BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	Rulemaking 20-05-003 (Filed May 7, 2020)

2022 INDIVIDUAL INTEGRATED RESOURCE PLAN OF SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E)

PUBLIC VERSION

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I. INTRODUCTION

In accordance with the Rules of Practice and Procedure of the California Public Utilities Commission (the "Commission"), and the direction set forth in Decision ("D.") 22-02-004 and the *Administrative Law Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for 2022 Integrated Resource Plan Filings* ("ALJ Ruling"), issued on June 14, 2022, San Diego Gas and Electric Company ("SDG&E") hereby submits its 2022 Individual Integrated Resource Plan ("IIRP").

The Integrated Resource Planning ("IRP") process is the statewide approach to electric resource planning established by Senate Bill ("SB") 350 that is intended to achieve California's greenhouse gas ("GHG") emissions reduction goals for the electric sector in a manner that preserves reliability and ensures reasonable cost.[1/] Under the Commission's revised IRP framework, the statewide resource planning process is based primarily on consideration of the IIRPs filed by individual load-serving entities ("LSEs") and adoption of a Preferred System Plan ("PSP") every two years. A Reference System Plan ("RSP") may be considered intermittently,

[1/] Senate Bill 350 (Stats. 2015, Ch. 547). Codified at Public Utilities Code §§ 454.51 and 454.52. All statutory references herein are to the Public Utilities Code unless otherwise noted.

when needed for policy reasons, or if electric sector goals or broader state GHG emissions goals are changed.[2/]

II. DISCUSSION

SDG&E supports the State's ambitious efforts to reduce GHG emissions and is committed to the State's vision of a clean energy future. Indeed, in its study, *The Path to Net Zero: A Decarbonization Roadmap for California*, SDG&E lays out an implementable strategy for achieving statewide decarbonization while continuing to prioritize grid reliability, affordability, and equity.[3/] SDG&E's IIRP, provided as Appendix 1 hereto, is designed to meet key statutory requirements related to ensuring system reliability,[4/] reducing GHG emissions with the best-fit resources at the lowest possible cost,[5/] and satisfying the State's Renewables Portfolio Standard ("RPS") program goals.[6/] The IIRP complies with the direction provided by the Commission through applicable decisions and rulings issued in the instant proceeding, and includes all required data and analysis, including a comprehensive description of its activities related to Disadvantaged Communities ("DACs") and a discussion of barriers to procurement and lessons learned.

SDG&E's IIRP submits two Conforming Portfolios that achieve targets of 30 and 25 million metric tons ("MMT") for the year 2035, respectively:

- SDG&E developed the 30 MMT Preferred Conforming Portfolio to achieve its bundled load-share of (1) 0.622 MMT in 2030 for an electric sector GHG target of 38 MMT and (2) 0.479 MMT in 2035 for an electric sector GHG target of 30 MMT.

[2/] D.22-02-004, p. 3.

[3/] SDG&E, *The Path to Net Zero: A Decarbonization Roadmap for California*, (April 2022). *Available at:* https://www.sdge.com/sites/default/files/documents/netzero2.pdf.

[4/] *See, e.g.*, Pub. Util. Code Section 399.

[5/] *See, e.g.,* Pub. Util. Code Sections 454.51, 454.52(a)(3).

[6/] *See* Pub. Util. Code Section 399.11, *et seq*.

- SDG&E developed the 25 MMT Preferred Conforming Portfolio to achieve its bundled load-share of (1) 0.473 MMT in 2030 for an electric sector GHG target of 30 MMT and (2) 0.386 MMT in 2035 for an electric sector GHG target of 25 MMT.

The modeling and analysis conducted by SDG&E suggest that the two Conforming Portfolios are equivalent in terms of cost and reliability: Both Conforming Portfolios would increase rates for bundled service customers approximately $0.05/kWh in 2035, compared to the baseline scenario (in 2021 dollars)[7/] and both portfolios yield capacity expansion requirements amounting to 1,546 MW of new capacity in 2035, comprised primarily of new solar, storage, and wind resources. However, while the modeling suggests equivalence between the two Conforming Portfolios and that SDG&E is well positioned to comply with both, SDG&E notes that the 25 MMT scenario is based upon flawed assumptions and cautions that adoption of the 25 MMT target before action is taken by the Commission to enact critical regulatory reforms and other supportive policies is premature and could jeopardize reliability and impose unreasonable cost on customers. The modeling results also ignore material obstacles to the energy transition that make adoption of a 25 MMT target infeasible at this time.

As SDG&E's *Path to Net Zero* study makes clear, achievement of the State's decarbonization, reliability and affordability goals is dependent upon timely Commission action on key policy issues. Simply adopting aspirational targets such as the 25 MMT GHG target for the electric sector will do little to advance the decarbonization effort if the regulatory framework necessary to implement the goal on a statewide basis is not in place. Thus, the Commission must ensure that key policies that support additional action by the electric sector to decarbonize are

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[7/] Procurement for additional transportation electrification sensitivity could offset that rate increase due to increased bundled service sales.

implemented *before* such actions are ordered by the Commission. Commission action on the following important issues would put implementation of the 25 MMT target within reach:

- **Improved Load Forecasting.** Deficiencies in the current forecasting process must be addressed before the Commission adopts a 25 MMT GHG emission target. The forecasting process must be improved such that the assumptions, methodology, and process applied eliminate the gap between state goals, expected outcomes, and actual outcomes on both the supply and demand sides. As the California Energy Commission ("CEC") has acknowledged, there are "numerous uncertainties about **how** various policy goals will actually be achieved, **when** they will be achieved, and **what** their energy demand impacts will be."[8/] The Inter-Agency Working Group ("IAWG") collectively has acknowledged that a broad set of policy directives may lead to greater discrepancies in the projected load forecasts in the Integrated Energy Policy Report ("IEPR"). As a result, the CEC adopted the IAWG's Demand Scenarios Project in 2021 to help inform planning around the IEPR forecasts to reflect policy-related drivers – most notably, higher electrification.[9/] While this represents progress, further work is needed to improve the load forecasting process.

- **Electric Rate Reform.** Rate design that is conducive to customer electrification is critical to support the decarbonization effort. Historically, electric rates in California have been designed to promote energy conservation by collecting nearly all costs, including fixed costs, through volumetric (*i.e.*, per kWh) electricity rates. As a result, electricity rates in California are some of the highest in the country, creating a disincentive for additional electrification. As the energy landscape and customer usage patterns evolve, so too should rate design. Adjusting electricity pricing and cost recovery to encourage the electrification of vehicles and appliances, while promoting bill stability, will be key to managing the costs of decarbonization. While comprehensive rate reform is urgently needed regardless of which target – 25 MMT or 30 MMT – is adopted, implementation of a more achievable GHG reduction target (*i.e.*, the 30 MMT target) is the most reasonable course of action during the interim.

- **Planning for Enabling Infrastructure.** To meet the GHG emission reduction objectives of the IRP process, the Commission must focus on development of transmission infrastructure that will facilitate delivery of clean energy. For example, upgraded substation and transmission infrastructure are 'no regrets' investments that will support both increased load growth and higher penetration of generation resources. Such enabling infrastructure generally involves lengthy timelines for development and will be critical for the electric sector as well as other sectors to contribute to the State's decarbonization efforts in an affordable

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[8/] California Energy Commission, *Presentation – Lead Commissioner Workshop to Launch Gas Decarbonization Proceeding* (June 3, 2022) at Slide 9 (emphasis in original).

[9/] California Energy Commission, Resolution No. 22-0524-5 (May 24, 2022) Adoption of Demand Scenarios.

> and reliable way. Thus, the Commission should take a proactive approach to transmission system planning to mitigate the inherent delay between the IRP and the California Independent System Operator's ("CAISO's") Transmission Planning Process ("TPP") outcomes and ensure that critical enabling infrastructure is available when needed.[10/]

The 25 MMT target is problematic inasmuch as it assumes the existence of an effective load forecasting process, an electric rate design that encourages increased electrification, and a transmission planning process that ensures that enabling infrastructure is timely constructed to facilitate delivery of clean energy. These conditions do not exist today. Moreover, the 25 MMT portfolio scenario rests on flawed assumptions regarding resource availability. The 25 MMT portfolio scenario assumes new resources can be commercially online on time and operate as expected, but current conditions, which are beyond the Commission's (and LSEs') control, suggest that this assumption is unrealistic. Project delays observed in the context of IRP and Electric Reliability[11/] procurement continue to be a statewide problem. Supply chain issues, deliverability and transmission constraints, and other factors contributing to construction delays are a significant concern and may *increase* in the future.

Thus, regrettably, adoption of the 25 MMT target is not feasible in this IRP cycle given the lack of necessary regulatory action and the other significant challenges currently faced by the electric sector. Lowering GHG emissions cannot come at the expense of reliability and affordability; implementation of an emissions target that jeopardizes reliability and/or imposes unreasonable cost is clearly not in the public interest. As California Energy Commission Vice-

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[10/] For example, SDG&E supports the Commission's recommendation that the TPP analyze the more aggressive 30 MMT GHG emissions target in 2030 and use a higher load scenario, the CEC's 2021 IEPR Additional Transportation Electrification scenario. While the transmission infrastructure necessary to implement the more ambitious target for IRP purposes is not currently in place (and therefore adoption of the target in this IRP cycle could undermine reliability), use of the more ambitious target for transmission planning will better ensure that necessary infrastructure is developed and available when needed.

[11/] *See* R.20-11-003.

Chair Siva Gunda has pointed out, "…if we stumble on keeping the lights on, the whole climate agenda is at risk."[12/]

To effectively balance the policy imperatives of reliability, GHG emission reduction, and affordability, the Commission should adopt a 30 MMT GHG target for all LSEs and the PSP, and should approve SDG&E's request for approval of its 30 MMT Preferred Conforming Portfolio. The 30 MMT target provides greater flexibility to facilitate transition to clean alternative fuels on a timeline that does not threaten reliability and will also prevent shifting of the burden of decarbonizing from the transportation sector to the electric sector, which aligns with the State's policy in favor of multi-sector responsibility for achieving GHG reductions. Once the Commission has addressed the critical policy issues discussed above, and provided that other regulatory and market challenges do not persist, adoption of a 25 MMT target may be more feasible in a future IRP cycle.

III. CONCLUSION

SDG&E respectfully requests that the Commission approve SDG&E's 30 MMT Preferred Conforming Portfolio and that the Commission expeditiously address the issues and concerns identified in its IIRP.

Respectfully submitted this 1st day of November 2022.

/s/ *Aimee M. Smith*
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[12] Remarks presented during California Energy Commission workshop held May 20, 2022, updating the outlook for summer 2022 through 2026 and midterm electric system reliability.

VERIFICATION

Estela de Llanos declares the following:

I am an officer of San Diego Gas & Electric Company ("SDG&E") and am authorized to make this verification on behalf of SDG&E. I am informed and believe that the matters stated in the foregoing **2022 INDIVIDUAL INTEGRATED RESOURCE PLAN OF SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E)** are true to my own knowledge, except as to matters which are therein stated on information and belief, and as to those matters, I believe them to be true.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct to the best of my knowledge.

Executed this 1st day of November 2022 at San Diego, California

By: */s/ Estela de Llanos*

Estela De Llanos
Vice President of Energy Procurement and Sustainability
SAN DIEGO GAS & ELECTRIC COMPANY

Appendix 1

2022 Individual Integrated Resource Plan of San Diego Gas & Electric Company

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I. EXECUTIVE SUMMARY

A. Introduction

In accordance with the direction provided by the California Public Utility Commission ("CPUC" or "Commission") in Decision ("D.") 22-02-004 and other applicable decisions and rulings issued in the Integrated Resource Planning ("IRP") proceeding, Rulemaking ("R.") 20-05-003, San Diego Gas & Electric Company ("SDG&E") submits this Individual Integrated Resource Plan ("IIRP"). SDG&E's IIRP reflects guidance provided by the Commission in the IRP proceeding and is designed to meet key statutory requirements related to ensuring system reliability,[1] reducing greenhouse gas ("GHG") emissions with the best-fit resources at the lowest possible cost,[2] and satisfying the State's Renewables Portfolio Standard ("RPS") program goals.[3]

As discussed herein, SDG&E submits two Conforming Portfolios that achieve targets of 30 and 25 million metric tons ("MMT") for the year 2035, respectively:

- SDG&E developed the 30 MMT Preferred Conforming Portfolio to achieve its bundled load-share of (1) 0.622 MMT in 2030 for an electric sector GHG target of 38 MMT and (2) 0.479 MMT in 2035 for an electric sector GHG target of 30 MMT.
- SDG&E developed the 25 MMT Preferred Conforming Portfolio to achieve its bundled load-share of (1) 0.473 MMT in 2030 for an electric sector GHG target of 30 MMT and (2) 0.386 MMT in 2035 for an electric sector GHG target of 25 MMT.

The modeling and analysis conducted by SDG&E suggest that the two portfolios studied – the 25 MMT portfolio and the 30 MMT portfolio – are equivalent in terms of cost and reliability. Both Conforming Portfolios would increase rates for bundled service customers

[1] *See, e.g.*, Pub. Util. Code Section 399.

[2] *See, e.g.,* Pub. Util. Code Sections 454.51, 454.52(a)(3).

[3] *See* Pub. Util. Code Section 399.11, *et seq*.

approximately $0.05/kWh in 2035, compared to the baseline scenario (in 2021 dollars)[4] and both portfolios yield capacity expansion requirements amounting to 1,546 MW of new capacity in 2035, comprised primarily of new solar, storage, and wind resources. However, while the modeling suggests equivalence between the two Conforming Portfolios and that SDG&E is well positioned to comply with both, SDG&E notes that the 25 MMT scenario is based upon flawed assumptions and cautions that adoption of the 25 MMT target before action is taken by the Commission on critical regulatory reforms and other supportive policies is premature and could jeopardize reliability and impose unreasonable cost on customers. SDG&E supports aiming for a lower GHG emissions target as a general proposition, but not at the expense of reliability and affordability. Thus, the 25 MMT target should not be adopted at this time given the uncertainty and challenges currently facing the electric sector.

It is clear that adopting an over-ambitious emissions target is not in the public interest given the potential impacts on reliability. As California Energy Commission ("CEC") Vice-Chair Siva Gunda has pointed out, "…if we stumble on keeping the lights on the whole climate agenda is at risk."[5] To ensure an effective balance between the policy imperatives of reliability, GHG reductions, and affordability, the Commission should adopt a 30 MMT GHG target for all load-serving entities ("LSEs") and the Preferred System Plan ("PSP"), and should approve SDG&E's request for approval of its 30 MMT Preferred Conforming Portfolio.

[4] Procurement for additional transportation electrification sensitivity could offset that rate increase due to increased bundled service sales.

[5] California Energy Commission workshop updating the outlook for summer 2022 through 2026 and midterm electric system reliability; May 20, 2022.

B. Overview and Recommendations

SDG&E is committed to the State's vision of a clean energy future. Indeed, in its study, *The Path to Net Zero: A Decarbonization Roadmap for California*, SDG&E lays out an implementable strategy for achieving statewide decarbonization while continuing to prioritize grid reliability, affordability, and equity.[6] As the *Path to Net Zero* study makes clear, achievement of the State's decarbonization, reliability and affordability goals is dependent upon timely action on key policy issues. Simply adopting aspirational targets such as the 25 MMT GHG target for the electric sector will do little to advance the decarbonization effort if the regulatory framework necessary to implement the goal on a statewide basis is not in place. Thus, the Commission must ensure that key policies that support additional action by the electric sector to decarbonize are implemented *before* such actions are ordered by the Commission.

While modeling results indicate that SDG&E's 25 MMT Conforming Portfolio is equivalent to the 30 MMT Conforming Portfolio in terms of cost and reliability, this conclusion is premised on a flawed set of assumptions regarding present and future conditions and ignores material obstacles to the energy transition that make adoption of a 25 MMT target infeasible at this time. Most notably, further Commission action is required in certain key areas to establish a foundation for further decarbonization efforts. If the following important issues are addressed, implementation of the 25 MMT target would be within reach:

- **Improved Load Forecasting.** Deficiencies in the current forecasting process must be addressed before the Commission adopts a 25 MMT GHG emission target. The forecasting process must be improved such that the assumptions, methodology, and process applied eliminate the gap between state goals, expected outcomes, and actual outcomes on both the supply and demand sides. As the CEC has acknowledged, there are "numerous uncertainties about **how** various policy goals will actually be achieved, **when** they will be achieved, and **what**

[6] SDG&E, *The Path to Net Zero: A Decarbonization Roadmap for California*, (April 2022). *Available at:* https://www.sdge.com/sites/default/files/documents/netzero2.pdf.

their energy demand impacts will be."[7] The Inter-Agency Working Group ("IAWG") collectively has acknowledged that a broad set of policy directives may lead to greater discrepancies in the projected load forecasts in the Integrated Energy Policy Report ("IEPR"). As a result, the CEC adopted the IAWG's Demand Scenarios Project in 2021 to help inform planning around the IEPR forecasts to reflect policy-related drivers – most notably, higher electrification.[8] While this represents progress, further work is needed to improve the load forecasting process.

- **Electric Rate Reform.** Rate design that is conducive to customer electrification is critical to support the decarbonization effort. Historically, electric rates in California have been designed to promote energy conservation by collecting nearly all costs, including fixed costs, through volumetric (*i.e.*, per kWh) electricity rates. As a result, electricity rates in California are some of the highest in the country, creating a disincentive for additional electrification. As the energy landscape and customer usage patterns evolve, so too should rate design. Adjusting electricity pricing and cost recovery to encourage the electrification of vehicles and appliances, while promoting bill stability, will be key to managing the costs of decarbonization. While comprehensive rate reform is urgently needed regardless of which target – 25 MMT or 30 MMT – is adopted, implementation of a more achievable GHG reduction target (*i.e.*, the 30 MMT target) is the most reasonable course of action during the interim.

- **Planning for Enabling Infrastructure.** To meet the GHG emission reduction objectives of the IRP process, the Commission must focus on development of transmission infrastructure that will facilitate delivery of clean energy. For example, upgraded substation and transmission infrastructure are 'no regrets' investments that will support both increased load growth and higher penetration of generation resources. Such enabling infrastructure generally involves lengthy timelines for development and will be critical for the electric sector as well as other sectors to contribute to the State's decarbonization efforts in an affordable and reliable way. Thus, the Commission should take a proactive approach to transmission system planning to mitigate the inherent delay between the IRP and the California Independent System Operator's ("CAISO's") Transmission Planning Process ("TPP") outcomes and ensure that critical enabling infrastructure is available when needed.[9]

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[7] California Energy Commission, *Presentation – Lead Commissioner Workshop to Launch Gas Decarbonization Proceeding* (June 3, 2022) at Slide 9 (emphasis in original).

[8] California Energy Commission, Resolution No. 22-0524-5 (May 24, 2022) Adoption of Demand Scenarios.

[9] For example, SDG&E supports the Commission's recommendation that the TPP analyze the more aggressive 30 MMT GHG emissions target in 2030 and use a higher load scenario, the CEC's 2021 IEPR Additional Transportation Electrification scenario. While the transmission infrastructure necessary to implement the more ambitious target for IRP purposes is not currently in place (and

Regrettably, the 25 MMT target is problematic inasmuch as it assumes the existence of an effective load forecasting process, an electric rate design that encourages increased electrification, and a transmission planning process that ensures that enabling infrastructure is timely constructed to facilitate delivery of clean energy. These conditions do not exist today, which makes adoption of the 25 MMT target in this IRP cycle unreasonable. Further action by the Commission to address the issues detailed above is needed before the 25 MMT target can be adopted.

In addition, factors outside of the Commission control militate against adoption of the 25 MMT target. Implementing a 25 MMT portfolio would require timely resource development, but project delays observed in the context of IRP and Electric Reliability[10] procurement continue to be a statewide problem. Supply chain issues, CAISO deliverability and transmission constraints, and other factors contributing to construction delays are a significant concern and may increase in the future. The 25 MMT portfolio scenario assumes new resources can be commercially online on time and operate as expected, but current conditions, which are beyond the Commission's (and LSEs') control, suggest that this assumption is unrealistic.

Likewise, implementation of the 25 MMT target in this IRP cycle could result in premature retirement of natural gas-fired resources before new technologies offering clean firm dispatchable power are available. To support economy-wide electrification, the demand for electricity over the next two decades is expected to grow 59 to 84 percent.[11] This growth in

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therefore adoption of the target in this IRP cycle could undermine reliability), use of the more ambitious target for transmission planning will better ensure that necessary infrastructure is developed and available when needed.

[10] R.20-11-003.

[11] CARB's Scoping Plan Update modeling data Alternatives 1-4 would result in 59-84% increase in electricity demand over a 25-year period of 2020-2045.

demand is expected to occur at the same time that reliance on non-firm, non-dispatchable, intermittent resources is increasing and firm, dispatchable natural gas-fired resources are phased out. The Commission has highlighted the need for clean firm and dispatchable power to address intermittency (*e.g.*, the IRP template directs LSEs to discuss "clean firm power planning"), but few technologies in existence today offer the attributes of clean firm power. Biomass and geothermal resources may, but these resources are high-priced and relatively scarce. Thus, development of new technologies offering clean firm and dispatchable power will be critical in order to ensure continued grid reliability.

To achieve this objective, the Commission should support development of viable alternative fuels, such as renewable natural gas and hydrogen, and long-duration storage options such as hydrogen and pumped hydroelectric that provide clean firm dispatchable power. In the meantime, the Commission should not undermine reliability by prematurely phasing out gas-fired resources. To ensure reliability during the "bridge" period while new firm, dispatchable zero-carbon resource technology matures, the Commission should signal to the market that existing gas plants should remain in operation[12] and maintain existing gas plants and gas infrastructure to enable a transition to a clean energy future without compromising grid reliability (*e.g.*, explore pipeline integrity measures, and gas power plant decarbonization enhancements). The 30 MMT target provides greater flexibility to facilitate transition to clean alternative fuels on a timeline that does not threaten reliability.

[12] IRP modeling has generally assumed that existing resources, including natural gas-fired resources, will continue to operate while new resources are built, so reliability can be predictably maintained. Likewise, IRP procurement has focused on contracting of new resources to meet incremental needs rather than to replace existing operating resources. CPUC Energy Division, Reliable and Clean Power Procurement Program Staff Options Paper (September 2022) ("Staff Options Paper") at 5. This is increasingly raising "concerns of insufficient forward contracting of existing resources, which could cause unexpected retirements of aging resources that are difficult to maintain with one-year contracts." *Id*.

