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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

CALIFORNIA High-Speed Rail Authority

EL DORADO COUNTY CALIFORNIA

Visalia UNIFIED SCHOOL DISTRICT
Every Student Succeeds

CITY OF PICO RIVERA CALIFORNIA

emwd

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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.*

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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 theses challenges, along with solutions for overcoming these barriers to unlock the value of clean energy resiliency projects.

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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.

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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 Voidance	$2,204,911
15-Yr Net Benefit	$252,612

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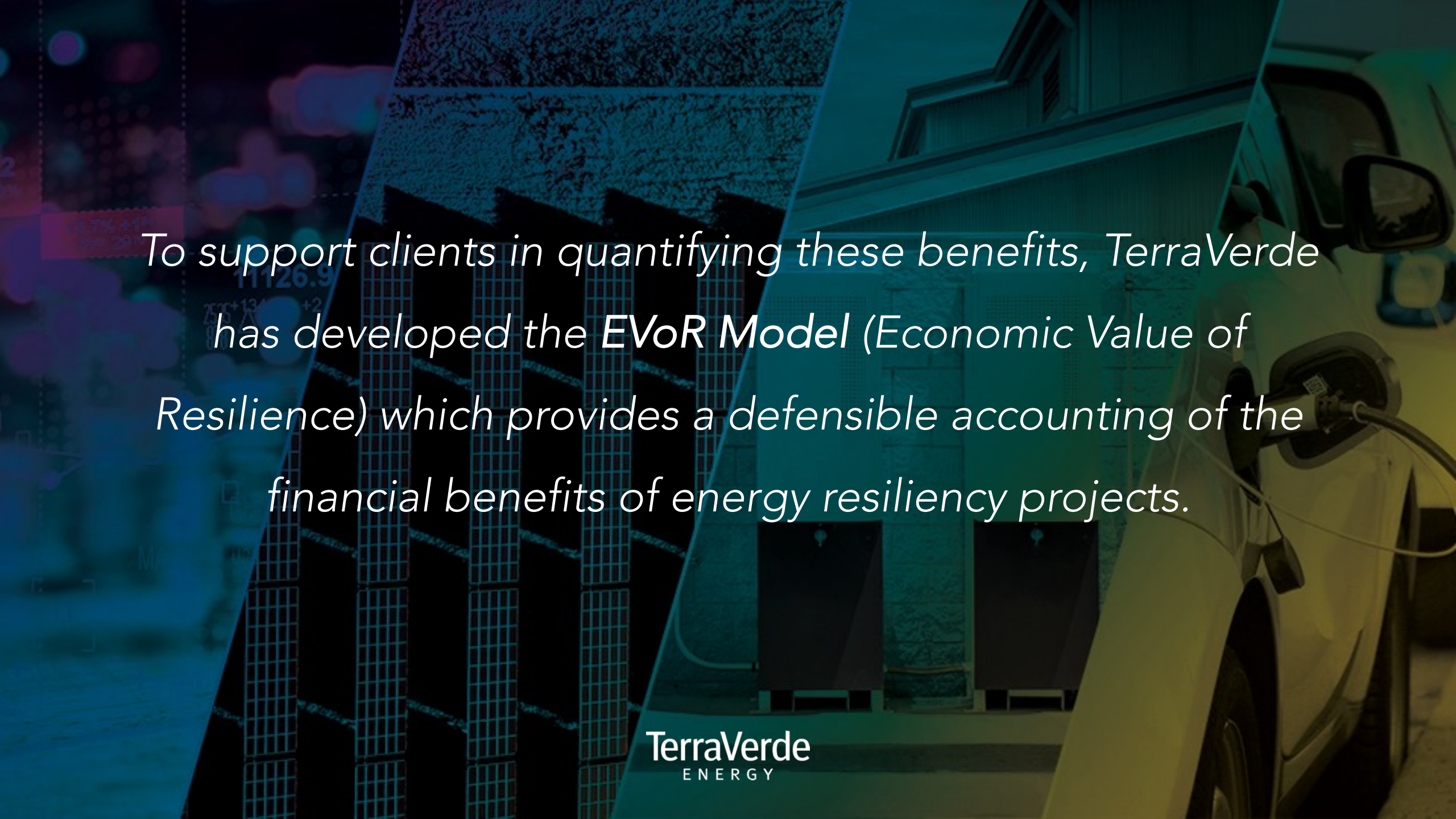

