UC Merced Energy Discussion

Central Valley

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9 December 2025

GridLAB

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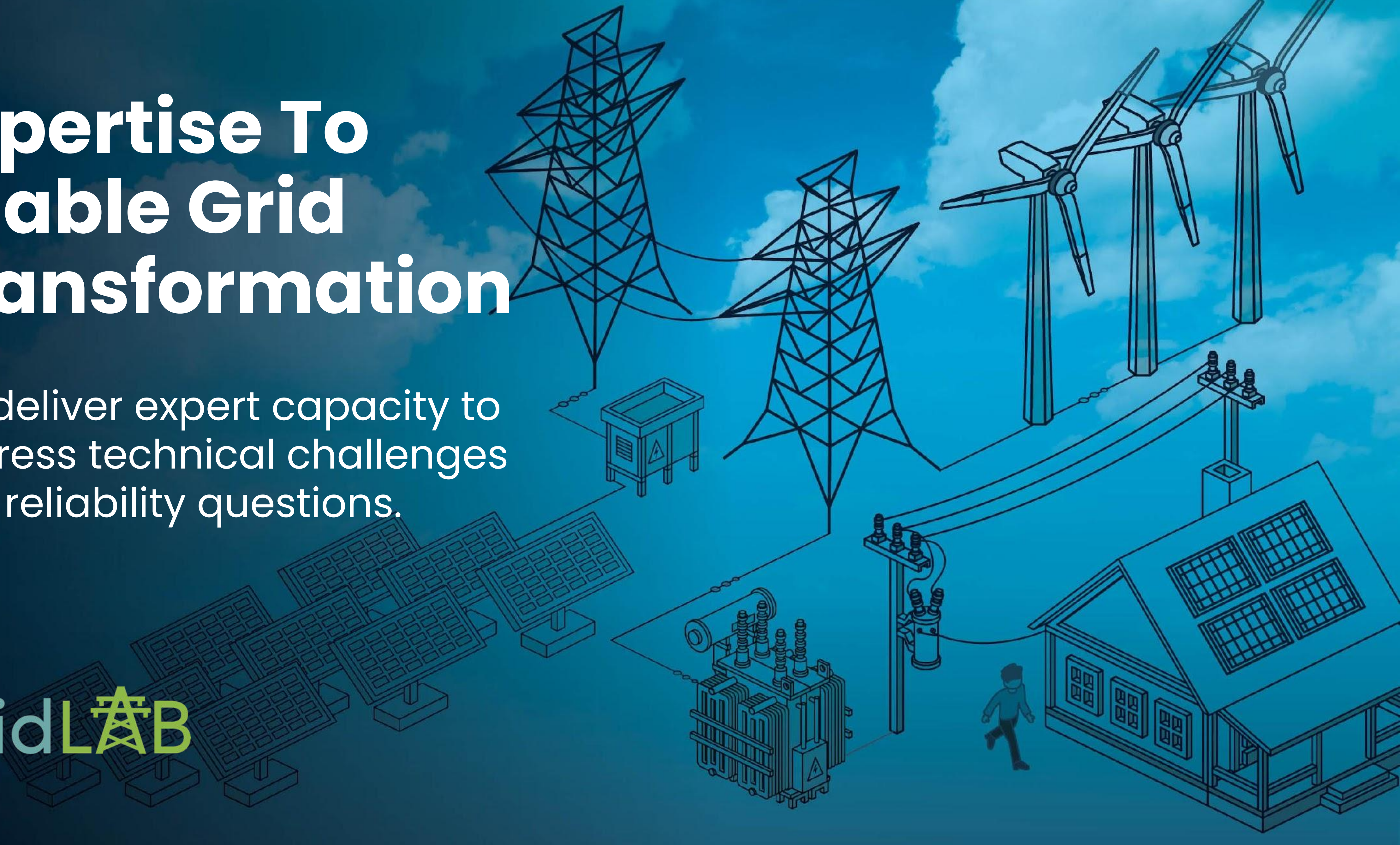
Introduction Slides

Expertise To Enable Grid Transformation

We deliver expert capacity to address technical challenges and reliability questions.



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Our Work

Clean Energy Futures

GridLab provides expert analysis to demonstrate that portfolios of clean energy resources can provide reliable, least-cost energy generation in lieu of fossil alternatives.

Rethinking Reliability

GridLab provides a roadmap for how to redefine grid planning, markets, and operations in order to support decarbonization.

Smart Transmission

GridLab provides expertise to advocate for new transmission and better use of our existing transmission system to enable grid decarbonization.

