Rulemaking No.: **20-08-020**
Exhibit No.: **PAO-10**
Witness: **Tom Beach**
Commissioner: **Martha Guzman Aceves**
ALJ: **Kelly A. Hymes**
Dated: **July 30, 2021**

Excerpt from Opening Brief of SVS on 2020 Changes to the ACC

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BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Create a Consistent Regulatory Framework for the Guidance, Planning and Evaluation of Integrated Distributed Energy Resources.	Rulemaking 14-10-003 (Filed October 2, 2014)

OPENING BRIEF AND OPENING COMMENTS OF THE SOLAR ENERGY INDUSTRIES ASSOCIATION AND VOTE SOLAR ON 2020 CHANGES TO THE AVOIDED COST CALCULATOR

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about 2 hours per year of power interruptions (excluding major disruptions).[171] The values shown in these reports are then used by the Joint IOUs in value-of-service studies. These studies assess how much customers value reliability in dollars per minute of avoided interruption. Multiplying these value-of-service metrics by the minutes of interruption per year yields the annual reliability value per customer to be gained by a storage system that can eliminate short duration interruptions.[172] While this value averages to approximately $300 per customer per year, the reliability value can be broken down into separate values for residential, small commercial, and large commercial / industrial.[173]

SEIA and Vote Solar have quantified the resiliency benefits of solar-plus-storage using what the literature on resiliency calls a "revealed preference" method based on the costs of customers' "defensive behavior" to mitigate the impacts of an extended, major interruption. This approach has been used by the U.S. military, and uses the cost of portable gasoline-powered generators that proliferate among residential customers who attempt to maintain a basic level of electric service at their homes during a long interruption. We have estimated the costs for a gasoline-powered backup system whose characteristics are as similar as possible to a solar-plus-storage system, including the costs to mitigate the noise and air emission impacts of the portable generator. The first step in this calculation is to determine an average cost for a portable inverter electric generator that is compliant with CARB emission requirements for California.[174] To that

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171 Exhibit SVS-01, p. 66, lines 10-12.

172 *Ibid*., p.66, lines 19-21.

173 *Id.*, p. 67, Table 6 and p. 68, Table 7.

174 An inverter generator is most comparable to a solar-plus-storage system because it is quieter, and thus closer to the value a customer receives from a solar-plus-storage system than other type of portable generators that are extremely noisy. Tr. Vol. 1 (SEIA/Vote Solar-Beach), p. 141, line 24, to p.142 line 3.

average cost is added sales tax, fuel storage costs,[175] the cost to install a manual transfer switch to feed the critical circuits in the home, and the cost of the air impacts associated with emissions of NOx, PM 2.5, and CO_2. The resultant cost of approximately $104 per kW-year constitutes the residential resiliency value.[176] Reproduced below is a revised version of Table 7 from the SEIA/Vote Solar testimony that includes a small change in these numbers that Mr. Beach made from the stand (the addition of the necessary locked shed to store gasoline safely).[177]

Revised Table 8: *Components of Residential Resiliency Value*

Component	Cost	Notes
Generator	$472 / kW	1.8 to 5.5 kW units
	$1,650	Assuming a 3.5 kW generator
CA Sales Tax	$140	At 8.5%
Transfer Switch	$600	Manual switch & installation
Fuel Storage	$1,050	Fuel containers, annual rotation, locked shed
Excess Energy Costs	$60	Electricity costs above $0.25/kWh
Air Impacts	$149	NOx, PM2.5, GHG Planning Price[178]
Total	$3,650	Total for the 3.4 kW unit
	$104 per kW-year	Assuming one 7-day interruption per decade

[175] Fuel storage costs include the cost to buy two 5-gallon, UL certified fuel storage containers to store 10 gallons of fuel, and then the cost every year to either add fuel stabilizer to the gasoline or the time to rotate the gasoline by pouring the old gas into your car and then driving to the gas station and filling up the fuel storage containers. In addition, a detached, ventilated, locked shed is need to store the gasoline. Tr. Vol. 1 (SEIA/Vote Solar-Beach), p. 144, line to p. 145, line 14.

[176] Note that this value now includes the $750 cost of a ventilated locked shed that is needed to store the gasoline as was addressed by Mr. Beach on cross examination. Tr. Vol. 1 (SEIA/Vote Solar-Beach), p.145, lines 11-14.

[177] Tr. Vol. 1 (SEIA/Vote Solar - Beach), p. 145, line 3-14.

[178] Mr. Beach estimated the air emissions for portable gasoline generators assuming emissions of NOx and PM2.5 at the CARB voluntary compliance standard for these small engines, although many small generators on the market do not comply with these standards. To value the heath impacts of emissions of criteria pollutants (NOx and PM2.5), Mr. Beach used the values provided in the white paper that he authored with Alison Seel of the Sierra Club, *Non-Energy Benefits of Distributed Generation* (August 3, 2015), which is in the record for this docket as Attachment 2 to SEIA's comments filed March 23, 2017 on the staff proposal recommending a societal cost test. For the GHG costs, Mr. Beach used the average 2018-2030 GHG Planning Price less $20 per ton for the cap & trade value of GHG emissions from gasoline, which were assumed to be included in the $4 per gallon cost of gasoline.

The resiliency value for commercial customers is determined using an approach similar to residential, based on the costs for backup diesel generators. Studies performed on a national basis have put this value at approximately $85 per kW-year.[179] However, given California's stricter air emission standards, this national value may be low. Taking this fact into account, SEIA / Vote Solar witness Mr. Beach calculated an annual value of $106 per kW year for commercial resiliency.[180]

These reliability and resiliency benefits can be incorporated into the ACC as annual values, escalating with inflation.[181] The reliability value is a dollar per customer value. The resiliency value is also an annual dollar value per customer, but is expressed in dollars per kW-year because it varies based on the kW discharge capacity of the battery storage system.[182]

On cross examination, the Joint IOUs attempted to challenge Mr. Beach's estimated resiliency values on the grounds that the average cost of the portable generators used by Mr. Beach was too high. The only "evidence" that the Joint IOUs offered was the cost of one standard generator (and not a quiet inverter generator).[183] As explained by Mr. Beach:

> [A] more robust methodology is to do a survey. I mean these things don't all have the same attributes and the same features. I would think that it's a more robust evaluation if you don't just look at one model; if you look at a range of different models that are on the market.[184]

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179 Exhibit SVS-01, p. 70, lines 4-9 *citing, e.g.*, S.C. Ericson and D. Olis, *A Comparison of Fuel Choices for Backup Generators* (NREL March 2019) at pp. 20-21 and 25-27.

180 Exhibit SVS-01, p.70, lines 11-16. ($70/kW-year for capital. $35/kW-year for maintenance and $1/kw-year for air emissions).

181 *Ibid*., p. 70, lines 20-21.

182 *Ibid.*, p. 70, lines 22-24.

183 Exhibit IOU-10 (showing the cost of one portable generator to be $679).

184 Tr. Vol. 1 (SEIA/ Vote Solar -Beach), p. 143, lines 2-8.