Adoption of the 30 MMT target in this IRP cycle also aligns with the State's policy in favor of multi-sector responsibility for achieving GHG reductions. The burden of decarbonizing must not be shifted from the transportation sector, which must do more, to the electric sector, which has already achieved significant GHG reductions. California has set ambitious goals related to Transportation Electrification ("TE"),[13] and while the Commission and the utilities have a role to play in facilitating the market and infrastructure for electric vehicles ("EVs"), satisfaction of the State's EV objectives is primarily dependent on market activity within the transportation sector. A 30 MMT target for the electric sector recognizes that material GHG reductions are likely to occur in the transportation sector due to favorable EV policies and incentives and keeps the burden of achieving those reductions on the transportation sector where it belongs rather than placing a disproportionate amount of the burden on the electric sector.

Given these concerns regarding the feasibility of 25 MMT GHG emissions target in the current regulatory and market environment, SDG&E recommends that the Commission take a measured approach to GHG reduction in the 2022-2023 IRP cycle and adopt the 30 MMT GHG target.[14] Once the Commission has addressed the critical policy issues discussed above, and provided that other regulatory and market challenges do not persist, adoption of a 25 MMT target may be more feasible in a future IRP cycle. Advancements in clean technology and improved

[13] For example, California has set a target of 5 million zero-emissions electric vehicles ("EVs") by 2030. Governor Newsom established a goal for all in-state sales of new passenger vehicles to be zero-emission by 2035 and 100 percent medium- and heavy-duty vehicles be zero-emission by 2045, among other goals.

[14] While the *Path to Net Zero* study is generally consistent with the outcomes of SDG&E's IIRP, they are not directly comparable. The key differences between the two are: (1) the *Path to Net Zero* study evaluated economy-wide decarbonization through 2045; (2) the projected electricity demand for the *Path to Net Zero* is significantly higher than what was assumed in the IIRP; and (3) the *Path to Net Zero* study included certain technologies that were not included as part of this IIRP.

inter-agency collaboration currently underway to support the Commission's emissions reduction goals,[15] may also help to make the 25 MMT target more feasible.

Finally, SDG&E reiterates that, to the extent the Commission orders incremental procurement in this IRP cycle, it should allocate the obligation it imposes equitably to ensure that each LSE contributes its fair share of system reliability and emissions-reduction targets. SDG&E has experienced a significant load departure due to the formation and expansion of community choice aggregators ("CCAs") in its service territory. SDG&E's share of the retail load within its service territory has declined dramatically, which in turn has reduced SDG&E's need for resources, as was anticipated in SDG&E's 2020 IIRP filing.[16] By the end of 2023, SDG&E expects that more than 78 percent of its electric customer meters will be served by a CCA for their electric commodity.[17] SDG&E also has a small number of customers taking Direct Access ("DA") commodity service.[18] Therefore, whether procurement is ordered to address the system reliability or GHG emissions targets, the Commission should allocate incremental procurement obligations equitably across LSEs according to their fair share of the need.

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[15] Examples include the IAWG and CEC Demand Scenarios Project discussed earlier, along with further regional cooperation resulting from the Assembly Concurrent Resolution ("ACR") 188. ACR 188 is intended to provide the legislature with the most recent information on organized energy markets and regional transmission organization efforts in California and the west in order to assess what can be done to realize these benefits. *See*: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220ACR188.

[16] *See*, Appendix 2 of *Individual Integrated Resource Plan of San Diego Gas & Electric Company*, filed September 1, 2020, at p. 2.

[17] This figure is based on meter count. SDG&E estimates that it will experience minimal additional CCA migration from the known CCAs formed to date in 2024. SDG&E does not have any estimates beyond 2024 based on what is known today.

[18] DA subscription has reached the Commission-established cap of 3,942 gigawatt-hours ("GWh") within SDG&E's service territory, and the Commission has recommended to the Legislature against further Direct Access expansion.

C. Process Used to Develop IIRP

SDG&E's process to develop its Plan started with careful review of its existing portfolio of resources, load forecasts, and Commission-adopted inputs and assumptions. At a high level, SDG&E compared (1) its load forecast, (2) its existing portfolio, (3) reliability procurement resulting from various Commission orders,[19] and (4) its position relative to existing procurement obligations[20] to determine the optimal approach for long-term procurement planning on behalf of SDG&E's bundled service customers.

Each of the scenarios were developed using a cost-optimized model and were tested against SDG&E's RPS compliance requirements, the IRP's LSE GHG benchmark (measured using the Clean System Power Tool), and other key bundled portfolio requirements, such as system Resource Adequacy ("RA") needs, to determine the need for any incremental resources and, if needed, which type. SDG&E then factored in the reliability procurement under development through 2026 to determine the incremental need for planned new resources. As a result, modeling for each of the two scenarios generated the same bundled resource buildout in both the 25 MMT and 30 MMT scenarios, totaling 1,546 MW of new SDG&E capacity needed by 2035.

D. Findings

SDG&E's IRP narrative conforms with the structure of the narrative template provided by the Commission. SDG&E provides an overview of its IRP narrative below.

Section II Study Design describes the underlying objectives and methodology that informed the process. SDG&E believes it is critical to balance several crucial objectives as it

[19] D.19-11-016, D.20-12-044, D.21-06-035, D.21-12-004, and D.21-12-015.

[20] Renewable Portfolio Standard ("RPS") compliance requirements, Resource Adequacy ("RA") compliance requirements, and GHG benchmarks.

develops its procurement plans. It attempts to do so in this IRP. These factors include supporting the State's GHG emissions targets and other clean energy goals. In addition, SDG&E focused on ensuring a reliable grid while prioritizing ratepayer affordability. SDG&E also describes the specific methodologies used in this IRP study. This includes both SDG&E's modeling tools and modeling approach. SDG&E used the Clean System Power Calculator and the PLEXOS Capacity Expansion and Production Cost Models in this study. Further, SDG&E applied its key inputs and assumptions into these models to develop its conforming portfolios for this IRP. These include portfolios that meet the targets of 30 MMT and 25 MMT GHG emissions in 2035. SDG&E further ran sensitivities related to additional transportation electrification.

Section III Study Results details how SDG&E's Conforming Portfolios yielded identical capacity expansion requirements, amounting to 1,546 MW of new capacity in 2035. This new capacity is primarily comprised of new solar, storage, and wind resources. SDG&E's two Conforming Portfolios achieve the GHG emissions targets, minimize local criteria air pollutants, and conform to reliability standards. SDG&E anticipates that its Conforming Portfolios will increase rates for customers to $0.56 per kWh in 2035 for bundled customers, but procurement for additional transportation electrification sensitivity could offset that rate increase due to increased bundled sales. Finally, Section III examines the outlook for specific elements of its plan, including transmission planning, offshore wind, out-of-state wind, and other resources.

Section IV Action Plan describes the action plans, challenges, barriers, and SDG&E's requests for Commission action associated with its conforming portfolios. SDG&E presents the status of existing procurement activities resulting from decisions in the IRP proceeding for near-term and mid-term reliability and the procurement activities that SDG&E proposes to meet incremental needs according to SDG&E's bundled load-share. SDG&E also outlines some

planned actions and ongoing and future engagement with disadvantaged communities. This includes specific activities designed to maximize SDG&E's contribution to Environmental and Social Justice within these communities. Section IV concludes with an overview of specific actions that SDG&E recommends the Commission take related to procurement and GHG reduction. These recommendations include process and equity improvements such as load-share-based allocation of procurement, flexibility instead of technology-specific procurement mandates, ensuring geographic diversity of generating resources, and avoiding stranding natural gas resources by supporting the development of alternative fuel technologies such as hydrogen and renewable natural gas.

Section V Lessons Learned identifies SDG&E's recommendations for improvement to the IRP process.

II. STUDY DESIGN

SDG&E designed its study for this IRP cycle to focus on maintaining system reliability while achieving its share of GHG emissions targets. For its bundled load, SDG&E developed two IRP scenarios and associated sensitivities for its Conforming Portfolios:

- **25 MMT Scenario:** A portfolio that achieves emissions that are equal to or less than SDG&E's proportional share of the GHG targets of 30 MMT by 2030 and 25MMT by 2035 GHG targets
- **30 MMT Scenario:** A portfolio that achieves emissions that are equal to or less than SDG&E's proportional share of the GHG targets of 38 MMT by 2030 and 30 MMT by 2035

In this section, SDG&E describes how it developed its individual IRP. SDG&E first discusses its objectives for the analytical work presented in the filing and scenarios included in SDG&E's Plan. Next, SDG&E describes the study methodology, including tools and approaches used in developing SDG&E's scenario analysis.

A. Objectives

SDG&E's electric system analysis is consistent with the goals for the IRP process as set forth in Senate Bill ("SB") 350, and the results are in line with SDG&E's *Path to Net Zero* study. SDG&E focused on reducing its emissions levels to meet its share of the Commission's targets for 2030 and 2035 reliably and cost-effectively. More specifically, SDG&E's study process was designed to meet the following objectives:

1. Achieve the State's RPS goals for the IRP planning horizon and SDG&E's share of the relevant electric sector 2035 GHG emissions targets.

SDG&E is committed to advancing the State's goals for a clean, safe, reliable and affordable electric system. To that end, SDG&E is anticipating procuring 56 percent[21] of its power from renewable resources for the 2021-2024 RPS Compliance Period, which is well above the State's 38.4-percent requirement.[22] SDG&E's objective for the 2022-2023 IRP cycle is to achieve its share of the 2035 GHG emissions benchmarks: 0.386 MMT for the 25-MMT Conforming Portfolio and 0.479 MMT for the 30-MMT Conforming Portfolio. These targets are also consistent with the California Air Resources Board's ("CARB's") 2022 Draft Scoping Plan Update, which establishes an electric sector GHG emissions goal of 30 MMT in 2045.

2. Ensure that SDG&E's bundled portfolios meet energy and capacity needs and adequately contribute to CAISO system reliability through 2035.

SDG&E limits its selection of shared system resources, such as existing transmission and import and export capability, to its bundled service customers' share of the overall system load.

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[21] SDG&E's Draft 2022 RPS Plan, Appendix 1a (Renewable Net Short Calculations), filed in R.18-07-003 on July 1, 2022. *Available at*: https://www.sdge.com/sites/default/files/regulatory/R.18-07-003%20SDGE%202022%20Draft%20RPS%20Plan%20Public%20Final%20w_Att%20A.pdf.

[22] The RPS program requirement for Compliance Period 4 (2021-2024) is 38.4%.

This limit allows SDG&E's bundled portfolios to use system resources without over-relying on the system. Generally, SDG&E limits candidate generation resources, as identified in the RESOLVE model, to its bundled load share to prevent over-subscribing the technical potential of economic resources, helping to avoid potential difficulties in combining all LSEs' portfolios into the Commission's PSP.

3. Create a least-cost, best-fit resource portfolio considering all baseline and candidate resources to serve load operably and reliably.

SDG&E's IRP analysis selects resources to meet the State's clean energy and reliability goals in a least-cost manner for its bundled customers and provides a system average rate forecast in compliance with CPUC requirements.

B. Methodology

SDG&E used the finalized energy and peak demand load forecast and behind-the-meter photovoltaic ("BTM PV") forecast developed pursuant to the June 15 Ruling[23] and posted on the Commission's IRP website.

1. Modeling Tool(s)

SDG&E's Resource Data Template ("RDT") outlines the existing and planned resources in SDG&E's portfolio to provide the total available capacity for the system and inform planning needs assessment. With this inventory, SDG&E then relied on three principal modeling tools to create, analyze, and validate resource portfolios for its IRP.

- Clean System Power Calculator ("CSP"): The GHG CSP[24] was used to determine the GHG mass quantity from SDG&E's portfolio and determine what additional

[23] R.20-05-003, *Administrative Law Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for the 2022 Integrated Resource Plan Filings*, issued June 15, 2022.

[24] The CSP was originally developed by the Commission and adopted in the May 25, 2018, *Administrative Law Judge's Ruling Finalizing Greenhouse Gas Emissions Accounting Methods, Load Forecasts, and Greenhouse Gas Benchmarks for Individual Integrated Resource Plan Filings*. It was later updated and renamed prior to the 2019-2020 IRP cycle.

actions, if any, may be needed during the planning period to meet the 2030 and 2035 GHG planning targets. The CSP helps to identify whether SDG&E has achieved the emissions target.

- PLEXOS Capacity Expansion Model ("CEM"): The PLEXOS CEM simulates generation and transmission investment to meet forecast electric load over many years, usually with the objective of minimizing the total cost of owning and operating the electrical system. Capacity expansion models can also be configured to allow only solutions that meet specific requirements, such as providing a minimum capacity to ensure the system's reliability or maintaining GHG emissions below an established level.

- PLEXOS Production Cost Model ("PCM"): The PCM simulation provides SDG&E with the operation of the optimal portfolio buildout. SDG&E used PLEXOS to determine the total generation portfolio costs included in the rate analysis. This tool differs from the RESOLVE model in several ways. First, this tool is not a capacity expansion model but instead allows for hourly cost-based dispatch. The PLEXOS model was used to obtain SDG&E-specific cost data for the Conforming Portfolios. Second, the model dispatched SDG&E's Conforming Portfolios for all years and all days of the planning period, as compared to RESOLVE, which only modeled certain years and used a limited number of "typical" days.

- PLEXOS Reliability Assessment: A Monte Carlo-based stochastic simulation calculated the loss of load expectation ("LOLE") for each capacity expansion build during key benchmark years (primarily 2035), leveraging weather, renewable generation, random outage data and load variables. The stochastic model runs a number of samples against these variables using the same resource portfolio to determine the number of loss-of-load events.

SDG&E used the PLEXOS capacity expansion and production cost modeling software (version 8), produced by Energy Exemplar, for its 2022 IRP analysis and resulting build plans. The dataset was derived directly from the RESOLVE PSP dataset, including the 2022 IRP updates. The RESOLVE model's generator capacities, generator operating characteristics, renewable profiles, and other inputs and constraints were all input directly into PLEXOS to develop the capacity expansion build plan and run production cost reliability analyses directly on those build plans. SDG&E modeled the entire WECC, regionally, similarly to how it is modeled in RESOLVE including all transmission constraints. The resulting build portfolio is the model's

optimal build plan for the CAISO area, and SDG&E's IIRP takes its pro rata share of the CAISO system expansion based on its emissions share as assigned in the CSP calculator.

The main difference between the PLEXOS model, the RESOLVE Excel file, and python-based model is that the PLEXOS model SDG&E used includes hourly load inputs (using the 2021 IEPR CAISO load) for every hour and day between 2023 and 2035 rather than the 37 representative days that are modeled in RESOLVE. Renewable profiles were developed using the RESOLVE profiles, averaging the representative days each month to produce a single representative profile for each renewable candidate for one day a month for all 12 months. Other inputs, such as hydro constraints, maintenance outages, etc. are represented as granular as possible subject to availability of the data in the RESOLVE database.

SDG&E believes the PLEXOS modeling software, using hourly timeseries load inputs, results in high quality modeling results. Moreover, PLEXOS provides the capability to do production cost reliability analyses on the same database, in the same software, and reduces the chance of mistakes and inconsistencies versus using separate tools. With a tool such as PLEXOS, there are many options, or "levers" to turn in terms of modeling assumptions and options. The same dataset, with the same input data, could be modeled using multiple types of capacity expansion load sampling or optimization techniques. SDG&E ran the most detailed and accurate simulations possible subject to the computational and time constraints while developing it's IRP plan. Modeling results will not be identical across different modeling tools, nor will results from the same tool be identical when different simulations settings are used. However, subject to the limitations, we believe these results accurately portray the high-level system requirements for the CAISO from today through 2035 and indicate how SDG&E needs to procure additional resources to do its part in ensuring a reliable and clean grid.

2. Modeling Approach

SDG&E's approach to developing its two scenarios is consistent with the requirements set forth in D.22-02-004, including the 25 MMT and 30 MMT benchmark scenarios. SDG&E details the assumptions used and its assessment of procurement need below.

a. Assumptions

SDG&E's modeling approach used inputs and assumptions consistent with those used by staff to develop the Preferred System Portfolio, as updated by IRP staff with more recent inputs and posted on the IRP website on June 15, 2022 (2021 PSP Portfolio with updates).[25] SDG&E used the finalized energy and peak demand load forecasts and behind-the-meter solar photovoltaic ("BTM PV") information that Energy Division developed. This load forecast includes fixed assumptions regarding the level of BTM PV, Energy Efficiency ("EE"), EVs, energy storage, Demand Response ("DR"), and building electrification. SDG&E also included its existing resource commitments as of September 1, 2022.

In accordance with ED's assumption that all existing resources net of planned[26] or economic retirements[27] would continue to operate for the planning period regardless of contract terms, SDG&E assumed that existing resources would stay online and continue to serve system load (*i.e.*, existing plants would not retire) but removed resources with expiring contracts from its Conforming Portfolios. Removing the expiring contracts from its Conforming Portfolios (while assuming their continued availability to serve system load) allows SDG&E to assess whether re-

[25] *LSE Filing Requirement RESOLVE Results*, issued June 15, 2022. *Available at*: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials.

[26] *E.g.*, Once-Through Cooling ("OTC") plants.

[27] RESOLVE uses an economic retention functionality to examine what portion of the existing gas-fired generation fleet may need to be retained or allowed to retire over the planning horizon.

contracting with existing resources may be the best option in the future. In addition, consistent with the Commission's direction to assume that all gas-fired generation resources would continue to operate throughout the planning cycle,[28] SDG&E did not assume Desert Star Energy Center (a 485-MW, combined-cycle power plant) would retire when its land lease expires in 2027.

b. Assessment of Need

SDG&E's Conforming Portfolios demonstrate that it is well positioned to achieve the State's climate and reliability goals under both the 25 MMT and 30 MMT benchmark scenarios. This advantage is due in part to the following:

- SDG&E's early compliance with RPS requirements, with around 56 percent of its energy mix expected from renewable resources in Compliance Period 4 (2021-2024);
- SDG&E's aggressive adoption of energy storage; and
- The absence of coal resources in SDG&E's portfolio

In assessing its procurement need, SDG&E first compared its existing portfolio to its GHG benchmark and RPS and RA compliance requirements. Although the PSP modeling is intended to optimize the resource mix to account for all three of these constraints, it does not provide insight into the portion of these resources that each LSE should procure. SDG&E's analysis of its portfolios compared to its compliance requirements provides guidance on whether the additional resources identified by the PSP should be procured by SDG&E or by other LSEs with less robust portfolios.

- For GHG emissions analysis, SDG&E first determined the portfolio's GHG mass production in each modeled year using the CSP tool. SDG&E then compared the result to its allocated share of the total GHG benchmarks (25 MMT and 30 MMT, respectively) used in the RESOLVE model for each of the modeled years, as

[28] *See* D.22-02-004. at p. 101.

formalized in the June 15 Ruling. Although D.22-02-004 only set 2030 and 2035 targets, comparing each year modeled in the CSP to the emissions target glide path shows SDG&E's current and future positions will meet the 2035 targets and provides valuable information regarding short- and mid-term needs. This analysis further demonstrates SDG&E's advantageous position relative to GHG compliance requirements.

- For RA, SDG&E examined its reliability need as follows:
    - SDG&E evaluated its reliability need by comparing its LSE managed peak share of the CAISO total reliability need in the ED provided Resource Data Template with its LSE total supply calculated in the same tool. This tool and reliability methodology was developed throughout the 2022 IRP cycle by ED and applies a 14 percent planning reserve margin ("PRM") to the entire CAISO gross load peak to determine a total reliability need. This total need is scaled down by the Marginal Reliability Need to Total Reliability Need Ration (MRN/TRN Ratio). SDG&E's managed peak share of this marginal reliability need is compared to SDG&E's total contracted supply to determine its net capacity position and ensure system reliability.
- For RPS, SDG&E calculated its RPS position as the percentage of total bundled retail sales supplied by RPS-eligible generation resources.

c. Scenarios Considered

SDG&E developed two IRP scenarios for its two Conforming Portfolios: one that achieves emissions that are equal to or less than SDG&E's proportional share of the GHG targets of 30 MMT by 2030 and 25 MMT by 2035, and another that achieves emissions that are equal to or less than SDG&E's proportional share of the GHG targets of 38 MMT by 2030 and 30 MMT by 2035. Both scenarios use the CSP tool, which relies on a GHG emissions benchmark approach. In addition to these two base cases, SDG&E conducted several sensitivity analyses. SDG&E designed these sensitivities to analyze potential real-world scenarios outside the base conforming portfolio requirements. These sensitivities included: additional transportation electrification, no offshore wind, or limiting the annual build of wind and solar to 3 GW each.

As demonstrated in this section, SDG&E designed its IRP modeling study to elicit accurate, actionable results that will inform its future actions to ensure alignment with State GHG targets, ensure reliability, and do so in the most economically efficient manner possible.

