



# BARRIERS & SOLUTIONS TO ENERGY RESILIENCY PROJECTS

Climate Center Webinar | 3.23.2022

# ABOUT TERRAVERDE ENERGY

*TerraVerde Energy is an independent energy consulting firm  
proudly supporting clients since 2009 with solar,  
battery storage, and energy resiliency projects*


**\$500 MILLION**  
in projects developed

**150 MEGAWATTS**  
in projects deployed

**\$50 MILLION**  
in savings delivered



**TerraVerde**  
ENERGY

The background is a collage of three images: solar panels on the left, a white electric car being charged on the right, and a modern house in the center. The entire image has a dark teal overlay.

*Given the complexities and costs of deploying clean energy resiliency projects (e.g., backup-power enabled solar + battery projects), a key barrier to deployment is generating economic value over the life of the project to justify the investment.*

# TWO SUB-SETS TO THIS BARRIER

Quantifying the Benefits of Backup Power

Generating Bankable Additional Value

Today, we're going to look more closely at these challenges, along with solutions for overcoming these barriers to unlock the value of clean energy resiliency projects.

# BARRIER: QUANTIFYING THE BENEFITS OF BACKUP POWER

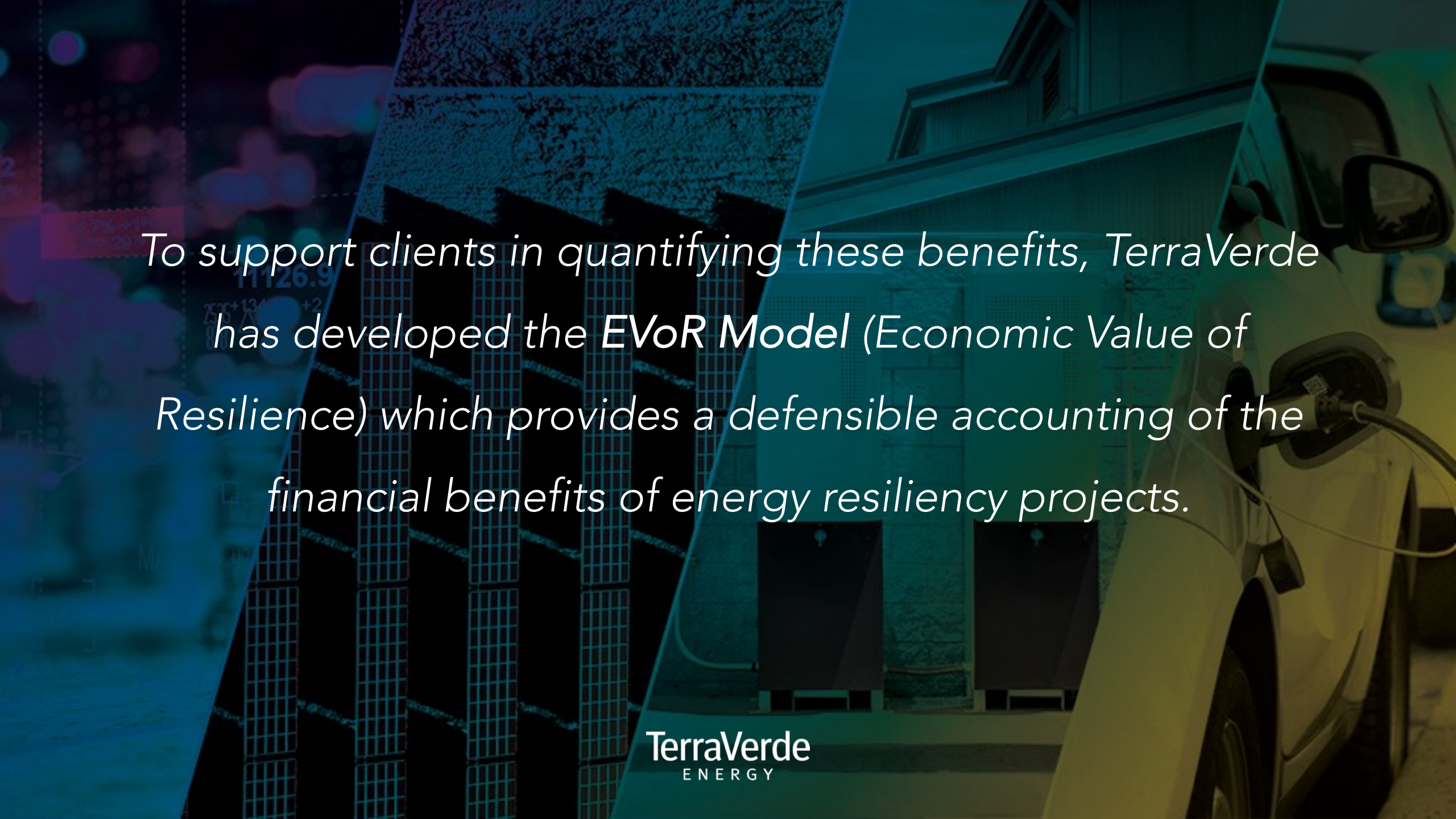
- **IDENTIFYING & ACCOUNTING** for the financial benefits of having backup power is an **ALL-IMPORTANT** elements to assessing the cost-benefit of an energy resiliency project.
- Unfortunately, this exercise can prove very challenging, due to a **LACK OF READILY AVAILABLE DATA & STANDARDS**.
- As a result, the value of the backup power benefits of these backup power enabled solar + battery projects are **UNACCOUNTED** for in the **COST-BENEFIT ANALYSIS**, making it harder for projects to find investment.

