DOCKETED	
Docket Number:	19-SB-100
Project Title:	SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future
TN #:	234767
Document Title:	SDGE Comments on SB 100 Modeling Results Workshop Comments Final
Description:	N/A
Filer:	System
Organization:	SDGE
Submitter Role:	Public
Submission Date:	9/15/2020 4:42:47 PM
Docketed Date:	9/15/2020

Comment Received From: Tim Carmichael
Submitted On: 9/15/2020
Docket Number: 19-SB-100

SDGE SB 100 Modeling Results Workshop Comments Final

Additional submitted attachment is included below.

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September 15, 2020

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

Joint Agencies: California Energy Commission, California Public Utilities Commission, and California Air Resources Board

RE: San Diego Gas & Electric Company Comments on the SB 100 Joint Agency Report's September 2, 2020 Draft Modeling Results Workshop; Docket No. 19-SB-100

Dear Commissioners and Board Members:

San Diego Gas & Electric Company (SDG&E) appreciates the opportunity to submit comments regarding the September 2, 2020 Draft Modeling Results Workshop on the Senate Bill 100 (SB 100) Joint Agency Report.

Recent events make it abundantly clear that bold action is necessary to address climate change. We are seeing unprecedented weather and fire patterns every year and spending billions of dollars on climate resilience activities that are designed to protect us from — but ultimately do not reduce — the threats posed by climate change. SDG&E is committed to enabling and accelerating the transition to zero-carbon electricity in every feasible way on behalf of our customers, the communities we serve, our employees, our families, and ourselves.

Recent events also make clear that this transformation must be accomplished without compromising reliability, flexibility and affordability. The goals set forth in SB 100 call for a complete transformation of the way energy is generated, delivered and consumed. Although the exact path to 100% renewable and zero-carbon electricity remains unknown, recent blackouts confirm that our path must always assure an adequate and flexible energy supply. Similarly, evidence of severe and systemic economic disparities confirms that we must maintain affordability. And we must do these things even as we push to *accelerate* decarbonization.

SDG&E has prepared the enclosed comments in an effort to support achieving the goals of SB 100. In sum, SDG&E urges the Joint Agencies to incorporate experience from California's recent rolling blackouts and more fully analyze the reliability, affordability and flexibility of various scenarios. SDG&E also requests that the Joint Agencies (i) measure the affordability impact of each SB 100 scenario modeled, (ii) remain technology neutral as a mix of solutions will likely reveal opportunities for reliability and affordability, and (iii) examine opportunities to decarbonize and retain strategic components of the gas fleet and gas infrastructure to ensure reliability. SDG&E believes that this additional analysis will enable the Joint Agencies to put forward a policy framework to achieve the goals of SB 100 without sacrificing reliability or affordability.

SDG&E looks forward to working collaboratively with the Joint Agencies to accelerate the transition to 100% renewable and zero-carbon electricity in a reliable, affordable and sustainable way.

Sincerely,

/s/_Miguel Romero

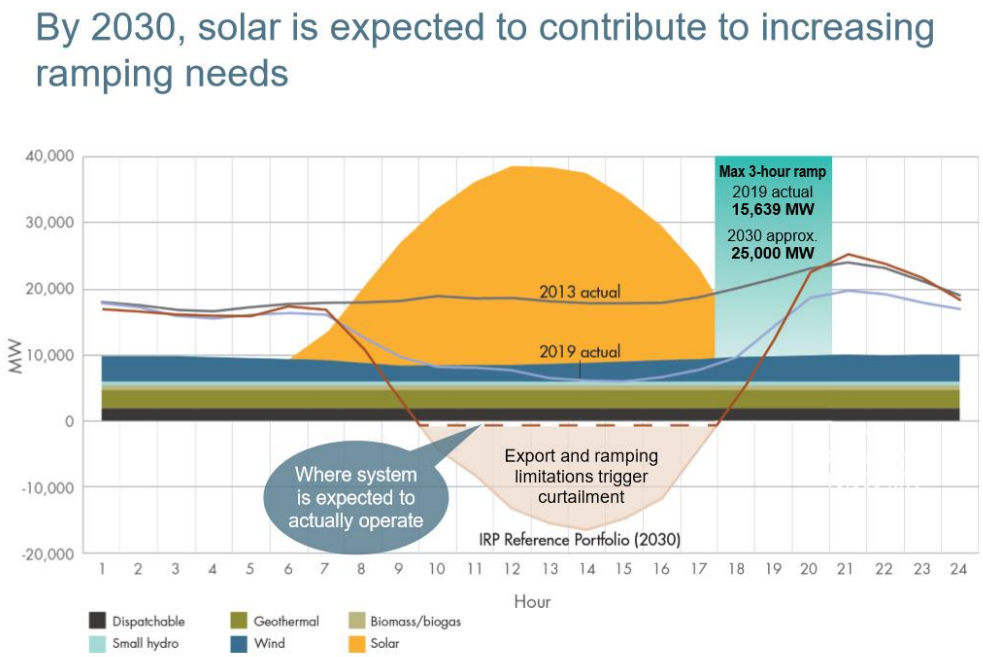
Miguel Romero
Vice President
Energy Supply

