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Peninsula Clean Energy Comments on Joint Agency Workshop

Additional submitted attachment is included below.

California Energy Commission
Docket Office
1516 Ninth Street
Sacramento, CA 95814-5512

June 22, 2021

Joint Agencies: California Energy Commission (CEC), California Public Utilities Commission (CPUC), and California Air Resources Board (CARB)

RE: Peninsula Clean Energy Authority Comments on Joint Agency Workshop on Next Steps to Plan for SB100 Resource Build, June 2, 2021; Docket No. 21-SIT-01

Dear Commissioners and Board Members:

Peninsula Clean Energy Authority (Peninsula Clean Energy hereinafter), a joint powers authority operating decarbonization programs in San Mateo County, strongly supports the SB100 study of California's decarbonization strategy but offer these comments for consideration as the Joint Agencies continue to refine the modeling of California's energy future. Peninsula Clean Energy supports the Joint Agencies' next steps as largely in line with our recommendations in our December 18, 2020 comments in this Docket.[1] While Peninsula Clean Energy calls itself a community choice aggregator (CCA) because that is the moniker most stakeholders have come to associate with our activities, our joint powers authority is offering many more decarbonization programs than mere energy supply to include building and transportation electrification, community outreach and education, and other local programs. We urge the Joint Agencies to continue to work closely with CCAs as some of the LSEs with the most aggressive decarbonization goals pursuing substantial new resource procurement to serve our customers as we expand as laid out in our December 18, 2020 comment letter.

[1] California Energy Commission Docket 19-SB-100, TN # 236059

Here, we again highlight a series of recommendations and actions of CCAs that represent key strategies for accelerating California's decarbonization.

Peninsula Clean Energy recommends that the Joint Agencies:

- Focus on approaches to deeper decarbonization that comport with the latest scientific consensus. The SB 100 study lays out a range of possible approaches, but only some of these are consistent with the near-zero emissions needed to avoid catastrophic climate destabilization impacts.
- Employ rigorous modeling of system reliability using geographic and temporally specific production cost modeling and loss of load studies, including specific modeling of the availability of imports from the entire Western Energy Coordination Council (WECC) region.
- Evaluate customer affordability by explicitly calculating the impact on total customer utility bills in comparison to other recently approved costs. The Joint Agencies should use the tools that California Public Utilities Commission has recently developed to evaluate affordability.
- Explicitly evaluate marginal generation costs against the costs of climate destabilization impacts resulting from carbon pollution, including by using a realistic cost of carbon that includes all social costs of carbon.

The Joint Agencies should consider additional strategies to reach acceptable carbon targets.

Peninsula Clean Energy applauds the Joint Agencies' recognition that "[d]ecarbonizing the electric grid is imperative to achieve economy-wide carbon neutrality."[2] This statement is supported by the basic findings of numerous studies that have guided California's climate strategy and it goes without saying that this goal cannot be accomplished while the electricity sector has continuing high emissions. Consequently, it is very troubling that the study concludes that the SB 100 core scenario results in 24 MMT by 2045.[3] The current scientific consensus is

[2] DRAFT 2021 SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future, Docket 19-SB-100, TN# 235848 (SB 100 study), at 11.
[3] SB 100 Study, Figure 34.

clear that this emissions rate unacceptably high. Given that the goal is carbon neutrality by 2050, we also question whether this rate target will result in economy-wide carbon neutrality by 2050.

The Joint Agencies should evaluate these results in the context of the scientific consensus about what is required to avoid the most catastrophic impacts of climate destabilization. In 2018, the Intergovernmental Panel on Climate Change found that to limit warming to 1.5°C, global $CO_{2\text{-equivalent}}$ emissions should decline by about 45% from 2010 levels by 2030 and reach net zero around 2050.[4] For the California energy sector to merely meet these emissions targets, electricity sector emissions should decline from 90.3 MMT (2010[5]) to 49 MMT $CO_{2\text{-eq}}$ by 2030 and to zero by 2050. These findings should guide our understanding of meaningful climate goals.

