

October 22, 2021

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RE: Pacific Gas and Electric Comments on the Scenario Concepts Technical Workshop for the 2022 Scoping Plan Update

Pacific Gas and Electric Company (PG&E) appreciates this opportunity to comment on the California Air Resources Board (CARB)’s September 30, 2021 Draft Scenarios Technical Workshop. PG&E appreciates the transparency in the Scoping Plan Update process thus far, and looks forward to additional technical workshops on the modeling assumptions and revised scenarios before the modeling commences. PG&E’s more detailed comments on the draft alternatives (scenarios) and assumptions are provided below.

General Comments

We encourage CARB to provide the same level of detail for its reference scenario as it has for its draft carbon neutrality scenarios. As CARB has indicated in prior workshops, there have been important policy and economic changes since CARB’s 2017 Scoping Plan modeling, and updating its reference case will be helpful for all stakeholders in understanding an up-to-date “current policy” emissions trajectory. We encourage CARB to provide its draft reference scenario assumptions in advance of its next scenarios workshop to facilitate timely stakeholder feedback.

CARB appears to be constructing scenarios differently than it did in its 2017 Scoping Plan, which were organized around policy packages. The current proposed scenarios all look like Alternative 1 (all prescriptive regulations) from 2017. This apparent change to the technical modeling approach deserves greater explanation from CARB. In particular, we encourage CARB to provide greater transparency in the linkages between the technical modeling choices and the policy packages that are under consideration for the 2022 Scoping Plan. While the modeling team has made clear that E3 PATHWAYS does not model policies directly and CARB has stated that the Scoping Plan is not the venue for changes to regulatory programs, the Scoping Plan remains important for establishing California’s high-level policy direction for achieving its

ambitious greenhouse gas (GHG) targets. As such, we encourage CARB to help stakeholders understand the high-level policy direction consistent with implementation of each of its proposed scenarios. For example, CARB could modify its proposed pathways scenario modeling assumptions table to include the key policy(s) that would drive the technology penetration levels presented in the table if that scenario were to be selected as the Scoping Plan preferred scenario. We believe this transparency is needed before the scenario modeling is finalized so that stakeholders can provide informed feedback about the draft scenarios under consideration.

PG&E encourages CARB to include a scenario like the one it ultimately selected in the 2017 Scoping Plan: a mix of flexible sector-specific standards and the economy wide cap-and-trade. It is not clear whether that scenario is already included in one of CARB's four draft scenarios or whether a new scenario would be needed to represent that approach.

Comments on Draft Scenario Inputs

A. 2030 GHG Goals

PG&E recognizes that in the scenarios seeking to reach carbon neutrality by 2035, the State's 2030 targets would need to be achieved earlier. However, PG&E would like to note that acceleration of the 2030 targets will entail overcoming significant hurdles in terms of ability to plan, permit and construct the new projects and infrastructure necessary for the required technology transition across most sectors.

B. Electric Sector GHG Targets

PG&E does not oppose considering a range of electric sector GHG targets and trajectories as policy sensitivities but emphasizes that the state is already on track to achieve a 38 MMT electric sector GHG target by 2030. As stated in PG&E's comments on the California Public Utilities Commission (CPUC)'s Administrative Law Judge (ALJ) Ruling Seeking Comments on the Proposed Preferred System Plan, PG&E believes that the state should focus on addressing gaps in its current planning efforts first.¹ Such areas which require additional work include the establishment of a reliability metric based on a stakeholder process with robust analysis, location specific resource requirements, study of new transmission costs, and study of potential transmission congestion and renewable curtailment due to the magnitude of expected renewable capacity to come online.