III. STUDY RESULTS

A. Conforming and Alternative Portfolios

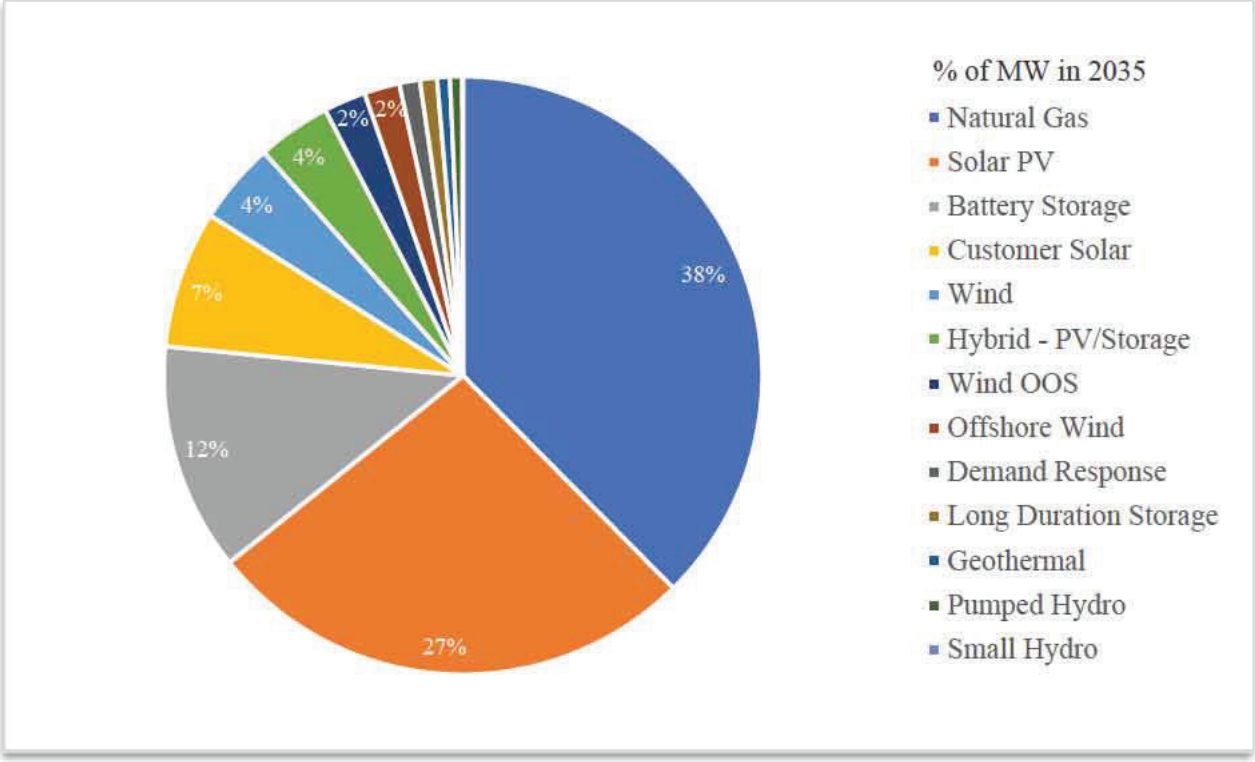
As explained above, SDG&E developed two least-cost, operable, and reliable Conforming Portfolios that consist of the same resource buildout to meet either the 25 or 30 MMT GHG target in 2035 for its bundled load:[29]

- SDG&E's **30 MMT Conforming Portfolio** and related sensitivities meet a bundled load-share totaling (1) 0.622 MMT in 2030 for an electric sector GHG target of 38 MMT and (2) 0.479 MMT in 2035 for an electric sector GHG target of 30 MMT.
- SDG&E's **25 MMT Conforming Portfolio** and related sensitivities meet a bundled load-share totaling (1) 0.473 MMT in 2030 for an electric sector GHG target of 30 MMT and (2) 0.386 MMT in 2035 for an electric sector GHG target of 25 MMT.

SDG&E developed these portfolios to confirm the operability, reliability, and achievement of the Commission's GHG targets for either scenario. SDG&E sought to develop an economic resource plan that was updated with the 2021 IEPR demand forecast and deemed reliable through rigorous LOLE analysis. Figure 1 below illustrates SDG&E's portfolio composition, which is reflected in both RDTs and discussed in more detail below. Each portfolio assumes compliance with procurement requirements outlined in the Mid-Term Reliability Decision, as of September 1, 2022.

[29] SDG&E does not propose an alternative portfolio.

***Figure 1* – SDG&E Conforming Portfolio Resource Mix[30]**



While SDG&E's portfolio is primarily made up of solar and natural gas resources, SDG&E's modeling resulted in planned existing and new resources consisting primarily of solar, storage, and wind resources, with small amounts of demand response and firm, zero-emitting resources (*e.g.*, geothermal). The total capacity of these planned existing and new resources in 2035 is 1,546 MW.[31] Table 1 below shows how the new planned resources identified in SDG&E's Preferred Conforming Portfolios compare to the mix of new resources identified in the CPUC's 2021 Preferred System Plan with updates.

[30] Identical under both the 25 MMT and 30 MMT Conforming Portfolios.

[31] Note that this total only accounts for the storage portion of hybrid resources and does not include the solar portion.

***Table 1* – PSP Resource Mix Compared to SDG&E's 2035 Portfolios**

Resource Category	2021 PSP		2022 SDG&E IRP
	25 MMT	30 MMT	25/30 MMT
Nuclear	0.4	0.4	0.0
CHP	0.6	0.6	0.0
Gas	15.7	16.3	37.6
Coal	0.0	0.0	0
Hydro (Large)	4.5	4.7	0.0
Hydro (Scheduled Imports)	1.8	1.9	0.0
Biomass	0.6	0.6	0.0
Geothermal	1.7	1.8	0.7
Hydro (Small)	0.6	0.6	0.0
Wind	7.1	6.9	4.4
Wind OOS New Tx	3.1	3.1	2.3
Offshore Wind	3.0	3.1	1.9
Solar	24.3	22.3	26.7
Customer Solar	17.9	18.5	7.4
Battery Storage	14.9	15.2	12.3
Long Duration Storage	0.0	0.0	0.9
Pumped Storage	1.8	1.9	0.7
Demand Response	1.9	2.1	1.1
Hybrid	0.0	0.0	4.0
Total Percentage	100	100	100

SDG&E submits a comprehensive, operable, and reliable set of Preferred Conforming Portfolios that meet the CAISO system share of both the 25 and 30 MMT GHG targets in 2035.

The following are key findings from the results of SDG&E's analysis.

- To confirm incremental near-term capacity needs, SDG&E removed D.19-11-016's required procurement of approximately 293 MW of incremental system RA capacity but included D.21-06-035's required procurement of 361 MW (subsequently increased through CPUC approval to 475 MW) of incremental capacity. By keeping procurement for D.19-11-016 but removing upcoming procurement for D.21-06-035 in the baseline, SDG&E's results confirm a near-term system capacity need of up to 616 MW through 2026.

- Even with the mandated 654 MW of system reliability procurement from D.19-11-016 and D.21-06-035, contract expirations trigger the need for an additional 1,370 MW of system capacity by 2030 to maintain reliability – specifically, 211 MW in 2027, an additional 86 MW in 2028, an additional 158 MW in 2029, and an additional 299 MW in 2030. SDG&E's PCM and LOLE analysis show that these system capacity needs can reliably and most economically be met with solar, four-hour battery storage, hybrid, wind (primarily out-of-state "OOS"), demand response, and geothermal resources.

- SDG&E examined the pattern of unserved load in its LOLE analysis and found that, due to surplus capacity needed to meet the GHG emissions targets, there were no loss-of-load events during the planning horizon.

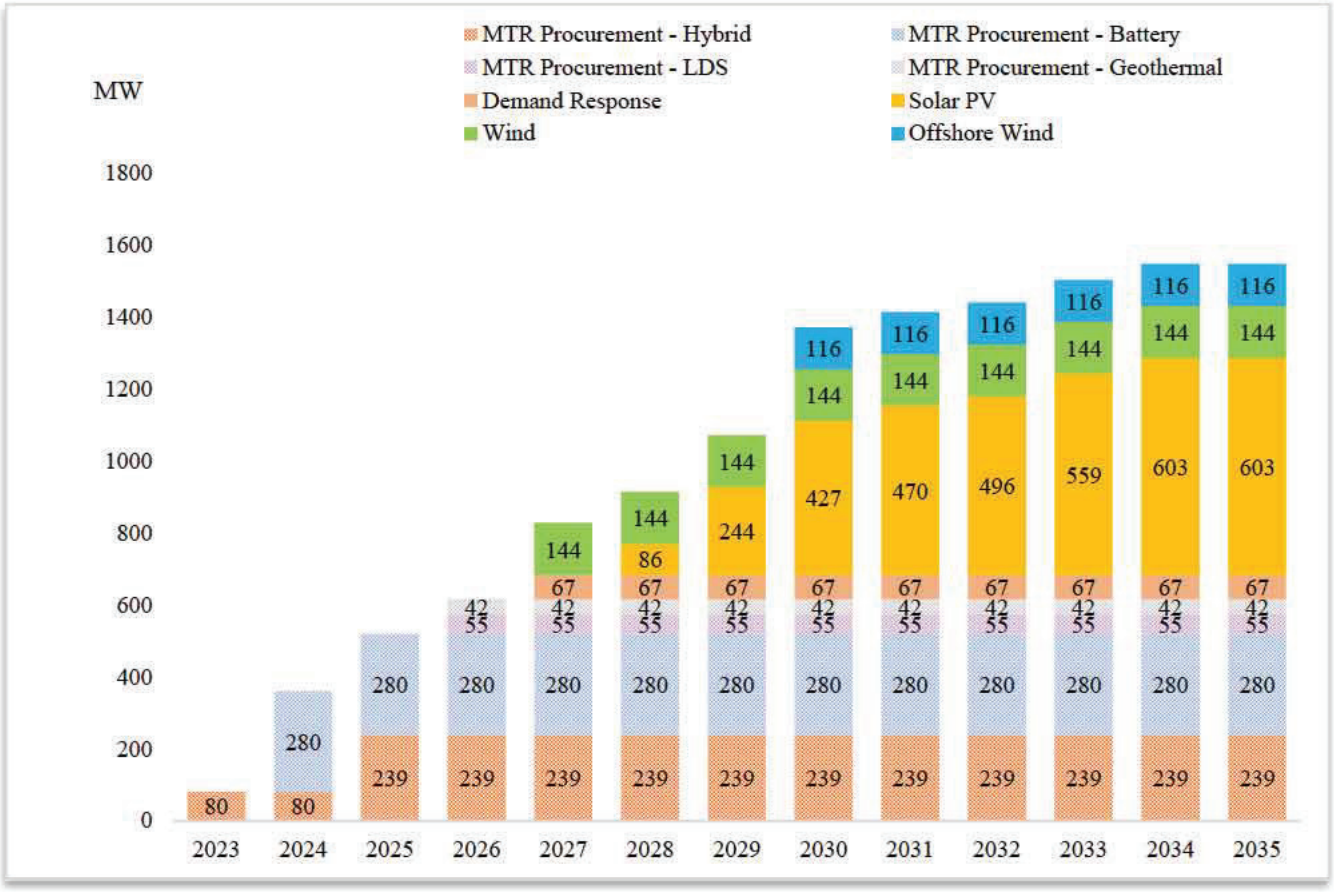
- In addition to the Additional Transportation Electrification ("ATE") scenarios, SDG&E also evaluated several other sensitivities. These include limiting the annual build of wind and solar to 3 GW each (6 GW total) systemwide, evaluating BTM resources as BTM instead of supply side, and preventing any offshore wind from being built. None of these additional scenarios significantly changed the overall build requirements, but instead altered how much of certain resource types were required, and the timeline required, to result in a similar final portfolio as SDG&E's conforming portfolios. Without the potential for offshore wind, more solar is selected within the MW and locational build constraints of the model relative to the additional land-based wind selected.

As shown in Figure 2 below, SDG&E's Preferred Conforming Portfolios include substantial solar, energy storage, and wind resource additions by 2035. This resource portfolio includes the most economic combination of resources to meet the GHG target and maintain reliability. By 2035, SDG&E's Preferred Conforming Portfolio includes the following cumulative capacity additions:

- Solar – 603 MW
- Battery Storage – 280 MW
- Hybrid – 239 MW
- Wind – 144 MW
- Offshore Wind – 116 MW
- Demand Response – 67 MW
- Geothermal – 42 MW

- Long-Duration Storage ("LDS") – 55 MW

***Figure 2* – Preferred Conforming Portfolio Cumulative Capacity Additions by 2035**



B. Preferred Conforming Portfolios

SDG&E's two Conforming Portfolios are its Preferred Conforming Portfolios ("PCP") since both achieve the respective GHG emissions targets and reliability standards. SDG&E's PCPs maintain reliability and result in lower GHG emissions than SDG&E's assigned benchmark. However, as discussed in detail throughout this Plan, SDG&E recommends that the Commission adopt the 30 MMT GHG emissions target, which strikes the right balance between the objective of advancing the State's GHG emissions reductions goals and other policies including the need to maintain system reliability. The 30 MMT Preferred Conforming Portfolio:

1) allows natural gas plants and gas infrastructure to run during system capacity shortfalls without severely impacting emissions compliance, given recent experiences in the summers of 2020 and 2022;

2) mitigates the risks associated with discrepancies between load forecasts and system capacity throughout the planning horizon;

3) allows more time for clean and new technologies to mature and become affordable;

4) allows the energy sector to overcome regulatory and market barriers discussed in this Plan; and

5) is within the CARB's range of acceptable emissions.

Below, SDG&E discusses how its selections are consistent with and satisfy each relevant statutory and administrative requirement in Public Utilities Code Section 454.52(a)(1).[32]

1. Meet the greenhouse gas emissions reduction targets established by the CARB, in coordination with the CPUC and the CEC, for the electricity sector and each load-serving entity that reflect the electricity sector's percentage in achieving the economywide greenhouse gas emissions reductions pursuant to Section 38566 of the Health and Safety Code.

Emissions associated with each of SDG&E's Conforming Portfolios, based on the CSP methodology, are below the CPUC benchmarks of 30 MMT and 25 MMT respectively, as discussed in Section III.E below. These benchmarks reflect the CPUC's efforts to develop individual targets that will result in meeting the electric sector's contribution to reducing GHG emissions below 40 percent from 1990 levels by 2030. Furthermore, SDG&E's Conforming Portfolios align with the CARB's 2017 and 2022 Scoping Plan Updates, which establish higher GHG emissions target of 38 MMT in 2030.

[32] All statutory references herein are to the Public Utilities Code unless otherwise noted.

2. Procure at least 60 percent eligible renewable energy resources by December 31, 2030, consistent with Article 16 (commencing with Section 399.11) of Chapter 2.3.

California's RPS program was recently modified to set a goal of 60 percent renewables by 2030.[33] SDG&E is fully compliant with RPS and long-term contracting requirements. SDG&E expects to continue as a leader in this area, as demonstrated by SDG&E's 2022 Draft RPS Procurement Plan.[34] Based on SDG&E's current RPS generation forecast, SDG&E anticipates meeting its RPS requirements for each CP through 2032 through a competitive solicitation or bilaterally, as needed, or by leveraging the bank. SDG&E will continue to procure to meet resource-specific interim renewable procurement mandates, as required.

3. Enable each electrical corporation to fulfill its obligation to serve its customers at just and reasonable rates.

The methodology used in the IRP process focuses on finding the least-cost procurement plan to meet the GHG objectives. This balances multiple considerations and lays the groundwork for SDG&E to provide reliable, affordable, and equitable service to its customers.

4. Minimize impacts on ratepayers' bills.

Issues related to affordability are of major concern to SDG&E. Thus, the statutory requirement in Section 454.52(a)(1)(D) to "minimize impacts on ratepayers' bills" must be a key directive guiding consideration of SDG&E's two Confirming Portfolios. SDG&E's modeling and analysis suggests that ratepayer impacts are identical between the two Preferred Conforming Portfolios. However, as discussed throughout this Plan, given the flawed and aspirational nature of the 25 MMT scenario modeling inputs and assumptions, the theoretical finding that implementation of a 25 MMT target would impose no additional cost on ratepayers is inherently

[33] Pub. Util. Code §399.11(a).

[34] *See* SDG&E's Draft 2022 RPS Plan, *supra*, note 21.

unreliable. For example, electricity rates in California are currently some of the highest in the country; lowering the MMT target leaves less flexibility to address modeling uncertainties and assumes sufficient resources will be available for ratepayers to cost effectively decarbonize other sectors, but this assumption is faulty in the absence of meaningful Commission action on rate reform, which has yet to occur.

Additional issues and uncertainties that could impact customer costs under a 25 MMT Conforming Portfolio include:

- IEPR forecasting must better align with policy drivers for electrification.
- Coordination between the CPUC and CAISO must tighten to reduce the lag between infrastructure and resource planning.
- The IRP's near-term and mid-term reliability and the Electric Reliability OIR decisions have driven significant procurement and buildout of resources that are yet to come online as planned.
- Whether existing resources remain in operation.
- As new natural gas and nuclear plants are no longer considered and until alternative fuel technologies mature, there is a growing urgency for clean firm, dispatchable zero-carbon resources and long-duration resources.
- Out-of-state and offshore wind supply plays an increasingly critical role in future LSE portfolios but depends on a number of factors outside the Commission's and the LSEs' control.
- Recent extreme weather events in 2020 and 2022 suggest that 1-in-10 reliability standard may be insufficient for resource planning.

Thus, while on its surface, SDG&E's quantitative modeling and data show that the rate impacts are identical between the two Conforming Portfolios, quantitative analysis alone is not determinative and does not satisfy the ratepayer protection obligation set forth in Section 454.52(a)(1)(D). Rather, qualitative assessment of the dynamic processes and interplay among the many risks and drivers behind future rates is paramount. Until the issues and uncertainties discussed above are resolved, the Commission should take a measured approach to accelerating

decarbonization in the electric sector and should maintain the trajectory for electric sector decarbonization adopted in the 2021 PSP decision – 30 MMT GHG emissions target in 2035. This approach best aligns with CARB Scoping Plan to allow fuel-emitting resources to serve reliability.

5. Ensure system and local reliability on both a near-term and long-term basis, including meeting the near-term and forecast long-term resource adequacy requirements of Section 380.

The CPUC's Resource Adequacy program was adopted nearly two decades ago to ensure the reliability of electric service in California. Pursuant to Section 380, the CPUC sets RA obligations applicable to all CPUC-jurisdictional LSEs, including investor-owned utilities ("IOUs"), energy service providers ("ESPs"), and CCAs. The Commission's RA policy framework guides resource procurement and promotes infrastructure investment by requiring that LSEs procure capacity to be available to the CAISO when and where needed. SDG&E's IRP portfolio was developed in compliance with the CPUC's current RA framework to address both system and local needs. However, as California and the Western Interconnection face increasing occurrences of extreme weather events like record-setting heat waves and droughts, the state should proceed with caution in simultaneously promoting demand-side electrification and supply-side GHG emissions reductions to ensure that the lights stay on 24/7/365.

6. Comply with paragraph (1) of subdivision (b) of Section 399.13 (i.e., at least 65 percent of the LSE's RPS procurement for each compliance period shall be from its contracts of 10 years or more in duration or in its ownership or ownership agreements for eligible renewable energy resources).

Section 399.13 and D.17-06-026 require that 65 percent of each retail seller's procurement that can be counted towards the RPS requirement must be from contracts (or ownership or ownership agreements) with term lengths of 10 years or more in duration. Section 399.13(a)(5)(B)(iii) also allowed SDG&E to elect early compliance with the long-term

contracting requirements in Section 339.13(b). In the RPS proceeding, SDG&E elected early compliance with the 65 percent long-term contracting requirement.

Beginning in 2020, long-term contracts have comprised 100 percent of SDG&E's remaining RPS contracts. SDG&E's developing contracts are long-term and have low risk of project failure. Because SDG&E's RPS portfolio is made up exclusively of long-term RPS contracts, it is not at risk for noncompliance with the 65-percent long-term contracting requirement. Additionally, SDG&E frequently monitors its portfolio to ensure continued compliance with the RPS Program requirements, including the long-term contracting requirement.

7. Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities.

The supply diversity of SDG&E's Preferred Conforming Portfolio is discussed in Section III.A above and shows SDG&E's resource mix is made up of multiple generating resource types such as solar, wind, biomass, natural gas, and storage. SDG&E's portfolio models are cost-optimized and do not lead to any transmission or system reliability issues. SDG&E's modeling accounted for transmission corridor limitations and allocated resources to minimize required transmission upgrades. In addition, SDG&E's IRP portfolios incorporate substantial increases in the utilization of energy storage resources. These energy storage resources can serve to improve systemwide reliability, not to mention improve the flexibility and resilience of the grid.

In addition, at the transmission level, CAISO's planning assumptions consider the results of the Commission's IRP proceeding and long-term forecasts of energy demand produced by the CEC in its IEPR. At the distribution level, coordination between the IRP and the High Distributed Energy Resources ("DER") Grid Planning (R.21-06-017) proceedings allow the IRP to include the most up-to-date information regarding any potential value of deferring distribution

upgrades with preferred resources. SDG&E supports improving coordination between agencies and proceedings, as intended by ACR 188 and the IAWG, as it believes a coordinated effort to share information improves the diversity, sustainability, and resilience of the grid, which inherently benefits local communities.

8. Enhance distribution systems and demand-side energy management.

SDG&E's Preferred Conforming Portfolio modeling incorporates the demand-side assumptions built into the CPUC's PSP including assumptions made within the IEPR. These assumptions reflect the adopted forecasts of demand-side resources. Further, SDG&E's portfolios incorporate significant energy storage resources which, as described above, serve to bolster the distribution system.

9. Minimize localized air pollutants and other greenhouse gas emissions, with early priority on disadvantaged communities identified pursuant to Section 39711 of the Health and Safety Code.

SDG&E's Preferred Conforming Portfolio relies on the adopted PSP and thus incorporates its impacts on disadvantaged communities ("DACs"). In addition, SDG&E supports a wide range of programs designed to support DACs, many of which specifically focus on air pollutant and GHG emissions reductions. SDG&E will continue to focus on programs that minimize air pollutants in DACs, as described further in Section III.D, below.

C. GHG Emissions Results

SDG&E used the CSP calculator to estimate the GHG mass emissions associated with each portfolio, as compared to its share of the GHG mass planning benchmarks for the 30 MMT and 25 MMT scenarios. The GHG emissions associated with SDG&E's Preferred Conforming Portfolios are below the 2035 GHG emissions benchmarks under both scenarios. SDG&E did not use custom hourly load shapes for GHG-free generation in the CSP. The results are shown in Table 2 below.

***Table 2* – Portfolio Emissions in 2035 Relative to Benchmarks**

GHG Target	SDG&E Position	Requirement
30 MMT	0.277 MMT	0.479 MMT
25 MMT	0.304 MMT	0.386 MMT

The emissions under the 25 MMT case are slightly higher even though both portfolios are the same. This is due to the assumptions inherent in the CSP calculator. The CSP calculator relies on slightly different assumptions under the 25 MMT case due to production cost modeling differences from running the lower-emission statewide portfolio.

D. Local Air Pollutant Minimization and Disadvantaged Communities

1. Local Air Pollutants

SDG&E provides local air pollutants associated with its Preferred Conforming Portfolios using the CSP. Table 3 below shows the results of SDG&E's analysis for NOx, PM2.5, and SO_2.

