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2030 Zero Carbon Plan

July 29, 2025

Sara Elsevier
Manager, Resource Planning

Powering forward.
Together.

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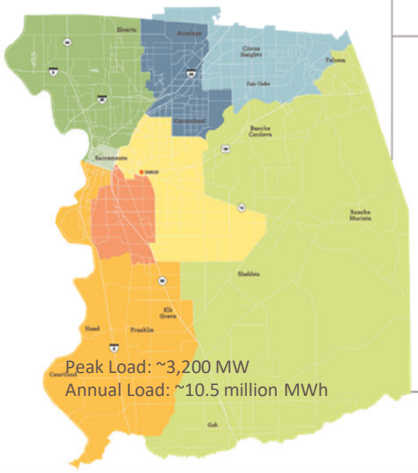
About the SMUD (Sacramento Municipal Utility District)

SMUD is your community-owned, not-for-profit electric service.

6th largest community-owned **in the U.S.**



75+ Years
Est. 1946

2023 Power mix about **78%*** **carbon-free**

100%
Zero carbon by 2030
The most ambitious goal of any large utility in the United States

~645,000 Customers

~2,300 Employees

7 member Elected Board of Directors

SMUD's rates are among the lowest in California

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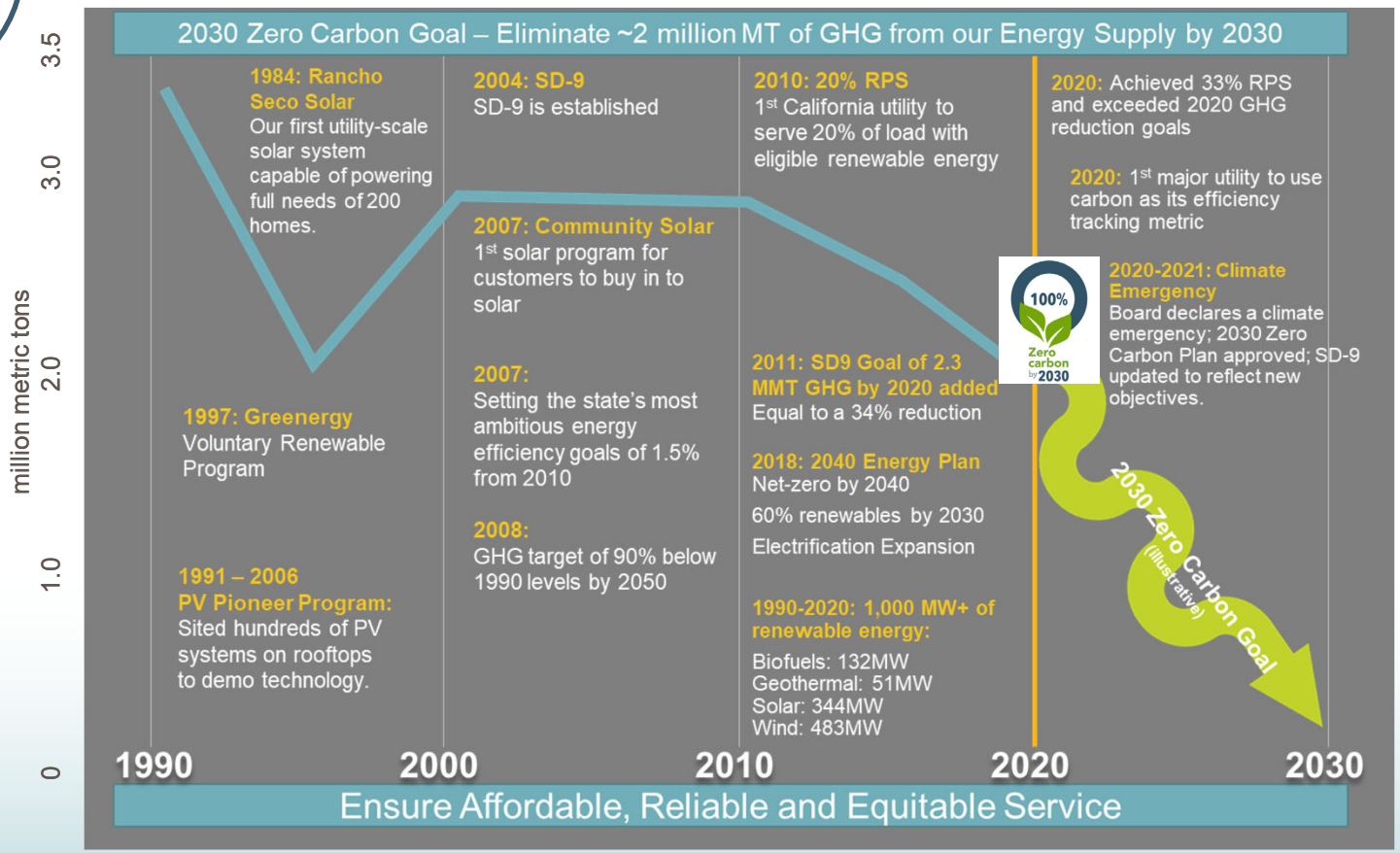
SMUD's History of Environmental Leadership



