



Strategic Power Supply Plan

Maximizing Local Solar and Battery Storage to Reduce Cost

Power San Diego will maximize the use of solar energy and battery storage in the City of San Diego (City) to provide 100 percent local solar power and battery storage to all San Diegans by 2039.¹ This is ten years after the projected 2029 startup of the Power San Diego public electric distribution utility. The primary driver for this approach is to lower electricity supply cost, while concurrently improving power resiliency and reliability.

In 2029, the City will have a forecast net electricity demand of 7,400 gigawatt-hours (GWh) per year.² Power San Diego will add 4,000 MW_{AC} of new local solar in the decade from 2029 to 2039 to offset the power supply currently imported over San Diego Gas & Electric (SDGE) transmission lines. The high and rising SDGE transmission charge – which will not be levied on solar power generated within Power San Diego service territory – makes solar power generated in the City of San Diego a lower-cost option for San Diegans.

Power San Diego can best deliver lower-cost electricity by focusing on local solar power paired with battery storage, complemented by smart energy efficiency (EE) and demand response (DR) programs,³ to reach 100 percent local clean energy in ten years. This approach will reduce the cost of electricity to City residents and provide income streams by aggregating and dispatching customer batteries during times of peak demand. An ancillary benefit will be local clean energy job growth.

San Diegans are currently charged an “all-in” power supply charge of approximately \$0.15 per kilowatt-hour (kWh) for power delivered over the transmission grid.⁴ This compares to a production cost for a commercial rooftop solar installation with battery storage of less than \$0.06/kWh, and a residential rooftop solar installation with battery storage of less than

¹ This strategy was originally developed in: B. Powers, *Roadmap to 100 Percent Local Solar Build-Out by 2030 in the City of San Diego*, May 2020. See: <https://tinyurl.com/nhhe48mr>

² NewGen Strategies and Solutions LLC, *City of San Diego Phase 1 Report - Public Power Feasibility Study*, July 11, 2023, pp. 7-1 to 7-4. 2029 net residential = 3,000 GWh; net commercial = 4,000 GWh; net industrial = 500 GWh. The City will also have a projected 2,500 GWh of net-energy metered (NEM) solar production in 2029.

³ Demand response means reducing or shifting a customer’s power needs to lower the amount of grid power needed during periods of peak demand. A common example involves cycling air conditioners off-and-on during heat waves to reduce power demand.

⁴ San Diego Community Power, *Board of Directors Regular Meeting – Presentation*, January 18, 2024, p. 18. 2024 winter residential rate = \$0.13/kWh; 2024 summer residential rate = \$0.19/kWh. Weighted 2024 average = ~\$0.15/kWh: <https://sdcommunitypower.org/wp-content/uploads/2020/12/0.Main-Presentation-01.18.2024-for-posting.pdf>.



\$0.12/kWh.⁵ Substantial savings can be realized by substituting imported grid power for local solar and battery power produced within Power San Diego service territory.

The City of San Diego has ample solar potential to auto-supply with local solar power. The solar potential of residential and commercial rooftops in San Diego is approximately 9,000 GWh.⁶ The solar potential of commercial parking lots is approximately 6,500 GWh.⁷ Available ground-mounted sites in the City have a solar potential of approximately 5,000 GWh.⁸ In combination, the solar potential of San Diego is in the range of 20,000 GWh per year. This is far greater than the 8,000 GWh of new solar power needed by 2039 to offset imported (transmission dependent) grid power.

However, this solar potential will remain underutilized while we are subject to the California Public Utilities Commission and investor-owned utility-backed legislation making rooftop solar more expensive and less accessible. We have seen this in practice. The passage of the net-energy metered (NEM) 3.0 tariff has resulted in greatly reduced rooftop solar installation rates in San Diego.

In contrast, Power San Diego will facilitate customer-owned rooftop NEM solar at an installation rate of 150 MW per year over the 2029 to 2039 period by re-establishing favorable NEM solar tariffs. This NEM installation rate has already been approached in practice - approximately 134 MW of NEM solar was added in the City in 2023.⁹ These customer-owned solar systems would include four hours of battery storage to enable load shifting and reliable supply capacity. To the extent feasible, battery capacity will be aggregated for use as peaking power supply in virtual power plants. Customers will also be financially incentivized to oversize their solar systems to fully utilize their roof area to maximize solar generation.

⁵ NREL, *U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks: Q1 2021*, November 2021, p. 32: <https://www.nrel.gov/docs/fy22osti/80694.pdf>. The addition of 4-hours of battery storage adds a premium of about 33 percent to the base solar-only cost. Base solar-only costs are from NREL, NREL ATB 2022 workbook spreadsheet, V2 corrected (July 21, 2022), available at <https://data.openei.org/submissions/5716>; Solar insolation classes for Southern California: https://atb.nrel.gov/electricity/2022/utility-scale_pv.

