September 15, 2020

California Energy Commission
California Public Utilities Commission
California Air Resources Board

Re: SB 100 Report Should Adopt a 100% Clean Energy Standard by 2030
SB 100 Draft Results
Docket No. 19-SB-100

Environment California appreciates the opportunity to comment on the SB 100 Draft Results and the associated September 2 workshop. We appreciate the thorough collaboration among agencies and the effort that has gone into developing and presenting a range of scenarios, the workshop and those that preceded it, and the responsiveness the agencies have shown to stakeholder comments over the course of the past year.

State Should Accelerate SB 100 Goals to 2030, Aim for Zero Carbon Emissions by 2035

In that spirit, and amid the tragic and prophetic backdrop of another record-setting wildfire season that has engulfed the state in smoke and ash for several weeks, we write in strong support of the scenario that would achieve the goals of SB 100 by 2030. We were heartened to recently hear the Governor endorse accelerating the SB 100 and other climate targets. Accordingly, we urge you to:

- Adopt as statewide goals in the SB 100 report 100 percent zero-carbon energy (that is, SB 100 compliance) by 2030 and zero greenhouse gas emissions in the electricity sector by 2035.
- Quantify the social (at least climate, if not health) benefits associated with meeting these targets.
- Explore additional strategies to most effectively meet these targets with minimum costs and cumulative greenhouse gas emissions.
- Immediately take steps to support and deploy the technologies that will be needed to most effectively meet these targets. In addition to a lot more energy efficiency, distributed and utility-scale solar and batteries, these technologies include offshore wind, long duration energy storage, demand response and possibly other zero carbon firm resources.

Accelerated Goals Can Be Achieved Cost Effectively

Achieving the SB 100 goals by 2030 would come at very little, if any, added cost to the electricity system, while delivering enormous climate and health benefits. The scenarios show that accelerating the SB 100 goal to 2030 would add zero cost to the system through at least 2027, what looks to be about $3 billion in 2030, then equaling out again over the longer term so costs in 2045 are similar to scenarios with more delayed goals. In an electricity system where costs are expected to be nearly $50 billion in 2030 and about $65 billion in 2045, these potential costs would likely be well within the range of uncertainty, given unknown technology costs, energy loads, and other variables.

What's more, the SB 100 by 2030 scenario does not include additional strategies that would reduce costs further, including higher levels of energy efficiency, customer-based solar and storage, more rapid deployment of offshore wind, greater levels of demand response, and utilization of zero-carbon firm resources. In other scenarios presented, these technologies are shown to reduce capacity requirements, costs and emissions compared to the SB 100 Core scenario. And certainly, a more diverse mix of resources and higher levels of distributed generation will serve to boost energy and community resiliency. The joint agencies should similarly explore how these diverse resources can reduce costs and provide additional energy and climate benefits beyond what is already shown in the baseline SB 100 by 2030 scenario, and they should highlight those findings in the SB 100 report.

Much, if not all, of any potential incremental costs over the next decade could be covered by the value of cap-and-trade allowances. In 2030, even if allowance prices are at the floor, the value of electric utility cap-and-trade allowances would be about $1.8 billion.[1] Much of this value flows directly back to customers and would offset most, if not all, of any potential added costs associated with accelerating clean energy deployment.

Any remaining net cost, though small, would be less than the social and economic value of accelerating clean energy development. Compared to the current 46 $MMTCO_2$ planning target for the electricity sector in 2030, (conservatively) assuming emissions associated with achieving the SB 100 goals in 2030 would be similar to the reference demand scenario in 2045 (19 $MMTCO_2$), and using a social cost of carbon of $50/$MTCO_2$ in 2030 – the social value of climate benefits associated with this policy would be about $1.4 billion in 2030. Together, the value of cap-and-trade allowances and social value of greenhouse gas emission reductions is at least on par with the potential costs of an accelerated SB 100 timeline, and potentially, much greater. This is

to say nothing of the value of the additional and significant health benefits, which we appreciate is beyond the scope of this current modeling effort.