TECHNICAL COMMENTS SUBMITTED BY SDG&E

SB 100's success hinges on the grid's ability to reliably deliver carbon free energy.

- **Modeling falls short in capturing multi-day and seasonal reliability needs.** At the September 2, 2020 Draft Modeling Results Workshop (Workshop), presenters asserted that "SB 100 is achievable with existing technologies." SDG&E is concerned about the viability of this statement. To appropriately forecast California's electric grid needs, modeling must cover multiple days or months. Yet RESOLVE is limited to a 24-hour dispatch window. The daylong time period limitation is a substantial shortcoming of the modeling that does not allow SB 100 modeling to capture long-term energy needs and results in the overreliance on short-term batteries and the underutilization of resources that can provide power long-term. This imbalance will lead to unviable portfolios and result in incorrect costs and correlated rate impacts. The modeling should therefore be expanded to more accurately reflect operational needs.

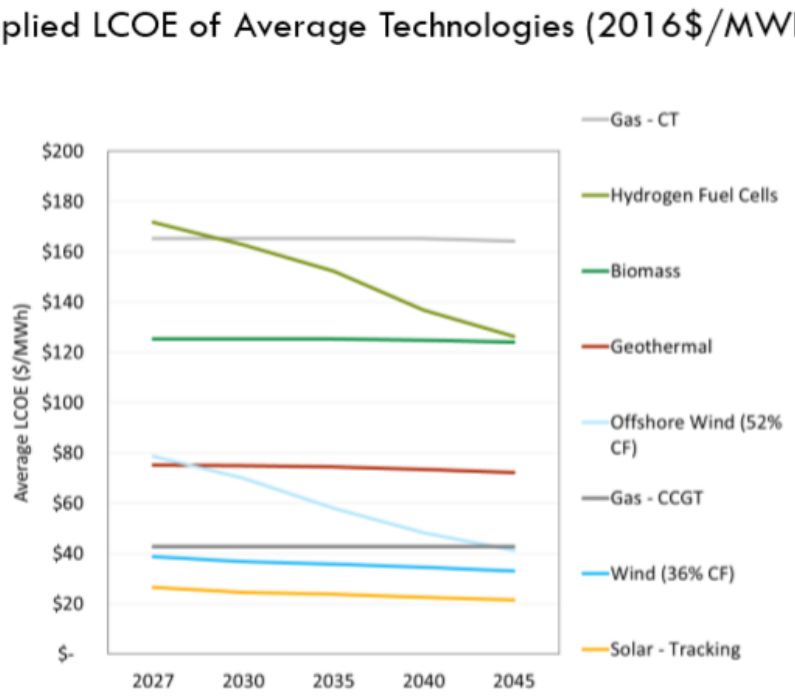
- **The SB 100 framework should acknowledge that to ensure reliability, steep ramping needs support from dispatchable resources and gas infrastructure.** The Workshop showed that if gas plants are retired under the no combustion scenario, they will have to be replaced with zero carbon firm resources in order to prevent reliability issues. CAISO's presentation at the SB 100 Modeling Inputs and Assumptions Workshop on February 24, 2020 explained the need for dispatchable resources to preserve reliability. Using the Integrated Resource Plan (IRP) Reference Portfolio for 2030, CAISO showed that a system with a large concentration of solar requires very high ramping capability, as illustrated in the chart below. CAISO also asserted that current battery technology cannot consistently meet these ramping needs due to multiple-day renewable droughts. Based on this analysis, CAISO recommended that dispatchable resources and gas transmission infrastructure be strategically maintained. Declines in resource diversity could be a contributor to shortages and curtailments, such as seen recently in California.



