

Grid for the Future: the pathway to affordable, clean, reliable, resilient and safe energy



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Webinar: Envisioning the Grid for the Future
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California could cut utility bills with distributed energy. Why isn't it?

Rooftop solar, batteries, EVs, and smart thermostats could help rein in rising grid costs — if only California could pass policies to make it happen.



By **Jeff St. John**
10 September 2024

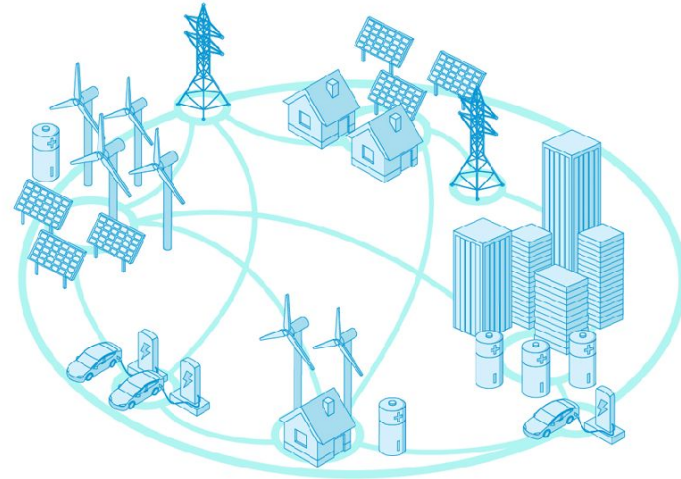


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- A helicopter is seen in flight against a dark, smoky sky, illuminated by its own lights. Below it, a large wildfire rages across a hillside, with bright orange and yellow flames and thick black smoke rising into the air. The scene is dramatic and highlights the severity of the fire.
- **Affordability crisis**
 - **Climate crisis**
 - **Environmental Justice crisis**

Characteristics of The Grid of the Future



Centralized, Dispatchable Resources
Inflexible Load
Single Points of Failure



Decentralized, Diverse Resources
Flexible Load
Resilient Redundancy

\$30B Untapped Cost Savings Available Through DERs

Households transforming the grid: Distributed energy resources are key to affordable clean power

Distributed energy resources like solar panels, EVs, and smart thermostats can help utilities meet rising peak demand and decarbonization goals to achieve net-zero electricity



<https://www2.deloitte.com/us/en/insights/industry/power-and-utilities/der-grid-modernization.html>

Vision for Demand Flexibility



...leading to a reduction in peak loads,
energy prices, and required infrastructure...



Lower peak
load means less
infrastructure cost..

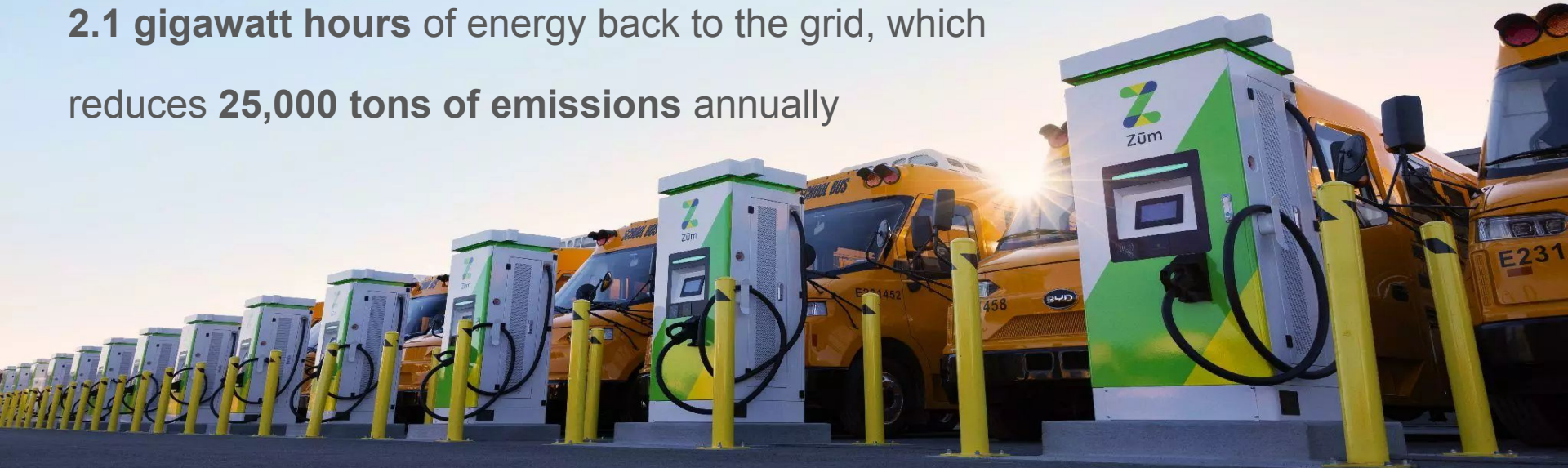
...and customers
buy more electricity
when it is cheaper