Compared to the more delayed scenarios, the results suggest that the state could meet the SB 100 goals by 2030 with relatively similar build rates for solar, wind and batteries, and perhaps without doing anything additional to other scenarios before 2027. In fact, the SB 100 by 2030 scenario has lower overall capacity requirements, and therefore more efficient resource utilization and lower land use impacts, than do the scenarios that achieve the SB 100 goals later. While this further suggests any near-term costs associated with an accelerated target could be negligible, the state should rather encourage near-term clean energy procurement and project development to help create jobs and recover from the economic recession, quickly add clean-energy resource capacity to boost energy resiliency, and accelerate climate and health benefits.

Indeed, various studies are now similarly finding that the state can largely decarbonize its power grid by 2030 at little or no cost. A working paper from Lawrence Berkeley National Laboratory found that California could cost-effectively achieve 95 percent carbon free electricity by 2030 using existing technologies.[2] Other recent studies have taken a national look, and found that we can achieve 90 percent zero carbon energy across the U.S. by 2035, using commercially available technologies, while creating half-a-million jobs and reducing electricity costs by 10 percent below current levels.[3] (This would essentially be the same as achieving SB 100 nationwide by 2035 – note that the SB 100 Core scenarios include 91-92 percent zero carbon generation.) A follow-up study found that 100 percent zero carbon energy is achievable across the U.S. by 2035 at no incremental cost to today's levels, using emerging technologies like green hydrogen.[4] The takeaway from these studies, and the joint agency modeling, is that we can quickly and cost-effectively achieve the statutory goals of SB 100, by 2030. The joint agencies should immediately pursue this objective.

All-in-all, a 2030 target for SB 100 would deliver net-economic benefits, significant climate benefits and otherwise looks a lot like scenarios where we further delay action on clean energy. Based on these scenarios and other studies, it's difficult to imagine why this wouldn't become the new policy of the state. The state should see this for what it is – a low-risk, high-upside, and absolutely necessary opportunity for reducing global warming pollution from the energy sector – and go all-in.

Energy Efficiency, Distributed Solar+Storage, Offshore Wind and Long-Duration Energy Storage are Key Technologies

Still, more work is to be done to enable optimal paths forward with minimal costs and emissions. In the SB 100 report, the joint agencies should commit to not only achieving the statutory goals of SB 100 by 2030, but also working to eliminate greenhouse gas emissions from the electricity sector in its entirety by 2035. We encourage you to explore additional scenarios that would achieve these objectives and include them in the SB 100 report.

For example, the scenarios show it becomes increasingly difficult to integrate more solar and wind with just batteries, and that significant greenhouse gas emissions remain – even in SB 100 compliant scenarios – without the use of more diverse resources and emerging technologies like demand response, offshore wind, long duration energy storage, and zero-carbon firm and dispatchable resources. Enabling greater levels of energy efficiency, customer and behind-the-meter solar, batteries and demand response will only reduce costs, boost resiliency, and improve utilization of existing grid assets, as highlighted in the scenarios. Additionally, every scenario modeled – except those that arbitrarily exclude it – appears to include offshore wind to its fully allowed capacity. And while the scenarios do not explore the range of technologies and potential associated with long duration energy storage, they show that zero-carbon firm and dispatchable resources (which includes long duration storage) can significantly reduce the capacity requirements and cost associated with meeting SB 100.

Agencies Should Take Steps to Further Support these Key Technologies

Accordingly, in its SB 100 report and future modeling exercises, we urge the joint agencies to highlight and further explore the role that these technologies can, and will, play in facilitating a more rapid, efficient transition to 100 percent clean energy with lower costs and emissions. In particular, we urge you to explore additional opportunities to deploy distributed energy, including customer solar-plus-storage, and scenarios and policies to use them to reduce emissions and improve the resiliency of the grid. It is also clear that the state needs to redouble its efforts around offshore wind. This resource can be deployed more quickly and to a greater capacity than included in the modeling, and the assumptions in the model should reflect that. Indeed, the state has already set a goal to have commercial offshore wind projects in California by 2026.[5] We think up to 3 GW could be deployed by 2030 and 10 GW by 2040.