Modernizing the Grid

GridLab advocates for transparent distribution planning that recognizes the flexibility of distributed energy resources to transform the grid.

GridLab by the Numbers

150+	41	55+	75+
Projects	**States**	**Clients**	**Experts**

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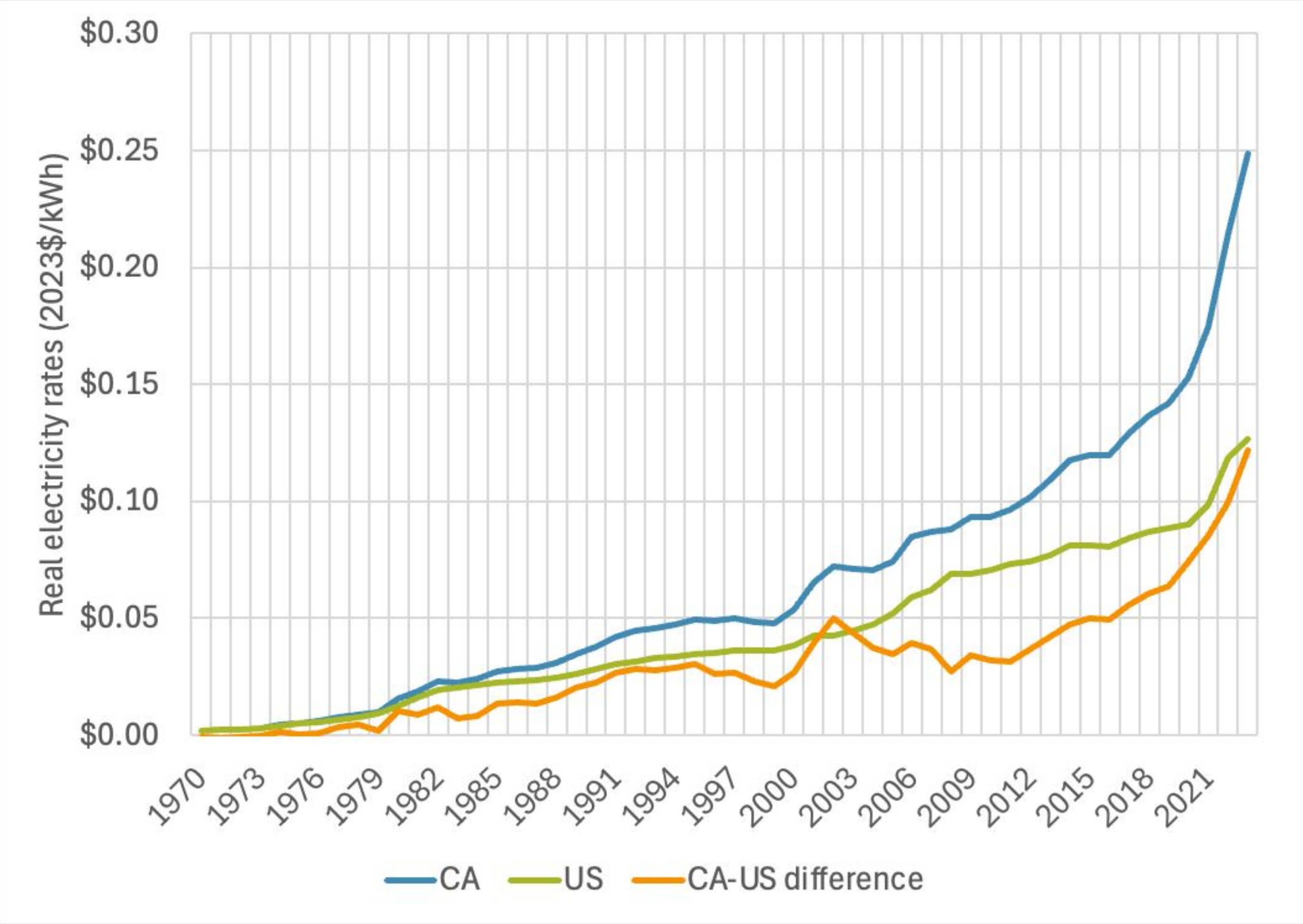
CA Rates Context

