initial group of pilots to inform the public of advances in all-electric appliances, with a focus on the social/political process of obtaining community consent for the work. To initiate this program, SMUD requests that the CEC work with the CPUC and other stakeholders to create a list of planned gas maintenance activities across the state, including the schedule of such repairs/ improvement and cost of such repairs, to test whether particular communities are willing to shift from partial gas service to all electric.

Calculate SB 350 Electrification Savings Credits. Electrification existing as a savings measure in SB 350 is an extremely valuable step, and we appreciate the efforts of the CEC staff to verbally approve SMUD's method of claiming savings on its electrification programs. We feel confident in that methodology. We also recognize that electrification can go a long way toward filling the SB 350 doubling gap if the work between the CEC and the California Air Resources Board ("CARB") on a method for calculating the equivalence between "single-fuel" energy efficiency measures and fuel

switching measures can be formalized so that other parties feel confident in the magnitude of the savings claims. We encourage the CEC to develop a draft method and issue it for public comment as soon as possible. This will give confidence to utilities across the state as they develop their electrification programs.

Exclude TDV Retail Adder from Cost-Effectiveness Calculations. In those cases where Time Dependent Valuation ("TDV") is used to assess the cost-effectiveness of electrification measures and programs, the TDV "retail adder" should be excluded from the calculation. The retail adder is an element of TDV intended to reflect the overhead cost of utilities providing customer service (metering, billing, phone response, websites, etc.). These overhead costs are fixed per customer – they do not change if the customer's electrical (or gas) bill increases or decreases. However, because the retail adder for electricity is significantly higher than the retail adder for gas, per unit of energy, the TDV calculation shows an increase in societal cost where no such increase actually exists. This hampers the ability of utilities to fairly assess the cost-effectiveness of electrification measures and programs.

Amortize Electrification Costs Over Multiple Device Life-Cycles. When assessing the cost-effectiveness of a code or program measure, calculations are currently done over the effective useful life ("EUL") of each end-use device. If the upfront costs of electrification are amortized over only one EUL cycle, the cost-effectiveness of the measure suffers. Some or all of these upfront costs should instead be amortized over the life of the *electrification*, rather than over the life of the device itself. The electrification of the home, once achieved with certain upfront costs, is effectively indefinite (as opposed to the capital cost of replacement equipment). It would make more sense to consider cost-effectiveness over several device EULs (say, five), not one. At present, there is no agreed structure for this calculation.

Examine Gas Distribution Resource Planning. The CEC, in concert with the CPUC, should begin development of a gas distribution resource planning structure, similar to that being developed for electricity distribution at the CPUC. As new homes and businesses are built, there is a significant risk of stranded assets, i.e., the gas distribution infrastructure needed for these new structures may end up being abandoned prior to their end of useful life. Replacement of existing but aging infrastructure faces the same issue. The changes that the State needs to meet its carbon goals require careful planning on the gas side as well as the electricity side.

Thank you again for the opportunity to comment on the IEPR Workshop on Renewable Integration and Electric System Flexibility. We look forward to discussing these topics further.

/s/

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