***Table 3* – Preferred Conforming Portfolio NOx, SO_2 and PM 2.5 Emissions**
(in tonnes/year)

Pollutant	25 MMT Scenario Emissions		30 MMT Scenario Emissions	
	2030	*2035*	*2030*	*2035*
NOx	18.46	15.86	19.02	19.56
PM 2.5	2.60	6.69	1.34	8.87
SO_2	0.69	0.66	0.60	0.87

2. Focus on Disadvantaged Communities

SDG&E supports the Commission's efforts to implement a standardized framework to evaluate air pollutant emissions (PM2.5, SOx, and NOx) and to address emission impacts in DACs. In this section, SDG&E describes and provides quantitative evidence to support how its Preferred Conforming Portfolios minimize local air pollutants, with early priority on DACs. For

purposes of IRP, a DAC is defined as follows based on the California Environmental Protection Agency's ("CalEPA's") designation:[35]

- Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 (1,984 tracts)
- Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores (19 tracts)
- Census tracts identified in the 2017 DAC designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0 (307 tracts)
- Lands under the control of federally recognized Tribes

Specifically, SDG&E discusses DAC demographics, current and planned activities or programs impacting DACs, estimates of emission of annual greenhouse gases, information for planned resources if proposed to be in a DAC (emitting and non-emitting), outreach efforts within DACs, criteria for evaluating procurement in DACs (which is discussed further in Section IV.B), and information on fossil-fueled plants within DACs. SDG&E does not propose any new gas fired power plants in this IRP. Nevertheless, the IRP process should account for the likelihood that these resources may continue to be needed (*e.g.*, for local reliability), even if they are no longer part of SDG&E's bundled portfolio.

SDG&E is engaged in a comprehensive set of activities to benefit low-income customers and customers in DACs, including targeted DAC-focused programs for clean transportation charging infrastructure, transportation electrification, energy efficiency ("EE"), distributed solar, energy storage, demand response, and low-income support programs such as California Alternative Rates for Energy ("CARE"), Family Electric Rate Assistance ("FERA"), and Energy Savings Assistance ("ESA"). SDG&E supports the statewide air pollution reduction program

[35] https://oehha.ca.gov/calenviroscreen/sb535.

based on Assembly Bill ("AB") 617 and is actively considering how to best facilitate the growth of electric and low-to-zero emission natural gas and hydrogen vehicles to reduce local air pollutant emissions from the transportation sector. Looking ahead, it is crucial that the State not limit its consideration of PM2.5, SOx, and NOx emissions to the electric sector.

a. DAC Demographics

SDG&E's service territory includes 56 DAC census tracts and 19 tribal land areas. SDG&E serves approximately 97,000 customers in DAC census tracts primarily located in South San Diego (Chula Vista, National City, and San Ysidro), along with El Cajon in the East. The 19 Tribal land areas are located predominately in the East of the service territory. Within these areas, SDG&E serves approximately 26,000 tribal customers. Combined, these DACs comprise roughly eight percent of SDG&E's total customers. However, reliance on some system power or other power with local pollutant or GHG emissions can have an impact on DACs outside SDG&E's bundled area. SDG&E therefore takes an expansive view in considering ameliorative action it can take in this area and details below its efforts to minimize DAC air pollution impacts, not only in its own service area, but also in the State as a whole. For illustrative purposes, Table 4 below presents additional details for SDG&E's DACs compared with SDG&E's overall service territory.[36]

[36] Demographics reflect census tract level data. Note that some customers in each census tract may be served by DA providers.

***Table 4* – DAC Demographics**

	CalEnviroScreen DACs	Tribal DACs	Combined DACs	SDG&E Territory[37]
General Demographics				
Male	49%	59%	51.5%	54%
Female	51%	41%	48.5%	46%
CARE Customer Breakdown				
Total Customers	97,500	26,356	123,857	1,485,345
Total CARE Customers	47,297	4,334	51,631	341,575
CARE participation rate	49%	16%	42%	23%
Customer Type %				
Industrial	0	0	0	0
Commercial	13%	18%	14%	10%
Residential	87%	82%	86%	90%

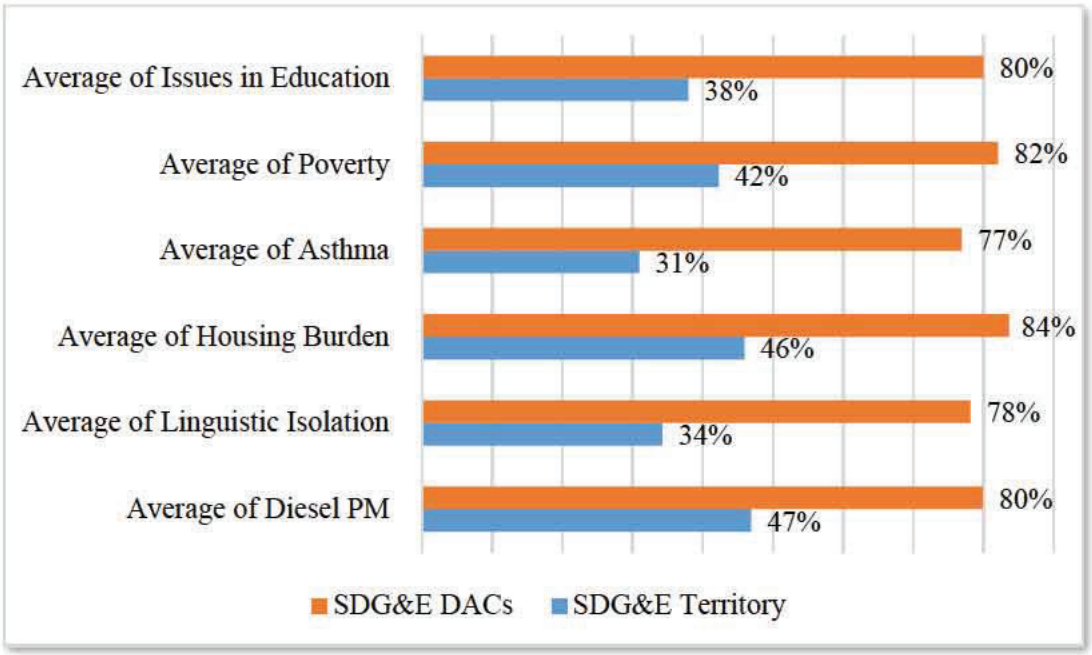
Understanding what factors contribute to SDG&E's DACs is critical to designing the best approach to serving these communities. CalEnviroScreen's designating factors are divided into two categories: pollution factors[38] and population factors.[39] The key indicators for SDG&E's DACs are shown in Figure 3 below. These indicators show that SDG&E DACs are disproportionately burdened with issues involving education, poverty, asthma, housing, linguistic isolation, and diesel Particulate Matter ("PM").

[37] SDG&E territory data includes DAC census tract data.

[38] Pollution factors include ozone, PM 2.5, diesel PM, pesticide, toxic release, cleanup sites, groundwater threats, hazardous waste, imp. Water bodies, solid waste.

[39] Population factors include asthma, low birth weight, cardiovascular disease, education, linguistic isolation, poverty, unemployment and housing burden.

***Figure 3* – Key DAC Indicators**[40]



b. DACs served by SDG&E

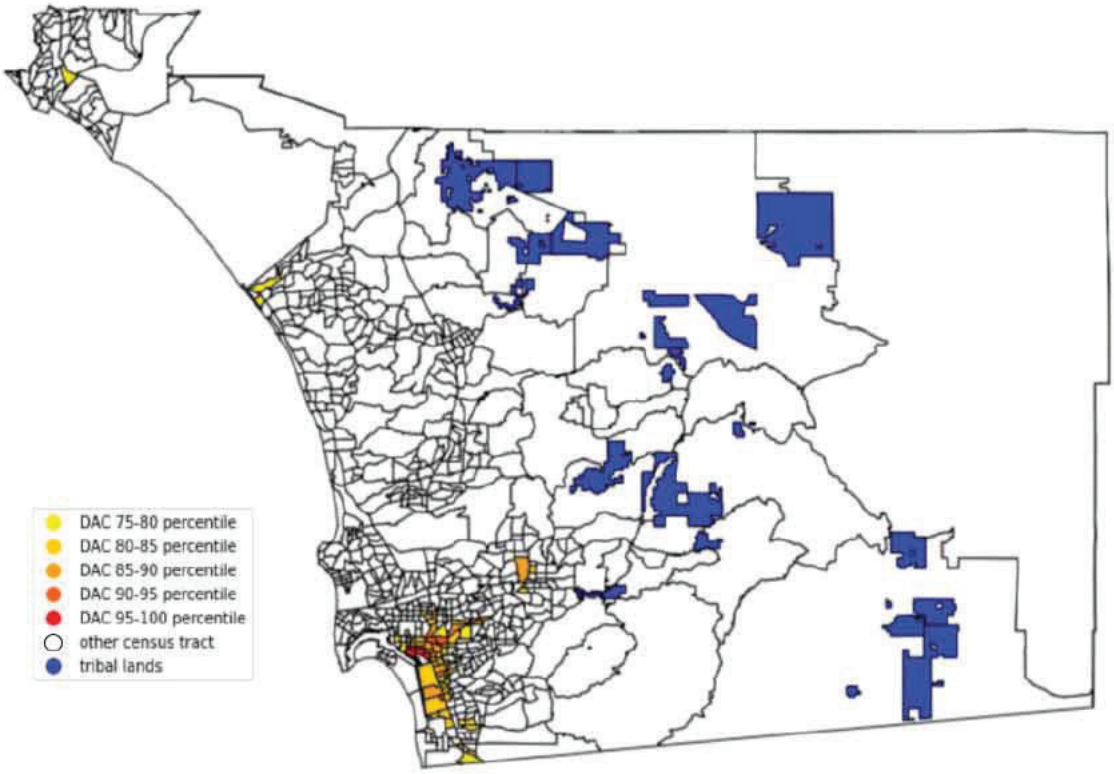
Figure 4 below provides a view of SDG&E's DACs and CalEnviroScreen rankings. The highest-scoring DACs are located near major transportation corridors and the Port of San Diego. This data highlights the need to continue efforts to maintain a clean power production fleet and focus on the transportation sector as a significant contributor to pollution in DACs.

Effectively serving DACs requires an understanding of the characteristics of the relevant communities and an analysis of the factors that qualify them as DACs. Factors relevant to SDG&E's DACs include diesel particulates, housing burden, linguistic isolation, poverty, asthma, and education level. As SDG&E has very few conventional generation resources in DACs, it will be critical for SDG&E to focus not only on reducing power plant emissions and

[40] Source: CalEnviroScreen 4.0. aggregate average percentile score by census tract. Tribal Lands do not fall into census tracts directly and are not captured by CalEnviroScreen 4.0, they are not included in this DAC indicator chart.

pollution but also on understanding the pollution impacts from other sectors as it considers how best to serve DAC customers. SDG&E is developing its Community Impact Platform as a tool to aid in serving DACs across the service territory.

***Figure 4* – SDG&E DAC Map Showing CalEnviroScreen 4.0 Results and Tribal Lands**



c. Current programs serving DACs

SDG&E has several DAC-related initiatives, which are summarized in Table 5 below. Many of these measures address some of the top DAC indicators for these communities, for example, by providing economic assistance with energy bills or low-cost opportunities to participate in green programs like energy efficiency and solar.

SDG&E is committed to serving the needs of its DAC customers. More than forty-five percent of SDG&E's DAC customers receive bill assistance through the CARE program. In addition, SDG&E CARE customers are automatically referred to the ESA Program offering no-cost energy efficiency measures to income-eligible customers that have not already been treated

through the ESA Program. All of SDG&E's existing or proposed electric vehicle programs target DACs in some way, and SDG&E is working with the Port of San Diego to deliver additional clean energy improvements for the Port of San Diego. The Port is located near SDG&E's most concentrated DAC area, and the Community Emissions Reduction Plan for the Portside Community was updated in 2021.[41]

***Table 5* – SDG&E Existing/Pending Programs Serving DACs**

Initiatives	Description
Rate	
CARE	Bill discount for income-eligible customers
FERA	Bill discount for income-eligible customers
Low-Income Programs	
ESA	No-cost weatherization and energy efficiency measures for eligible low-income customers.
Incentive Programs	
Solar on Multifamily Affordable Housing ("SOMAH")	Installations began occurring in 2021, accelerating in 2022. The average incentive is roughly $350,000. There have been 11 projects to date with a total installed capacity of 1.77 MW in SDG&E's territory. At least 80 percent of property residents have incomes at or below 60 percent of the area median income, as determined by the Department of Housing and Community Development, and/or are located in a DAC.
DAC Single-Family Affordable Solar Homes ("DAC-SASH")	The DAC-SASH program is newly available in mid-2020 to low-income customers who are resident-owners of single-family homes in DACs. Unlike traditional SASH, eligibility for DAC-SASH is not limited to designated affordable housing units and, therefore, will be available to a broader group of homeowners than the current SASH program. This program is administrated by a statewide administrator, and SDG&E has had limited activity in this program.
Pilot Programs	

[41] *Available at:* https://www.sdapcd.org/content/dam/sdapcd/documents/capp/cerp/Portside-Environmental-Justice-CERP-July-2021.pdf.

Initiatives	Description
CARE Programmable Communicating Thermostat ("PCT")	Targeted at high usage CARE customers to test if PCTs assist them on a TOU rate.
Expanded CARE Energy Storage ("ES") Program	Provides a $1.20/watt incentive (up to $75,000) to cover the full cost of ES for Expanded CARE Nonprofits
Demand Response Pilot	Pilot program targeting DACs with the purpose of improving local air quality by leveraging a battery located in a DAC community. Additionally, via outreach to small and medium DAC businesses, show the advantage of using a small battery to help offset peak energy use. Outreach about the project was also directed to residential customers. SDG&E ultimately partnered with Boys and Girls Club and the project was completed in August 2022.
Electric Vehicles[42,43]	
Power Your Drive ("PYD") Pilot (complete)	• EV grid-integrated charging infrastructure program that installed 3,033 Level 2 chargers at 257 sites. • DAC target: 10 percent. This program is complete and achieved 32 percent DAC implementation.
Port Electrification (complete)	• Installed 12 charging ports at two sites to support medium/heavy-duty EVs and electric forklifts at the Port of San Diego. • DAC target: Majority in DACs. This program is complete and achieved 100 percent DAC implementation.
Electrify Local Highways (complete)	• Installed 80 Level 2 ports and eight Direct Current Fast Charger charging stations at four Caltrans Park-and-Ride lots located along highways for public use. • DAC target: Program achieved 50 percent DAC implementation.
Dealership Incentives (complete)	• Offered educational materials, training, and financial incentives for dealerships that sell EVs in exchange for customers agreeing to participate in one of SDG&E's EV rates. • Emphasized sales in DACs and focused on dealerships in DACs.

[42] Current program unless otherwise noted.

[43] Service territory definition.

Initiatives	Description
Fleet Delivery (complete)	• Installed 79 charging ports for fleet delivery vehicles at four locations. • DAC target: Program achieved 75 percent DAC implementation.
Green Shuttle (complete)	• Installed charging stations at 3 locations frequented by shuttles on a fixed route, including four Direct Current Fast Chargers and six high-powered Level 2 chargers. • DAC target: Current program has 67 percent DAC implementation.
PYD for Fleets (MD/HD)	• Install EV charging infrastructure to support approximately 3,000 Class 2-8 medium/heavy-duty EVs, including forklifts and transport refrigeration units at 300 sites. • DAC target: 30 percent of the infrastructure budget.
V2G Electric School Bus Pilot	• V2G Electric School Bus Pilot utilizes six electric school buses capable of V2G as a distributed energy resource to test technologies and explore financial incentives. • The school site is in a DAC
Power Your Drive for Schools (AB 1082)	• Pilot program to install approximately 196 charging ports at 30 schools and educational institutions. • DAC target: 40 percent. (Current program has 50% DAC implementation.)
PYD for Parks (AB 1083)	• Pilot to install 140 charging ports at 22 State/City/County parks and beaches. • Expansion of AB 1083 to City and County parks will enable larger opportunity for DAC incorporation. • DAC target: 50 percent. (Current program has 100 percent DAC implementation.)
PYD for Work and Homes Extension	• An extension of the Power Your Drive Pilot Program to add 2,000 Level 2 charging ports at approximately 200 workplaces and multi-unit dwellings over two years. • AB 841 underserved community target: 50 percent
PYD for Communities	• Application (via advice letter) for a near term priority program focusing on publicly accessible fast charging for light-duty vehicles • AB 841 underserved community target: 70 percent.

d. Estimates of annual GHG emissions

The Commission has directed LSEs to include in their IRPs "detailed estimates of annual greenhouse gases and local air pollutants (including at least nitrogen oxides and particulate matter), as well as annual starts of natural gas plants" in DACs. Providing DAC-specific emissions related to SDG&E's portfolio is not meaningful because emissions from these plants cannot be tied explicitly to SDG&E's Preferred Conforming Portfolios or to the energy needs of the DACs in which they are located. These units are dispatched by the CAISO and thus are operated to meet all loads and not just the load served by SDG&E, or the load in the DAC. However, to help inform the Commission as to the operation of plants located in DACs in SDG&E's service area, SDG&E provides a list of such plants in Table 6 below.

It is also important to note that for SDG&E's service area, the number of natural gas plants located in DACs is relatively small. These plants fall into two categories: Combined heat and power ("CHP") facilities and natural gas peaker plants that provide both system and local reliability. SDG&E's contract for the 26.8 MW CHP facility is set to expire in 2024. Of the two peaker plants located in DACs, one is under a long-term contract with SDG&E. The other is owned by SDG&E. Both of these plants are used to meet local resource adequacy obligations. These plants are bid at their variable operating cost to the CAISO markets. The market solution determines their operation based on CAISO needs, not SDG&E's bundled need.

SDG&E also has an energy storage facility located in a DAC. SDG&E installed a new energy storage facility in El Cajon in 2017, in response to the Commission's request to add energy storage to reduce reliance on natural gas plants due to the reduction in Aliso Canyon's operational gas storage.

Information regarding natural gas plants located in DACs in SDG&E service area is provided below.[44]

***Table 6* – SDG&E Owned or Contracted Natural Gas Plants in DACs**

Facility	Size (MW)	Description
CP Kelco	26.8	CHP Facility, under contract to SDG&E through 2024, per CHP settlement
El Cajon Energy Center	48.1	Peaking facility under contract through 2035, needed to meet local resource adequacy
Cuyamaca Facility	47.0	Peaking facility owned by SDG&E, needed to meet local resource adequacy
Yuma Cogeneration Associates	54.9	CHP facility, under contract to SDG&E through 2024
El Cajon Energy Center, LLC	48.1	Wellhead facility, under contract with SDG&E through 2035
Desert Star Energy Center; Boulder City NV	480	Gas Fired Combine Cycle Facility under contract through 2027, acquired by SDG&E in October 2011 pursuant to D.07-11-046

e. Locational information for all planned resources if proposed to be located in a DAC including emitting and non-emitting resources

Modeling results do not yield the specificity of locational information. These details depend on the procurement process, and where developers plan to cite generating resources based on the solicitation requirements. However, all generating resources are subject to applicable zoning and ministerial permit requirements, including environmental review pursuant to the California Environmental Quality Act ("CEQA") and local Air Pollution Control District requirements.

[44] In Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad, President Biden directed the Council on Environmental Quality to create a Climate and Economic Justice Screening Tool. The purpose of the tool is to help Federal agencies identify disadvantaged communities that are marginalized, underserved, and overburdened by pollution. The current version of the tool provides socioeconomic, environmental, and climate information to inform decisions that may affect these communities. The tool identifies disadvantaged communities through publicly available, nationally consistent datasets.

f. Evaluation criteria for potential procurement in DACs

SDG&E is developing methods to ensure that new procurement will prioritize the reduction of emissions and pollution in DACs. First, SDG&E will focus on using bid evaluation criteria to provide "early priority" for resources that, if selected, would result in reduced emissions in DACs. Specifically, SDG&E will actively seek bids for non-emitting resources located in DACs by using bid evaluation criteria that favor such projects. SDG&E is incorporating DAC considerations into its least-cost, best-fit ("LCBF") valuation methodology. A similar approach to that utilized under the RPS program will be applied to IRP procurement (*i.e.*, it will be applicable to the evaluation of all technologies as well as new or operating facilities). This ensures that impacts to DACs are evaluated at the earliest possible opportunity and that the results are incorporated into the decision-making process. Qualitative criteria are used to compare projects of similar cost, meaning that a project that provides benefits to DACs may be ranked higher than a similar project that does not offer such benefits. See Section IV.B for further discussion of SDG&E's action plan for DACs.

g. Outreach to DACs

SDG&E has not conducted IRP-specific outreach to DACs prior to finalizing and submitting its IIRP, given the extensive modeling necessary, need to assess the results, and significant task of developing a plan between August publication of all the necessary material from the Commission's Energy Division and the ultimate filing deadline of November 1. However, SDG&E considers impacts to DACs in its activities, including the IRP. See Section IV.B for further discussion of SDG&E's action plan for DACs, including outreach.

E. Cost and Rate Analysis

SDG&E anticipates that the incremental procurement necessary under either the 25 MMT or 30 MMT Preferred Conforming Portfolio will increase rates for customers. Attachment A,

presents the revenue requirements and rate analysis for the current (baseline) and the Preferred Conforming Portfolios. Affordability is paramount to a clean and reliable system. SDG&E's modeling and analysis resulted in two identical portfolios that result in an identical bundled system average rate increase of approximately $0.05/kWh in 2035, compared to the baseline scenario, as detailed in Attachment A. However, while the two scenarios produced identical portfolios, the flawed inputs and assumptions used for the 25 MMT scenario, discussed above, create concerns that the forecasted bundled system average rate increase for the 25 MMT would actually be higher than what is reflected in the analysis.

It is important to consider that these forecasts do not incorporate the costs of any additional transmission or distribution investments that may be needed to connect new resources and continue reliably serving SDG&E's customers, which also place upward pressure on rates.

In the Appendix A tables, SDG&E provides detailed information on the forecasted revenue requirement and system average rate for bundled customers for the current (baseline) and Preferred Conforming Portfolios. These tables reflect SDG&E's estimated portfolio costs through 2035. The revenue requirements do not include portfolio optimization activities that might include, but are not limited to, renewable energy credit ("REC") and/or RA sales due to load departure.

As discussed in the Study Design Section II, the scenarios presented relied on the Commission's planning assumptions to develop price assumptions used for bundled energy market purchases and revenues for generation market sales. This includes gas prices, GHG allowance costs, and REC and RA market prices. For the other components of its revenue requirement forecast (transmission, distribution, demand-side management ["DSM"] programs, and other), SDG&E created a forecast based upon recent assumptions. SDG&E's analysis is

based on revenue requirements reflective of SDG&E's general rate case ("GRC") and other Commission approved revenues and balancing accounts, and modeling assumptions provided in the category descriptions below.

Note that the illustrative system average rates provided below are for purposes of this IIRP only, are not representative of SDG&E's actual rates, and should only be used for the limited purpose of assessing the impact of the Preferred Conforming Portfolios. Actual realized rates will depend upon realized market prices, the outcomes of future rate cases, in particular GRCs, other ongoing proceedings, and market conditions. Future rate forecasts will reflect the information available at that time and may lead to updated revenue requirements associated with additional (or reduced) costs including, but not limited to, transmission and distribution upgrades, grid modernization costs, clean transportation infrastructure costs, and changes based on SDG&E's cost of capital.