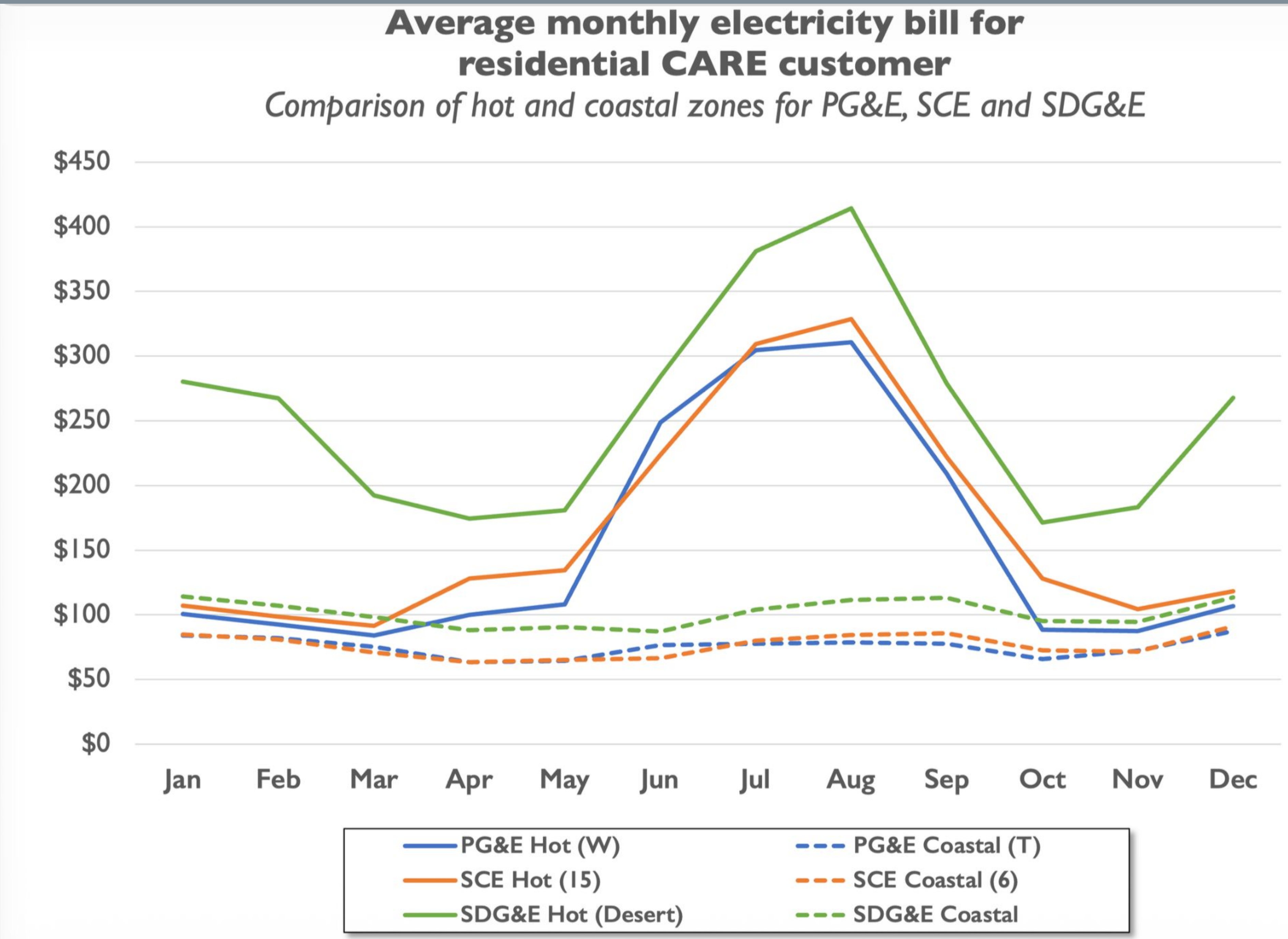
Historical Perspective

- California's average costs were lower than U.S. average before 1974
- Costs diverged over the next five decades – in 2023 California average costs were double the U.S. average
- High average costs in California are a product of multiple forces, some of which are decades in the making