# CASE STUDY: SCHOOL DISTRICT IN NORTHERN CALIFORNIA

Quantifying the value of backup power proved vital in proving the cost-effectiveness of their energy resiliency projects. When the power goes out for more than 6 hours, they are required by law to dispose of their refrigerated and frozen foods. Across five of their locations, that equated to a \$226,500 loss per 6+ hour outage. Based on the detailed study and findings related to their potential projects, this School District approved the following projects for implementation late last year:

Sites	Two High Schools
Existing Solar (combined)	950 kW
New Batteries (combined)	950 kW / 4,167 kWh

CAPEX	(\$2,808,365)
SGIP Incentives	\$1,046,470
15-Yr OPEX	(\$589,685)
15-Yr Utility Bill Savings	\$399,282
15-Yr Business Interruption Cost Avoidance	\$2,204,911
15-Yr Net Benefit	\$252,612



To support clients in quantifying these benefits, TerraVerde has developed the *EV<sub>o</sub>R Model* (Economic Value of Resilience) which provides a defensible accounting of the financial benefits of energy resiliency projects.

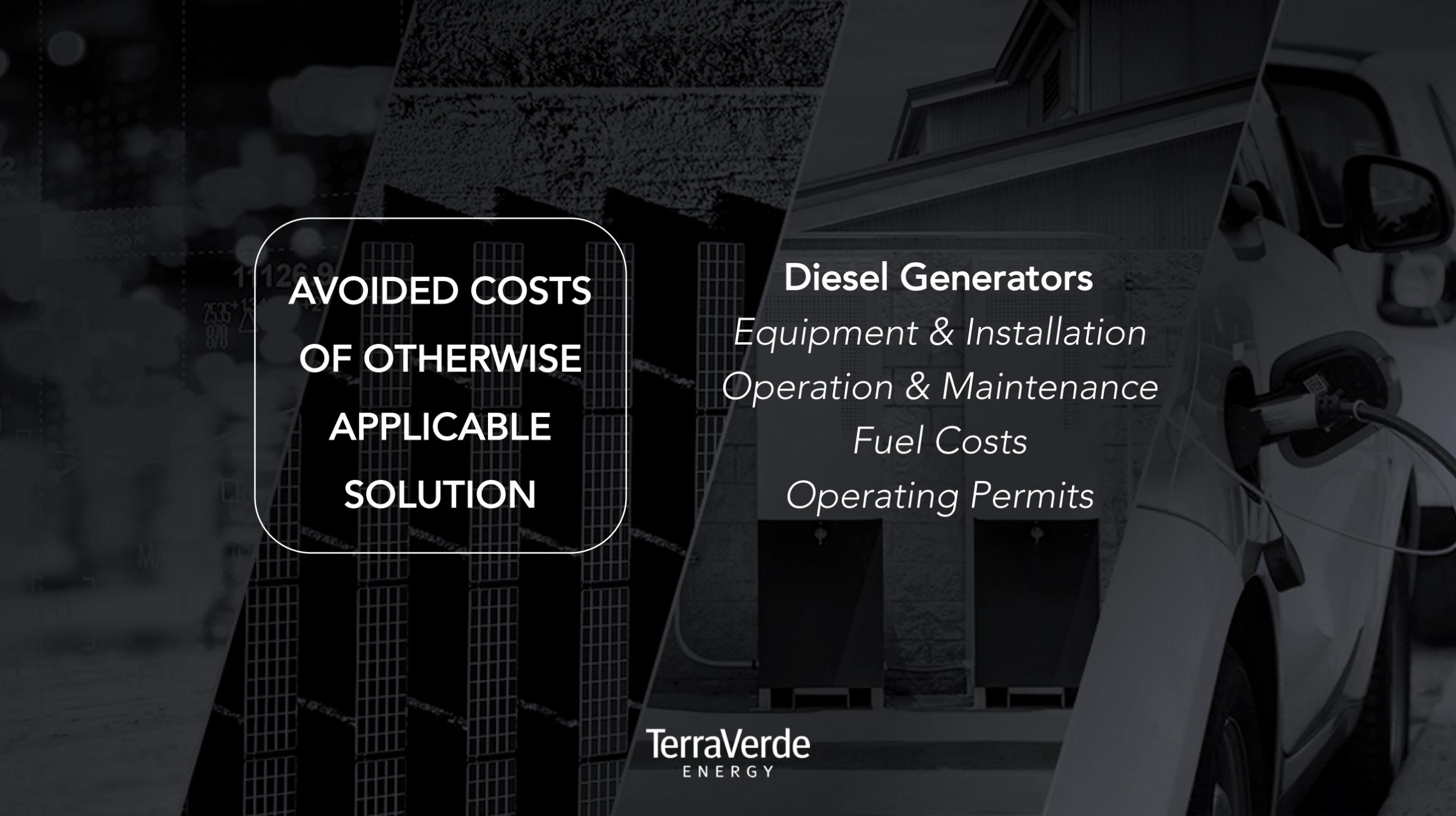
**EV<sub>o</sub>R =**

**AVOIDED COSTS  
OF OTHERWISE  
APPLICABLE  
SOLUTION**

**+**

**AVOIDED COSTS  
OF POWER  
INTERRUPTION**

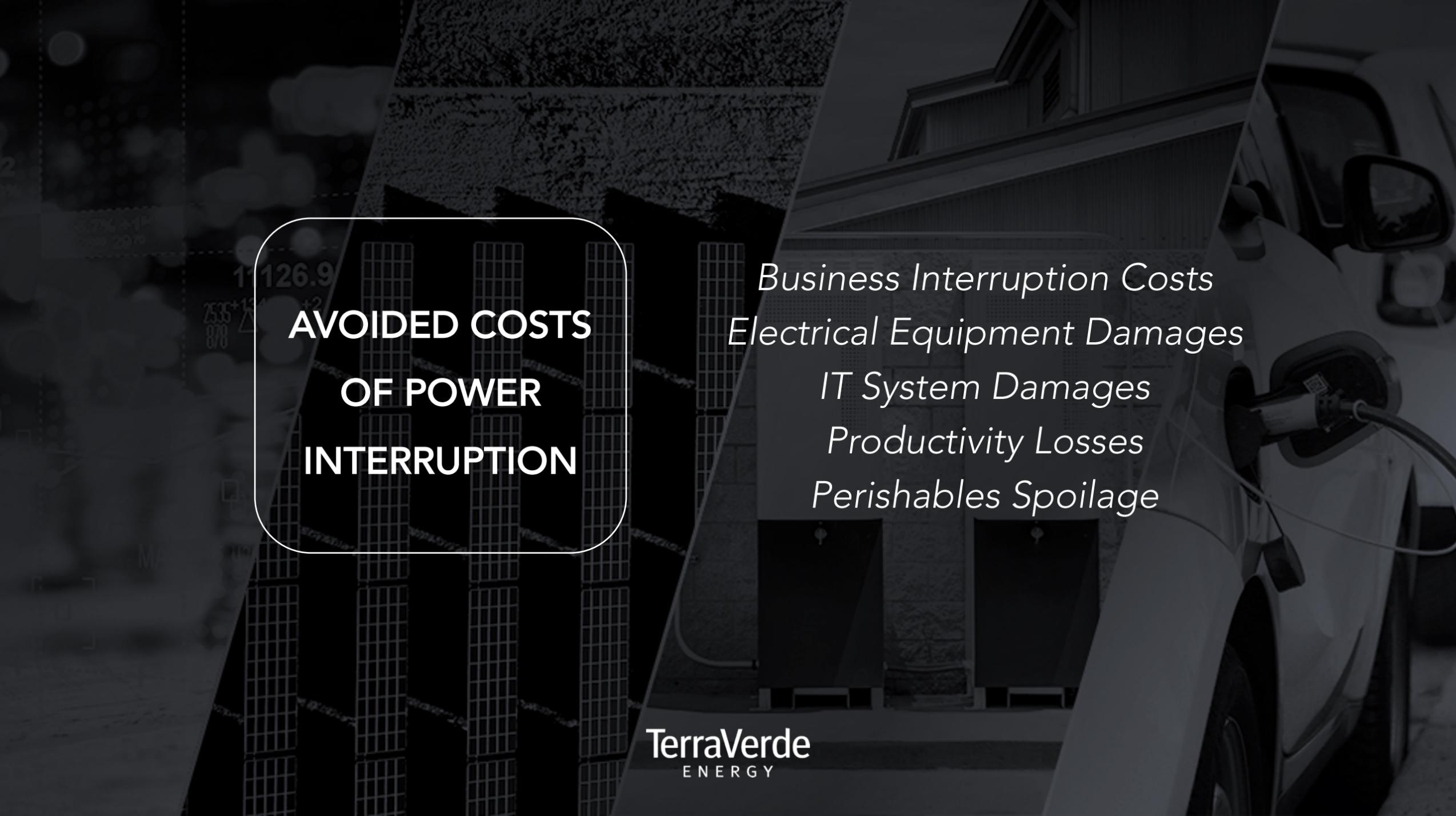
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**AVOIDED COSTS  
OF OTHERWISE  
APPLICABLE  
SOLUTION**

**Diesel Generators**

*Equipment & Installation  
Operation & Maintenance  
Fuel Costs  
Operating Permits*



**AVOIDED COSTS  
OF POWER  
INTERRUPTION**

*Business Interruption Costs  
Electrical Equipment Damages  
IT System Damages  
Productivity Losses  
Perishables Spoilage*

# ANOTHER BARRIER: GENERATING SUFFICIENT VALUE

Beyond the Economic Value of Resilience, it is vital to **IDENTIFY & MAXIMIZE THE ADDITIONAL VALUE** streams that the clean energy resiliency technologies can generate.



## SOLAR PV SYSTEMS

generate energy **SAVINGS** by reducing electric utility bills

generate **REVENUE** via monetizing Renewable Energy Certificates



## BATTERY ENERGY STORAGE SYSTEMS

generate **SAVINGS** by reducing peak demand and shifting load to less expensive hours

generate **REVENUE** via participating in grid services programs & DER programs

# ANOTHER BARRIER: GENERATING SUFFICIENT VALUE

There are several challenges in this vein:

- Many facilities that would be prioritized for community energy resiliency have relatively low energy usage, and therefore less opportunity for generating savings (e.g., fire stations)
- Many of these facilities are also on utility rates that make it difficult for solar & battery systems to generate sufficient value (e.g., Northern California Schools on PG&E's A-6 rate, no demand charges)
- Under current rules, projects adding batteries to existing solar projects do not qualify for the Federal Investment Tax Credit, which would otherwise offset 26% of the project costs

# AN INNOVATIVE APPROACH PARTNERING WITH CCAs

Community Choice Energy Aggregators (CCAs) are electricity providers operated by local governments on the poles and wires of the Investor-Owned Utilities.