SDG&E relied on the following published information for input data:

- Forecasts are escalated using SDG&E's Gas and Electric Operations and Maintenance Price Index ("GEOMPI") used in the 2021 IEPR.
- Lines 1-2 and 5: The 2023-2026 Baseline scenario for distribution, transmission, and other revenue requirement forecast based on SDG&E's Q3 2022 Itemized List of Electric Revenue Requirements served on September 16, 2022, pursuant to Ordering Paragraph 4 of D.22-08-023. The forecast includes all revenue requirements approved by the Commission but not yet implemented as well as pending requests.
- Line 3: The 2023-2026 Baseline scenario for the generation revenue requirement forecast is based on the 2023 ERRA and Electric Sales Forecast Application (A.22-05-025), as updated on October 12, 2022, pending Commission approval and 2023 Generation Base Margin from SDG&E's TY 2019 GRC.
- Line 4: The 2023-2026 Baseline scenario for demand-side programs revenue requirement forecast based on 2021 IEPR.
- Line 5: Other revenue requirement includes Local Generation Charge, GHG Revenue, Competition Transition Charge, Nuclear Decommissioning, Public

Purpose Programs, Reliability Services, Total Rate Adjustment Component, and Wildfire Fund Nonbypassable Charge. It does not include PCIA revenues.

- Line 7-8: The 2023-2035 Electric sales forecast is based on the CEC 2021 California Energy Demand forecast, which was adopted by the CEC Commissioners in the 2021 IEPR.

F. System Reliability Analysis

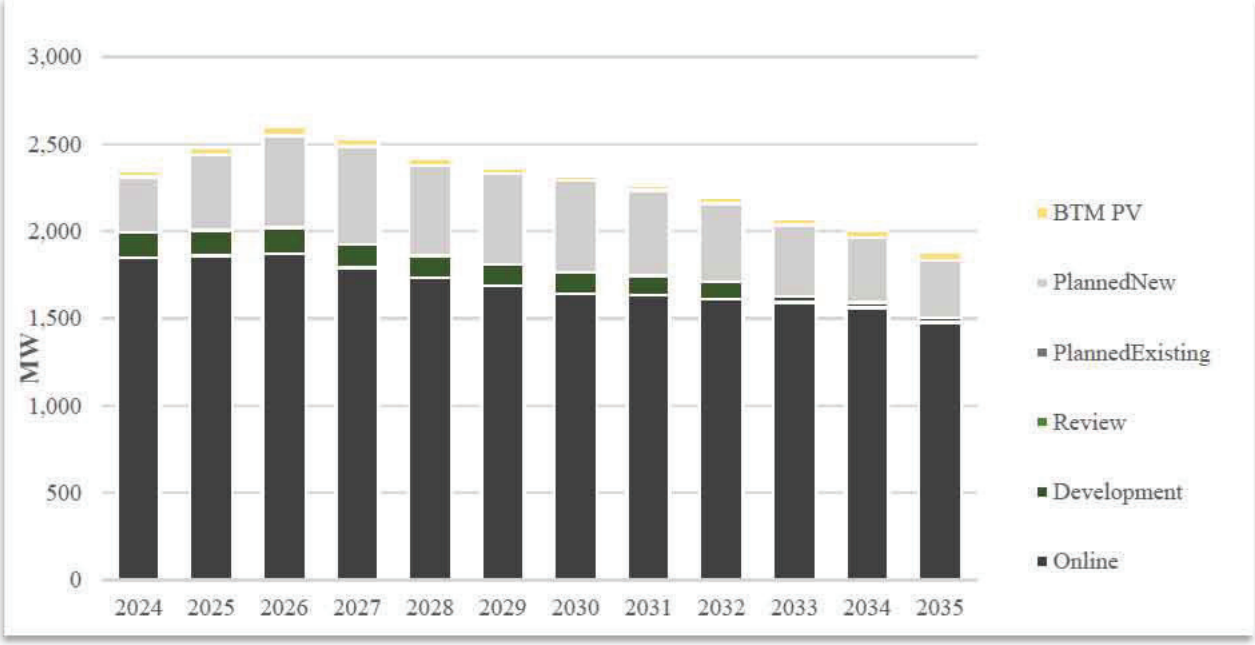
In this IRP cycle, the Commission's RDT relies on a perfect capacity ("PCAP") PRM and marginal effective load-carrying capacity ("ELCC") approach for reliability analysis. The PCAP approach removes from the reserve margin an allowance for forced outages of firm resources and accrediting all resource types at their respective ELCC – *i.e.*, their perfect capacity equivalent, based on simulations that consider their risk of outages, resource availability, and their interaction with load and other resource types. A marginal ELCC approach uses lower marginal ELCC percentages but also reduces the effective capacity that LSEs need to show.

As a result, SDG&E's Preferred Conforming Portfolios provide over [redacted] surplus capacity in every year through 2035, as the total supply exceeds total reliability need. Below, SDG&E provides load and resource table by contract status, as well as a chart of this information, for each preferred conforming portfolio that includes total reliability need (effective MW), total supply (effective MW), and net capacity position (effective MW) for all study years. Attachment B provides SDG&E's detailed reliability position, summarized in Table 7 below.

Table 7 – **Preferred Conforming Portfolio Reliability Position (Effective MW)**

ELCC by Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Online	1,851	1,859	1,871	1,790	1,734	1,688	1,643	1,637	1,613	1,592	1,563	1,478
Development	143	146	149	137	125	123	121	110	99	34	29	25
Review	-	-	-	-	-	-	-	-	-	-	-	-
Planned Existing	-	-	-	-	-	-	-	-	-	-	-	-
Planned New	319	432	528	561	519	521	529	489	449	411	372	330
BTM PV	39	44	49	44	38	34	28	31	35	38	41	45
Total Supply	**2,352**	**2,480**	**2,597**	**2,533**	**2,416**	**2,366**	**2,321**	**2,267**	**2,195**	**2,074**	**2,006**	**1,878**
Total Need												
Net Capacity												

Figure 5 – **SDG&E Capacity by Contract Status**



SDG&E generally uses a LOLE methodology for verifying the reliability of the aggregated portfolio, that it meets a minimum reliability criterion of less than or equal to 0.1, or 1 event in 10 years LOLE. In this IRP cycle, Energy Division conducted studies on the PRM and ELCC to improve IRP reliability planning. As a result, both conforming portfolios were found to be more reliable than a 0.1 LOLE.

The CPUC's recent study process has generated a more robust analysis of reliability needs by each LSE, allowing the Commission to determine which LSEs should be responsible for system reliability procurement needs by assessing which portfolios are deficient relative to their individual system requirements. If an interim reliability assessment is needed before the Commission can complete this full process, it will be critical to understand how to allocate that need appropriately to the LSEs with portfolios that fall short of system RA requirements. Additionally, the Commission may wish to consider how much in energy-limited resources each LSE may procure to meet their system RA requirements. Relying solely on energy-limited resources will risk reliability even if an LSE were to meet its system RA requirements. The Commission needs to ensure reliability can be met in the long run because, when significant reliability issues surface in the RA timeframe, it will be too late to avoid load shedding (*i.e.*, blackouts) to maintain reliability if no additional resources exist at that time.

G. High Electrification Planning

To satisfy its assigned GHG Emission Benchmarks by 2035, SDG&E's modeling shows the need to procure an additional 318 MW of capacity by 2035 under the CEC's High-Electrification scenario in order to serve the additional demand within the GHG emissions limit.[45] Because SDG&E's modeling for the 25 MMT and 30 MMT scenarios yields the same buildout, there is no difference in the additional procurement needed to serve ATE for either GHG emissions target. SDG&E estimates that ATE procurement would increase the costs by

[45] CEC has developed and adopted two demand-side projections: High Electrification ("HE") and Additional Transportation Electrification ("Additional TE"). The CPUC is developing the resource portfolio satisfying the higher load, using the Additional TE, and a 2030 30 MMT target and will transmit this portfolio to CAISO by the end of June to be studied as a policy-driven sensitivity in the 2022-2023 TPP. Therefore, in this section, high electrification planning is limited to ATE.

about $231.6 million above the base case, Preferred Conforming Portfolios. The tables below specify the amount of procurement necessary for each resource type through 2035.

***Table 8* – Additional Procurement Needed (in MW) for ATE Scenario by Resource Type**

Resource Type	Base Case	ATE	Difference	Transmission Zone
Demand Response	67	67	-	GreaterImpOutsideTxConstraintZones
Geothermal	42	42	-	Greater_Imperial_Geothermal
Hybrid – Storage Portion	239	239	-	Greater_Imperial_Solar
Hybrid – PV Portion	254	254	-	Greater_Imperial_Solar
Long Duration Storage	55	55	-	GreaterImpOutsideTxConstraintZones
Offshore Wind	115	115	-	-
Solar	603	625	22	Greater_Imperial_Solar
Solar OOS	0	296	296	-
Utility Battery	280	280	-	GreaterImpOutsideTxConstraintZones
Wind	7	7	-	Greater_Imperial_Wind
Wind OOS	137	137	-	-
Total	1,799	2,117	318	

***Table 9* – Additional Build Cost Per Year (Million $)**

Year	Cost
2022	-
2023	-
2024	-
2025	-
2026	-
2027	-
2028	10.3
2029	23.3
2030	31.4
2031	48.1
2032	25.6
2033	16.2
2034	48.0
2035	28.7
Total	231.6

While the additional procurement costs increase bundled rates in each year, additional bundled sales resulting from ATE load could help to offset the rate impacts by approximately six cents/kWh lower in 2035 as compared to the preferred conforming portfolios, assuming the forecast for 2021 IEPR ATE load forecast is accurate and the additional load materializes.

H. Existing Resource Planning

The 2021 Preferred System Plan found that, "in the 2019-21 IRP cycle, aggregated LSE Preferred Conforming Portfolios failed to meet GHG and reliability targets due to insufficient new capacity being planned for, and that this was caused in part by LSEs over-relying on existing resources."[46] SDG&E appreciates the challenge of ensuring that existing resources continue to be made available for the planning horizon and that LSEs are not over-relying on those existing resources.

To improve planning around existing resources as part of this IRP cycle, SDG&E analyzes and discusses how this finding impacted SDG&E's approach to developing its 2022 Preferred Conforming Portfolios. SDG&E recognizes that an overreliance on existing resources could lead to insufficient capacity being contracted and therefore available to the system. Specifically, IRP modeling and assumptions must account for contract expirations, planned resource retirements, and existing resource availability for each LSE. For instance, while a particular resource may provide a specific amount of capacity under contract to SDG&E, when that contract expires, some portion of that capacity may get procured by another LSE and no longer be available to SDG&E.

[46] Energy Division 2022 IRP Narrative Template. *Available at*: https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/long-term-procurement-planning/2022-irp-cycle-events-and-materials.

For this IRP cycle, SDG&E has taken steps to maximize the accuracy of existing resource planning and minimize the risk of over-reliance on existing resources.

1. Contract Expirations

First, SDG&E removed any existing resources from its portfolio based on contract expirations prior to conducting any modeling. When contracts expire, SDG&E is able to right-size its portfolio, solicit new contracts based on current needs, and ensure least-cost, best-fit procurement. While SDG&E assumes, consistent with the Commission's direction, that expiring resources will remain available to the market (*i.e.*, will not retire), SDG&E does not assume that these resources will be fully available to SDG&E. Table 10 below shows SDG&E's expiring contracts through the planning horizon.

***Table 10* – SDG&E's Expiring Contracts through 2035**

End Year	Contract	Capacity (MW)	Technology Type
2022	Morgan Stanley (NOB)	125	Specified Imports
	Prima Deshecha	6.1	Biogas
2023	Miramar Biogas	4.5	Biogas
2024	Kelco	26.8	Natural Gas
	Oak Creek	3.5	Wind
	OhmConnect	4.5	Demand Response
	Otay Mesa	603.6	Natural Gas
	Sycamore Landfill 2	2.25	Biogas
	Yuma Cogeneration Associates (CHP)	54.93	Natural Gas
2025	Goal Line (CHP)	49.9	Natural Gas
	Kumeyaay Wind	50	Wind
	San Gorgonio (Phoenix)	11.2	Wind
2026	Coram	7.5	Wind
	Grossmont Hospital (CHP)	4.6	Natural Gas
	Sentinel Energy	47	Natural Gas
2027	Badger Filtration Plant	0.6	Conduit Hydro
	HL Power Company, LP	24	Biomass
2030	Maricopa West	20	Solar PV
2031	San Marcos Landfill	1.5	Biogas

End Year	Contract	Capacity (MW)	Technology Type
	Sycamore Landfill 1	1.5	Biogas
2032	Johanna Energy Center	20	Battery Storage
	Manzana Wind	100	Wind
	Pacific Wind	140	Wind
	Sagebrush Energy Storage	80	Battery Storage
2033	Bright Canyon / Los Alamitos	10	Hybrid – PV
	Campo Verde	139	Solar PV
	Cascade	18.5	Solar PV
	Ocotillo Express	265.29	Wind
	Olivenhain	0.45	Conduit Hydro
	Ortega Grid	10	Battery Storage
2034	Centinela	125	Solar PV
	Centinela Expansion	45	Solar PV
	Edwards-Sanborn Hybrid Phase 1	25	Hybrid – PV
2035	El Cajon Energy Center (Wellhead)	47	Natural Gas
	Energia Sierra Juarez (ESJ)	155	Wind
	Orange Grove	99.21	Natural Gas
	Seville	20	Solar PV

2. Selection of Existing System Resources

While SDG&E removes expiring contracts, its Preferred Conforming Portfolios still include existing resources, defined here as resources with contract statuses of "online" and "planned existing" in the RDT. SDG&E's Conforming Portfolios include 3,049 MW of contracted nameplate capacity from existing resources in 2035.[47]

Moreover, SDG&E limited its selection of existing system resources, including transmission import and export capability, to a percentage equal to its bundled share of the overall CAISO system load, with candidate resources partitioned on a *pro rata* basis. This allows SDG&E to use existing resources effectively without overestimating the number of resources that will be available to SDG&E. Capping the existing resource use based on its

[47] This total reflects the capacity after CAM and MCAM quantities are removed.

bundled customers, rather than customers in its service territory serves to properly account for the overlapping territory served by the CCAs located in SDG&E's larger service territory. If this candidate resource partitioning approach is used by all LSEs, it will ensure that the total selected resources by each category will not exceed the maximum available potential when the Commission combines LSEs' IIRPs to form the PSP.

The continued availability of existing gas-fired resources should be assessed as emission targets and LSEs' IIRPs are adopted. As shown in Table 10, 933 MW of contracted natural gas generation capacity is expected to expire by 2035. This capacity is being replaced by non-emitting resources in SDG&E's IIRP and, as a practical matter, it is not clear whether or to what extent this capacity will remain operational after contract expiration. An additional 485 MW of capacity may go offline in 2027 after Desert Star's land lease expires. IRP procurement has focused on contracting new resources for *incremental* needs, which assumes continued availability of existing resources. This approach increasingly gives rise to "concerns of insufficient forward contracting of *existing* resources, which could cause unexpected retirements of aging resources that are difficult to maintain with one-year contracts."[48]

I. Hydro Generation Risk Management

Hydro generation is subject to drought-related risk that could impact reliability. This risk mainly arises in the form of water supply constraints and evaporative losses. SDG&E has significantly fewer hydro resources as a proportion of its bundled portfolio than the PSP, which greatly reduces the associated risks. In fact, SDG&E's current bundled energy portfolio contains

[48] *Administrative Law Judge's Ruling Seeking Comments on Staff Paper on Procurement Program and Potential Near-Term Actions to Encourage Additional Procurement*, Attachment A ("Reliable and Clean Power Procurement Program Staff Options Paper"), issued in R.20-11-003 on September 8, 2022, at p. 5 (emphasis added).

no large hydroelectric generating resources and only one small pumped hydro generation facility, whose unique characteristics ensure minimal in-state drought risk for SDG&E.

Although a portion of SDG&E energy needs are supplied by the market, some of which could include hydro from other areas of California, SDG&E's Conforming Portfolios do not show additional hydroelectric generation resources being built between now and 2035. To the extent there is a drought limiting hydro energy in the market, there are other resources available to mitigate those risks.

J. Long-Duration Storage Planning

SDG&E's current portfolio consists of diverse resources, including natural gas-fired generation, while remaining below the GHG benchmarks. From a statewide perspective, SDG&E understands that long-duration energy storage provides essential benefits to the electric grid that mirror benefits provided by natural gas-fired generation and the underlying gas infrastructure. Long-duration energy storage can be beneficial during specific times when solar and/or wind resources are not available to serve load and provide scheduled energy to manage grid frequency. As California progresses toward economy-wide carbon neutrality in 2045, long-duration energy storage will be an important tool for meeting State energy reliability needs.

While SDG&E's Preferred Conforming Portfolios include 55 MW of cumulative long-duration energy storage capacity beginning in 2026 and remaining at that level through 2035, it is essential to note that the technology is overcoming challenges and must develop further to meet the reliability needs of the future grid affordably. In other words, energy storage is not a "magic bullet" solution for ensuring grid reliability; it does not provide the same optionality as gas-fired resources. Natural gas combustion and its underlying natural gas infrastructure can support a highly renewable portfolio with its ability to respond to:

- intraday ramping needs

- multiday renewable droughts
- seasonality

By contrast, four-hour battery storage can assist with intra-day ramping but not multi-day solar droughts or seasonality, and long-duration storage options require further analysis to confirm that the resources maximize their intra-day ramping capability during significant events. Seasonal variability of renewable generation, intra-day ramping needs, and the potential for multiple-day renewable energy droughts highlight the need for additional flexible, dispatchable resources that are available year-round. With clean energy technologies constantly evolving, it is possible that a new or modified solution for long-term storage will emerge in the future.

K. Clean Firm Power Planning

As directed by the Commission, this section describes SDG&E's approach to planning for clean firm generation. However, SDG&E also discusses the growing need to plan for *dispatchable* power – which provides critical reliability benefits distinct from firm power. The Commission defines clean firm generation as resources that:

- Have an annual capacity factor of at least 80 percent resources;
- are not subject to use limitations;
- are not weather-dependent;
- are not storage;
- can generate when needed, for as long as needed; and
- do not have any onsite emissions, except if the resource otherwise qualifies under the RPS program eligibility requirements.

These attributes generally are met by geothermal resources. SDG&E's Preferred Conforming Portfolios include only SDG&E's share of geothermal resources ordered under D.21-06-035, amounting to 42 MW through 2035. As the RDT shows, SDG&E does not have

any currently existing resources that meet these attributes. The IRP mid-term reliability decision requires procurement of such resources.[49] While valuable for system reliability, at this time, clean firm resources are relatively scarce and come at a high price. SDG&E's mid-term reliability solicitation efforts have not yielded any contracts for such resources to date.

However, in developing its Preferred Conforming Portfolios, SDG&E has maximized its share of clean firm resources under the mid-term reliability procurement directive – in sum, 42 MW by 2026. Because of the high cost to build, however, SDG&E's modeling confirms that it is not cost-optimal to construct any new clean firm resources.

It is incumbent upon the State to ensure the sufficient firm and, equally important, dispatchable resources necessary to ensure system reliability. Clean firm options have little dependence on weather or time of day and, therefore, can provide a more cost-effective approach to maintaining reliability. Without clean firm options, maintaining reliability will require significant overbuilding of these weather and time-of-day-dependent resources paired with a substantial investment in storage options. This considerable investment would ultimately come at a high cost to ratepayers. SDG&E has seen evidence of this potential pattern in its current cycle IRP modeling. These realities make clean firm power options essential to developing the reliable grid of the future while maintaining affordability.

Firm and dispatchable are distinct resource attributes that both play a vital role in the energy transition. Further, SDG&E believes that resource diversity is essential to designing a

[49] In D.21-06-035, Ordering Paragraph 2, the Commission ordered procurement of at least 1,000 MW of generation capacity that "has no on-site emissions or is eligible under the requirements of the renewables portfolio standard program, and has at least an 80 percent capacity factor. The resource must not be use limited or weather dependent. No storage projects shall qualify under this provision."

grid reliant on clean firm power while maintaining reliable operation. In this section, SDG&E describes its plans for future clean firm power resources being incorporated into the grid.

1. Portfolio Resources

SDG&E designed its study for this IRP cycle to focus on maintaining system reliability while achieving its share of the CPUC's GHG emissions targets. SDG&E's modeling did not select any additional clean firm power options beyond those that were required by the midterm reliability decision, instead opting to build extensive solar and wind resources paired with new and existing battery storage. This non-selection is likely due to the comparative incremental costs of the clean firm options and other modeling constraints.

***Table 11* – SDG&E's Clean Firm Power Capacity**

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Capacity (MW)	0	0	0	42	42	42	42	42	42	42	42	42	42

2. Potential Future Resources

SDG&E expects zero-carbon firm capacity resources to prove necessary for the future of California's grid and believes these resources will play a more prominent role in future IRP cycles. Several technologies that meet the requirements to be considered clean firm generation are currently in various stages of development and commercialization. These technologies, once implemented, will facilitate electric sector decarbonization while also supporting reliability by operating when other clean resources such as solar and wind are unavailable.

a. Zero Carbon Technologies

Hydrogen Combustion. SDG&E supports the implementation of hydrogen combustion as a means to 100 percent zero carbon electricity in 2045 to meet the goals of SB 100.[50] In its *Path to Net Zero* study, SDG&E envisioned clean hydrogen generation as a technology capable of maintaining reliability while also satisfying the demand for clean energy. This technology could be utilized as a dispatchable resource but could also be used for firm power generation should the technology prove cost-effective.

Small Modular Nuclear Reactors. Small modular nuclear reactors represent a potentially viable technology without the geographical limitations of other clean firm resource technologies. Reactors could be aggregated in centralized locations or spread out over regions to create microgrids. However, small modular nuclear reactors face a unique legislative challenge due to California's current ban on new nuclear generation until permanent waste storage facilities are readied.