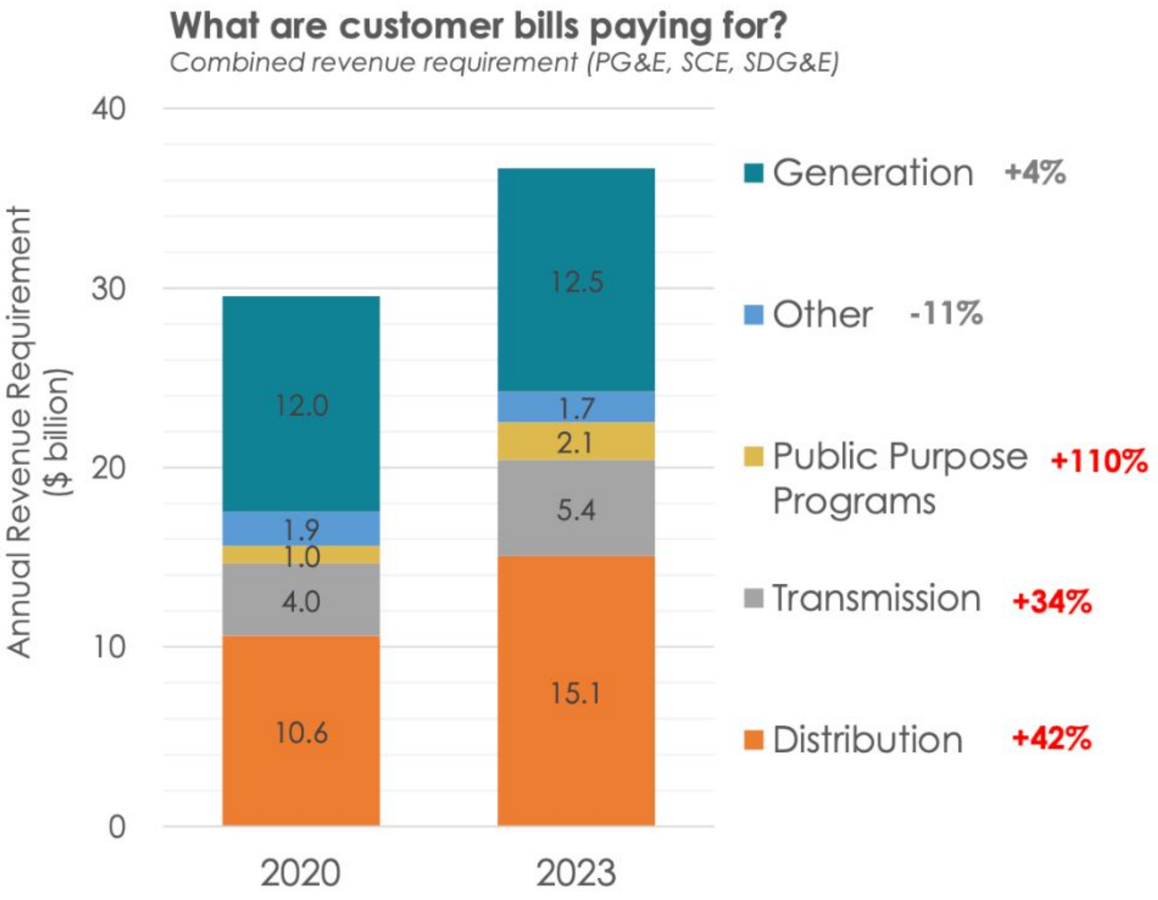
Figure. Real average electricity costs in California (CA), U.S., and CA-U.S. difference, 1970-2023



Source: Average cost data are from EIA-861. CA and U.S. data were both deflated using the Bureau of Labor Statistics' CPI-U index.


Average monthly electricity bill for
residential CARE customer
Comparison of hot and coastal zones for PG&E, SCE and SDG&E
$450
$400
$350
$300
$250
$200
$150
$100
$50
$0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
PG&E Hot (W)
PG&E Coastal (T)
SCE Hot (15)
SCE Coastal (6)
SDG&E Hot (Desert)
SDG&E Coastal

Costs unrelated to consumption are going up



Notable Cost Drivers

- Wildfire-related expenses
- Distribution system maintenance & upgrades
- Transmission buildout

Notable Rate Drivers

- Rate-based subsidies

Source: California Public Utilities Commission. Recreated from data in *2023 Senate Bill 695 Report: Report to the Governor and Legislature on Actions to Limit Utility Cost and Rate Increases Pursuant to PUC Code Section 913.1.* (May 2023)