If California is to adequately address the threat of climate destabilization, additional approaches will be required. Fortunately, deeper reductions should be achievable. The California Energy Commission's own Deep Decarbonization study suggested that the optimal electric sector emissions would be 8MMT by 2050 as part of a strategy that could save Californians $400 billion a year in present value.[6] This level would be a third of the SB100 scenario and on par with the "no combustion" scenario.[7] The Joint Agencies should continue this work to develop more effective approaches to deeper decarbonization than is currently reflected in the SB 100 study scenario.

Ultimately, the main strategy for achieving carbon neutrality will be planning to do so. The Joint Agencies will need to develop plans within the scope of their authority to not only achieve SB100 goals but to drive electricity generation emissions to near zero through more aggressive deployment of carbon-free generation, storage, and demand-side strategies. The no-combustion scenario of the SB100 Study for example results in emissions of 10 MMT $_{CO2\text{-eq yr-1}}$ by 2045[8] while the Framing Study scenarios developed by the CPUC result in emissions between

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[4] See Intergovernmental Panel on Climate Change (2018) Global Warming of 1.5C Report, Chapter 2, at 95, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter2_Low_Res.pdf.
[5] See, California Air Resources Board, GHG inventory data, https://ww2.arb.ca.gov/ghg-inventory-data
[6] Amber Mahone et al., *Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model.* California Energy Commission. Publication Number: CEC-500-2018-012, at 40, available at https://www.ethree.com/wp-content/uploads/2018/06/Deep_Decarbonization_in_a_High_Renewables_Future_CEC-500-2018-012-1.pdf (June 2018)
[7] SB100 Study, Figure 45.
[8] SB 100 Study, Figure 45.

10.3 and 15.5 10 MMT $_{CO2\text{-}eq\ yr^{-1}}$ by 2045[9], and the Deep Decarbonization Study suggests 8MMT may be optimal.[10] These studies should be taken as the road map for realistically approaching the zero emissions standard that the scientific consensus calls for.

Feasibility

Peninsula Clean Energy appreciates the Joint Agencies' position that the goals of SB100 are feasible, even if the SB 100 study itself is directional only.[11] Identifying general approaches and shortfalls (e.g., high overall emissions) without attempting to create a binding plan is appropriate since the main procurement planning for the state is being conducted by the CPUC in the Integrated Resources Proceeding and by the California Energy Commission for LSEs under its jurisdiction. However, robust modeling by the Joint Agencies will provide an invaluable comparison point to the results of models by the CPUC, CAISO, Southern California Edison, and others.

The technical feasibility of decarbonization is supported by the range of studies demonstrating how to achieve even deeper decarbonization than is envisioned in the SB100 study. For example, SB100 study itself identifies strategies, such as increased load flexibility and no combustion approaches which result in considerably lower emissions at marginally higher cost. Similarly, the Deep Decarbonization study conducted by E3 on behalf of the California Energy Commission identified 8 MMT as the cost optimal emissions level for the electricity sector within the context of the entire economy.[12] Additionally, the 2035 Report from the Goldman School finds that generating 90% of energy from renewable sources is feasible by

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[9] CPUC Presentation in Integrated Resources Proceeding R.16-02-007, 2019-20 IRP: Proposed Reference System Plan, November 6, 2019, Slide 158, https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/UtilitiesIndustries/Energy/EnergyPrograms/ElectPowerProcurementGeneration/irp/2018/2019%20IRP%20Proposed%20Reference%20System%20Plan_20191106.pdf

[10] Amber Mahone et al., *Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model.* California Energy Commission. Publication Number: CEC-500-2018-012, at 40, available at https://www.ethree.com/wp-content/uploads/2018/06/Deep_Decarbonization_in_a_High_Renewables_Future_CEC-500-2018-012-1.pdf (June 2018)

[11] SB100 Study, at 25-26.