⁶ Google Project Sunroof - City of San Diego, accessed March 2, 2024: https://sunroof.withgoogle.com/data-explorer/place/ChIJSx6SrQ9T2YARed8V_f0hOg0/.

⁷ Roadmap (2020), Table 3, p. 24. Parking lot solar potential at 25% coverage = 2,700 GWh per year. At 60% coverage, parking lot solar potential = $(0.60/0.25) \times 2,700 \text{ GWh-yr} = 6,500 \text{ GWh-yr}$.

⁸ NREL, *U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis*, July 2012, Table 2, p. 10. California urban ground-mounted utility-scale (1 MW) solar potential = 111 MW. California population - ~40 million. San Diego population = 1.4 million. San Diego California urban ground-mounted utility-scale solar potential = $(1.4 \text{ million}/40 \text{ million}) \times 111 \text{ GW} = 2.8 \text{ GW}$ (2,800 MW). $2,800 \text{ MW} \times 1,900 \text{ MWh/MW} \times (1 \text{ GWh}/1,000 \text{ MWh}) = 5,320 \text{ GWh}$.

⁹ California Distributed Generation Statistics, Statistics and Charts, Data view: SDGE, 2023 = 319 MW installed: <https://www.californiadgstats.ca.gov/charts/>. The City of San Diego is 42% of SDGE sales. Therefore, approximate amount of NEM solar installed in the City of San Diego in 2023 = $0.42 \times 319 \text{ MW} = 134 \text{ MW}$.



An additional 250 MW_{AC} per year of commercial and industrial rooftop and parking lot solar will be added over the 2029 to 2039 timeframe. How? Power San Diego will issue “requests for proposal” (RFPs) to meet the annual installation targets with competitively bid projects. Ground-mounted commercial-scale solar projects will also be developed where appropriate sites are available in the built environment of San Diego.

These solar installations will include at least four hours of battery storage. Power from these installations will be sold wholesale directly to the Power San Diego distribution grid. These installations will be owned by building owners, by third parties (including San Diego Community Power) under power purchase agreements, and by Power San Diego.

Power San Diego will be fully integrated with the existing SDGE transmission grid and will have access to imported power when it is needed to supplement supply generated in the City.

250 MW_{AC} of load reduction in the form of air conditioner (A/C) cycling would be developed by Power San Diego in the 2029-2039 decade. An EE target reduction of 20 percent, or approximately 2,000 GWh of the projected 2039 net electricity demand in the City, will be achieved by focusing EE upgrade efforts on customers using disproportionately high amounts of electricity. An opt-out program structure would be used to maximize the potential gains as fast as they can be achieved.¹⁰ On-bill financing available to all customers including renters – with payment tied to the meter number and not an individual - would fund a substantial amount of this local clean energy development.¹¹

The Power San Diego power supply roadmap is embodied in the following actions:

- Maximize commercial parking lot and warehouse solar and battery storage project development, maintaining an installation rate of 250 MW_{AC} per year in 2029-2039.
- Achieve an average NEM solar installation rate of 150 MW_{AC} per year in San Diego in 2029-2039.
- Expand on-bill financing to allow all customers, regardless of whether they are owners or renters, to benefit from solar power and battery storage.
- Add 250 MW of A/C cycling DR in 2029-2039.
- Focus EE upgrades on “high users” in each customer class.

¹⁰ Opt-out program: customers are included in the program unless they affirmatively “opt-out” by stating to the utility that they do not want to participate. Well designed opt-out programs can achieve 90-95% participation.

¹¹ The Hawaii Green Infrastructure Authority has pioneered this type of funding for renters: <https://gems.hawaii.gov/participate-now/for-homeowners/>.



- Incorporate customer battery storage into virtual power plants to maximize the value to battery storage owners and Power San Diego.
- Maximize use of the opt-out program structure to assure rapid deployment of EE, DR, and customer solar and battery storage.

The City and its residents, through Power San Diego, will have the authority to determine how the power serving the community is supplied and delivered.¹² The power supply focus will be local, within the City. Building out locally means the same community paying for the power benefits economically from its development. Jobs – good jobs – stay in the community. Local financial institutions gain by investing in local projects. Local businesses benefit from the increased need for services of all kinds. Homeowners and building owners increase the value of their property. Renters gain direct access to clean power. San Diegans have been fighting for this kind of local clean energy future for years. Now is the time to make it happen with Power San Diego.

¹² SDCP currently contracts for the power supply delivered to most San Diego residents. Numerous commercial businesses, representing about 25 percent of the City’s electricity demand and known as Direct Access customers, directly procure their own electricity supplies.