*SD-9 or Strategic Directive 9, contains SMUD's core Resource Planning objectives.

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Where We're Headed

Affordable . Reliable . Equitable

1 Repurpose natural gas generation

Replace 2 power plants with renewable and storage resources and retool remaining 3 to minimize emissions.

2 Expand proven clean technology

Grow SMUD's renewable and battery storage by 3.5x. Support customer's resources via solar and battery storage.

CCS was identified as a promising technology in this area of the plan

3 Pilot & scale new technology and business models

Increase education and demand flexibility, spread adoption of customer-owned virtual power plants & invest in grid-scale technology.

4 Pursue grants, partnerships and limit rate impacts

5 Maximize community benefits

Stay affordable and reliable, improve air quality and overall community health while supporting under-resourced communities.

Lean on proven technologies to get up to 90% of the way

Goal:

Eliminate CO_2 from SMUD's power supply

100% Zero carbon by 2030

Create thousands of new regional clean tech jobs

+ Electrify Vehicles and Buildings to reduce GHG emissions by 1.365 million MT by 2030

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Guardrails: Affordability & Reliability

The Zero Carbon Plan was designed to be a flexible pathway, without compromising the guardrails of **affordability** & **reliability.**

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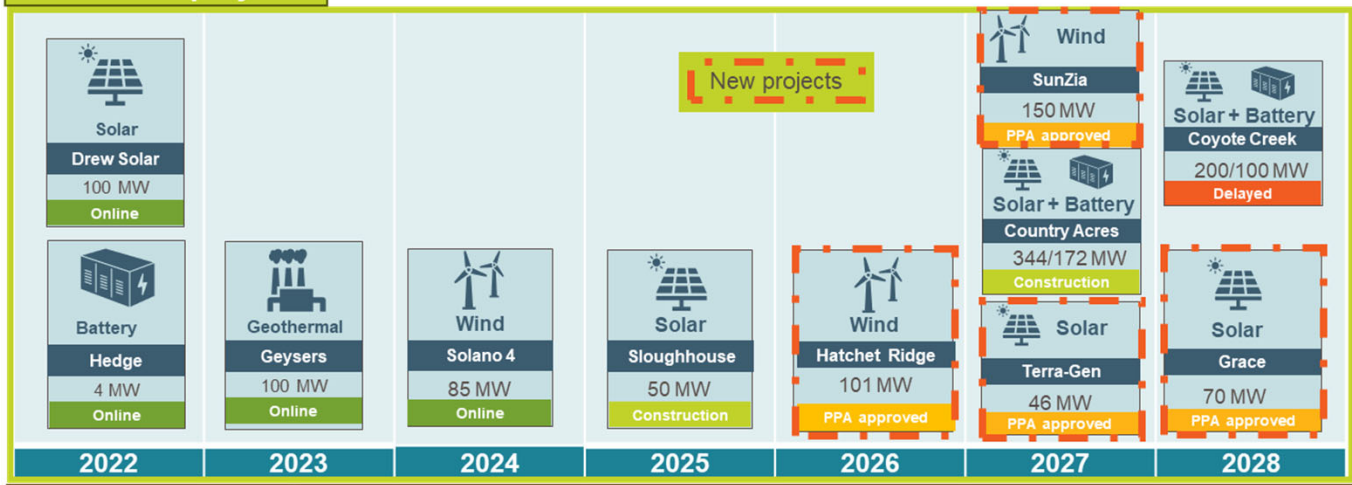
Renewable & Storage Progress Snapshot

