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Comments of Environmental Defense Fund

Additional submitted attachment is included below.

Comments on the Senate Bill 100 Draft Results
Docket # 19-SB-100

Environmental Defense Fund (EDF) appreciates the opportunity to submit comments in response to the informative results presented at the September 2, 2020 Senate Bill (SB) 100 workshop. EDF applauds the robust efforts made by the joint agencies to date, and offers these comments in hopes of achieving a carbon neutral electric grid in a reliable and affordable manner.

Procurement for a carbon neutral electric grid is different than clean energy procurement to date

Prior to SB 100, procurement of clean energy generation was on a "least cost, best fit" approach. The "fit" was into the existing electric grid and portfolio. New resources could be and existing fossil could be displaced. The modelling frameworks assumes that this will be the same process. However, we have to recognizes that the goals of SB 100 are unlike prior clean energy procurement efforts. The goal is to eliminate carbon emissions, not just to meet generation shortfalls or replace some fossil generation.

For example, as stated during the workshop, several technologies were either excluded or discounted because they were not commercially available or there was insufficient cost data. EDF believes this is the wrong approach. SB 100 has new requirements (including but not limited to both a 60% renewable portfolio standard and the other 40% being carbon neutral._ That 40% "other" category underscores the need for long duration, clean, dispatchable power resources. These technologies are available but are not widely commercially adopted yet, so the need for clean firm power is not being accurately reflected in the dispatch results.

EDF is concerned that the modelling results across all of the scenarios overly favor solar generation plus short duration (~4 hour batteries). EDF's internal modelling indicates that while we will need significant amount of these resources, that it is inadvisable for them to be the exclusive sources of generation.

Other clean, firm power technologies should be explicitly considered, including but not limited to:

- Expanded use of geothermal
- Long duration (seasonal) energy storage
- Utilizing the existing combined cycle generation fleet with carbon neutral fuels (including hydrogen, biomethane)
- Carbon Capture Utilization and Storage

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- Import of out of state nuclear
- Other carbon-free fuels produced from net-zero carbon processes.

EDF makes these suggestions for two reasons. First, is *affordability*. California has a demonstrated record of resource diversity providing ratepayer value. This level of resource diversity is not reflected in the results. (EDF notes that one of the main conclusions on Slide 42 is that portfolio diversity is valued by the model, but the constraints limit this diversity significantly, which impacts affordability.) Second, *reliability*. EDF is concerned that absent inclusion of these resources at scale that there will be periods of dark, cloudy and windless days in the winter where California would have to over-build solar + short duration storage to such a level that it would present significant operational challenges during the rest of the time. This will be even more relevant as California moves to electrify its heating loads and we increase winter electric demands to provide these heating services. EDF contends that if we employ clean firm power technologies that the electric grid will not need to retain the fossil fleet (absent the CCUS or the biofuels options) and is concerned that there is an assumption that fossil is the only way to maintain reliability. EDF encourages the Energy Commission to reject this implicit assumption.

As we stated in our verbal comments during the workshop, the goal right now should be to send a clear market signal for the attributes that we want on the time horizon that we need – and not to suppose that existing technologies will suffice. EDF observes that if SB 100 wanted to be limited to commercially available technologies, that the 60% threshold would have been made much higher. EDF agrees with the staff conclusion on slide 42 that "innovation in zero carbon technologies" will reduce costs – but think that a significant amount of cost reductions could be experienced now if the modeling assumptions were changed.

Relatedly, EDF agrees with staff that high integrity biomethane is not widely available, but it is commercially available and there is an active market for it within the Low Carbon Fuel Standard for transportation uses. EDF does not know if this market will remain or change, but suggests that at least one of the modelling scenarios consider how these fuels could be integrated into the electric grid. Using the fuels in hard-to-electify sectors such as heavy industry and electric generation may be more viable than in residential cooking and heating. For example, EDF observes that the Energy Commission does not consider how biofuels could be used in combined heat and power applications (to satisfy industrial heat needs) and the corresponding electric output from those generators. The "no combustion" scenario (see slide 32) does not fully think through how the industrial heat needs will be met if we remove the ability to export the electric generation and if there would be an overall emissions *increase* if those facilities just used a stand-alone industrial boiler. By eliminating "drop fuels" from the results, the Energy Commission cannot consider these types of situations.

With respect to long duration energy storage, EDF is concerned that the models are using too specific of a reference case (pumped hydro) and again are not considering other long duration energy storage technologies. The goal should be to have multi-day to seasonal level storage available to help complement the short duration energy storage (4 hour duration).

EDF agrees with the conclusions that demand flexibility will be critical, along with properly aligned time-of-use periods to match new load growth with generation. EDF encourages the Energy Commission to more granularly consider *how* new load will be added to the grid as we electrify other parts of the economy. Not all load will be equal, and we may be creating new peak/shoulder periods that will influence demand, especially with winter heating and night-time electric truck charging. Understanding when during the day these new electric demands will appear on the grid will inform what types of resources will need to be procured and the amount of demand flexibility required.

Last, EDF agrees that "sustained" build out rates will be required. The pace of that build out requires major capital. For electric generation assets that do not fit neatly into one service territory, the state may want to consider ways of doing fractional contracting, or employing a central coordinating buyer and allocate costs to volunteering participating load serving entities. The Energy Commission should recognize that building out these resources will take time, and there is very little harm in "front loading" expected build out – reaching our goals early is okay, but delaying changes to the electric grid significantly will eliminate any flexibility and increase the risk of failure, and also increase costs to ratepayers. EDF suggests that all procurement targets consider investment risk and failure/delays as critical.

Once again, EDF thanks the staff of all of the joint agencies for their time and efforts and hope that these comments are useful.

Sincerely

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