- Widespread adoption of demand flexibility solutions
- Reduced peak loads, energy prices, infrastructure needs
- Reduced cost of service

Zum School Buses with Oakland Unified School District

74 EV school buses and charging infrastructure provide up to
2.1 gigawatt hours of energy back to the grid, which
reduces **25,000 tons of emissions** annually






MCE's Virtual Power Plant Pilot in Richmond

Energy that's cleaner for Richmond and more reliable for everyone.

Richmond home receives an all-electric, carbon-free makeover.



California Electricity Aggregator Targets Low-Income Customers with its First Virtual Power Plant

Jan. 9, 2025

The Clean Power Alliance, one of California's largest Community Choice Aggregators and green energy suppliers, will partner with Haven Energy to create a virtual power plant and advance access to clean and reliable energy for disadvantaged communities.

[Kathy Hitchens](#)

The Power of Bidirectional vehicles

Vehicle-to-Load (V2L)

EV batteries can power devices and equipment

Off-Grid
Appliances



BiDi Vehicle



Vehicle-to-Home (V2H)

Home Loads



Grid



BiDi Vehicle



EV batteries can provide backup power to homes during grid outages, enhancing household energy independence.

Vehicle-to-Grid (V2G)

BiDi Vehicle



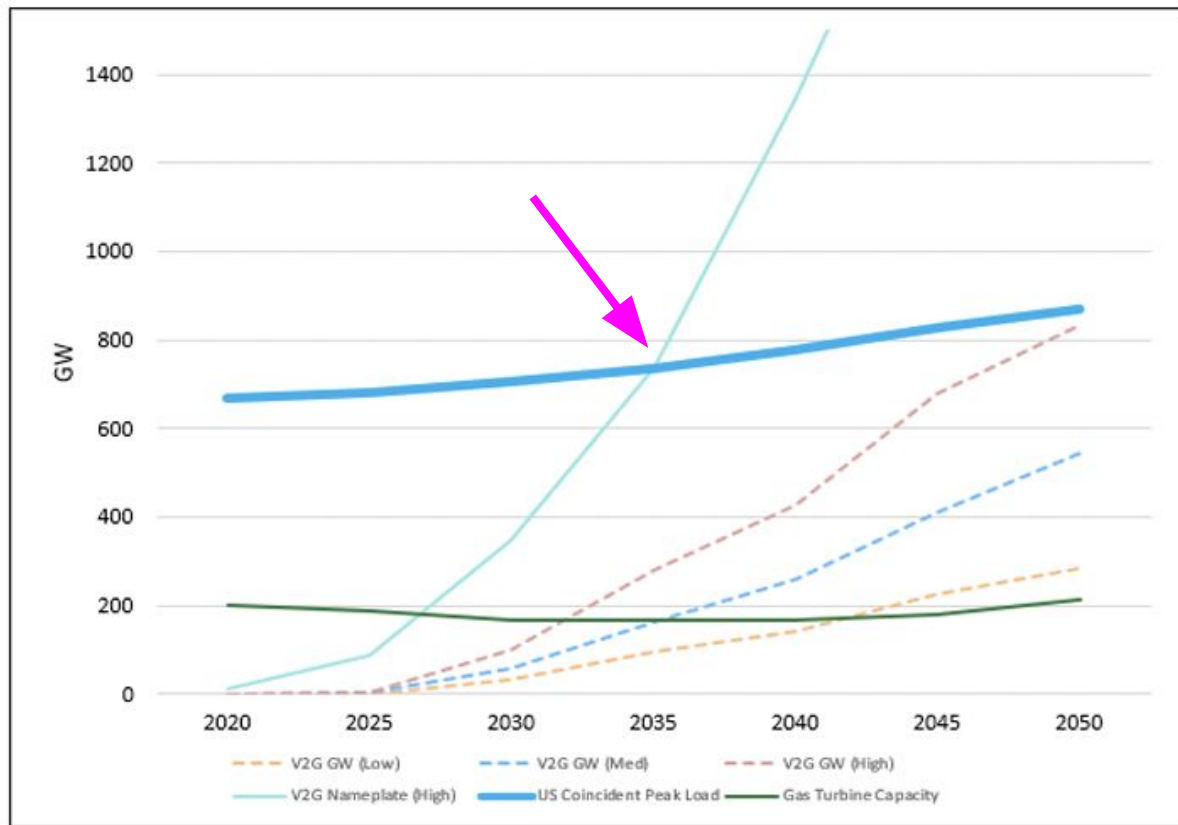
Grid

EVs can function as mobile energy units, supplying power to the grid or home during high demand or when renewable sources are low, aiding in grid stabilization.