Setting GHG targets and trajectories that are more aggressive than existing requirements, without addressing the gaps above, could lead to required levels of new low and zero-emission generation and storage resources, extraordinary levels of demand side management needs, and unprecedented levels of infrastructure build-out that would be unrealistic to

¹ PG&E Opening Comments on ALJ Ruling Seeking Comments on the Proposed Preferred System Plan, September 27, 2021. Available at http://prccappiiswc002/Docs/ElectricIntegratedResourcePlanningOIR/Pleadings/PGE/2021/ElectricIntegratedResourcePlanningOIR_Plea_PGE_20210927_671930.pdf

achieve. The trajectory of statewide GHG emissions reductions must be managed to support customer affordability.

C. Transportation Assumptions

In line with its comments about the scenarios proposed at the workshop in August, PG&E emphasizes the importance of coordinated and comprehensive planning for the charging infrastructure that will be needed to meet each vehicle segments' charging needs. Regardless of the specific transportation goals set forth in this Scoping Plan update, the charging needs of the transportation sector will be substantial and varied in type and require proactive planning and investment by all market players.

Light-duty passenger vehicles represent the largest portion of emissions from the transportation sector and will be a critical part of achieving any emission reduction goal in the sector and across the state. Zero Emission Vehicle (ZEV) model availability for light-duty (LD) vehicles continues to grow, making the assumptions for LD ZEVs in Alternatives 2 through 4 ambitious but plausible. However, PG&E believes there is more uncertainty about the feasibility that 100% of LD vehicle sales will be ZEVs by 2025 with no Plug-In Hybrid Vehicle (PHEV) sales after 2030 as shown in Scenario 1. Of the approximately 2 million light-duty vehicles sold each year in California, ZEVs make up 10.6%.² Reaching a 100% ZEV sales target by 2025 means that ZEV sales in California increase nearly ten-fold in four years. Vehicle providers may not have the manufacturing capability to meet the sales needs of the light-duty sector with only ZEVs by 2025, which creates uncertainty on the plausibility of that emission reduction pillar in Scenario 1. PG&E is supportive of modeling the other VMT, fuel economy, and LD ZEV sales assumptions in the scenarios.

Similarly, while PG&E believes that the assumption of 100% medium-duty/heavy-duty (MD/HD) ZEV sales across the four alternatives is ambitious (especially by 2030) but plausible, there is significant uncertainty about the feasibility of the 100% ZEV truck operation assumptions, in particular in that it suggests early retirement of a substantial number of non-ZEV vehicles. PG&E is hesitant about this assumption, particularly by 2035, due to the more complex and heterogenous needs of the MD/HD vehicle segment. ZEV sales requirements and fleet electrification requirements may spur production of sufficient MD/HD ZEV models available to meet the majority of fleets' needs, but there will likely not be enough suitable ZEV models to meet the needs of specialty fleets that include custom and/or emergency vehicles for example. Additionally, there are significant political challenges to requiring early retirement of fleet vehicles, which would be necessary to meet the 100% ZEV operation targets assumed in Scenarios 1 and 2. PG&E recommends the truck operation

² California Energy Commission. Zero Emission Vehicle and Infrastructure Statistics. <https://www.energy.ca.gov/data-reports/energy-insights/zero-emission-vehicle-and-charger-statistics>. Data retrieved October 13, 2021.

assumption be qualified to allow for some percentage of the truck fleets to remain non-ZEV to make the modeling of the scenarios more informative and plausible.

Lastly, PG&E questions the value of modeling the assumption that 50% of aviation fuel demand and not all of ocean-going vessel fuel demand is met in 2035 in Scenario 1. Given the ambitious carbon neutrality target in Scenario 1, PG&E understands the importance and challenge of decarbonizing aviation and ocean-going vessels but is hesitant about the assumption that over 50% of the fuel demand from those two sectors will not be met. This would have significant ramifications for the State and global economy, and it may be more valuable to assume a smaller amount of fuel demand is not met and also include higher levels of fuel cell penetration.

D. Building Sector

New Residential and Commercial Buildings

The years proposed in the draft scenarios align with expected Title 24 Part 6 update cycles, and therefore are appropriate. For Scenarios 2 and 3, CARB may want to consider that all-electric requirements for commercial buildings may be phased in after all-electric requirements for residential buildings (i.e., all electric appliances in residential buildings beginning in 2026 and all electric appliances in commercial buildings beginning in 2029).