Enhanced Geothermal Systems. Enhanced geothermal systems offer potential for this technology in SDG&E's service territory and across the State. However, this technology may require fracking and result in environmental impacts, which could prove challenging. Further, the technology is costly compared to other clean firm power options.

b. Near-Zero Carbon Technologies

Natural Gas or Biofuel with Carbon Capture and Sequestration. In addition to the Zero Carbon resources described above, SDG&E believes that certain technological advancements

[50] Establishes a target for renewable and zero-carbon resources to supply 100 percent of retail sales and electricity procured to serve all state agencies by 2045. SB 100 also requires the CEC, CPUC, and CARB to use programs under existing laws to achieve 100 percent clean electricity and issue a joint policy report on SB 100 by 2021 and every four years thereafter. Hydrogen and other renewable fuels are currently being considered in the SB 100 Joint Agency review process. *See*: https://www.energy.ca.gov/sb100.

can allow for the continued use of existing natural gas resources while still achieving net-zero economy-wide GHG emissions. A key technology in this realm is natural gas with carbon capture and sequestration ("CCS"). Admittedly, no existing carbon capture technology is expected to capture 100 percent of emissions. Current technology is designed to capture between 85 and 95 percent of CO_2 emissions, making natural gas with CCS a near-zero carbon option. It is important to note that these CCS technologies could achieve higher CO_2 capture, but this would come at a higher cost. The advantage of CCS, however, is that it allows for retrofitting existing firm, dispatchable thermal resources to operate with significantly fewer emissions.

c. Summary of Challenges/Risks to Future Clean Firm Power Resources

While fully supportive of new technologies to enable a zero-carbon electric grid. SDG&E recognizes the unique challenges the State is facing. Some of the most difficult are discussed below.

Cost. Many of these technologies are new and, as such, do not benefit from the cost savings associated with wide-scale implementation and adoption.

Location and Infrastructure. Certain technologies may need to be in areas where transmission corridors do not currently exist, requiring additional infrastructure upgrades. Further, CCS technology will require developing or repurposing infrastructure to transport captured carbon dioxide to offsite sequestration locations.

Legislative Challenges. Certain technologies may require changes to existing laws at the federal, state, and local levels.

General Uncertainty. Certain potential Clean Firm resources are still in development, and as such, increased uncertainty exists. This uncertainty presents a unique risk in the IRP context. As the forecasting horizon increases, so does uncertainty. In addition, new technologies have an

increased risk of additional constraints, such as supply chain issues. Therefore, the long-term IRP plan creates inherent risk especially combined with the already uncertain characteristics of these technologies.

Despite these challenges, SDG&E remains fully committed to decarbonization and will continue to incorporate these technologies into its future IRP planning cycles as they become commercially available.

L. Out-of-State Wind Planning

Out-of-state ("OOS") wind resources will be critical to maintaining a clean and reliable grid. The Commission's 2021 PSP calls for 1,500 MW of new OOS wind generation to be available beginning in 2030.[51] However, modeling results show 600 MW of OOS wind from Baja California by 2024 and an additional 5,000 MW split between New Mexico and Wyoming by 2026. OOS wind procurement remains at these levels through 2035. These results translate to SDG&E bundled procurement of 15 MW by 2024 and 137 MW by 2026. It should be noted that given the geographic split with respect to OOS wind, the most economical solution will be to select resources located in *either* New Mexico or Wyoming in order to maximize the value of the significant investment in the selected transmission path. CAISO recently held a stakeholder process seeking feedback on which option should be selected.[52]

OOS wind can offer numerous advantages over in-state wind resources. For example, OOS wind resources typically provide higher capacity factors and production profiles that differ from the wind resources available in California. These attributes make OOS wind an attractive

[51] D.22-02-004 at p. 87.

[52] CAISO, *Accessing Out of State Wind Resources. Available at*: http://www.caiso.com/InitiativeDocuments/Presentation-2021-2022TransmissionPlanningProcess-Jun272022.pdf.

resource despite the additional transmission required, although these transmission requirements do present higher costs and project development risk. In particular, the transmission projects needed to connect OOS wind to the CAISO grid require significant lead times and approval from multiple state and federal regulatory agencies.

M. Offshore Wind Planning

SDG&E's 2035 offshore wind ("OSW") modeling results assume that the technology will be available by 2030 and maximizes the procurement resulting in SDG&E's bundled proportion of 116 MW in 2030. OSW technology, once implemented, will facilitate electric sector decarbonization while also supporting reliability by operating when other clean resources such as solar are unavailable. SDG&E designed its study for this IRP cycle to focus on maintaining system reliability while achieving its share of the CPUC's GHG emissions targets.

SDG&E considers emerging offshore wind technology to be a key resource to strengthen the diversity of its renewables portfolio. Harnessing untapped potential energy sources such as OSW will advance California's progress toward its clean energy goals. However, OSW projects are currently in various stages of development and commercialization and present challenges common to the industry such supply chain constraints, as well as unique risks including the following:

Cost: OSW electric technology is considered significantly more complex than onshore wind and no OSW resources have begun operation in California to date. Constructing OSW farms involves significant support structure costs, operating and maintenance costs, and electrical infrastructure costs. The estimated levelized cost-benefit assumptions and savings associated with wide-scale commercialization implementation, especially in deeper waters, come at a higher financial cost.

Geography: While most wind farms are today located over shallow open waters, offshore wind turbines present higher production over deeper waters areas where consistently higher wind speeds occur. Geographically, the further the wind farm is from the shore, the higher the cost of its infrastructure upgrades and maintenance. Sea waves and very high winds can also damage OSW turbines, which require more maintenance than onshore turbines.

Permitting Challenges: Although state and federal agencies have launched initiatives to prioritize and incentivize OSW procurement with aggressive timelines and targets, coordination and priority alignment between the Energy Commission and specified agencies are needed to achieve these goals. Recognizing the current challenges and delays associated with OSW procurement, Assembly Bill 525 (Chiu, 2021) directs state agencies to develop a strategic plan for offshore wind energy developments installed off the California coast in federal waters.[53]

Environmental Impacts: Technological advances allow higher capacity turbines to be installed in deeper water, but there are still questions regarding the environmental impacts of such projects. The primary environmental concerns related to offshore wind developments include noise levels, risk of collisions, changes to benthic and pelagic habitats, alterations to food webs, and pollution from increased vessel traffic or release of contaminants from seabed sediments.

The long-term nature of IRP planning also creates additional risk – as the forecasting horizon increases, so too does uncertainty. Despite the challenges presented, SDG&E remains fully committed to recommending and procuring OSW. While SDG&E cautions that an eight-

[53] California Legislative Information AB-525 Energy: offshore wind generation. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB525.

year plan for offshore wind development may prove overly aggressive, it agrees that offshore wind is likely needed to achieve California's clean energy goals for 2045.

N. Transmission Planning

The availability of transmission directly affects how deliverable a resource is to the power system (and subsequently, to load). CAISO periodically releases its Transmission Capability Estimates White Paper, which defines the transmission upgrades that are needed to ensure interconnection of resources in each area.[54] These upgrades are considered in RESOLVE for capacity expansion.

SDG&E carefully considered transmission planning in developing this IIRP. The CPUC transmits resource portfolios to the CAISO to be used as an input for its Transmission Planning Process ("TPP"). The base case resource portfolio is used by CAISO to identify transmission needs in the ten-year timeframe. Because these transmission needs are then approved by the CAISO Board of Governors to accommodate planned resources, among other reasons, it is important that the CPUC use all available information, including LSE plans, when mapping the resources in the base case portfolio. As infrastructure planning horizons are extended to 15 years in order to account for long lead time transmission and resources, SDG&E encourages continuity and coordination throughout the infrastructure planning processes at CAISO, CPUC, and CEC. Recent legislation such as SB 887, which requires the CPUC, CAISO and CEC to collaborate to identify the highest priority transmission facilities required to support resource portfolios of

[54] *Available at*: https://www.caiso.com/Documents/RevisedWhitePaper-2021TransmissionCapabilityEstimates-CPUCResourcePlanningProcess.pdf.

expected future renewable energy resources and zero-carbon resources, underscores the need for joint coordination on transmission issues over longer-term horizons.[55]

Transmission and substation infrastructure upgrades and development not only support higher electrification loads but also enable the interconnection of resources needed to serve system reliability across all planning horizons. The CAISO's TPP addresses the broader transmission system planning and is intended to prepare the entire grid. However, individual resources rely on certain planned transmission projects and/or trigger upgrades to the transmission system as part of the interconnection process. Better coordination between the CPUC's IRP and the CAISO's TPP can help to reduce interconnection timelines by better preparing the transmission system in advance. SDG&E carefully considers these nuances in developing its IRP filing. Furthermore, SDG&E agrees that transmission upgrades may be a cost-effective way for an LSE to access new resources and that LSEs should demonstrate that they are actively coordinating with the CAISO and transmission owners to plan for upgrades along with cost justifications, timelines, and risks associated with those upgrades.

1. Planned Existing Resources

a. Near-Term Reliability Resources

SDG&E has identified three contracted resources that have locations identified in the RDT that are currently in development and has evaluated the extent to which transmission upgrades may be necessary for interconnection and development:

i) Los Alamitos Bright Canyon Energy ("BCE"): SDG&E procured 10 MW of capacity for Los Alamitos BCE to serve near-term reliability pursuant to D.19-11-016. The project is located in the LA Basin in Orange County and has a commercial online date ("COD") of [redacted]. The developer submitted evidence of full capacity deliverability status ("FCDS") from the CAISO during

[55] SB 887 (Stats. 2022, Ch. 358). https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB887.

the contract process. SDG&E is not aware of any transmission upgrades that are necessary for this project to meet its COD.

ii) Ortega Grid: SDG&E procured 10 MW of capacity for Ortega Grid to serve near-term reliability pursuant to D.19-11-016. The project is located in the LA Basin in Riverside County and has a COD of [redacted]. The developer submitted evidence of FCDS from the CAISO during the contract process. SDG&E is not aware of any transmission upgrades that are necessary for this project to meet its COD.

iii) Sagebrush Storage: SDG&E procured 80 MW of capacity for Ortega Grid to serve near-term reliability pursuant to D.19-11-016. The project is located in Kern County and has a COD of [redacted]. The developer submitted evidence of FCDS from the CAISO during the contract process. SDG&E is not aware of any transmission upgrades that are necessary for this project to meet its COD.

b. Mid-Term Reliability Resources

While solicitations are under way for 2023-2026 mid-term reliability pursuant to D.21-06-035, SDG&E does not have any projects contracted and under development yet.[56] Therefore, there are no known transmission upgrades pending or necessary at this time.

2. Transmission Planning Priorities

Planning to ensure clean firm and dispatchable resources is critical to system reliability, given (1) the energy transition from conventional baseload generation to intermittent renewable resources and (2) changes in load patterns associated with behind-the-meter resources and high electrification. Unprecedented system reliability events— including the 2020 heat emergency during which CAISO ordered the first rolling blackouts in the State since 2001 and the 2022 heat emergency during which rolling blackouts were only narrowly avoided[57]— highlight the need to assess the State's energy landscape in the face of unprecedented weather patterns and customer

[56] SDG&E filed Advice Letter ("AL") 4096-E requesting approval of Tranche 1 mid-term IRP contracts resulting from SDG&E's request for offers, pursuant to D.21-06-035, on October 27, 2022. This Tier 3 AL will be effective upon Commission Resolution.

[57] http://www.caiso.com/Documents/Stage-3-Emergency-Declared-Rotating-Power-Outages-Initiated-Maintain-Grid-Stability.pdf.

demand. As the effects of climate change intensify, other sectors of the economy electrify, and the electric sector decarbonizes, electric grid reliability becomes even more critical in California. While SDG&E does not identify specific locations for new resources in the RDT for its Preferred Conforming Portfolios, the Commission should adopt two key priorities to support cohesive resource and transmission planning processes:

i) Improve Interagency Coordination: The current IRP and CAISO TPP call for the IRP to first identify procurement needs before transmission area deliverability upgrades are approved. This construct should include closer coordination with CAISO studies to ensure that the transmission system always has reasonable spare capacity available to accommodate emergency or non-emergency procurement needs that result from the IRP.

ii) Incorporate Geographic Diversity: Geographic diversity is an important consideration for system reliability. SDG&E is concerned that there is potential for clustering or concentrating resources in a single geographic area that is beneficial for renewable energy generation (*e.g.*, the desert or valley), but then transporting that generation to load centers via a large transmission line. Such a transmission line may be susceptible to increasingly prevalent wildfires (as observed in recent years), earthquakes, or other natural disasters. The same concern applies to the concentrated resources, which may have been geographically clustered to the most economically beneficial area. This brings about an additional nuance of needing not only a geographically diverse resource fleet, but also generation that is situated near load centers.

IV. ACTION PLAN

A. Proposed Procurement Activities and Potential Barriers

1. Resources to meet D.19-11-016 procurement requirements

In D.19-11-016, the Commission ordered SDG&E to procure at least 292.9 MW of capacity qualifying as system resource adequacy, with at least 50 percent delivered by August 1, 2021, 75 percent by August 1, 2022, and 100 percent by August 1, 2023. In compliance with this directive, SDG&E has executed contracts to procure a total of 309 MW, with 8 MW procured on behalf of other LSEs. The table below provides relevant contract details, with most projects already online.

***Table 12* – Status of Near-Term Reliability Procurement**

Contract ID	Status – *COD*	Resource Type	CPUC Approval	MW
Los Alamitos (Bright Canyon)	Development – [redacted]	Solar + Storage	Approved via Resolution E-5139	10
Ortega Grid	Development – [redacted]	Storage	Amendment to Contract in AL 4026-E pending approval	10
Sagebrush Storage	Development – [redacted]	Storage	AL 3868-E approved	80
Edward-Sanborn Hybrid	Online	Solar + Storage	AL 4010-E approved	25
Gateway Storage	Online	Storage	AL 4010-E approved	10
Johanna Energy Center	Online	Storage	Approved via Resolution E-5139	20
Kearny Energy Storage North	Online	Storage	Approved via Resolution E-5117	10
Kearny Energy Storage South	Online	Storage	Approved via Resolution E-5117	10
Sentinel Energy – D.19-11-016	Online	Gas peaking	Approved via Resolution E-5117	20
Valley Center Energy Storage 1	Online	Storage	Approved via Resolution E-5117	50
Valley Center Energy Storage 2	Online	Storage	Approved via Resolution E-5117	54
Vista Energy Storage 1	Online	Storage	Approved via Resolution E-5117	10

2. Resources to meet the Mid-Term Reliability Decision, D.21-06-035, procurement requirements, including:

a. 1,000 MW of firm zero-emitting resource requirements

b. 1,000 MW of long-duration storage resource requirements

c. 2,500 MW of zero-emissions generation, generation paired with storage, or demand response resource requirements

d. All other procurement requirements

The Commission directed all LSEs to undertake incremental electric system reliability procurement for the 2023-2026 compliance period. D.21-06-035 requires procurement of 11,500 MW of incremental September Net Qualifying Capacity ("NQC"), with the following targets:

- At least 2,000 MW by August 1, 2023
- An additional 6,000 MW by June 1, 2024
- An additional 1,500 MW by June 1, 2025
- An additional 2,000 MW by June 1, 2026

The Decision requires that at least 2,500 MW of the resources procured by the LSEs collectively, between 2023 and 2025, be from zero-emission resources that generate electricity, or generation resources paired with storage, or demand response, to replace the current supply of energy from the Diablo Canyon Power Plant and ensure there is no resultant increase in GHG emissions upon its retirement. The Decision specified that SDG&E's total share of the procurement requirement includes a total of 361 MW with the following conditions:

- 63 MW online by August 1, 2023,
- 188 MW online by June 1, 2024,
- 47 MW online by June 1, 2025, and
- 63 MW of long-lead time ("LLT") resources by 2026, and
- A minimum of 78 MW of zero-emitting capacity by 2025.

SDG&E and San Diego Community Power ("SDCP") mutually agreed to adjust their respective procurement requirements to better reflect load migration between the two LSEs. As outlined in AL 3967-E, SDG&E and SDCP used the most up-to-date estimates of the volume and timing of anticipated load migration in the SDG&E service territory to refine, modify, and reallocate their respective procurement obligations without changing the total volume of procurement required under the Decision. Following Commission approval of the AL on June 23, 2022, SDG&E would be required to procure an additional 114.3 MW of capacity. SDG&E's revised total share of the procurement requirement is 475 MW with the following conditions:

- 83 MW online by August 1, 2023,

- 247 MW by June 1, 2024,
- 62 MW by June 1, 2025,
- 82 MW of LLT resources by 2026, and
- A minimum of 103 MW of zero-emitting capacity by 2025.

On September 30, 2021, SDG&E issued its 2023-2026 mid-term IRP RFO with offers due by no later than November 19, 2021. SDG&E reopened the RFO on April 26, 2022, for submission of new offers and/or updates to previously submitted offers with offers due by no later than May 11, 2022. SDG&E filed AL 4096-E on October 27, 2022, to request approval of Tranche 1 contracts, which include generation paired with storage and standalone storage resources. SDG&E expects to seek approval of the remaining contracts, which include zero-emitting and long-duration storage resources in 2023. SDG&E meets monthly with its Procurement Review Group to discuss its procurement activities and provide updates regarding its progress.

3. Offshore wind

As discussed above in Section III.M, SDG&E's 2035 offshore wind modeling results assume that the technology will be available by 2030 and maximizes the procurement of 4,707 MW in 2030. OSW technology, once implemented, will facilitate electric sector decarbonization while also supporting reliability by operating when other clean resources such as solar are unavailable. SDG&E designed its study for this IRP cycle to focus on maintaining system reliability while achieving its share of the CPUC's GHG emissions targets. Given that OSW is a nascent technology in California, SDG&E recognizes the unique challenges and risks associated with OSW projects, including cost, geography, legislative challenges, and environmental impacts. Despite these challenges, SDG&E remains fully committed to recommending and procuring OSW.

4. Out-of-state wind

As discussed earlier in Section III.L, out-of-state wind resources will be critical to maintaining a clean and reliable grid. The Commission's 2021 PSP calls for 1,500 MW of new OOS wind generation to be available beginning in 2030.[58] Modeling results show 600 MW of OOS wind from Baja California by 2024 and an additional 5,000 MW split between New Mexico and Wyoming by 2026, with OOS wind procurement remaining at these levels through 2035. These results translate to SDG&E bundled procurement of137 MW by 2027. As noted above, the most cost-effective approach to contracting OOS wind is to select resources located in either New Mexico or Wyoming given the significant transmission-related investment involved in selection of either path. CAISO recently held a stakeholder process[59] seeking feedback regarding which option should be selected.

5. Clean hydrogen

In D.22-02-004, the Commission elected to remove hydrogen from the IRP and to "wait to monitor other state and federal developments."[60] While hydrogen is not currently included in the IRP's inputs and assumptions, SDG&E submits that clean hydrogen and other alternative fuels will necessarily play a key role in a diverse, reliable, and dispatchable resource portfolio. SDG&E does not propose procurement or other activities related to hydrogen in its IIRP, its *Path to Net Zero* study identifies 100 percent clean hydrogen generation as a critical technology needed for the State to maintain electric reliability while satisfying increased demand for carbon-free electricity and forecasts a need for 20 GW of clean hydrogen by 2045. To serve the need for

[58] D.22-02-004, at p. 87.

[59] CAISO, *Accessing Out of State Wind Resources*. *Available at*: http://www.caiso.com/InitiativeDocuments/Presentation-2021-2022TransmissionPlanningProcess-Jun272022.pdf.

[60] D.22-02-004, at p. 183.

clean firm and dispatchable generation, the *Path to Net Zero* study projects California will have an annual demand of 6.5 MMT of clean hydrogen in 2045, of which 80 percent would be for the electric sector. Having clean, dispatchable resources that can provide carbon-free electricity when needed will be critical to ensuring a clean, reliable electric supply for a decarbonized California. Developing the necessary technology and infrastructure to enable clean dispatchable resources will be a tremendous, but important, undertaking.

Innovations in hydrogen, particularly those enabling cost reductions in the production of clean hydrogen, will be essential for the energy sector. SDG&E is leading in this work by implementing innovative projects like our hydrogen projects planned at the Palomar Energy Center and the Borrego Springs Microgrid. These projects will be critical to improving our technical capabilities in the emerging hydrogen sector, working closely with all relevant stakeholders to shape the future hydrogen regulatory framework, and exploring new and exciting projects that will play a crucial role in creating the hydrogen economy.

At the Palomar Energy Center, an electrolyzer and solar panels will be installed to produce electrolytic hydrogen onsite. The Palomar Energy Center is a 565-MW power plant that serves hundreds of thousands of homes in the region. It is a prime location to test multiple use cases for hydrogen. At Palomar, hydrogen will be blended with natural gas to produce electricity and used as a cooling gas in the combined cycle process. A hydrogen refueling station will also be installed to serve the first fuel cell vehicles in our fleet. In addition to the hydrogen pilot project at the Palomar Energy Center, SDG&E will be piloting hydrogen as a long-duration energy storage system in Borrego Springs. At the Borrego Springs Microgrid, a new project will showcase hydrogen as long-duration energy storage in the power sector. Like SDG&E's project at the Palomar Energy Center, hydrogen will be produced by an electrolyzer when solar energy is

abundant, and then compressed and stored. A fuel cell will also be installed to produce electricity with the stored hydrogen when required by the grid. The project will be integrated with the existing Borrego Springs Microgrid and thus will also contribute to strengthening the reliability of this remote desert community.

The successful implementation of these pilot projects is a crucial step towards improving the adoption and integration of clean hydrogen into California's decarbonized economy. These projects have been designed and selected to allow SDG&E to test priority hydrogen use cases, including dispatchable carbon-free power generation and long-term energy storage. Learnings from these pilots will be vital to informing future hydrogen deployments for resilience, grid balancing, and decarbonized transport, and can be used more broadly to help inform California's hydrogen deployment strategy. SDG&E is committed to advancing the beneficial use of hydrogen through continued pilots, testing, and analysis. Deployment of these pilots will improve SDG&E's ability to incorporate hydrogen into its operations and prepare to support the continued growth and scaling of the hydrogen industry in California. SDG&E looks forward to sharing more information about these efforts as its pilot projects progress.

SDG&E is also exploring the potential conversion of its gas-fired generation fleet to clean dispatchable resources like battery energy storage or hydrogen. As part of its sustainability strategy, SDG&E continues the development of pilots to test hydrogen for long-duration energy storage, electric generation, vehicle fueling, and blending into an existing natural gas system, including:

- Borrego Springs Microgrid hydrogen test for long duration (eight-hour or more) scaling up energy storage and grid reliability.
- Hydrogen blending study at UC San Diego campus. The project will study the feasibility of injecting up to 20% clean hydrogen into an isolated section of a

natural gas line that serves common building equipment in a UC San Diego apartment complex.

- At the Palomar Energy Center in Escondido, an onsite electrolyzer and solar panels will produce hydrogen to fuel the first hydrogen vehicles fleet, and as a cooling gas in the combined cycle process.