*To support clients in quantifying these benefits, TerraVerde has developed the **EVoR Model** (Economic Value of Resilience) which provides a defensible accounting of the financial benefits of energy resiliency projects.*

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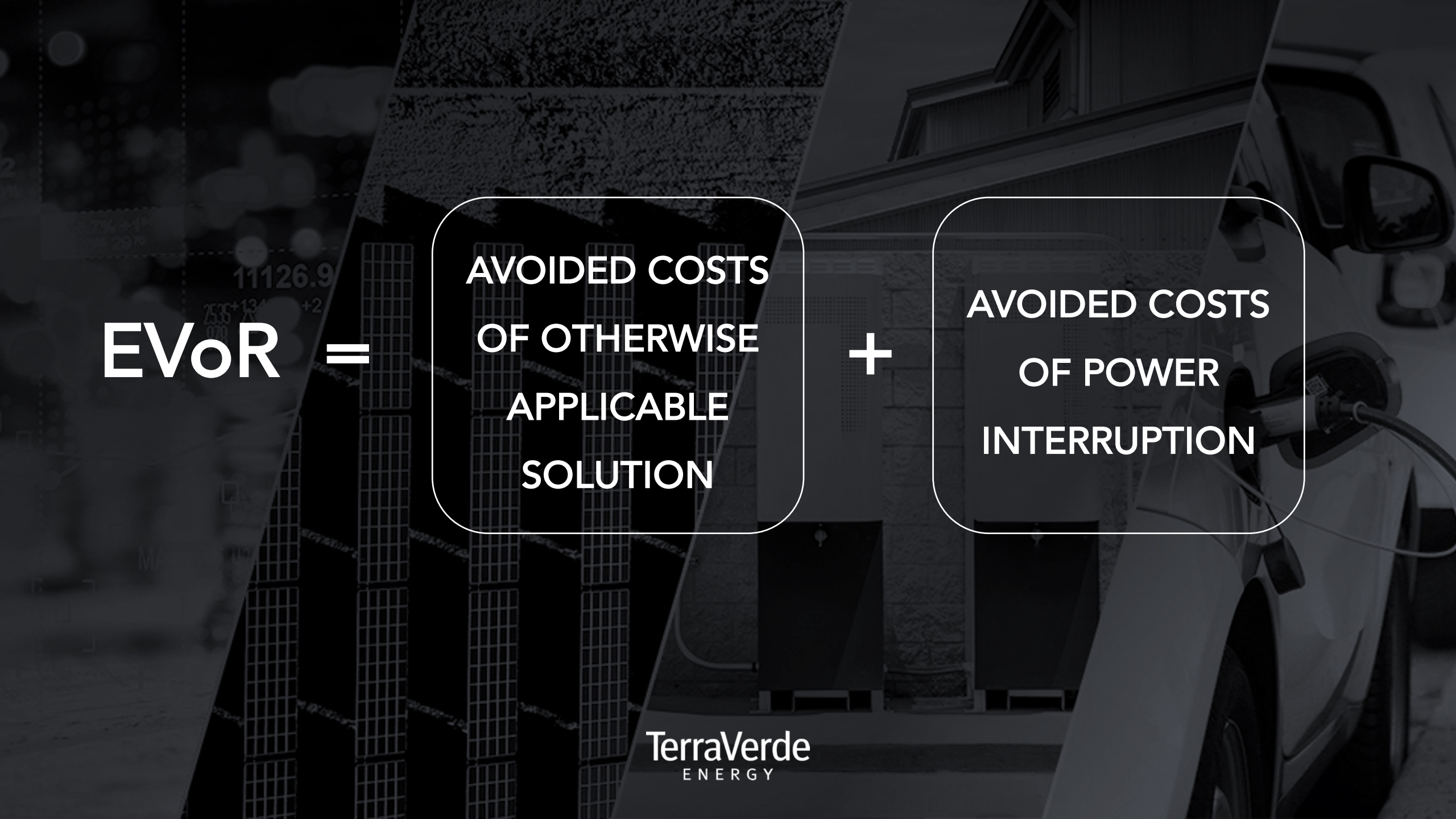