Experts like Dr. Jane Long of the California Center for Science and Technology explained that electrification will further exacerbate the ramping issue illustrated in the CAISO chart above. For example, at the July 21, 2020 Track 1B workshop on Gas Reliability, Dr. Long expressed concern that electrification of heating would create a "perfect storm" on the electric system when electrified winter heating relies more on renewable energy when renewables have only 60-80% of their capacity. Under those conditions, ramps would be even steeper and the need for dispatchable resources in those hours even greater. To support dispatchable resources to meet increased peaks and ramping, the maintenance and capability of the gas system will be critical, even as total throughput for natural gas declines. The need for natural gas and its related infrastructure makes them critical partners to successful renewable integration and will continue to increase as reliance on intermittent supply resources increases.

- **Cost Comparisons should include a reliability component.** SDG&E is concerned about cost comparisons shown in the Implied Levelized Cost of Energy (LCOE) of Average Technologies chart within the Workshop presentation (shown below). Specifically, although the chart implies comparability of technologies, it fails to account for reliability. The energy sector has been focused on cost parity between conventional resources and renewable resources for the last decade. This is an important metric for the global pursuit for climate change solutions. Once a grid passes a certain level of renewable penetration, such as in California, however, comparing straight renewable costs to dispatchable resources is no longer helpful. Specifically, the comparison creates the erroneous impression that 100% renewable is attainable at reduced costs by selecting the cheapest resource: solar energy. Additionally, once renewable penetration at the levels experienced in California creates a steep demand for ramping, as shown in the CAISO chart above, the capacity for cheap renewable energy without storage has been

met. In order to add reliable energy to the grid, additional intermittent resources need to be paired with technology that allows for electricity or fuel storage, otherwise, more intermittent resources will simply intensify the ramp-up problem and make matters worse, not better. Thus, cost comparisons for California should show costs of solar paired with storage and wind paired with storage in order to be compared to dispatchable resources. Alternatively, the modeling could include Effective Load Carrying Capability (ELCC) in the cost comparison. Pairing intermittent resources with storage will improve the transparency of the SB 100 efforts and recognize the importance of including reliability. It provides a better comparison of costs in that it includes dispatchability.



- **100% Retail Sales is the right path for Core Scenarios.** SDG&E is encouraged that the Joint Agencies continue to interpret SB 100 as being applied to 100% Retail Sales and not to losses. Including losses in the Core Scenarios would place more pressure on reliability. However, we urge the Joint Agencies to reconsider and reject the Study Scenarios that aim to apply SB 100 to both Retail Sales and losses due to its impact to reliability.

- **Modeling should include gas fleet retention costs.** The Workshop presentation stated that "Natural gas capacity is largely retained, but fleet-wide utilization decreases by 50% compared to a 60% RPS future." This statement recognizes the need for natural gas plants to support the reliability of California's electricity grid. The modeling should thus include forecast costs necessary to maintain the gas fleet's new "on-call" status. Failing to include these cost estimates will underestimate the SB 100 costs of supporting a portfolio that consists primarily of intermittent resources.

The Joint Agency Report (Report) should submit an implementable solution based on modeling efforts that incorporate all costs and includes affordability.

- **SB 100 modeling scenarios must take into account realistic transmission costs. Transmission impacts will not be quantifiable until resources are identified at the local level.** Transmission specific resources must be identified in local areas to accurately identify the impacts. Until that modeling is performed, the transmission costs associated with the delivery of power that would be needed to support the resource mix will be understated. The Joint Agencies need to ensure that modeling of new capacity also includes necessary incremental transmission costs. Another area of cost concern would be the Local Capacity Requirements (LCR). LCRs are calculated by turning down generation internal to a transmission-constrained load area. This is done until the first constraints (overload, voltage condition, etc) are reached. The resulting generation level is called the LCR. As fossil fuel units are retired under SB 100, this capacity will be replaced by storage and/or transmission upgrades. These will be significantly more expensive for the ratepayer.

  The Joint Agencies should consider performing a power flow model to incorporate transmission constraints as well as the capacity expansion model. Battery storage modeling presents its own challenges that need to be considered. Power flow modeling is necessary to ensure batteries are charged in hours that energy is available. In addition, not allowing the battery to charge will make it unavailable in later hours when the battery output was expected/scheduled. Power flow modeling would also help more accurately model new build wind and solar candidate resources which will, as stated in the Workshop, require hundreds of square miles of land which will necessarily be located far from load and will thus need transmission lines for delivery.