Committed projects



~1,520 MW of new carbon free projects
~44% of goal

RPS Compliance Period 5
52% by 2027

RPS Compliance Period 6
60% by 2030

Project Evaluation & Development Pipeline

TIMING TBD

Local Solar	Local Battery	Regional Wind	Regional Solar	Geothermal	CCS
510 MW	390 MW	95 MW	165 MW	100 MW	315 MW

~1,575 MW of new carbon free projects

Clean Distributed Energy Resources & Programs

Continued support of clean distributed customer solar/storage and new customer programs such as Virtual Power Plants to reduce use of thermals during peak

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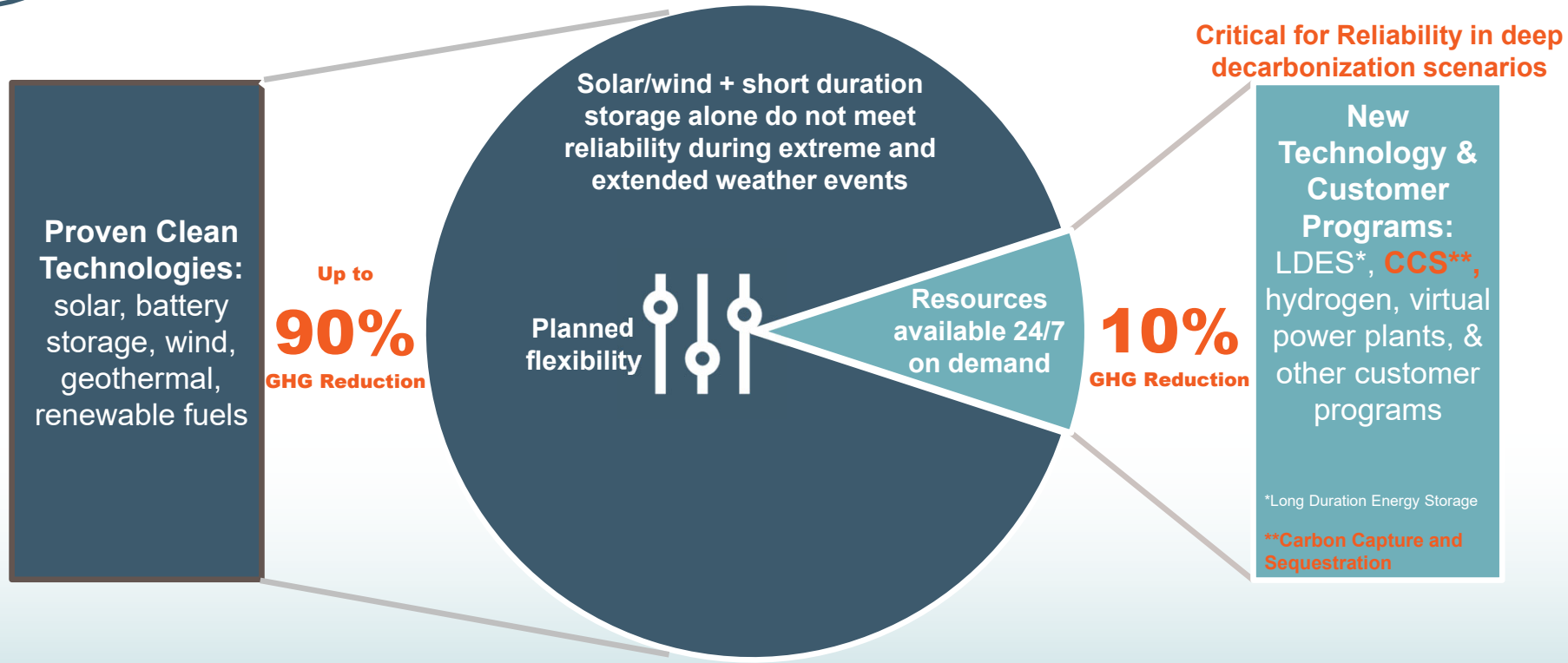
Need for New Clean Firm Resource Technology