[12] Mahone, Amber, Zachary Subin, Jenya Kahn-Lang, Douglas Allen, Vivian Li, Gerrit De Moor, Nancy Ryan, Snuller Price. 2018. Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model. California Energy Commission. Publication Number: CEC-500-2018-012

2035, and would cost less than a grid based on current energy policies, with ancillary health and economic benefits reaching into the trillions of dollars nationwide.[13] The National Renewable Energy Laboratory also reports that a 90% renewable grid is feasible.[14] Thus, the conclusion that the goals of SB100 are feasible comports with existing research.

Build rates:

The deep decarbonization needed to avoid the worst impacts of climate disruption will require sustained and serious effort, as noted in the SB 100 Study. However, with the support of the Joint Agencies, that effort should also be feasible. To ensure success, the Joint Agencies should coordinate more closely with all of the states' Load Serving Entities to evaluate feasible build rates and identify barriers to deployment of the necessary resources, including demand-side resources. The California Public Utilities Commission-jurisdictional LSEs have recently submitted Integrated Resources Plans that should provide an indication of the build rates planned by these LSEs to compare to the rates anticipated in the SB100 Study. The SB100 study indicates that historical rates have averaged 1 GW of utility scale solar and 300 MW of wind per year.[15] By comparison, the California Public Utilities Commission reports near term projections of new contracted resources include nearly 900 MW of solar, nearly 1 GW of solar plus storage, 700 MW of wind generation, and nearly 1.5GW of standalone storage contracted to be online by August 2021.[16] CCAs are planning to procure 20GW of renewable generation and storage through 2030.[17]

Peninsula Clean Energy recommends comparing the results of capacity expansion models with the aggregated planned procurement identified in the Integrated Resources Planning

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[13] Goldman School of Public Policy, 2035 Report, available at https://www.2035report.com/

[14] *Renewable Electricity Futures Study (Entire Report)*
National Renewable Energy Laboratory. (2012). Renewable Electricity Futures Study. Hand, M.M.; Baldwin, S.; DeMeo, E.; Reilly, J.M.; Mai, T.; Arent, D.; Porro, G.; Meshek, M.; Sandor, D. eds. 4 vols. NREL/TP-6A20-52409. Golden, CO: National Renewable Energy Laboratory. ("Renewable Electricity Futures Study")
http://www.nrel.gov/analysis/re_futures/.

[15] SB 100 Study, at 20.

[16] M. Sterkel and N. Raffan, CPUC, Status of New Resources Expected, November 2020, https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442466860

[17] https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/calif-aggregators-to-seek-up-to-20-gw-of-renewable-energy-storage-by-2030-61247574

proceeding at the CPUC.[18] Progress on necessary build rates to decarbonize can be evaluated based on both actual and aggregate planned procurement. These Integrated Resource Plans are grounded in each LSE's real-world deployment plans as informed by business judgment on cost effectiveness of particular resources. This should provide an important picture of what additional needs may remain to achieve California's climate goals and how much the Joint Agencies will need to act to facilitate faster build rates.

Reliability

Peninsula Clean Energy is pleased that the Joint Agencies propose to engage strongly in far more robust assessments of system reliability. These assessments should be loss of load studies using zonal or nodal production cost models. With time-dependent generation and storage becoming the backbone of the decarbonized grid, reliability measures must evaluate the probability of outage in all hours with Monte Carlo simulations over a wide range of conditions. The RESOLVE capacity expansion tool lacks adequate spatial and temporal resolution to capture critical dynamics. In addition, these studies should capture critical dynamics throughout the Western Electricity Coordinating Council region, because the levels of available imports, especially during stressed periods, is proving to be a key variable driving reliability. Thus, the Joint Agencies should seriously consider detailed modeling of conditions across the WECC regions.