Due to hydrogen's unique characteristics, experts and policymakers across the globe acknowledge that clean hydrogen will play a significant role in achieving carbon neutrality goals. To ensure that hydrogen becomes a viable and eligible resource in the IRP process, the Commission should create regulatory mechanisms to encourage the development of hydrogen fuel resources, including long-duration energy storage resources.

6. Other energy storage not discussed above

Battery energy storage resources provide a unique set of attributes to the grid, including the ability to use abundant (potentially otherwise curtailed) renewable energy during peak demand hours and to provide ancillary services to the grid. The Commission has authorized SDG&E to procure over 95 MW of utility-owned storage ("UOS") capacity currently in operation and a total of almost 345 MW of UOS expected to be online in 2023.[61]

In addition to providing critical energy during peak demand, as was experienced during the September 2022 heat emergency, battery energy storage assets increase overall reliability and resiliency for the region as a whole. Like other project developers, SDG&E has encountered recent challenges in developing battery energy storage systems. Proximity to existing infrastructure, permitting delays, and interconnection capacity restrictions limit the number of near-term opportunities that are most beneficial to ratepayers. Additionally, supply chain issues

[61] *See*, Resolution E-5193, issued February 15, 2022, approved three utility-owned energy storage contracts totaling 161 MW pursuant to D.21-12-015. *See also*, Resolution E-5219, issued June 29, 2022, approving four utility-owned energy storage projects totaling 39 MW pursuant to D.21-12-004.

and resource constraints (of both commodity and labor) have resulted in delays and can result in price increases.

As SDG&E recently suggested, the Commission should extend the expedited approval process established in D.21-12-005 to resources procured under D.19-11-06 and D.21-06-035 and any additional future procurement mandates. Specifically, expedited approvals may be especially valuable to ratepayers as it pertains to potential expansion of existing development projects, where economies of scale may be realized, and additional mobilization fees may be avoided. As an example, in D.21-12-004, the Commission approved a power capacity of 10 MW and an energy capacity of 40 MWh for each of four SDG&E UOS projects. In Advice Letter ("AL") 3992-E, SDG&E recognized footprint constraints and proposed to develop 50.5 MWh of energy capacity in three of its storage projects as upfront augmentation to ensure that 40 MWh of capacity would be maintained at the battery's end of life. The Public Advocates Office protested this AL, delaying the approval process and placing the project's COD, which is needed for summer 2023 reliability, in jeopardy. While the Commission ultimately approved the AL, SDG&E raises this instance as an example of opportunity for improvement in the forward planning process, including streamlining regulatory review.

SDG&E's forecast for this IRP period demonstrates the need for battery energy storage to ensure that load, GHG, and reliability standards are met. Battery energy storage resources provide a unique set of attributes to the grid, including the ability to use abundant (potentially otherwise curtailed) renewable energy during peak demand hours and to provide ancillary services to the grid. To the extent that SDG&E, or any LSE, uses battery energy storage to meet its requirements, the LSE will need excess generation capacity in order to charge those batteries. In a scenario where batteries are used to serve load daily, this need is likely to occur in the late

afternoon and evening hours as solar resources begin to go offline. Therefore, LSEs need to have sufficient renewable energy resources to serve the grid load, PRM, and the charging load required by battery storage resources.

7. Other demand response not described above

SDG&E's Preferred Conforming Portfolios show 67 MW of incremental demand response ("DR") in 2027. As a threshold matter, SDG&E is awaiting Commission decisions (1) approving its 2023-2027 DR funding Application 22-05-003 for programs through 2027[62] where such DR in SDG&E's territory is not necessarily cost effective and (2) indicating whether SDG&E will be required to run a 2024 DR Auction Mechanism ("DRAM") solicitation in 2023 for 2024.[63] However, while DR remains an integral part of achieving State goals, SDG&E neither proposes nor supports mandated procurement of "DR resources that are not needed, which have not been consistently reliable compared to other, and which may prove to be more expensive than other resources.[64] Rather than adopt a carveout for DR, the Commission should allow DR to compete against other resources to IRP solicitations.[65]

8. Other energy efficiency not described above

SDG&E does not propose additional procurement or activities related to energy efficiency.

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[62] *Assigned Commissioner's Scoping Memo and Ruling*, issued in A.22-05-002 on July 5, 2022.

[63] *Id.*

[64] *SDG&E Reply Brief on Demand Response Auction Mechanism*, filed in A.22-05-002 *et al.* (consolidated) on October 28, 2022.

[65] *SDG&E Opening Brief on Demand Response Auction Mechanism*, filed in A.22-05-002 *et al* (consolidated) on October 7, 2002, at p. 4.

9. Other distributed generation not described above

SDG&E does not propose additional procurement activities to include distributed generation, beyond those associated with the annual Distribution Investment Deferral Framework and Distribution Planning Process developed in R.21-06-017.

10. Transportation electrification, including any investments above and beyond what is included in IEPR

SDG&E does not propose additional procurement or investment above and beyond what is included in the IEPR or addressed within the scope of the SDG&E's applications[66] to the Commission and the Commission's Transportation Electrification proceeding.[67]

11. Building electrification, including any investments above and beyond what is included in IEPR

The California Energy Commission's 2018 IEPR Update found that greenhouse gas emissions from buildings are second only to transportation and recommended developing a plan to assess the feasibility of significantly reducing greenhouse gas emissions from buildings.[68]

In January 2019, the CPUC instituted a new rulemaking on building decarbonization (R.19-01-011). The proposed scope of the rulemaking includes: 1) implementing SB 1477; 2) potential pilot programs to address new construction in areas damaged by wildfires; 3) coordinating CPUC policies with Title 24 Building Energy Efficiency Standards and Title 20 Appliance Efficiency Standards developed at the Energy Commission; and 4) establishing a building decarbonization policy framework.

As with transportation electrification, the Commission and the utilities will be working to advance building electrification through various means, but much depends on market and

[66] A.21-12-008, A.19-07-006, A.19-10-012.

[67] R.18-12-006.

[68] https://www.energy.ca.gov/2018_energypolicy/.

consumer adoption. For the 2022 IRP specifically, SDG&E does not propose additional procurement or investment above and beyond what is included in the IEPR or addressed within the scope of the Building Decarbonization proceeding.

12. Other

SDG&E does not propose additional procurement or investment.

B. Disadvantaged Communities ("DACs")

Within this IRP, the Commission is utilizing the following criteria, derived from the California Environmental Protection Agency to identify disadvantaged communities:

1. Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0
2. Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps, but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores
3. Census tracts identified in the 2017 DAC designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0
4. Lands under the control of federally recognized Tribes

SDG&E designed its IIRP to ensure sufficient resource capacity for SDG&E's bundled customers while also creating opportunities and access to cleaner forms of power for our DACs. This section details SDG&E's activities and programs that address DACs, consistent with SDG&E's GRC,[69] its *Path to Net Zero* study,[70] its Sustainability Strategy,[71] and other regulatory guidance.

[69] Application ("A.") 22-05-016 (SDG&E 2024 General Rate Case). *Available at*: https://www.sdge.com/sdge-2024-general-rate-case.

[70] SDG&E, *The Path to Net Zero: A Decarbonization Roadmap for California*, (April 2022). *Available at:* https://www.sdge.com/sites/default/files/documents/netzero2.pdf.

[71] SDG&E, *Building a Better Future: Sustainability Strategy Update* (October 2021). *Available at*: https://www.sdge.com/sites/default/files/documents/Sustainability_2021.pdf.

1. Activities and Programs to Address DACs

Since SDG&E's 2020 Individual IRP filing, there have been updates to two statewide tools and documents that influenced SDG&E's actions and engagement with DACs. First, the update from CalEnviroScreen 3.0 to 4.0 brings improvements to the statewide tool that aids in identifying DACs,[72] giving SDG&E further insight to prioritize identify and prioritize activities, including outreach. Second, the update to the Commission's Environmental and Social Justice ("ESJ") Action Plan advances the framework to promote environmental and social justice for all Californians.[73] SDG&E's current and planned activities and programs fully support these advancements.

Environmental and social justice ("ESJ") are imperative to support a just and equitable energy transition in California's DACs, as discussed in SDG&E's most recent General Rate Case application.[74] SDG&E's actions are guided by that principle and have continued to evolve to maximize SDG&E's contribution to ESJ. SDG&E provides a list of completed, in-progress, and pending programs serving DACs in Section III.D of this IRP. As described below, SDG&E has undertaken various activities and programs that specifically target DACs in support of the IRP.

a. Cameron Corners Microgrid

SDG&E deployed this microgrid to provide resiliency during Public Safety Power Shutoff events within Cameron Corners, a remote, low-income community located in a Tier 3

[72] OEHHA, CalEnviroScreen 4.0 (October 20, 2021), *Available at*: https://oehha.ca.gov/media/downloads/calenviroscreen/report/calenviroscreen40reportf2021.pdf.

[73] CPUC, Environmental & Social Justice Action Plan – Version 2.0, (April 7, 2022), *Available at:* https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/newsoffice/key-issues/esj/esj-action-plan-v2jw.pdf.

[74] A.22-05-016 (SDG&E 2024 General Rate Case), Exh. SDG&E-02 (Testimony of Estela De Llanos [Sustainability Policy]). *Available at*: https://www.sdge.com/sites/default/files/regulatory/SDGE-02_Direct_Testimony_of_De_Llanos_Sustainability_Policy.pdf.

High Fire Threat District in the eastern part of San Diego County. More than 2,700 solar panels draw 875 kilowatts ("kW") of energy and six units of iron-flow batteries can deliver about 2,400 kilowatt-hours ("kWh") of electricity to 11 locations in Campo.[75] This microgrid serves many critical customers, including a medical care facility, a CAL FIRE station, a telecom central office (switching station), local food establishments, convenience stores, and gas/propane stations. These crucial facilities provide residents with essential goods and services during a grid outage.

b. V2G Pilot

SDG&E is implementing a V2G pilot at Cajon Valley School District, which includes DACs. As part of the five-year project, SDG&E installed six 60-kW, bidirectional Direct Current fast chargers at the district's bus yard in El Cajon. The eight V2G-capable school buses help advance clean air and climate goals while bolstering grid reliability.[76]

c. Community Impact Platform

SDG&E launched a new modeling tool that combines publicly available census tract, air quality, income, and other data sources with SDG&E's vehicle telematics data to visualize and track fleet CO_2 emissions within each community that SDG&E serves. SDG&E utilizes this increased data access to inform its operations in DACs and allows the utility to minimize its GHG impacts on those communities.[77] SDG&E is exploring ways to enhance the Community Impact Platform.

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[75] *See* https://www.sandiegouniontribune.com/business/story/2022-06-07/new-microgrid-promises-some-relief-from-power-outages-for-folks-in-campo.

[76] *See* https://www.sdgenews.com/article/sdge-and-cajon-valley-union-school-district-flip-switch-regions-first-vehicle-grid-project.

[77] A.22-05-016 (SDG&E 2024 General Rate Case), Exh. SDG&E-02 (Testimony of Estela De Llanos [Sustainability Policy]). *Available at*: https://www.sdge.com/sites/default/files/regulatory/SDGE-02_Direct_Testimony_of_De_Llanos_Sustainability_Policy.pdf.

d. SDG&E's Habitat Conservation Plan[78]

EO N-82-20 highlights the role natural and working lands ("NWLs") will have in sequestering carbon and acting as resilient buffers against the rising threat of climate change.[79] Many of these NWL's include tribal lands that qualify as DACs. Through CEQA and NEPA processes, SDG&E engages with communities throughout the service territory, including DACs, to mitigate potential project adverse impacts on NWLs. SDG&E's Habitat Conservation Plan, updated in 2022, outlines how we work to limit environmental impact while operating our gas and electric system and to preserve NWLs.

2. Minimizing Criteria Air Pollutants in DACs

For SDG&E's service area, the number of natural gas plants located in DACs is relatively small, as shown in Table 13. These plants fall into two categories: combined heat and power ("CHP") facilities and natural gas peaker plants that provide both system and local reliability.

***Table 13* – SDG&E Owned or Contracted Natural Gas Plants in DACs**

Facility	Size (MW)	Description
CP Kelco	26.8	CHP Facility, under contract to SDG&E through 2024, per CHP settlement
El Cajon Energy Center	48.1	Peaking facility under contract through 2035, needed to meet local resource adequacy
Cuyamaca Facility	47.0	Peaking facility owned by SDG&E, needed to meet local resource adequacy
Yuma Cogeneration Associates	54.9	CHP facility, under contract to SDG&E through 2024
El Cajon Energy Center, LLC	48.1	Wellhead facility, under contract with SDG&E through 2035
Desert Star Energy Center; Boulder City NV	480	Gas Fired Combine Cycle Facility under contract through 2027, acquired by SDG&E in October 2011 pursuant to D.07-11-046

[78] The NCCP covers 2,245,800 acres of SDG&E's service area and was designed to avoid, minimize, and mitigate impacts to 110 Covered Species and their habitats while allowing SDG&E to install, maintain, operate, and repair its existing gas and electric system and undertake anticipated expansion of that system. *Available at:* https://wildlife.ca.gov/Conservation/Planning/NCCP/Plans/San-Diego-GE.

[79] Executive Order N-82-20 (October 7, 2020).

SDG&E's contract for CP Kelco will expire in 2024. There are two peaker plants located in DACs, El Cajon and Cuyamaca. El Cajon is under a long-term contract with SDG&E. Cuyamaca is owned by SDG&E. Both plants are used to meet local resource adequacy obligations. These plants are bid at their variable operating cost to the CAISO markets. The market solution determines their operation based on system needs. SDG&E plans to hire third-party technical and engineering experts to model the costs and feasibility of converting the Cuyamaca Energy Center 47 MW natural gas-powered black start peaker plant to operate on 100% hydrogen fuel.[80] Doing so, if feasible, would allow the facility to operate carbon-free in the DAC while still allowing the facility to contribute to grid reliability. Outside of SDGE's service area, SDG&E has Desert Star Energy Center in Boulder City, Nevada, under contract until 2027. It is a gas-fired, combined-cycle facility dispatched by CAISO. While this facility does not fall into CalEnviroScreen, the federal Climate and Economic Justice Screening Tool identifies the community as disadvantaged.[81]

[80] *See* A.22-05-016 (SDG&E 2024 General Rate Case), Exh. SDG&E-15-R (Revised Prepared Direct Testimony of Fernando Valero [Clean Energy Innovations]). *Available at*: https://www.sdge.com/sites/default/files/regulatory/SDGE-15R%20Revised%20Direct%20Testimony%20-%20Clean%20Energy%20Innovations%20-%20SDGE%20Ex%2015_1647_1648.pdf.

[81] In Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad, President Biden directed the Council on Environmental Quality to create a Climate and Economic Justice Screening Tool. The purpose of the tool is to help Federal agencies identify disadvantaged communities that are marginalized, underserved, and overburdened by pollution. The current version of the tool provides socioeconomic, environmental, and climate information to inform decisions that may affect these communities. The tool identifies disadvantaged communities through publicly available, nationally consistent datasets.

***Figure 6* – Map of Cuyamaca, El Cajon and Kelco (Barrio Logan) with Cal Enviro 4.0**

In addition, to mitigate the need to activate the peaker plants located in DACs, SDG&E installed a battery energy storage facility in El Cajon, an identified DAC.

a. Metrics and scoring for prioritization local air pollution reductions in DACs

SDG&E is using methods to ensure that new procurement will prioritize the reduction of air emissions and pollution in DACs, if applicable to the type of resources for each IRP procurement mandate.

1. SDG&E will focus on use of bid evaluation criteria to ensure "early priority" for reducing air emissions in DACs. Specifically, SDG&E will actively seek bids for non-emitting resources located in DACs by using bid evaluation criteria that favor such projects.

2. SDG&E is incorporating DAC considerations into its least-cost, best-fit ("LCBF") valuation methodology. A similar approach to the approach utilized under the RPS program will be applied to procurement made under the IRP (i.e., it will be applicable to the evaluation of all technologies as well as new or operating

facilities). This ensures that impacts to DACs are evaluated at the earliest possible opportunity and that the results are incorporated into the decision-making process.

3. Qualitative criteria are used to compare projects of similar cost, meaning that a project that provides benefits to DACs may be ranked higher than a similar project that does not provide such benefits.

b. Current and planned outreach efforts

SDG&E is currently engaged in and plans multiple outreach efforts related to DACs. SDG&E communicates broadly to external stakeholders through various formats, including press releases, FAQs printed in local media, social media posts, and photos. At the local level, SDG&E engages with stakeholders in a variety of ways to solicit input and feedback.

Path to Net Zero Study and Outreach: In 2022, SDG&E met with more than 400 customers, employees, partners, community leaders and critics to discuss the *Path to Net Zero* study. In addition, SDG&E convenes three "Community Advisory Councils," including one in Boulder City and another focused on wildfire safety. Within the City of San Diego, SDG&E's franchise agreements prioritize action in Communities of Concern, which similarly identifies census tracts to CalEnviroScreen, and shares some indicators.[82] SDG&E offers to present to the City Council twice a year its efforts to promote climate equity, climate goals, and Greenhouse Gas reductions in Communities of Concern. The electric franchise agreement requires SDG&E to fund an equity-focused solar expansion program in partnership with a non-profit, committing $10 million over ten years for incentives, refunds, equipment, labor, program management, and administration. It also outlines goals for energy efficiency engagement and local workforce

[82] Franchise Agreement between the City of San Diego and SDG&E. *Available at*: https://sandiego.hylandcloud.com/211agendaonlinecouncil/Documents/ViewDocument/Energy_Cooperation_Agreement.pdf?meetingId=4260&documentType=Minutes&itemId=198290&publishId=552585&isSection=false.

development activities in clean energy between SDG&E and the City to benefit Communities of Concern.

Community Microgrids: As discussed above, SDG&E is engaged in developing community microgrids to serve DACs. In addition, SDG&E plans to conduct two days of public outreach at Borrego Springs Microgrid with a bilingual customer representative. There will be tours of SDG&E's microgrid facility, presentations, and learning opportunities with subject matter experts.

Tribal Outreach: For tribal communities, SDG&E is engaged in year-round education and outreach, which includes engagement on climate programs and offerings. SDG&E started an annual Tribal Leader Clean Energy Summit in 2022 to bring tribes and federal, state, and utility experts together to discuss a collaborative approach to the clean energy transition. SDG&E also provides briefings to individual tribes and collectively to tribal leadership through the Southern California Tribal Chairmen's Association (which is representative of the federally recognized tribes SDG&E serves). SDG&E also engages with regional partners promoting climate equity with tribes, including Tribal Climate Science Alliance and tribal environmental directors. SDG&E is partnering with the Indian Health Council and Southern Indian Health Council to provide EV and secure funding for EV which will benefit the tribes SDG&E serves.

Community Air Protection Program: In AB 617, the state designated the city of San Diego's Portside Community to establish a Community Air Protection Program to reduce air pollution exposures and improve public health. In partnership with the Port of San Diego and their Maritime Clean Air Strategy, SDG&E has provided support in community outreach efforts in the Portside Communities. In 2021, San Diego's Border Communities was added to AB 617's

Community Air Protection Program. SDG&E held six public learning workshops in these communities, supporting clean trucking initiatives to reduce emissions at border communities.

C. Commission Direction or Actions

SDG&E intends to provide a more comprehensive set of recommendations for a programmatic approach to IRP planning and procurement in response to the recent ruling with the Energy Division Staff Options Paper, the Reliable and Clean Power Procurement Program, issued October 7, 2022. Below, SDG&E describes the direction that it seeks from the Commission.

1. Allocate future procurement based on load-share to ensure that LSEs meet their fair share without opt-out.

SDG&E has experienced a significant substantial load departure because of large CCAs forming and expanding within its service territory, decreasing SDG&E's share of the retail load within its service territory and reducing SDG&E's need for resources, as anticipated in SDG&E's 2020 IIRP filing.[83] SDG&E also has a small number of customers taking Direct DA commodity service.[84]

By the end of 2023, SDG&E expects that more than 78% of its total electric customer meters will be served by a CCA for their electric commodity.[85] Currently, there are three CCAs in SDG&E's territory: San Diego Community Power ("SDCP"), Clean Energy Alliance ("CEA"), and Orange County Power Authority ("OCPA"). Table 14 includes the numbers and

[83] *See*, Appendix 2 of *Individual Integrated Resource Plan of San Diego Gas & Electric Company*, filed September 1, 2020, at p. 2.

[84] DA subscription has reached the Commission-established cap of 3,942 gigawatt-hours ("GWh") within SDG&E's service territory, and the Commission has recommended to the Legislature against further Direct Access expansion.

[85] SDG&E estimates that it will experience minimal additional CCA migration from the known CCAs formed to date in 2024. SDG&E does not have any estimates beyond 2024 based on what is known today.

timing of the anticipated CCA migration within SDG&E's territory as estimated based on available information.

***Table 14* – Estimated Migrating Load Allocations and Timing[86]**

	2022	2023	2024*
SDG&E	33%	16%	10%
SDCP	40%	51%	51%
CEA	6%	10%	17%
OCPA	0%	1%	1%
DA	22%	22%	22%
Total	100%	100%	100%

Therefore, whether procurement is ordered to address the system reliability or GHG emissions targets, the Commission should allocate incremental procurement obligations equitably across LSEs. LSEs who are not deficient should not be burdened with the obligation to procure on behalf of customers of other LSEs who have failed to do their part to meet reliability or emissions requirements.

2. Allow flexibility in technology-specific mandates, given regulatory and market uncertainty for different resources.

While LSE portfolios specify resource types, SDG&E discourages adoption of technology-specific procurement mandates. Such mandates are contrary to a least-cost, best-fit standard and constrain an LSE's ability to procure based on need. For any future procurement directives, the Commission should instead specify the attributes of the types of resources needed without necessarily specifying particular technologies. Additionally, if a set of attributes create a high-cost resource, the Commission should provide a mechanism for LSEs to request waiver of

[86] All forecasts based on current customer meter counts and associated loads as of March 1, 2022. Projections for 2024 are estimates only and not reflective of any implementation plans yet to be filed by CCAs in SDG&E's service territory.

specific attributes to reduce cost. For example, if a resource has to be clean, have an 80-percent capacity factor, and not depend on weather, and solicitation efforts have not been successful, the LSE should be able to procure a resource with a lower capacity factor or slightly higher emissions, if such resources are more cost-effective.

3. Maintain natural gas fleet availability while supporting development of alternative fuel technologies to ensure reliability and local resiliency.

