ADVANCED ENERGY UNITED™

Affordability Through Innovation

April 22, 2025

Advanced Energy United

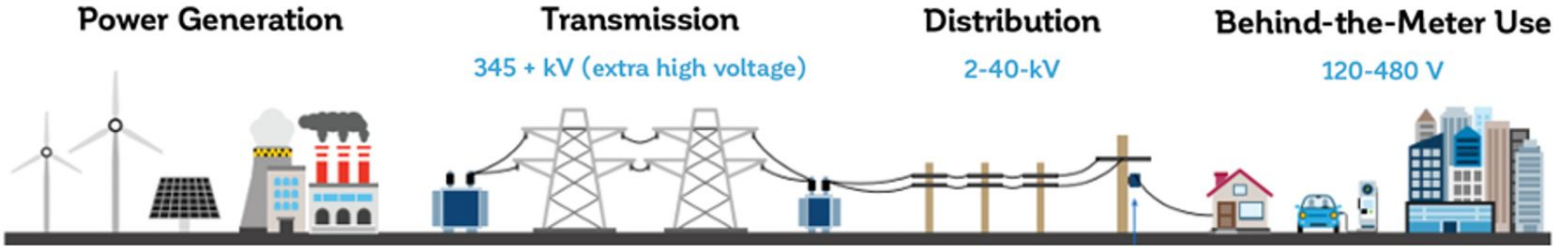
We are the association of businesses united in our mission to achieve 100% clean energy in America.

Member listings are not comprehensive

ADVANCED ENERGY UNITED™

Innovation is advancing across the grid

These innovations are ready for deployment and can unlock massive savings

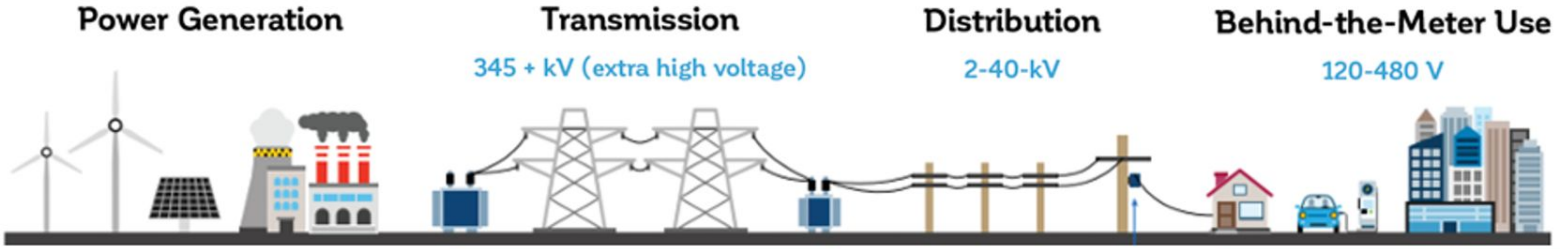


Power Generation	Transmission	Distribution	Behind-the-Meter Use
Solar, wind (onshore & offshore), geothermal, offshore wind Battery Energy Storage Systems (BESS) Emerging: green hydrogen, advanced geothermal	Advanced Reconductoring Grid-Enhancing Technologies (GETs) Innovative transmission financing	Flexible Interconnection Agreements Community solar Virtual power plants (VPPs) Microgrids	Distributed energy resources (DERs) Demand flexibility Virtual power plants (VPPs) Dynamic pricing mechanisms

ADVANCED ENERGY UNITED™

Innovation is advancing across the grid

These innovations are ready for deployment and can unlock massive savings



Power Generation	Transmission	Distribution	Behind-the-Meter Use
Solar, wind (onshore & offshore), geothermal, offshore wind Battery Energy Storage Systems (BESS) Emerging: green hydrogen, advanced geothermal	Advanced Reconductoring Grid-Enhancing Technologies (GETs) Innovative transmission financing	Flexible Interconnection Agreements Community solar Virtual power plants (VPPs) Microgrids	Distributed energy resources (DERs) Demand flexibility Virtual power plants (VPPs) Dynamic pricing mechanisms