Existing Residential and Commercial Buildings

For Scenario 1, it is uncertain how all electric appliances would be retrofitted by 2035. What mechanism achieves early retirement of these appliances? As seen in the 2019 Residential Appliance Saturation Survey, electric space and water heating appliances only represent up to approximately 10% of current building stock in California.³ There is therefore some uncertainty that 100% early retirement of combustion appliances by 2035 could be achieved without an external policy lever. It would be more reasonable to assume replacement upon burnout (through a point-of-sale gas appliance prohibition or other similar mechanism) for all scenarios.

If CARB's State Implementation Plan proposes a 2030 point-of-sale ban on gas appliances, that date should be reflected in the scenarios here, with the most conservative Scenario (4) instead being a 2030 timeline for all appliance sales to be electric, and all other Scenarios (1-3) looking at earlier phase outs.

PG&E would also like to confirm that "electric appliances" is inclusive of all appliances and not just water heating and space heating appliances. From the perspective of future gas rates, it will be important to think through strategies to fully electrify residential and commercial buildings. If uses such as cooking are exempt, PG&E would still need to invest

³ 2019 Residential Appliance Saturation Survey available at: <https://www.energy.ca.gov/publications/2021/2019-california-residential-appliance-saturation-study-rass>

in maintenance of the natural gas system with a much lower throughput (i.e. revenue). This could cause rates to become unstable, especially for low-income customers who are not able to fully electrify their homes.

Building and Industrial Energy Efficiency

For building energy assumptions, it is not clear from the workshop presentation nor the Proposed PATHWAYS Scenario Modeling Assumptions document why CARB chose the Integrated Energy Policy Report (IEPR) Mid-High (electric) and Mid-Mid (gas) cases. Similarly, for industrial energy efficiency, it is not clear why CARB selected to model an energy demand reduction of 6% relative to the IEPR Mid-Mid case. PG&E requests additional information from CARB on the reasoning behind these choices so that stakeholders can provide input on the appropriateness of using these cases for purposes of the Scoping Plan modeling, especially since these assumptions will be constant across all scenarios.

E. Low Carbon Fuels (for transportation, buildings, and industry)

CARB's Scenario Modeling Assumptions document states that in Scenario 1, renewable natural gas (RNG) would be used to produce hydrogen for electricity production using fuel cells to support buildings and industry. Is it CARB's assumption that only RNG would be used for hydrogen production or would hydrogen from other sources also be eligible (i.e. from electrolysis, gasification, pyrolysis, nuclear, etc.)? Clean electricity could also be generated with RNG and hydrogen blends used to power turbines.

In terms of additional options that could be useful to model, PG&E recommends considering an option for a higher ratio of hydrogen/RNG supplied to residential and commercial buildings instead of further electrification of remaining appliances beyond 2040. This scenario would be useful in exploring decarbonization strategies assuming that a point-of-sale phase out of combustion appliances, as modeled in the current building sector scenarios, was unsuccessful or infeasible. CARB should also consider a scenario with dedicated hydrogen pipelines as a substitute for natural gas to serve residential and commercial loads, as well as industrial clusters (as currently outlined for Scenarios 2-4). CARB has identified a 7% hydrogen blend with natural gas. While PG&E believes that 7% is reasonable for purposes of modeling, CARB should note that there is still uncertainty on what the safe value for hydrogen blending will be. PG&E cautions that the actual percentage blend will need to be determined after research is complete on the impacts of hydrogen-natural gas blends on the gas system, and mitigations are identified for safe injection of hydrogen in the gas system.

PG&E appreciates the opportunity to provide these comments on the draft scenarios and assumptions presented in the September workshop. We look forward to discussing the assumptions in greater detail in forthcoming workshops and technical meetings.

Please feel free to contact me if you have any questions or concerns.

Sincerely,

/s/

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