EVoR =

AVOIDED COSTS OF OTHERWISE APPLICABLE SOLUTION

+

AVOIDED COSTS OF POWER INTERRUPTION

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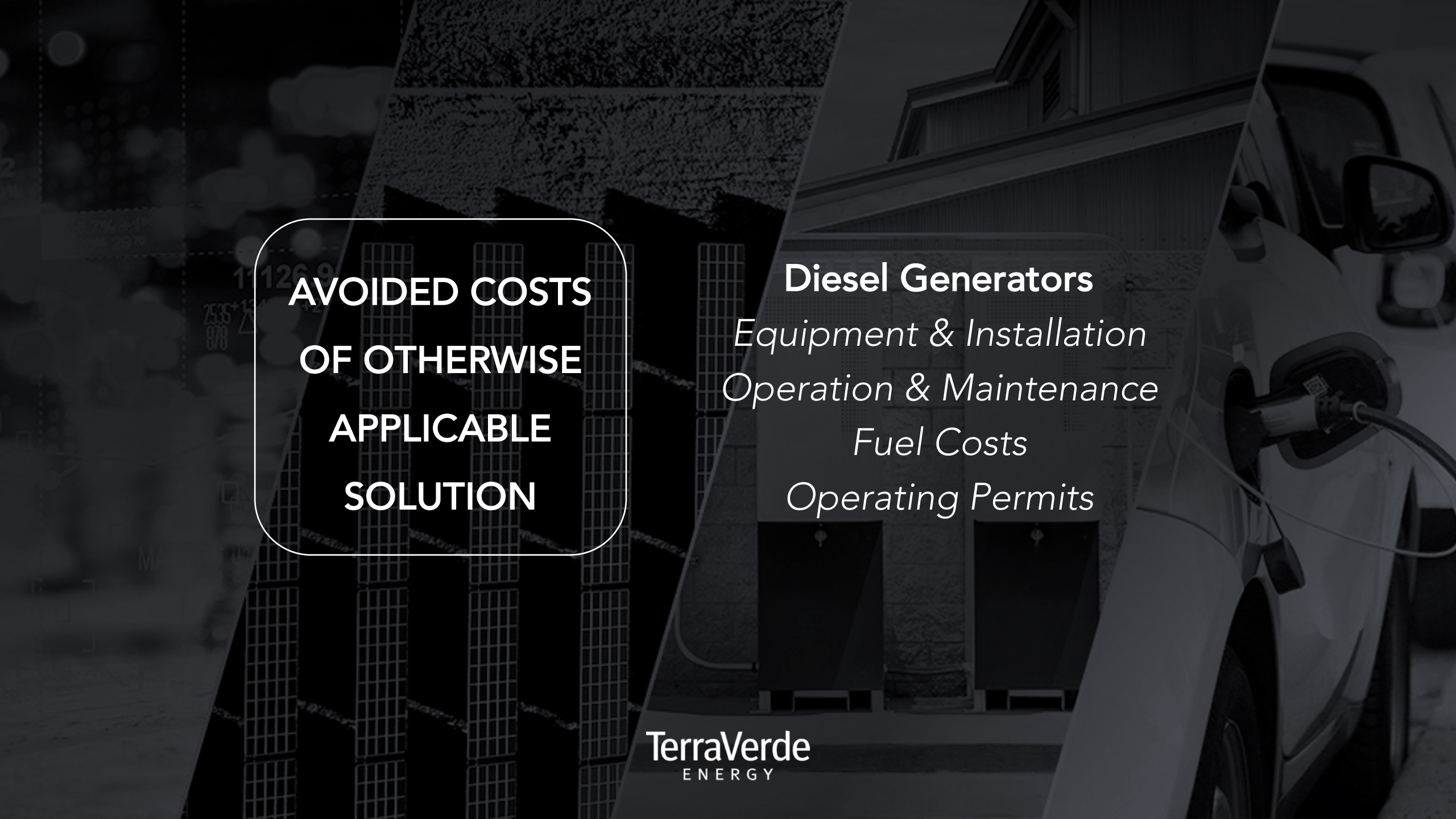