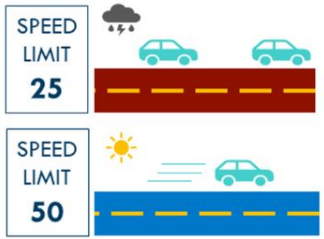
ADVANCED ENERGY UNITED™

GETs could save over $600M per year in California

Grid-enhancing technologies (GETs) can reduce congestion by 40% or more

Dynamic Line Ratings

Adjust the carrying capacity of transmission lines based on real-time measurement of ambient conditions



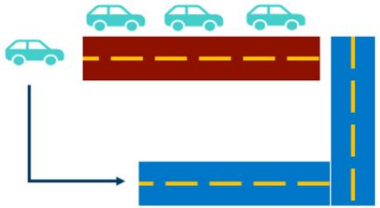
RMI. Cheaper, Cleaner, Faster.

Advanced Power Flow Controls

Hardware solutions that push power away from lines with capacity constraints and pull power to lines with spare capacity

Topology Optimization

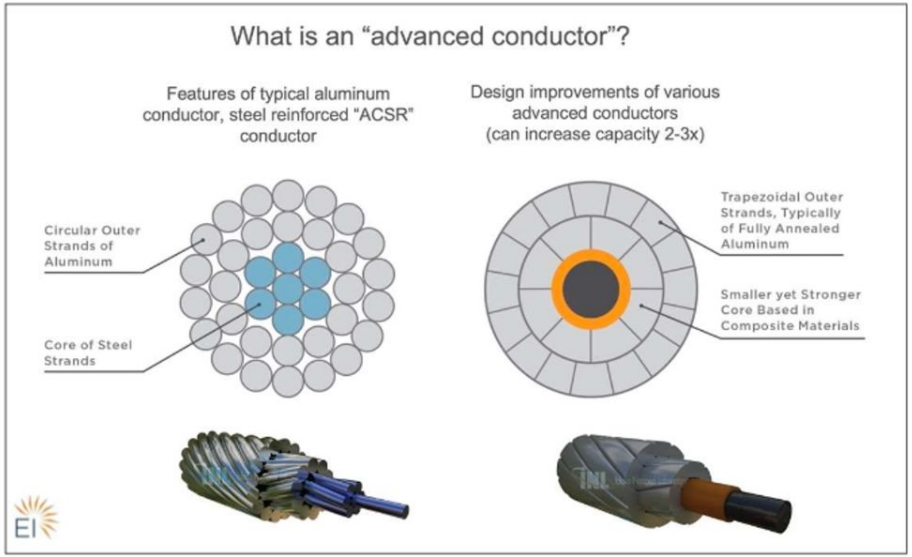
Software solutions that automatically route power flows around traffic



ADVANCED ENERGY UNITED™

Reconductoring: Triple the capacity of existing lines

Advanced conductors can 2x-3x the capacity of existing rights of way, reducing the need to build new transmission



Advanced conductor renderings courtesy of Idaho National Laboratory.[8]

ADVANCED ENERGY UNITED™

GETs, reconductoring, and financing bills & funds

Policy momentum is ongoing for these innovative grid solutions

2025

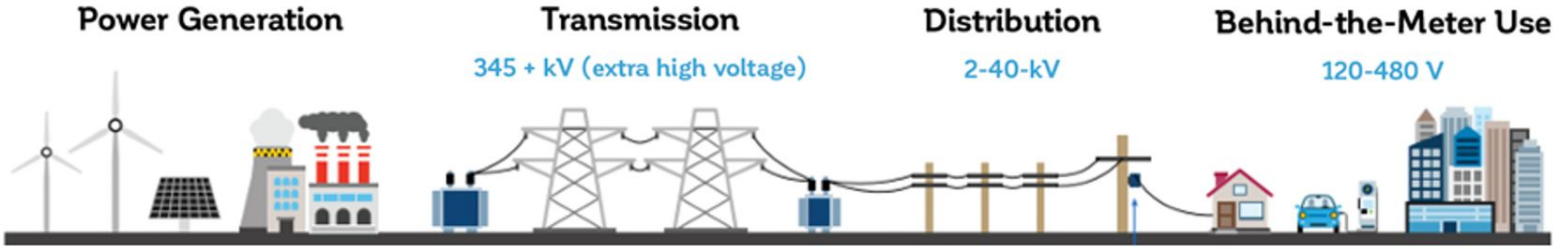
- **AB 854 (Petrie-Norris):** CEQA exemption for reconductoring of transmission infrastructure.
- **Proposition 4 Funds:** $325 million for public financing of clean energy transmission projects, with preference given to projects that provide multiple benefits like reconductoring and other grid-enhancing technologies.
- **SB 330 (Padilla):** Authorizes pilots to leverage low-cost public debt to build transmission more affordably.
- **AB 825 (Petrie-Norris):** Creates a public transmission financing program using the $325M from Prop. 4.