Assessments of reliability must move past using simply System RA constraints in capacity expansion. As was demonstrated in the stage 3 emergencies of August 14th and 15th of 2020, existing peak-based System RA constructs do not entirely capture the hourly dynamics that increasingly determine reliability and can fail to accurately capture the contributions of renewable technologies.[19] As time-dependent generation and storage become the bulk of resources, reliability measures will need to capture variation across all hours. Since reliability is

[18] California Public Utilities Commission Proceeding R.20-05-003, Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.
[19] See CAISO Preliminary Root Cause Analysis Mid-August 2020 Heat Storm, October 6, 2020, at 6, http://www.caiso.com/Documents/Preliminary-Root-Cause-Analysis-Rotating-Outages-August-2020.pdf. See also, Integrated Resources Plan of Southern California Edison, submitted to CPUC Integrated Resources Proceeding R.20-05-003, September 1, 2020, at 32.

a function of the entire system portfolio, metrics which attempt to assign reliability values to individual resources and technologies will miss important dynamics.

Beyond the Monte Carlo simulations, Peninsula Clean Energy also recommends additional studies of extreme event periods. First, future studies should examine grid performance during both high heat emergencies, which drive both thermal derating of fossil gas resources and high loads, as well as during monsoon conditions of low solar and wind generation. Secondly, future work should examine the distribution of weather events to determine just how likely such high heat or monsoon conditions are and just how much capacity is unavailable during such events. Currently, there is much qualitative discussion of theoretical "dunkelflaute" (German for "still and dark" days) conditions, but almost no quantitative evaluation of how common such days are and how much generation declines during such conditions. Without a solid quantitative evaluation of the scope and scale of real-world generation shortfalls, plans to address these issues are unlikely to result in optimal solutions.

Cost evaluations

Affordability is a fundamentally important consideration, even if it is not the only consideration in energy policy. Therefore, Peninsula Clean Energy recommends several additional analyses of the rate impacts of increasing penetration of greenhouse-gas free resources on customer bills, especially compared to the impacts of other approved costs.

First, future studies should translate the increases in portfolio costs to changes in total customer utility costs, as developed in the California Public Utilities Commission affordability proceeding R.18-07-006.[20] For example, the SB 100 Core scenario results in approximately $5 billion in additional annual total resource cost (TRC) in 2045, or a 6 percent increase over the 60% RPS reference in 2045.[21] Similarly, the no combustion scenario would cost $7.8 billion annually additionally or a 11.8% increase in portfolio costs. However, portfolio costs do not directly translate into increases in customer bills, because generation costs represent only a fraction of total customer bills. Thus, these portfolio costs should be converted into potential increases in customer bills, which should represent a smaller percent increase since only a

[20] CPUC Decision 20-07-032
[21] SB 100 study, at 19

portion of total utility bills are affected.[22] In addition, these costs would occur over the next 25 years, so the annual increase implied by these increases would be a small fraction of the total change over 25 years.

Second, these increases should be compared to other cost increases proposed and approved over the last several years. For example, system average electricity rates have increased by 6% over the period from 2005 through 2018. Recently, Pacific Gas & Electric Company. (PG&E) has requested an 8% one-year increase in electricity generation rates (not including transmission and distribution revenue requirements) for 2020 from the CPUC in its most recent General Rate Case.[23] Similarly, Southern California Edison Company (SCE) implemented a rate increase which would increase average customer rates by 6.2% this year.[24] The CPUC approved rate increases for San Diego Gas & Electric Company that would translate into a 0.7% increase for an average inland customer[25]. (While 0.7% appears small, if that rate were compounded annually over 25 years, customer bills would be 19% higher than they are today). Similarly, overall transmission and distribution system costs have increased from approximately $24 billion in 2008 to over $50 billion ten years later in 2018, a growth rate far faster than the cost increases contemplated in the SB 100 study.[26] The context of other rate increases than have been typical over recent decades provides important context for discussions about affordability and the impacts on customers.

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[22] For example, today generation costs are approximately 44% of total system average rates. (See California Public Utility Commission, California Electric and Gas Utility Cost Report (2019 AB 67 Report) April 2019, Table 1-9. Thus, a 6% increase in generation costs that make up 44% of the system average rate would increase the overall system average rate by 2.64%. Furthermore, a 2.64% increase over 25 years would occur if costs were to increase by 0.2% each year, compounded annually. Similarly, a 11.8% marginal cost of the no combustion scenario would represent an approximately 5.2% increase, or a slightly less than a 0.4% marginal compound annual growth rate.