The Public ADVOCATES OFFICE

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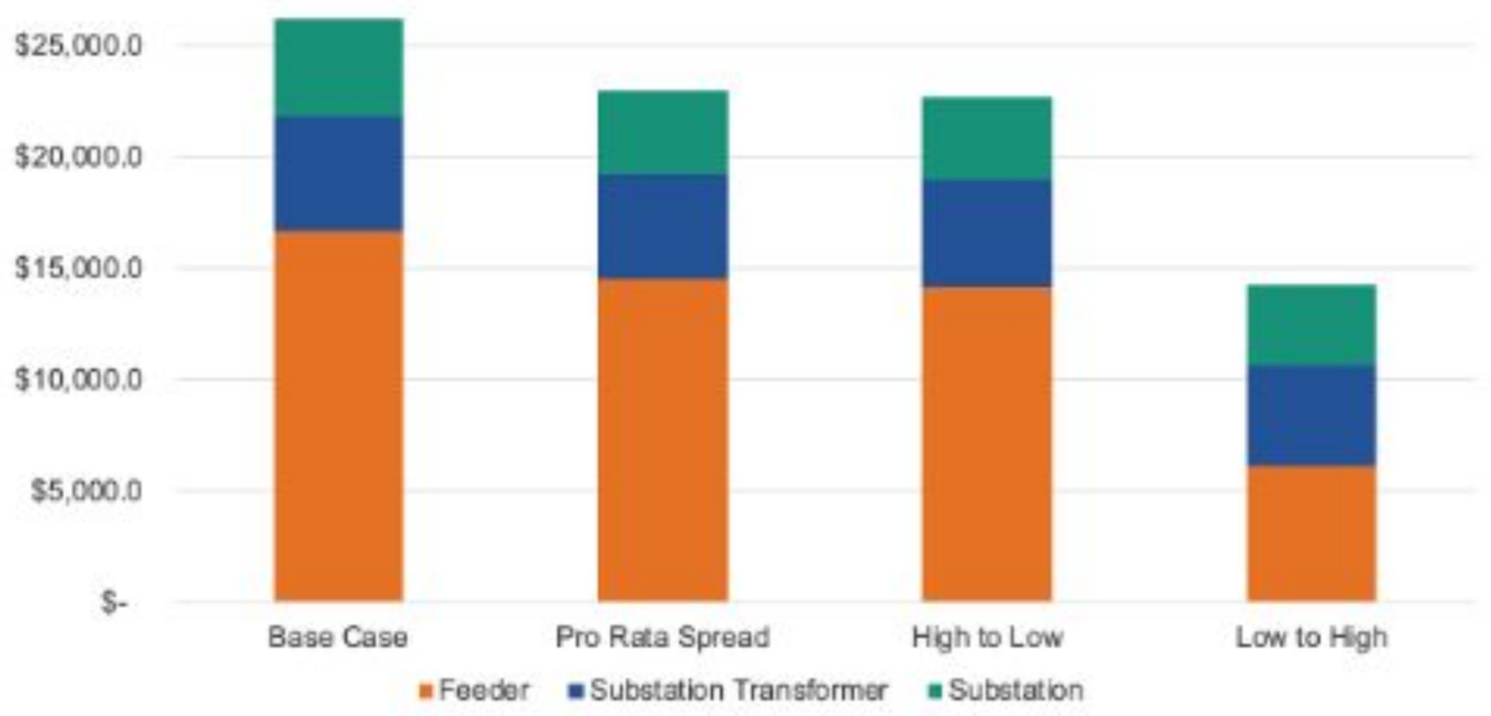
CA Load Flex – Reduce Distribution Costs

GridLab/Kevala Study on Avoided Dist cost

- How do we allocated the 3.5 GW of Load Flex to the distribution system?
- Traditional approach was the allocate the flexibility across all feeders equally.
- What if we took a more targeted approach to allocating this valuable flexibility?
- Allocate in four ways:
  - Pro Rata Spread
  - Highest loaded Feeder to Lowest
  - Lowest loaded Feeders to Highest

GridLab/Kevala Study on Avoided Dist cost

- Lowest to High avoids $12B compared to base case
- Important to note this is a “technical potential”
- Hard to achieve this level
- There is more value that traditional avoided cost approaches that assume zero value from load flex



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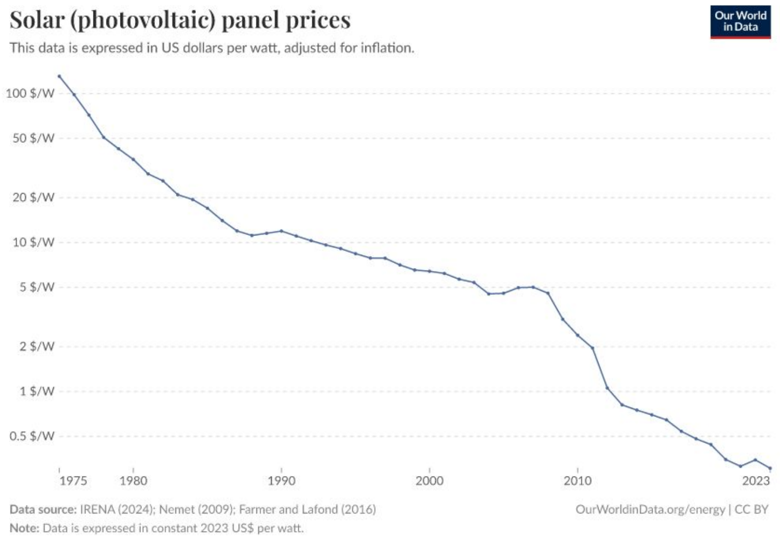
Surplus Interconnection