2024

- **SB 1006 (Padilla):** Requires utilities to study the opportunities of GETs and advanced reconductoring projects.
- **AB 2779 (Petrie-Norris):** Requires CAISO to report to the PUC any new use of GETs.
- **SB 862 (Allen):** Climate Bond. Included $325 million for transmission projects including reconductoring and other grid-enhancing technologies

Innovation is advancing across the grid

These innovations are ready for deployment and can unlock massive savings

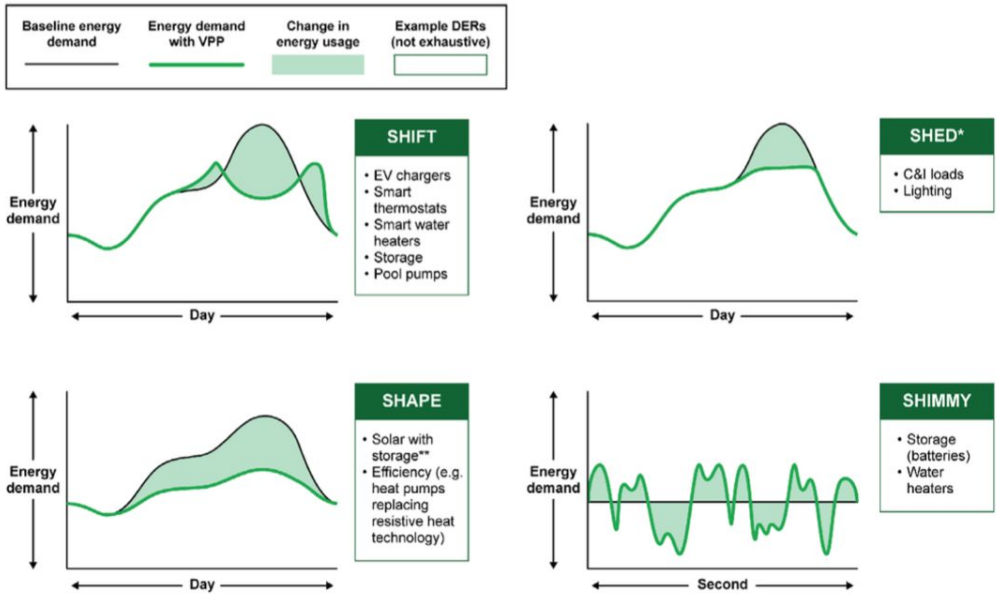


Power Generation	Transmission	Distribution	Behind-the-Meter Use
Solar, wind (onshore & offshore), geothermal, offshore wind Battery Energy Storage Systems (BESS) Emerging: green hydrogen, advanced geothermal	Advanced Reconductoring Grid-Enhancing Technologies (GETs) Innovative transmission financing	Flexible Interconnection Agreements Community solar Virtual power plants (VPPs) Microgrids	Distributed energy resources (DERs) Demand flexibility Virtual power plants (VPPs) Dynamic pricing mechanisms