  Section 5 454.53 (b)(2) of SB 100 requires the Joint Agencies to "[p]revent unreasonable impacts to electricity, gas, and water customer rates and bills resulting from implementation of this section, taking into full consideration the economic and environmental costs and benefits of renewable energy and zero-carbon resources." Realistic cost inputs, assumptions and modeling must be utilized to realistically estimate cost, affordability and reasonable impact to rates. Without these fundamental considerations clearly articulated and used, it is unclear what the Joint Agencies consider to be a "reasonable" impact on rates if the infrastructure needed to support the resource mix is not fully incorporated. Simply quantifying the cost, as was done in the Workshop, does not answer the essential question, "is the solution affordable and reasonable?"

  Affordability and cost are not the same thing. Stakeholders and the JA have the additional problem that "unreasonable" was left undefined. Without clarity on this point, it is difficult to know whether the requirement in Section 5 454.53 (b)(2) of SB 100 is met.

- **Including rate impact assumptions in the model can help prevent from selecting a portfolio that would result in "unreasonable" impacts to rates, and energy bills that customers cannot afford**. There are many technologies and resource types that can be used to further SB 100 goals, and some may lead to unreasonable impacts to customer rates and bills if rate impact assumptions are ignored. It is imperative that the model be able to balance the investment in technology solutions that will help the state meet the SB 100 goals, while ensuring that impacts to customers' rates and bills are reasonable and fair to all customers and do not create cross-subsidies or cost-shifts. This point is critical for assuring an equitable transition to zero-carbon electricity.

  Additionally, it is imperative that rate impacts from SB 100 be included in the modeling because other programs and requirements, such as grid resiliency and fire hardening,[1] may also put upward pressure on rates. Compounding these rate pressures will affect all customers, especially customers in disadvantaged communities (DAC) and communities of concern.

  It is also critical for transportation and building electrification because the success of electrification is inversely linked to the price of electricity. Accordingly, affordability is key to help lower emissions and air pollution in other sectors. The Joint Agencies should keep this qualitative goal in mind when modeling affordability. Lastly, given the ongoing COVID-19 pandemic, SDG&E believes that an affordability assessment will be especially important as many Californians, particularly vulnerable populations, are experiencing additional financial burdens. Successful modeling of SB 100 requires a thoughtful balance to minimize customer costs while meeting State policy goals.

The pathway to SB 100 requires a framework that supports flexibility and technology inclusivity.

- **Hydrogen fuel cells, biomass and geothermal, natural gas generation (NG) coupled with carbon capture and sequestration (CCS), renewable natural gas (RNG) generation, and hydrogen as a drop-in fuel should be included as Candidate Resources in all Scenarios.** SDG&E supports the Core Scenarios and its demand and resource sensitivities. SDG&E is also encouraged that generic firm resources and others were included in the Study Scenarios but urge the Joint Agencies to make efforts to find pricing for technologies that were excluded from being Candidate Resources in the Core Scenarios. As example, E3 performed a study using a West version of its US PATHWAYS model and performed a deep dive into the potential role of hydrogen as long-duration storage within the electricity sector and examined the cost of hydrogen production and storage.[2]

[1] For example, SDG&E has spent ~ $1.5 billion over the last decade on grid resiliency, fire hardening our system, and using advanced technologies to reduce climate risk and improve public safety.
[2] https://www.ethree.com/wp-content/uploads/2020/07/E3_MHPS_Hydrogen-in-the-West-Report_Final_June2020.pdf

According to the Modeling Framework and Scenario Overview, "only commercialized technologies with vetted and publicly available cost and performance datasets were included for core scenarios." SDG&E supports the inclusion of Offshore Wind (OSW) as a Candidate Resource in Core Scenarios, even though similar to drop-in fuels, it is not yet commercially available in California. Other similarly situated technologies such as those mentioned above should be equally considered as OSW and the model should be allowed to select from all potential resources for every scenario. Waiting until 2025 to incorporate these technology types into the core scenarios would be a disservice to CA. Given the magnitude of the climate challenges we face today, all viable technologies should be on the table.