Dual Challenges Facing The Grid

Energy (MWh) Bottleneck

1. Over 2,500 GW of energy projects waiting to connect to the grid, stuck "in the queue"
2. Much of this is low cost, solar and wind energy



Capacity (MW) Crunch

1. 12 GW of coal, gas and petroleum power plants scheduled to retire in 2025. Nearly 70 GW of coal planned to retire by 2030
2. Peak loads forecasted to increase by 175 GW by 2030, and 270 GW by 2035 (24% and 36%, respectively)

https://ieefa.org/resources/nowhere-go-down-us-coal-capacity-generation
https://www.utilitydive.com/news/load-growth-challenges-supply-demand-brattle/745302/

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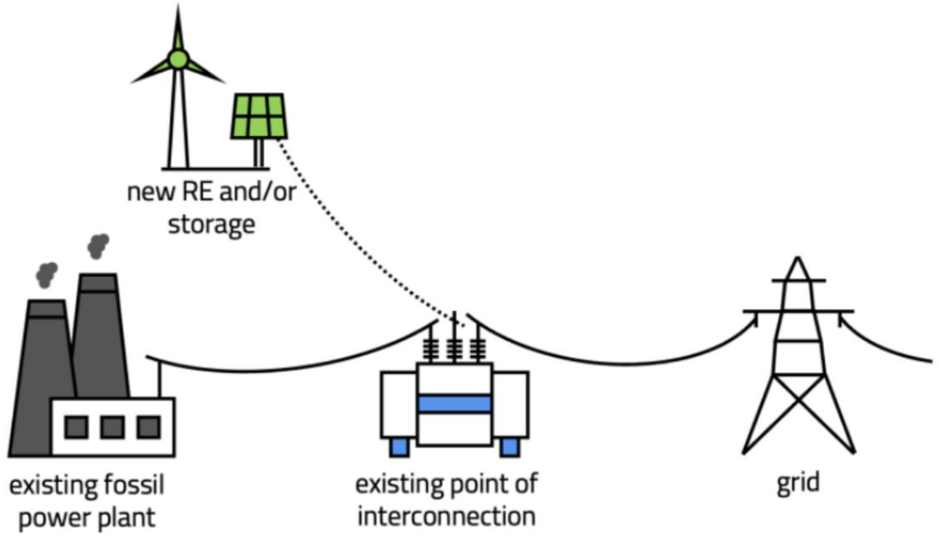
What is Surplus Interconnection Service?

FERC Order 845:

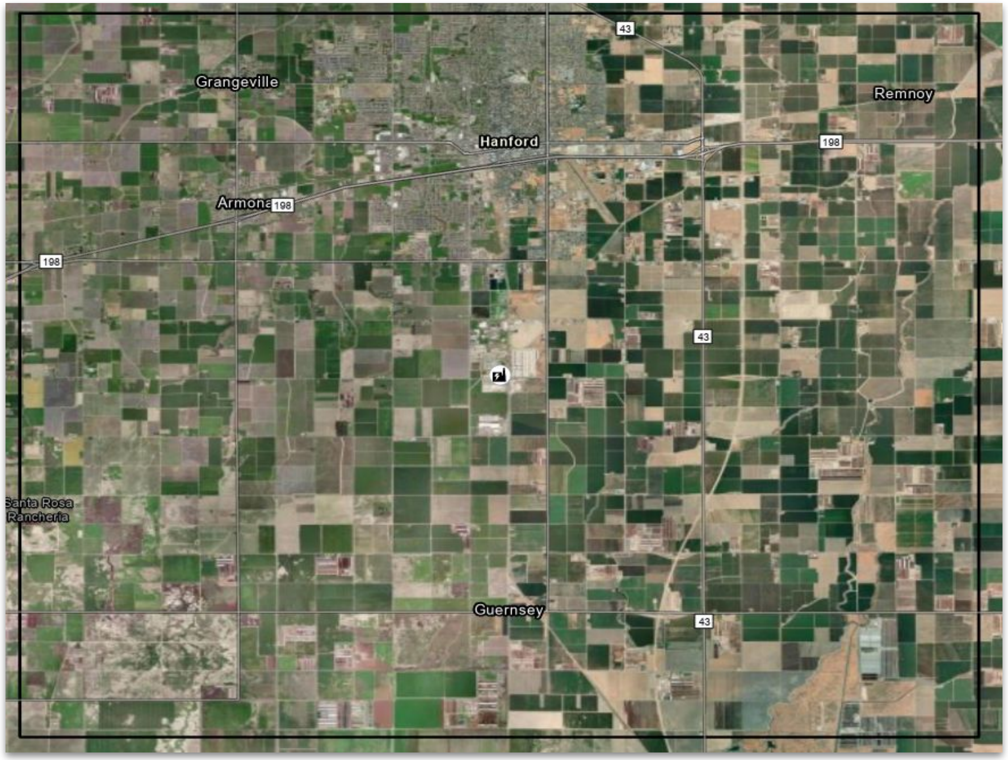
"any unneeded portion of Interconnection Service established in a Large Generator Interconnection Agreement, such that if Surplus Interconnection Service is utilized the total amount of Interconnection Service at the Point of Interconnection would remain the same."