[23] PG&E GRC Proceedings (Phase I), California Public Utilities Commission, https://www.cpuc.ca.gov/General.aspx?id=10432#:~:text=PG%26E%20had%20requested%20a%20rate,million%20for%202021%20and%202022.&text=PG%26E's%20revenue%20for%202019%20is%20%248.518%20million.

[24] Advice Letter 4172-E-B (April 6, 2020)

[25] CPUC Decision 19-09-051, at 2.

[26] See California Public Utility Commission, California Electric and Gas Utility Cost Report (2019 AB 67 Report) April 2019, Figure 2.1.

Third, the marginal annual cost increases implied by any higher generation portfolio costs should be evaluated using the metrics developed in the California Public Utilities Commission's Affordability Docket.[27] In particular, once generation cost increases are translated into annual customer utility bill increases, the importance of these bill increases should be evaluated using the affordability ratio for the 20th income percentile, as developed in D.20-07-032. The affordability ratio analysis has indicated that affordability concerns are particularly acute in a subset of approximately 10% of census tracts, which suggests addressing affordability will require targeted efforts to ameliorate affordability impacts rather than a generalized reductions in total portfolio costs.[28] This calculation should allow the Joint Agencies to evaluate the actual cost impacts of generation portfolio costs on vulnerable customers under an assumption that marginal cost increases are distributed equally to all income percentiles.

Fourth, the Joint Agencies should recognize there are more effective approaches for addressing equity than decarbonizing too slowly, which creates costs of its own and represents a poor strategy for addressing equity concerns. Rate increases (if any, since some studies suggest decarbonizing the grid will lower costs at levels of up to 90-95% renewable energy[29]) need not be distributed equally across all customers, but rather than expansion of programs such as CARE/FERA and other equity programs can be used to address impacts on the most vulnerable customers and communities. Addressing equity issues directly is preferable to trying to realize false economies that result in impacts of climate destabilization falling disproportionately on vulnerable frontline communities. Given the success of these programs to maintain affordability for the most vulnerable, the choice between decarbonization and affordability for the most vulnerable is a false one.

Social Costs of Carbon

Peninsula Clean Energy strongly supports the Joint Agency proposal to incorporate the social costs of carbon in future analyses. All costs of decarbonization must be evaluated against the rapidly accelerating costs of damage from climate destabilization. To date, total resource

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[27] CPUC Proceeding R.18-07-006, Order Instituting Rulemaking to Establish a Framework and Processes for Assessing the Affordability of Utility Service, see especially Decision 20-07-032.
[28] CPUC 2019 Annual Affordability Report (April 2021), Available at https://www.cpuc.ca.gov/2019-Annual-Affordability-Report/
[29] Goldman School of Public Policy, 2035 Report, available at https://www.2035report.com/

costs in both the Integrated Resources Proceeding and in the SB100 Final Report ignore the costs of damages from carbon emissions, focusing instead on lower compliance costs. If the estimates of these costs of climate destabilization are too low, models will deliver inaccurate results indicating higher than optimal carbon emissions.

The values used by RESOLVE undervalue the benefit of faster and greater decarbonization. In the Inputs and Assumptions document, the low-cost trajectory is indicated as the default value used in the capacity expansion.[30] However, these values implied are far lower than are reasonable considering other estimates, especially those developed by the White House Office of Management and Budgets that are reported in the SB 100 Study.[31] (See Table 1 below). By including compliance costs, but not social costs of carbon, these analyses essentially ignore the negative externalities that result from carbon pollution, which amounts to pretending those costs of impacts such as drought, sea level rise, and wildfire do not exist. In the current era, this is not a tenable position.