ADVANCED ENERGY UNITED™

Demand flexibility: Powered by DERs

Reducing peak demand with smart, distributed technologies



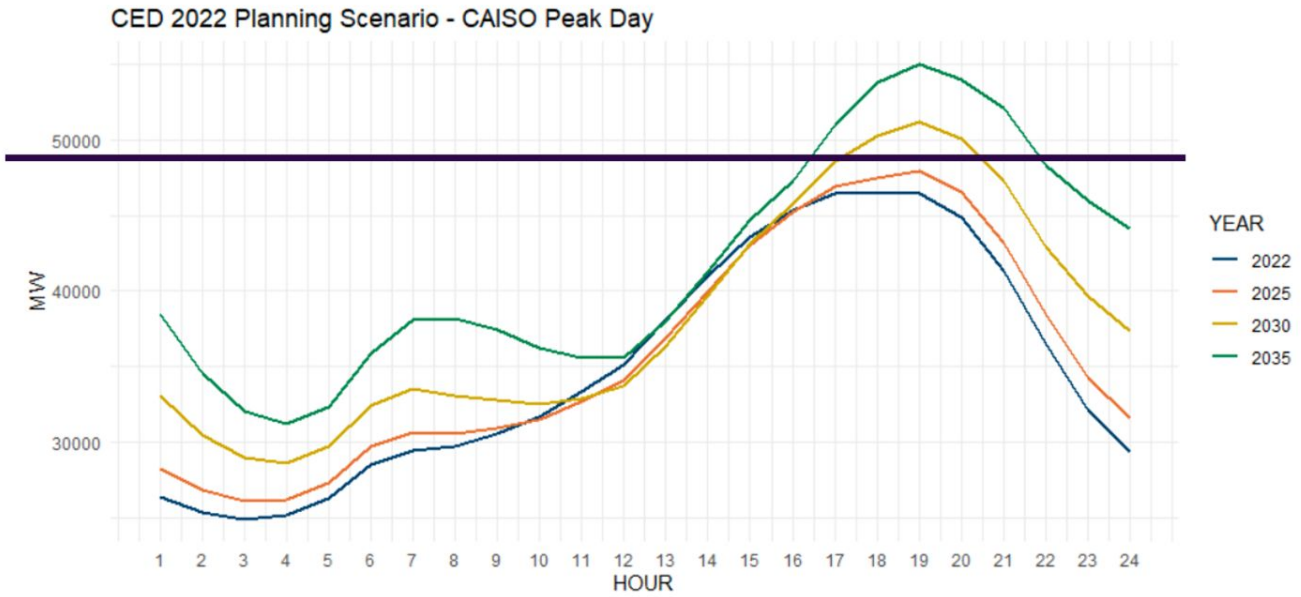
Note: *Load shed for some DERs results in load shifting to later hours as a system (e.g., HVAC) recovers from an event.
**Distributed solar with storage reduces demand on the grid without impacting the energy consumed behind the meter.
Source: Adapted from Lawrence Berkeley National Laboratory and NASEO-NARUC Grid-Interactive Buildings Working Group.[xiii]

ADVANCED ENERGY UNITED™

As Demand Rises, Infrastructure is Built to the Peaks

Without flexibility, peak demand sets the price we all pay

Grid infrastructure capacity (illustrative)



Docketed in CEC Docket 22-IEPR-03: Presentation - Peak Electricity Demand - Update to the California Energy Demand Forecast 2021-2035

ADVANCED ENERGY UNITED™

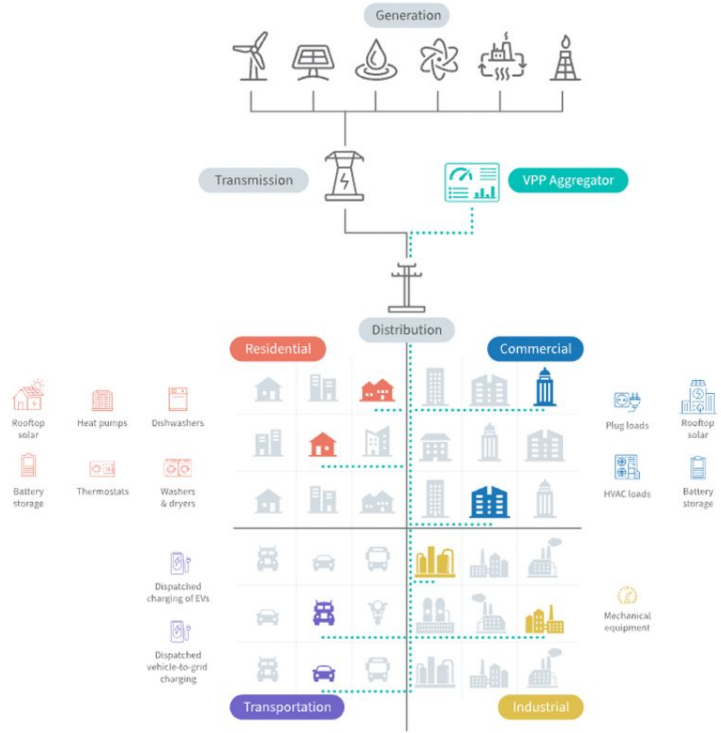
VPPs: Customer technologies powering the grid

Virtual power plant (VPP):

An actively coordinated aggregation of distributed energy resources (DERs) that are dispatchable and can balance electricity demand and supply and reduce or shift demand.