Hanford Energy Park

- Capacity - 92 MW
- Capacity Factor - 1% (2022)
- Variable Cost - $64/MWh

Satellite image of Hanford Energy Park



6 mile square for the Hanford Energy Park

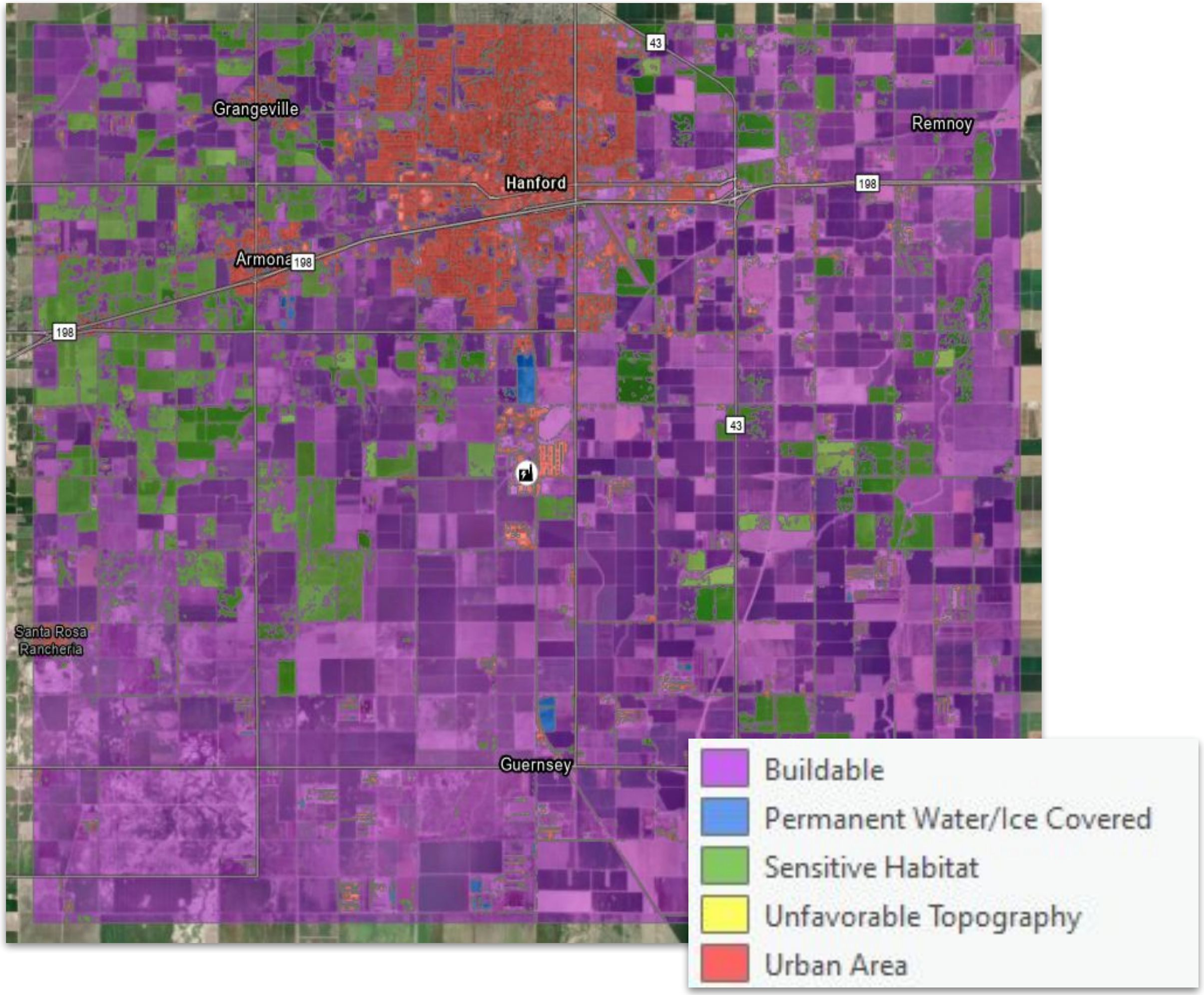
Hanford Energy Park

Classification into **buildable** and **non-buildable** area using satellite datasets