The appropriate social costs of carbon must both incorporate the higher range of impact costs, since California is highly vulnerable, and include an appropriate intergeneration discount rate. The compliance values used in RESOLVE derive from discount rates recognized as too high to be used to discount intergenerational transfers of the kind implied by climate destabilization. For example, the California Public Utilities Commission has adopted two discount rates for use in further studies: A rate of 3% reflecting the numerous costs not included in the IWG measures, including wildfire, and the weighted cost of capital.[32] As a result of the choice of discount rate, the values the Commission adopted for study in the Social Cost Test include both the average 3% discount rate values, but also the much higher "high impact" values which represent the high end of climate risk that may occur (See Table 1 below). Both sets of values adopted by the CPUC are sharply higher than the low valuations given in the RESOLVE model. At minimum, the Joint Agencies should recognize that there may be significant disagreement about the tolerance for climate destabilization damages, such as droughts and large-scale wildfires, as recognized in D.19-05-016. This suggests the Joint Agencies should

[30] Inputs & Assumptions – CEC SB 100 Joint Agency Report, California Docket 19-SB-100, TN# 234532, at 85
[31] SB 100 study, at C-3.
[32] D.19-05-016, at 42 and 46.

conduct sensitivity analyses with higher costs of carbon to assess the implication of assigning greater importance to climate damage to vulnerable communities in future years.

Table 1 – Representative Social Cost of Carbon Values Series under Different Discount Rates and Assumptions

		SB 100 from IWG			D.19-05-016	
	RESOLVE Default Values	Low (7.5% Discount Rate)	Med (5.0% DR)	High (2.5% DR)	3% DR	High Impact Values
2025		$16.44	$54.01	$79.85	$45	$138
2027	$21.66					
2030	$25.25	$18.79	$58.71	$85.72	$50	$152
2035	$32.55	$21.14	$64.58	$91.59	$55	$168
2040	$41.06	$24.66	$70.45	$98.63	$60	$183
2045	$54.09	$27.01	$75.15	$104.51	$64	$197

Evaluation of cost increases on decarbonization efforts.

The Joint Agencies are also in an excellent position to evaluate whether these cost increases would be sufficient to hamper decarbonization efforts. As noted above, the Joint Agencies have the data needed to translate these marginal generation cost increases into marginal customer bill increases. The Energy Commission has also evaluated how changes in customer bills alter rates of EV adoption. Recently, in the Integrated Energy Policy Report proceeding, California Energy Commission staff reported on data underlying projections of transportation decarbonization.[33] One component of that evaluation was an evaluation of a 20% increase in electric rate costs on EV adoption. At the electricity rate elasticities of EV demand identified by Energy Commission staff, these impacts of a 20% increase were modest. It should be a relatively straightforward effort to evaluate what impact a 2% or 4% or even 6% increase in

[33] California Energy Commission, IEPR Program Workshop, December 3,2020, Session 1: Transportation Energy Demand Forecast Update - Commissioner Workshop on Updates to the California Energy Demand 2019-2030 Forecast.

electricity rates would have on EV adoption to evaluate concerns that electricity sector decarbonization may affect EV adoption rates.

Load Flexibility

Peninsula Clean Energy also recommends the Joint Agencies expand exploration of demand-side resources and the value that these resources can provide in reducing costs. The Load Flexibility scenario provides a valuable start, but other academic studies, such as the NREL Renewable Futures Study[34] and the California Energy Commission's Deep Decarbonization study both suggest that increase load flexibility through Demand Response, Load Shifting and other demand side resources can greatly facilitate deeper levels of decarbonization at lower costs. Peninsula Clean Energy recommends the Joint Agencies deepen its examination these strategies and the business models and regulatory changes that would enable such strategies

Conclusion

Peninsula Clean Energy appreciates the opportunity to engage with the Joint Agencies on modeling to evaluate the outlines of the steps needed to decarbonize California's energy sector to safe levels.

Respectfully submitted,

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Peninsula Clean Energy

[34] Renewable Energy Futures Study, at xviii.