Distributed Energy Resources (DERs):

- Solar and/or battery storage
- Electric vehicles and chargers
- Smart thermostats
- Heat pumps
- Flexible commercial and industrial loads

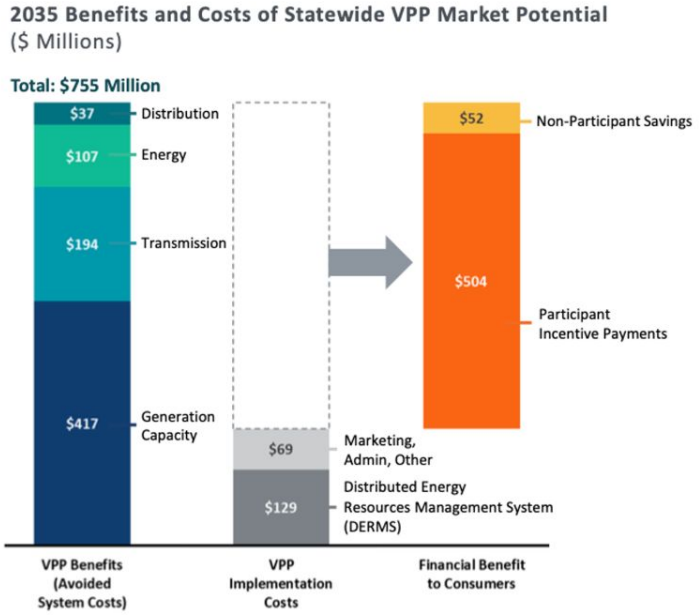


VP3 & RMI: Virtual Power Plant Flipbook: How Utilities and Their Customers Are Already Benefiting from VPPs and Insights for Future Implementation.

ADVANCED ENERGY UNITED™

VPPs = $550 Million in Annual Consumer Savings

Smart devices working together to deliver real dollars back to households



NOTE: Values shown in 2023 dollars. Split between participant incentives and non-participant savings will vary depending on program design.

Brattle Group: California's Virtual Power Plant Potential: How Five Consumer Technologies Could Improve the State's Energy Affordability. April 2024

An individual household participating in all four residential VPP options could receive participation payments of $500 to $1,000 per year.

ADVANCED ENERGY UNITED™

VPPs are already working – Here and nationwide

California Energy Commission's **Demand Side Grid Support (DSGS)**	PG&E and Sunrun's **Peak Power Rewards**	NRG and Renew Home's **Texas VPP**
• **Area:** CA - Statewide • **Start:** Launched in 2022 at the direction of the legislature • **Tech:** Batteries, smart thermostats, EVs, etc • **Capacity:** Over 500 MW & over 260,000 customers	• **Area:** PG&E territory • **Start:** Launched in 2023 at the authorization by the CPUC • **Tech:** Rooftop solar & battery systems • **Capacity:** 32 MW & 8,500 customers	• **Area:** Texas - Statewide • **Start:** Partnership announced last year • **Tech:** Smart thermostats • **Capacity:** 1,000 MW by 2035