CEC estimates 8 million EVs in CA by 2030. If 5 million were bidirectional, their stored energy would be enough energy to power every home in California for a day

Data Sources: California Energy Commission, US Census

Total nationwide EV battery capacity will exceed peak US electricity demand in 2035¹

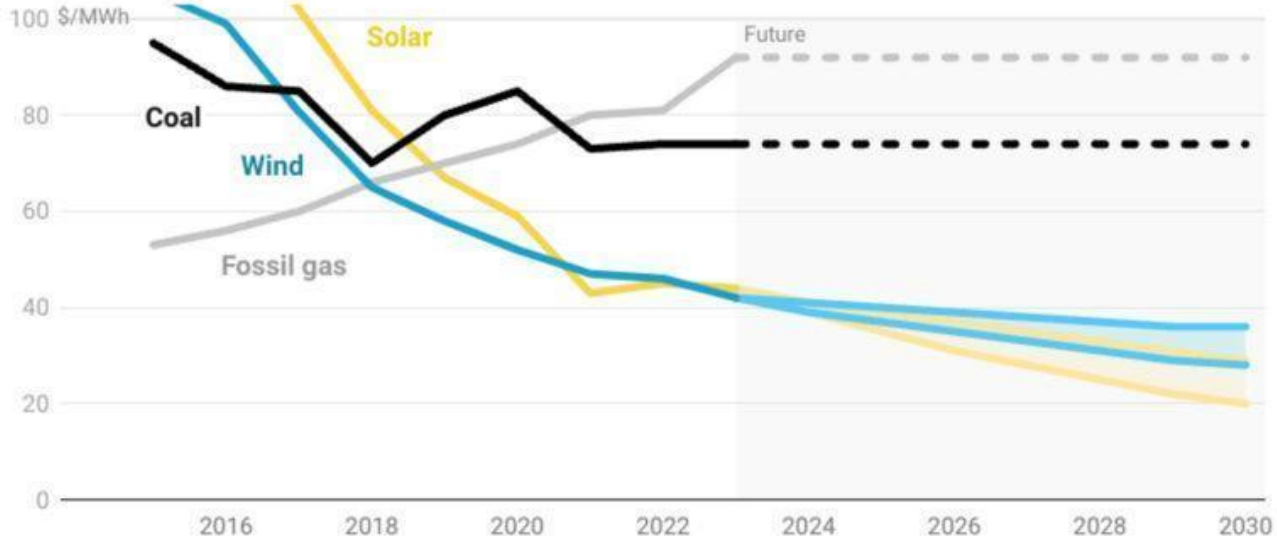


¹ Presented at an October 2022 EPRI Webex. Based on EIA projections of EV populations

Falling costs of renewables

Renewables will keep beating fossil fuels on cost

Analysts project that wind and solar will continue to get cheaper, falling further below coal and gas costs globally this decade.