- **Keep Natural Gas plants and infrastructure to ensure reliability.** SDG&E is concerned with continued calls to eliminate combustion. In panel 3 of the Workshop, for example, Roger Lin from the Disadvantaged Communities Advisory Group claimed that the language of SB 100 does not mention combustion as acceptable. But he misreads the statute and, more fundamentally, the complete elimination of combustion, including for example natural gas plants and infrastructure, would reduce the flexibility and availability of resources to achieve SB 100 goals in an affordable manner. Simply put, without combustion, multiple viable *zero-carbon and potentially negative carbon* solutions are categorically eliminated. For example, the outright elimination of combustion would foreclose natural gas generation with carbon capture and sequestration (CCS), renewable natural gas (RNG) generation, and hydrogen (H2) generation. These are important tools that can help California achieve its zero carbon goals while meeting the reliability standards of the electric grid in an affordable way. Removing these flexible resource types would decrease the diversity of resources. Fewer choices typically lead to higher costs and reduced resource availability, thus potentially jeopardizing the robustness and stability of the electric system. As illustrated on slide 36 of the No Combustion Study Scenario costs, the Report's modeling shows increased costs. A no combustion scenario can be useful as a bookend to the most expensive case for achieving carbon neutrality but is not a realistic scenario given the importance of balancing affordability and reliability.[3]

  The graph below, from the IEPR Executive Summary shows the multiple sectors that contribute to emissions/air pollution. As can be seen in the study's results, the Electric Sector contributed fewer criteria pollutants in 2012 compared to other sectors. And in the 8 years since the reporting year of this study, the Electric Sector has continued to reduce more emissions and criteria pollutants due to the Renewables Portfolio Standard (RPS) and Cap-and-Trade (C&T) programs causing generators to run less.

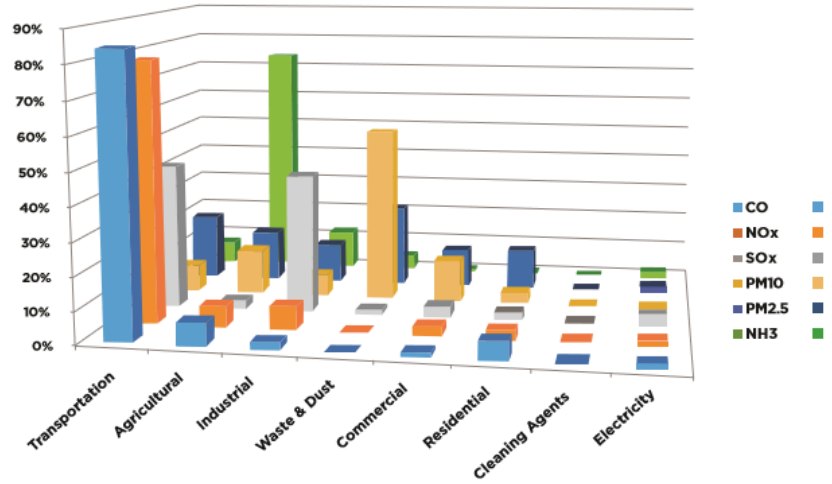
  The IEPR graph suggests that greater reductions in air pollution for DACs and for all Californians can be achieved through the transportation and agriculture sectors. Methane emissions from the agriculture sector – the highest emitter of methane of any sector – can be captured and reused as RNG or in compressed natural gas (CNG) vehicles. And because of the High Global Warming Potential of methane, using it for any of these

[3] Though as previously noted, SDG&E believes the model's cost estimates do not incorporate the full costs of transmission needed to ensure delivery of resources.

energy needs results in negative emissions. For its part, the transportation sector is the highest emitter of carbon emissions and of NOx and SOx particulates. Some effective ways to help lower both emissions and criteria pollutants from the transportation sector include transportation electrification and the use of hydrogen, RNG, or CNG as fuel for vehicles. SDG&E and other utilities are helping this effort through multiple transportation electrification programs. Another way the electric sector will help reduce emissions and criteria pollutants is by providing low-carbon electricity for building and appliance electrification programs. The electric sector will continue to help in the effort for lower carbon and cleaner air.

Figure ES-3:

California Air Quality Emissions per Sector (2012 Estimated Annual Average)



Source: California Energy Commission using California Air Resources Board data

- **SB 100 Joint Agency Report should be directional only.** As such, programs such as the Integrated Resource Plan (IRP) should utilize the SB 100 report as directional and not prescriptive. Thus, any technologies that were not selected in a SB 100 reporting cycle should not be categorically eliminated in the IRP (or other programs.)