AVOIDED COSTS OF OTHERWISE APPLICABLE SOLUTION

Diesel Generators

Equipment & Installation

Operation & Maintenance

Fuel Costs

Operating Permits

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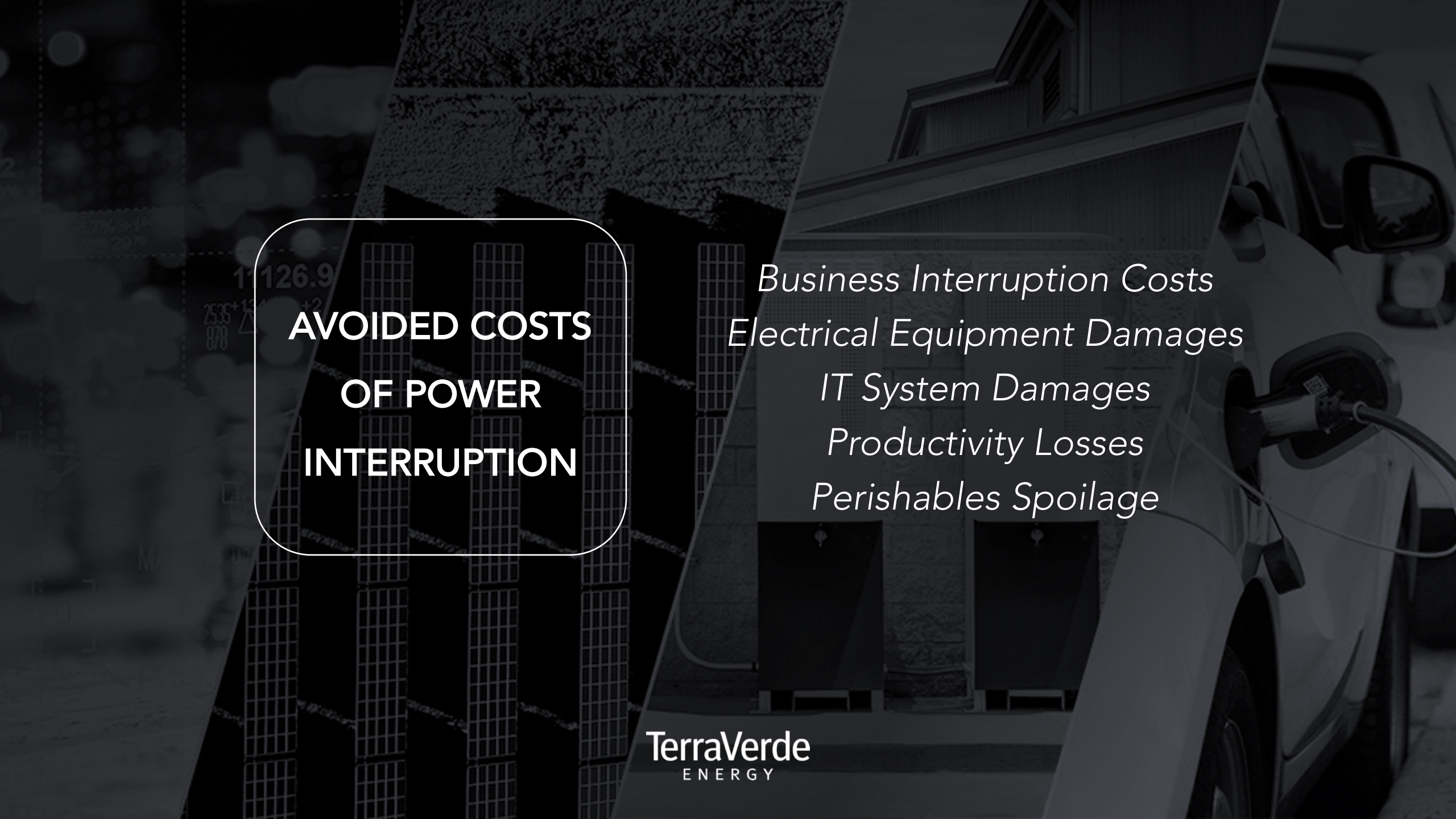

AVOIDED COSTS OF POWER INTERRUPTION

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

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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

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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.

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

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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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