Demand flexibility & VPP bills & initiatives

Policy momentum is ongoing for these innovative grid & consumer solutions

2025

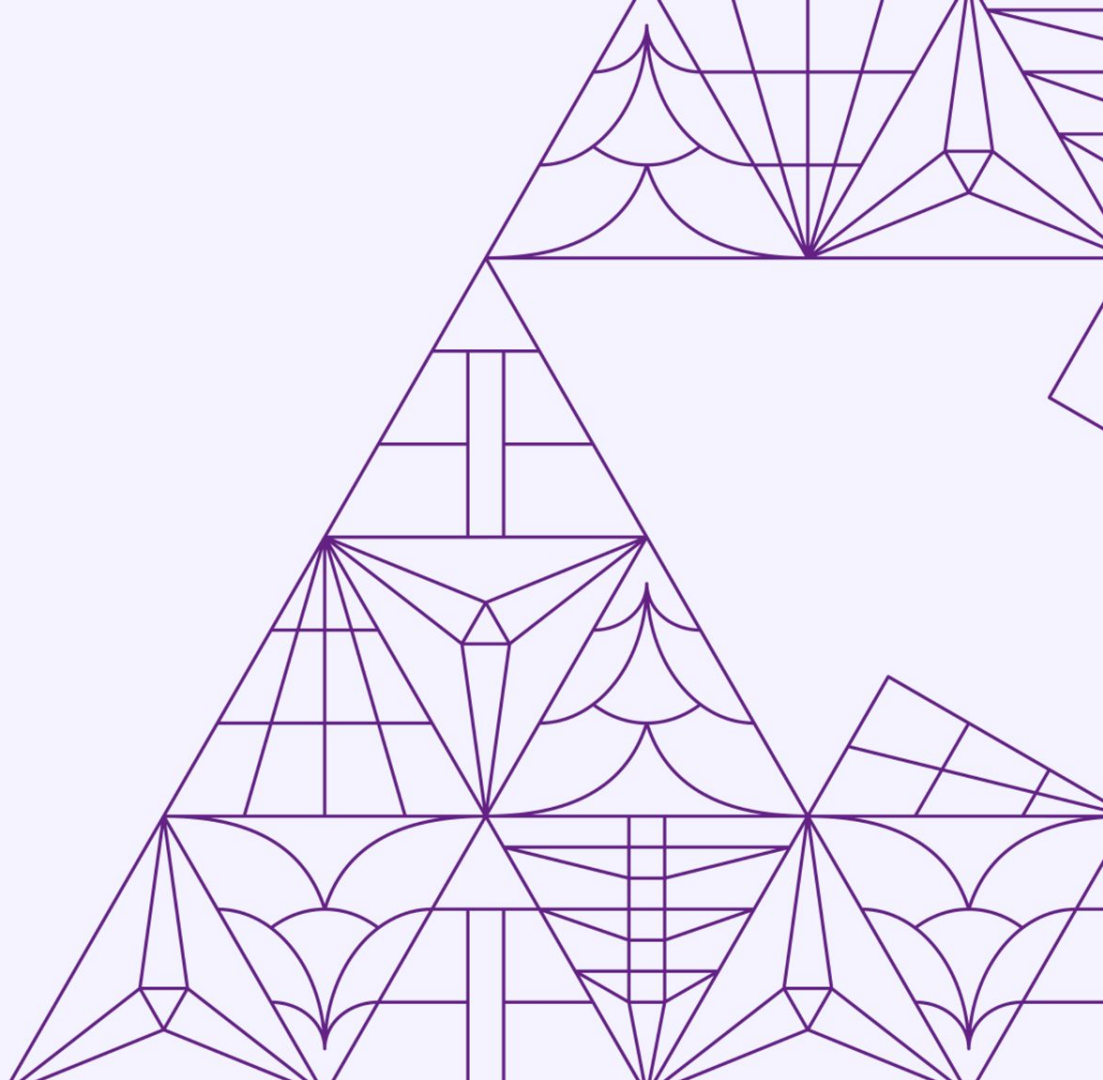
- **AB 740 (Harabedian):** Requires the CEC to work with the CPUC and CAISO to identify barriers to VPP deployment and prepare a VPP deployment strategy.
- **AB 44 (Schultz):** Sets clear rules for how load serving entities can reduce their electricity demand with VPPs.
- **SB 541 (Becker):** Allocates the state's load-shift goal by load-serving entity and directs the CEC to create a location-based avoided cost metric.
- **DSGS & DEBA Funding:** The Governor's budget offers funding for these key demand flexibility programs.
- **CEC Demand Flexibility Summit –** May 22

2022

- **SB 846:** Directed the CEC to establish a statewide Load Shift Goal and update it every 2 years.
- **AB 205:** Created the Distributed Electricity Backup Assets (DEBA) Program to fund new DERs for emergency supply and the Demand Side Grid Support Program to incentivize dispatchable load reduction (VPPs)

Thank you

Contact me:
Edson Perez
eperez@advancedenergyunited.org



ADVANCED ENERGY UNITED™

advancedenergyunited.org
@AdvEnergyUnited

1801 Pennsylvania Avenue NW, Suite 410
Washington, DC 20006