CCAs are increasingly offering programs that provide savings & resiliency benefits to customers.

The California Community Choice Association's mission is to support the development and long-term sustainability of locally-run CCA electricity providers throughout California.

## Areas of Service:

**Apple Valley Choice Energy**  
City of Apple Valley

**Central Coast Community Energy**  
Unincorporated Monterey, San Benito, Santa Barbara & Santa Cruz Counties & 27 cities

**Clean Energy Alliance**  
3 cities

**Clean Power Alliance**  
Unincorporated Ventura County & 7 cities, Unincorporated Los Angeles County & 23 cities

**CleanPowerSF**  
San Francisco County

**Desert Community Energy**  
Palm Springs

**East Bay Community Energy**  
Unincorporated Alameda County & 14 cities

**King City Community Power**  
King City

**Lancaster Choice Energy**  
City of Lancaster

**MCE**  
Marin & Napa Counties, Unincorporated Solano County & 2 cities, Unincorporated Contra Costa County & 14 cities

**Peninsula Clean Energy**  
Unincorporated San Mateo County & 20 cities

**Pico Rivera Innovative Municipal Energy**  
City of Pico Rivera

**Pioneer Community Energy**  
El Dorado County, Unincorporated Placer County & 6 cities

**Pomona Choice Energy**  
City of Pomona

**Rancho Mirage Energy Authority**  
City of Rancho Mirage

**Redwood Coast Energy Authority**  
Humboldt County

**San Diego Community Power**  
5 cities

**San Jacinto Power**  
City of San Jacinto

**San Jose Clean Energy**  
City of San Jose

**Santa Barbara Clean Energy**  
City of Santa Barbara

**Silicon Valley Clean Energy**  
Unincorporated Santa Clara County & 13 cities

**Sonoma Clean Power**  
Sonoma & Mendocino Counties

**Valley Clean Energy**  
Yolo County & Cities of Winters, Woodland & Davis



**CALCCA**  
ADVANCING LOCAL ENERGY CHOICE [cal-cca.org](http://cal-cca.org)

■ Serving Customers

■ Implementation Plan Filed

■ Considering CCA

\* Not all towns/cities within a county are served by the local CCA program. Please visit individual agency websites for more detailed service area information. To learn more about CalCCA please visit our website at [cal-cca.org](http://cal-cca.org).

# TERRAVERDE'S DISTRIBUTED PPA PROGRAM

TerraVerde is now working with 8 CCAs (and counting) on a program that aligns CCA & customer interests in behind-the-meter solar + battery projects.

CCAs deploy third-party owned solar + battery projects at customer facilities. Customers get energy cost savings & resiliency. CCAs leverages the energy resources in the wholesale markets to generate **ADDITIONAL VALUE.**

## Programs Under Development

Town of Apple Valley  
City of Lancaster  
City of Palm Springs  
City of Pico Rivera  
City of Pomona  
City of Rancho Mirage  
City of San Jacinto  
City of Santa Barbara

# TERRAVERDE'S DISTRIBUTED PPA PROGRAM

For example, the following is a summary of 25-year program financials for a solar + battery project under development at a High School campus in one of these CCA's Distributed PPA Programs.

## PROJECT SPECS

Site	High School
Electricity Rate	TOU-8-E
Solar Size (kW)	627
Battery Size (kW/kWh)	283 / 1131

## SCHOOL FINANCIALS

Utility Bill Savings	\$7,360,255
Program Payments	(\$6,548,546)
Net Benefits	\$811,710

## CCA FINANCIALS

Program Costs	(\$7,905,050)
Customer Payments	\$6,548,546
DER Benefits	\$1,847,086
Net Benefits	\$490,582



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# TerraVerde

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