Long duration storage is a key technology to further explore and support in the report, as well. A recent study found that it reduces the cost of systems dominated by wind, solar and batteries, and that reductions in the cost of long duration storage systems reduce the cost of an electricity system twice as fast as do reductions in the cost of

batteries.[6] Another study confirms this, finding long duration storage and other zero-carbon firm and dispatchable resources, could provide system flexibility, reduce curtailment and balance the grid at lower costs than retaining significant natural gas capacity that is rarely used.[7] The joint agencies should explore the opportunity these technologies offer to not just to meet the statutory goals of SB 100, but also look further to eliminate emissions across the electricity sector by displacing the ongoing role still envisioned for fossil-fueled plants to balance the grid, and to achieve zero carbon emissions sector-wide by 2035.

Finally, due to the identified promise and need for these emerging technologies, we also encourage the joint agencies to take immediate steps to begin supporting their deployment. This may include additional planning, demonstration projects, and targeted procurement for long duration energy storage and possibly other zero-carbon firm resources. Additionally, for offshore wind, the state should set short-term and long-term goals in the SB 100 report, accelerate funding to complete research related to potential environmental impacts, work with the federal government to enable projects off the California coast, and begin upgrading the transmission system and seaports to accommodate offshore wind projects.[8] And we encourage the state to build on the success of the Million Solar Roofs program, which has led to 9 GW of clean energy for residents across the state, and create programs that allow schools and other state facilities to add solar power and batteries, potentially up to 3 GW. The size of the load should be big enough to cover operations, and when not needed the energy could be sold back to the grid to create an income stream and an incentive for greater energy efficiency. During emergencies, the power could be used in local communities in case of a power shut off or for emergency response teams.

An Urgent Need to Act

As Governor Newsom toured more devastation from wildfires in Butte County last week, he shared the anger and exhaustion that we all do: “This is a climate damn emergency. This is real and it’s happening…Our goals are inadequate to the reality we are experiencing.” Please heed the Governor’s warning, and act with the great urgency that this moment requires of us.

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[1] Assuming a floor price, based on trendline inflation, of about \$30/MTCO_2 in 2030. https://ww2.arb.ca.gov/sites/default/files/classic//cc/capandtrade/ct_reg_unofficial.pdf

[2] Phadke, A. et al (2019) Cost-effective decarbonization of California’s power sector by 2030 with the aid of battery storage, Working Paper 009, Lawrence Berkeley National Laboratory,

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https://eta-publications.lbl.gov/sites/default/files/californiapowerdecarbonizationdraft_v6.pdf
[3] Phadke, A. et al (2020) 2035: Plummeting Solar, Wind and Battery Costs Can Accelerate Our Clean Electricity Future, Goldman School of Public Policy, UC Berkeley, June. http://www.2035report.com/wp-content/uploads/2020/06/2035-Report.pdf
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https://energyinnovation.org/wp-content/uploads/2020/09/Pathways-to-100-Zero-Carbon-Power-by-2035-Without-Increasing-Customer-Costs.pdf
[5] COPC (2020) Strategic Plan to Protect California's Coast and Ocean 2020-2025, California Ocean Protection Council, February.
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[6] Dowling, J.A. et al (2020) Role of Long-Duration Energy Storage in Variable Renewable Electricity Systems, *Joule,* August 6. DOI: https://doi.org/10.1016/j.joule.2020.07.007
[7] Phadke, A. et al (2020) 2035: Plummeting Solar, Wind and Battery Costs Can Accelerate Our Clean Electricity Future, Goldman School of Public Policy, UC Berkeley, June. http://www.2035report.com/wp-content/uploads/2020/06/2035-Report.pdf
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