As discussed earlier, the Commission should evaluate market pressures on existing natural gas fleet and whether there is sufficient incentive to remain online and available for dispatch. If sufficient incentive is not available, the Commission should evaluate what further incentives are needed and what other technologies should be incentivized to take its place.

V. LESSONS LEARNED

SDG&E offers below its observations regarding the overall IRP process and potential areas of improvement. SDG&E does not attempt to catalogue here every necessary modification to the IRP outline, process, or required data submittals – it anticipates that these issues will continue to be refined over time – instead, SDG&E seeks to identify major issues that warrant immediate attention.

1. The IRP should evolve into a more programmatic approach to resource planning and procurement, while allotting more time to develop IIRPs.

For the IRP process to be useful, the Commission must establish a clear link between the resource planning process and the establishment of resource procurement targets. Separate Commission proceedings that impose standalone resource procurement requirements must be linked to the IRP process so that the IRP can inform the determinations made in those. For example, the IRP process should be more closely coordinated with the RPS proceeding, including policy initiatives that are RPS-related such as BioRAM and BioMAT, or even replace

the RPS proceeding entirely. Consolidation of initiatives that involve mandated procurement should occur in the IRP proceeding, where procurement is examined on a more holistic level.

Other opportunities for coordination include collaboration with the Affordability OIR to determine if an affordability threshold should be included and considered as the Commission conducts its resource planning and develops resulting procurement mandates.

2. The IRP should focus more on a contingency planning approach as the resource market tightens.

Future IRP processes should begin to focus less on a probabilistic approach – *i.e.*, what likely will happen – and more on a contingency planning approach – *i.e.*, what needs to happen if certain conditions occur. For example, how should various resources be planned if:

a) More electrification happens on-peak than during the middle of the day;

b) Increased weather uncertainty creates humid, cloudy days for 10 days straight, as occurred in September 2022;

c) Offshore wind will not be available by 2030; and

d) Existing resources retire rather than compete against planned new resources. Especially if policy and economic signals continue to make renewables more attractive or the only compliant technology versus conventional generation types, these resources that were assumed to stay online may retire early.

These scenarios will create more certainty around what should happen for resource planning. If, in many of these "what if" scenarios, similar build of renewables and storage are optimal, then it creates more confidence in the procurement needs. If the various scenarios yield different resource types, it shows how resource diversity should be encouraged to prepare for different futures.

Second, reliability should be assessed differently. The 1-in-10 LOLE should still be the standard, but, given that historical data is no longer representative of the future, the stochastic modeling to generate a 0.1 LOLE should lean more heavily on recent weather events and future

predictions. Supply side renewable outages and demand side spikes should be considered more frequently when the random sampling is generated.

3. The IRP should assess local capacity requirements.

The IRP process should include an assessment similar to the CAISO's LCR process so that at least a regional assessment can be performed for each local area and reliability needs can be better identified as being driven by either system or local need. Under the current IRP, the need for new resources can be tied to attainment of GHG reduction goals, or to the need for resources to ensure that system and/or local reliability needs are met. The assessment of each LSE's position as to each of these targets is imperative to determining fair allocation of costs relative to need. Local reliability is not currently assessed as part of the IRP process. Incorporating a regional or local reliability assessment may add time to the current IRP cycle schedule but would increase the efficiency of the individual IRP plan aggregation, bus-bar mapping, and PSP development efforts.

It is also important that the IRP and CAISO's transmission studies are closely coordinated so any necessary transmission upgrades are available to support resources that are identified in the IRP process. Additionally, in the development of a least cost portfolio, consideration of whether and when it is economic to reduce local capacity requirements through the addition of new transmission should be included. This determination requires a comparison between (i) the estimated cost of adding new transmission, and (ii) the projected cost of meeting local capacity requirements with existing and/or new local generation.

This is a non-trivial undertaking since it requires extensive interaction with and input from the CAISO. Current modeling approaches do not have the capability to perform this comparison and arrive at a solution that is optimized across all feasible transmission and resource options. The bus-bar mapping process is a good example of a successful iterative process with

the CAISO during the IRP process. The CAISO's TPP process informs the IRP with an assessment of the previous cycle's preferred portfolio, but it is not frequent enough to assess trade-offs between new resources and new transmission lines. Incorporating a more frequent, iterative modeling exercise with the CAISO would facilitate this type of analysis.

Attachment A

Revenue Requirements and Bundled System Average Rates

PUBLIC VERSION

CONFIDENTIAL DATA - All data in this workbook tab labeled "Bundled Sales" represent retail sales to bundled customers and is protected by section V.C. of the IOU Confidentiality Matrix, adopted as Appendix 1 of CPUC Decision D.06-06-066 as well as data that can be used to derive the retail sales

***Table A-1* – Revenue Requirements and Bundled System Average Rates for Baseline Scenario (2021 $)**

Line	Cost Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	Distribution ($000)	$1,928,300	$2,056,940	$2,053,049	$2,080,723	$2,131,846	$2,184,226	$2,237,892	$2,292,877	$2,349,213	$2,406,933	$2,466,071	$2,526,663	$2,588,743
2	Transmission ($000)	$1,050,689	$1,048,535	$1,048,535	$1,048,535	$1,074,297	$1,100,693	$1,127,737	$1,155,445	$1,183,835	$1,212,921	$1,242,723	$1,273,257	$1,304,541
3	Generation ($000)				$738,368	$756,510	$775,097	$794,142	$813,654	$833,645	$854,128	$875,114	$896,615	$918,645
4	Demand Side Programs ($000)	$124,884	$120,249	$120,619	$123,583	$126,619	$129,730	$132,918	$136,184	$139,530	$142,958	$146,470	$150,069	$153,756
5	Other ($000)	$431,344	$441,840	$419,228	$416,643	$426,880	$437,369	$448,115	$459,125	$470,406	$481,964	$493,805	$505,938	$518,369
6*	Baseline Revenue Requirement ($000)				4,407,852	4,516,153	4,627,115	4,740,803	4,857,284	4,976,628	5,098,904	5,224,184	5,352,542	5,484,054
7	System Sales (GWh)	17,072	17,167	17,225	17,284	17,347	17,403	17,476	17,556	17,659	17,738	17,827	17,901	17,973
8	Bundled Sales (GWh)				3,308	3,333	3,354	3,385	3,415	3,457	3,488	3,525	3,555	3,580
9	System Average Delivery Rate ($/kWh)	$0.21	$0.21	$0.21	$0.21	$0.22	$0.22	$0.23	$0.23	$0.23	$0.24	$0.24	$0.25	$0.25
10	Bundled Generation Rate ($/kWh)	$0.19	$0.23	$0.22	$0.22	$0.23	$0.23	$0.23	$0.24	$0.24	$0.24	$0.25	$0.25	$0.26
11	Bundled System Average Rate ($/kWh)	$0.40	$0.44	$0.44	$0.44	$0.44	$0.45	$0.46	$0.47	$0.48	$0.48	$0.49	$0.50	$0.51

CONFIDENTIAL DATA - All data in this workbook tab labeled "Bundled Sales" represent retail sales to bundled customers and is protected by section V.C. of the IOU Confidentiality Matrix, adopted as Appendix 1 of CPUC Decision D.06-06-066 as well as data that can be used to derive the retail sales

Table A-2 **– Revenue Requirements and Bundled System Average Rates for 30 MMT Preferred Conforming Portfolio (2021 $)**

Line	Cost Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	Distribution ($000)	$1,928,300	$2,056,940	$2,053,049	$2,080,723	$2,131,846	$2,184,226	$2,237,892	$2,292,877	$2,349,213	$2,406,933	$2,466,071	$2,526,663	$2,588,743
2	Transmission ($000)	$1,050,689	$1,048,535	$1,048,535	$1,048,535	$1,074,297	$1,100,693	$1,127,737	$1,155,445	$1,183,835	$1,212,921	$1,242,723	$1,273,257	$1,304,541
3	Generation ($000)				$813,136	$890,911	$912,344	$938,500	$986,968	$1,008,404	$1,029,237	$1,052,771	$1,075,868	$1,096,589
4	Demand Side Programs ($000)	$124,884	$120,249	$120,619	$123,583	$126,619	$129,730	$132,918	$136,184	$139,530	$142,958	$146,470	$150,069	$153,756
5	Other ($000)	$431,344	$441,840	$419,228	$416,643	$426,880	$437,369	$448,115	$459,125	$470,406	$481,964	$493,805	$505,938	$518,369
6*	Baseline Revenue Requirement ($000)				$4,482,620	$4,650,554	$4,764,361	$4,885,161	$5,030,599	$5,151,387	$5,274,013	$5,401,841	$5,531,794	$5,661,997
7	System Sales (GWh)	17,072	17,167	17,225	17,284	17,347	17,403	17,476	17,556	17,659	17,738	17,827	17,901	17,973
8	Bundled Sales (GWh)				3,308	3,333	3,354	3,385	3,415	3,457	3,488	3,525	3,555	3,580
9	System Average Delivery Rate ($/kWh)	$0.21	$0.21	$0.21	$0.21	$0.22	$0.22	$0.23	$0.23	$0.23	$0.24	$0.24	$0.25	$0.25
10	Bundled Generation Rate ($/kWh)	$0.19	$0.23	$0.23	$0.25	$0.27	$0.27	$0.28	$0.29	$0.29	$0.30	$0.30	$0.30	$0.31
11	Bundled System Average Rate ($/kWh)	$0.40	$0.44	$0.44	$0.46	$0.48	$0.49	$0.50	$0.52	$0.53	$0.53	$0.54	$0.55	$0.56
	Change from Baseline:		2.9%	4.6%	6.9%	9.1%	9.0%	9.3%	10.8%	10.6%	10.4%	10.2%	10.1%	9.7%

CONFIDENTIAL DATA - All data in this workbook tab labeled "Bundled Sales" represent retail sales to bundled customers and is protected by section V.C. of the IOU Confidentiality Matrix, adopted as Appendix 1 of CPUC Decision D.06-06-066 as well as data that can be used to derive the retail sales

Table A-3 **– Revenue Requirements and Bundled System Average Rates for 25 MMT Preferred Conforming Portfolio (2021 $)**

Line	Cost Category	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	Distribution ($000)	$1,928,300	$2,056,940	$2,053,049	$2,080,723	$2,131,846	$2,184,226	$2,237,892	$2,292,877	$2,349,213	$2,406,933	$2,466,071	$2,526,663	$2,588,743
2	Transmission ($000)	$1,050,689	$1,048,535	$1,048,535	$1,048,535	$1,074,297	$1,100,693	$1,127,737	$1,155,445	$1,183,835	$1,212,921	$1,242,723	$1,273,257	$1,304,541
3	Generation ($000)				$813,136	$890,911	$912,344	$938,500	$986,968	$1,008,404	$1,029,237	$1,052,771	$1,075,868	$1,096,589
4	Demand Side Programs ($000)	$124,884	$120,249	$120,619	$123,583	$126,619	$129,730	$132,918	$136,184	$139,530	$142,958	$146,470	$150,069	$153,756
5	Other ($000)	$431,344	$441,840	$419,228	$416,643	$426,880	$437,369	$448,115	$459,125	$470,406	$481,964	$493,805	$505,938	$518,369
6*	Baseline Revenue Requirement ($000)				$4,482,620	$4,650,554	$4,764,361	$4,885,161	$5,030,599	$5,151,387	$5,274,013	$5,401,841	$5,531,794	$5,661,997
7	System Sales (GWh)	17,072	17,167	17,225	17,284	17,347	17,403	17,476	17,556	17,659	17,738	17,827	17,901	17,973
8	Bundled Sales (GWh)				3,308	3,333	3,354	3,385	3,415	3,457	3,488	3,525	3,555	3,580
9	System Average Delivery Rate ($/kWh)	$0.21	$0.21	$0.21	$0.21	$0.22	$0.22	$0.23	$0.23	$0.23	$0.24	$0.24	$0.25	$0.25
10	Bundled Generation Rate ($/kWh)	$0.19	$0.23	$0.23	$0.25	$0.27	$0.27	$0.28	$0.29	$0.29	$0.30	$0.30	$0.30	$0.31
11	Bundled System Average Rate ($/kWh)	$0.40	$0.44	$0.44	$0.46	$0.48	$0.49	$0.50	$0.52	$0.53	$0.53	$0.54	$0.55	$0.56
	Change from Baseline:		2.9%	4.6%	6.9%	9.1%	9.0%	9.3%	10.8%	10.6%	10.4%	10.2%	10.1%	9.7%

Attachment B

System Reliability Progress Tracking Table

25 MMT Preferred Conforming Portfolio

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
hybrid	Online	21	22	22	21	20	21	22	20	17	15	-	-
in_state_wind_south	Online	99	112	118	82	46	59	73	65	47	17	14	5
in_state_wind_north	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Online	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Online	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Online	163	159	154	131	108	100	93	89	88	86	64	63
btm_pv	Online	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Online	156	158	159	154	149	156	162	144	113	97	81	65
5hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Online	36	36	35	35	34	35	36	34	33	32	31	29
demand_response	Online	1	-	-	-	-	-	-	-	-	-	-	-
hydro	Online	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
small_hydro	Online	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Online	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Online	7	26	27	2	2	2	2	-	-	-	-	-
biogas	Online	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Online	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Online	906	916	927	930	933	922	912	924	937	949	961	974
gas_ct	Online	422	433	429	421	412	404	396	402	408	414	421	342
cogen	Online	46	-	-	-	-	-	-	-	-	-	-	-
ice	Online	-	-	-	-	-	-	-	-	-	-	-	-
coal	Online	-	-	-	-	-	-	-	-	-	-	-	-
steam	Online	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Online	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	Development	9	9	9	8	8	9	9	8	7	-	-	-
in_state_wind_south	Development	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Development	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
out_of_state_wind_AZNM	Development	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Development	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Development	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	Development	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Development	128	129	131	126	122	128	133	118	104	36	30	24
5hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Development	2	2	2	2	2	2	2	2	2	2	1	1
7hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Development	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Development	-	-	-	-	-	-	-	-	-	-	-	-
hydro	Development	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Development	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Development	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Development	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Development	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Development	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
gas_cc	Development	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	Development	-	-	-	-	-	-	-	-	-	-	-	-
cogen	Development	-	-	-	-	-	-	-	-	-	-	-	-
ice	Development	-	-	-	-	-	-	-	-	-	-	-	-
coal	Development	-	-	-	-	-	-	-	-	-	-	-	-
steam	Development	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Development	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	Review	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	Review	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Review	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Review	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Review	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	Review	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
5hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Review	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Review	-	-	-	-	-	-	-	-	-	-	-	-
hydro	Review	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Review	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Review	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Review	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Review	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Review	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Review	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	Review	-	-	-	-	-	-	-	-	-	-	-	-
cogen	Review	-	-	-	-	-	-	-	-	-	-	-	-
ice	Review	-	-	-	-	-	-	-	-	-	-	-	-
coal	Review	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
steam	Review	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Review	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
5hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
demand_response	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
hydro	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
biogas	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
cogen	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
ice	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
coal	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
steam	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	PlannedNew	68	172	174	168	162	170	177	158	138	119	99	80
in_state_wind_south	PlannedNew	-	-	-	15	9	11	25	22	19	17	14	11
in_state_wind_north	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
out_of_state_wind_WYID	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	PlannedNew	-	-	-	-	7	19	30	33	34	37	39	39
btm_pv	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	PlannedNew	239	242	245	237	228	239	249	222	194	167	140	112
5hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	PlannedNew	-	-	48	48	47	48	49	47	45	43	40	38
pumped_storage	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	PlannedNew	-	-	-	52	49	53	58	48	39	29	19	10
hydro	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	PlannedNew	-	-	38	39	39	39	38	39	39	39	40	40
biomass_wood	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
biogas	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
cogen	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
ice	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
coal	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
steam	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
LSE total supply (effective MW)		**2,303**	**2,415**	**2,518**	**2,471**	**2,379**	**2,417**	**2,466**	**2,375**	**2,263**	**2,097**	**1,995**	**1,833**

Attachment C

System Reliability Progress Tracking Table

30 MMT Preferred Conforming Portfolio

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
hybrid	Online	22	23	23	21	19	19	19	17	15	13	-	-
in_state_wind_south	Online	126	125	117	91	65	64	63	57	42	16	14	5
in_state_wind_north	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Online	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Online	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Online	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Online	126	134	142	133	125	102	79	79	80	81	62	63
btm_pv	Online	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Online	161	164	167	154	141	138	136	123	99	87	76	65
5hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Online	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Online	36	37	37	37	36	36	36	34	33	32	31	29
demand_response	Online	1	-	-	-	-	-	-	-	-	-	-	-
hydro	Online	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Online	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Online	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Online	7	27	27	2	2	2	2	-	-	-	-	-
biogas	Online	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Online	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Online	910	926	941	938	935	924	913	926	940	953	966	980
gas_ct	Online	416	424	416	414	411	404	396	400	405	410	415	336
cogen	Online	45	-	-	-	-	-	-	-	-	-	-	-
ice	Online	-	-	-	-	-	-	-	-	-	-	-	-
coal	Online	-	-	-	-	-	-	-	-	-	-	-	-
steam	Online	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Online	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	Development	9	9	9	8	8	8	7	7	6	-	-	-
in_state_wind_south	Development	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
in_state_wind_north	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	Development	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Development	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Development	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Development	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	Development	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Development	132	135	137	126	116	114	111	101	91	32	28	24
5hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Development	2	2	2	2	2	2	2	2	2	2	1	1
7hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Development	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Development	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Development	-	-	-	-	-	-	-	-	-	-	-	-
hydro	Development	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Development	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Development	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Development	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Development	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Development	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Development	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	Development	-	-	-	-	-	-	-	-	-	-	-	-
cogen	Development	-	-	-	-	-	-	-	-	-	-	-	-
ice	Development	-	-	-	-	-	-	-	-	-	-	-	-
coal	Development	-	-	-	-	-	-	-	-	-	-	-	-
steam	Development	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Development	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	Review	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	Review	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	Review	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
out_of_state_wind_WAOR	Review	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	Review	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	Review	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	Review	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	Review	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
5hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	Review	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	Review	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	Review	-	-	-	-	-	-	-	-	-	-	-	-
hydro	Review	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	Review	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	Review	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	Review	-	-	-	-	-	-	-	-	-	-	-	-
biogas	Review	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	Review	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	Review	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	Review	-	-	-	-	-	-	-	-	-	-	-	-
cogen	Review	-	-	-	-	-	-	-	-	-	-	-	-
ice	Review	-	-	-	-	-	-	-	-	-	-	-	-
coal	Review	-	-	-	-	-	-	-	-	-	-	-	-
steam	Review	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	Review	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_south	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
in_state_wind_north	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
offshore_wind	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
btm_pv	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
5hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
pumped_storage	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
hydro	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
biomass_wood	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
biogas	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
cogen	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
ice	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
coal	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
steam	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	PlannedExisting	-	-	-	-	-	-	-	-	-	-	-	-
hybrid	PlannedNew	71	179	183	168	154	151	148	134	121	107	93	80
in_state_wind_south	PlannedNew	-	-	-	17	12	12	21	19	17	15	14	12
in_state_wind_north	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WYID	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_WAOR	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
out_of_state_wind_AZNM	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
offshore_wind	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
utility_pv	PlannedNew	-	-	-	-	8	19	26	29	31	35	38	39

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
btm_pv	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
4hr_batteries	PlannedNew	248	252	257	237	216	213	209	189	170	151	132	112
5hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
6hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
7hr_batteries	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
8hr_batteries	PlannedNew	-	-	51	49	48	47	47	45	43	42	40	38
pumped_storage	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
demand_response	PlannedNew	-	-	-	52	42	41	40	34	28	22	16	10
hydro	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
small_hydro	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
geothermal	PlannedNew	-	-	37	38	39	39	39	39	39	39	40	40
biomass_wood	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
biogas	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
nuclear	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
gas_cc	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
gas_ct	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
cogen	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
ice	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
coal	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
steam	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
unspecified_import	PlannedNew	-	-	-	-	-	-	-	-	-	-	-	-
LSE total supply (effective MW)		**2,313**	**2,437**	**2,548**	**2,489**	**2,378**	**2,332**	**2,292**	**2,236**	**2,161**	**2,036**	**1,965**	**1,833**

Attachment D

Resource Data Template

25 MMT Preferred Conforming Portfolio

PUBLIC VERSION

Due to the large file size, this attachment will be provided to Energy Division staff through the Commission's FTP site and posted online per the Notice of Availability.

Attachment E

Clean System Power Tool

25 MMT Preferred Conforming Portfolio

Due to the large file size, this attachment will be provided to Energy Division staff through the Commission's FTP site and posted online per the Notice of Availability.

Attachment F

Resource Data Template

30 MMT Preferred Conforming Portfolio

PUBLIC VERSION

Due to the large file size, this attachment will be provided to Energy Division staff through the Commission's FTP site and posted online per the Notice of Availability.

Attachment G

Clean System Power Tool

30 MMT Preferred Conforming Portfolio

Due to the large file size, this attachment will be provided to Energy Division staff through the Commission's FTP site and posted online per the Notice of Availability.

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	Rulemaking 20-05-003 (Filed May 7, 2020)

NOTICE OF AVAILABILITY OF 2022 INDIVIDUAL INTEGRATED RESOURCE PLAN OF SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E)

PUBLIC VERSION

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SAN DIEGO GAS & ELECTRIC COMPANY

November 1, 2022

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Continue Electric Integrated Resource Planning and Related Procurement Processes.	Rulemaking 20-05-003 (Filed May 7, 2020)

NOTICE OF AVAILABILITY OF 2022 INDIVIDUAL INTEGRATED RESOURCE PLAN OF SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E) (PUBLIC VERSION)

Pursuant to Rule 1.9(d) of the Rules of Practice and Procedure of the California Public Utilities Commission (the "Commission"), San Diego Gas & Electric Company ("SDG&E") hereby provides notice that it has electronically filed with the Commission's docket office its **2022 INDIVIDUAL INTEGRATED RESOURCE PLAN ("IIRP") OF SAN DIEGO GAS & ELECTRIC COMPANY**.

The public version of SDG&E's IIRP filing is available on SDG&E's website at the following link: www.sdge.com/IntegratedResourcePlanOIR. SDG&E's IIRP filing may also be obtained by contacting:

Will Fuller
Regulatory Business Manager
San Diego Gas & Electric Company
8330 Century Park Court, CP32D
San Diego, California 92123
Telephone: (619) 857-4852
wfuller@sdge.com

Respectfully submitted this 1st day of November 2022.

/s/ *Aimee M. Smith*

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