The Cost of Solar PV modules are Plummeting

The price of solar panels is at an all-time low

Price in \$ per watt

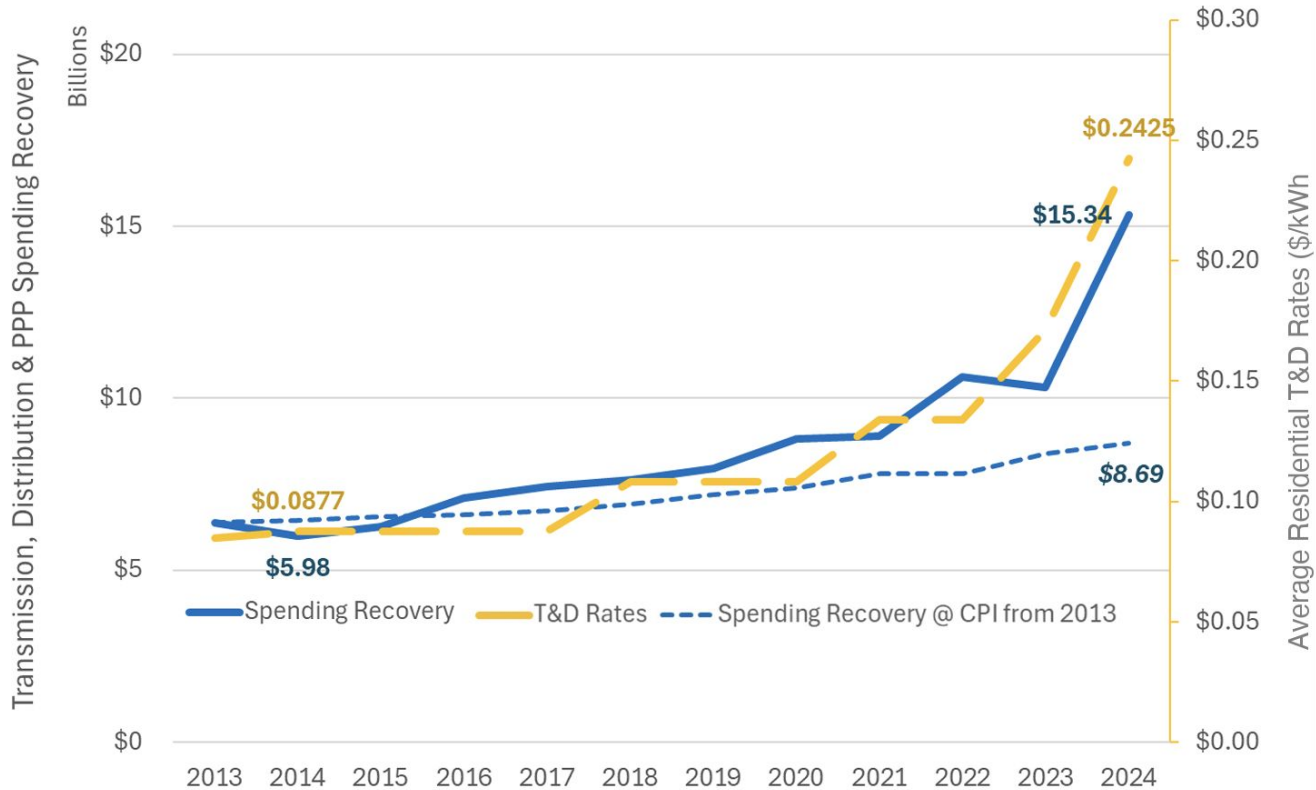


Three-month rolling average, price of monocrystalline silicon modules

Source: BloombergNEF

© FT

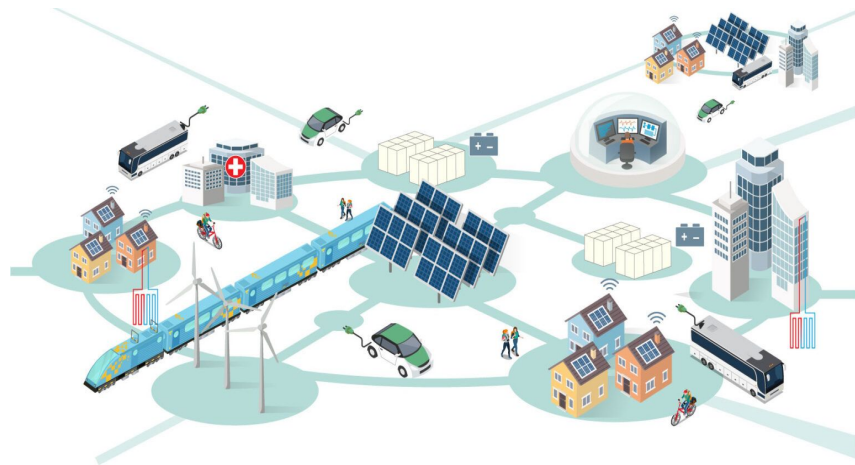
PG&E Transmission & Distribution Spending Driving Rate Increases



Source: Richard McCann, M.Cubed Consulting
("Spending Recovery = Collections from ratepayers for utility spending from current and previous years)

New Policies Needed to Enable Bottom Up Resource Planning

- Reform grid resource and grid planning to emphasize local supply close to load as a foundational principle.
- Reform distribution utilities to provide an open-access network for DER participation.
- Compensate the full value of Distributed Energy Resources (DERs)
- Reform utility compensation to align with state climate goals.





few large power plants

production



many small power producers

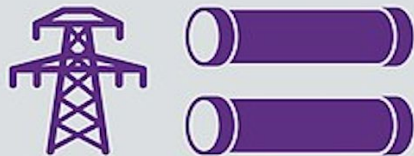


centralized, mostly national

market



decentralized, ignoring boundaries



based on large power lines and pipelines

transmission



including small-scale transmission and regional supply compensation



top to bottom

distribution



both directions



passive, only paying

consumer



active, participating in the system

Compensate the Full Value of DERs (Value Stack Pricing)



Actions for Success

1. Policymakers:

- Dismantle regulatory roadblocks hindering DER deployment and economic participation

2. Utilities:

- Invest in grid modernization to support bidirectional energy flows

3. Businesses:

- Develop strategies to leverage the emerging energy ecosystem

For more information go to the Report.

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