It takes a portfolio approach to achieve zero carbon.



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Need for New Clean Firm Resource Technology

IRP Studies show the need for clean firm resources during prolonged low solar and wind production events

- Winter can be the most problematic time of the year with variable energy resources
- Example: In January 2022 SMUD experienced a prolonged weather event that limited solar product to under 10% of its capability for a 2 week period.

Clean firm technologies need to provide the type of certainty natural gas resources do today

- Intra hour balancing
- Firmness across days/weeks/seasons if necessary, due to low renewables availability
- New Clean firm resources need to provide ancillary services, resource adequacy, and energy on demand

SMUD continues to pursue several clean firm resources including carbon capture and sequestration (CCS) and long duration energy storage (LDES).

- Alternative to lithium-ion batteries for longer duration solutions are being explored.

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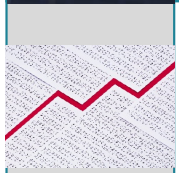
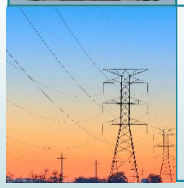
Calpine Sutter Decarbonization Project (CCS) Opportunity

- The Sutter CCS project is being developed by Calpine Corporation
  - Conversion of an existing 550 MW Natural Gas plant to include CCS; located in Sutter County in Northern California.
  - Calpine's sequestration partner to develop, build, own and operate sequestration site near by the existing gas plant.
  - SMUD's interest is as a potential off-taker of the energy from the plant (SMUD to consider a power purchase agreement in 2026)

- Sutter CCS Retrofit Project Details:
  - Online date 2029
  - Up to ~1.7 million metric tons GHG stored per year.
  - Capture rate expected to be 95-98%.
  - First in the world air-cooled CCS facility
  - No new transmission or interconnection needed; transport pipeline will look to use existing right-of-way to nearby geologic storage site.
- Funding: Calpine continues development despite losing the DOE grant of $270 million; 45Q tax credits remain and provide significantly to project economics.

Considerations and Challenges with Integrating Clean Firm Resources into Energy Supply

	**Weather volatility** – Extreme temperatures and changing weather patterns impact peak loads and availability of hydro and other energy supply resources.
	**Upward Resource Cost Pressures and Development Delays** – Higher costs for clean resources and uncertainty around availability of tax credits, grants funding and import tariffs. Funding opportunities are needed to buy down costs of these resources to limit the impact to our customers and remain within our affordability guardrails.
	**Technology Readiness** – many new clean technologies are behind in viability and commercial availability. Rising costs and uncertainty around grant funding has exacerbated this problem.
	**Regulatory Framework** – new clean technologies like CCS need consistent recognition and definitions across state agencies and environmental policies (e.g., SB 100, MRR, Cap-and-Trade, Power Source Disclosure) to enable long-term planning and investments.
	**Transition Takes Time and Testing** – As we transition to new technologies, we must be careful of transitioning away from our existing assets too fast. The transition will ensure reliability is maintained.

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