77% of area within this 6 mile square is buildable

Solar Potential - 18.1 GW

Wind Potential - 2.2 GW



24 GW of RE can be added at CA thermal plants

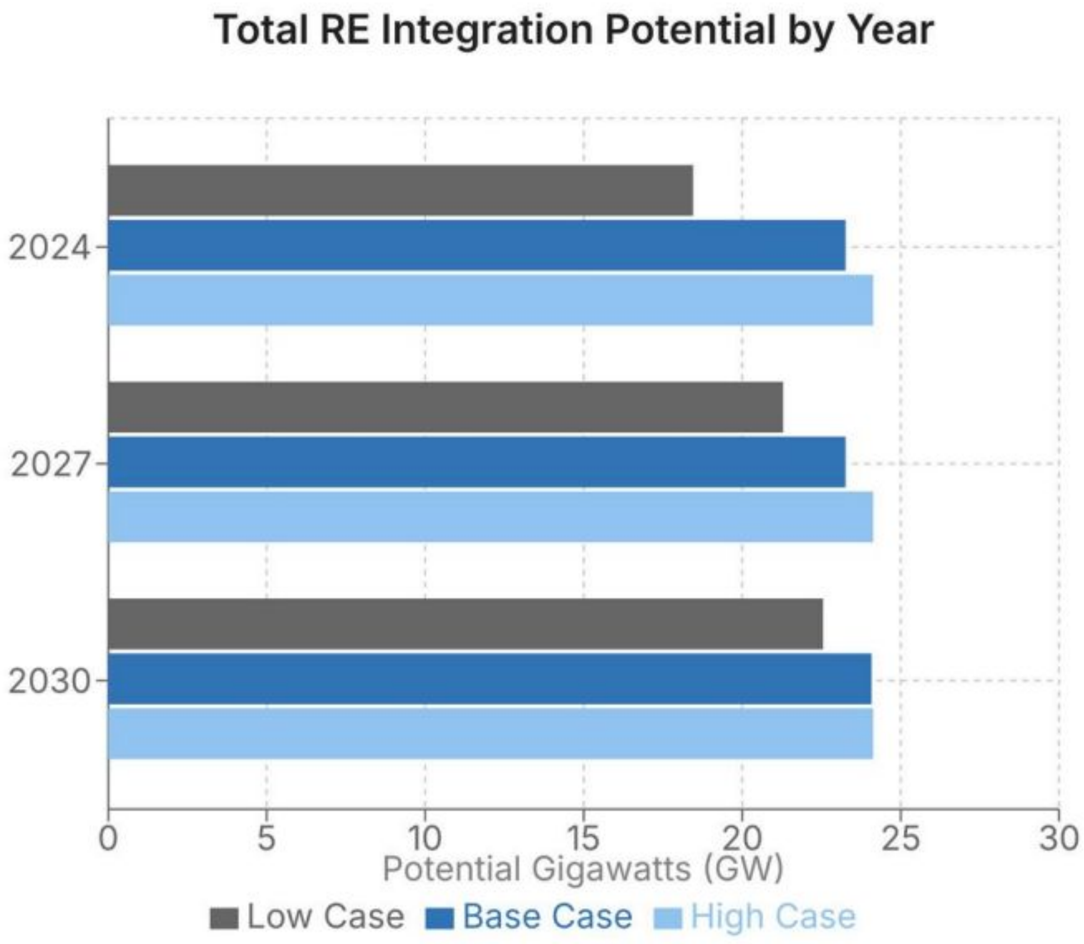
24.08 GW of RE can be integrated economically near thermal plants by 2030

- 24.08 GW of RE economically viable by 2030 (15.65 GW solar and 8.43 GW of wind)
- 23.26 GW can be added today

Sensitivity analysis:

  - Low fuel prices - 18.45 GW (2024) and 22.55 GW (2030)
  - High fuel prices - 24.13 GW (2024) and 24.13 GW (2030)

- Uncertainty range narrows significantly: from 5.68 GW in 2024 to 1.58 GW in 2030
- Even worst-case scenario shows robust growth in viable capacity



Thank you!

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