

MICROGRID KNOWLEDGE™

2023 CONFERENCE

LIGHTS ON!

May 16-17, 2023 | Anaheim, CA

OWNED &
PRODUCED BY:



PRESENTED BY:





05 / 16 / 23

The Greatest Bang for Your Buck

Getting Projects Contracted and Funded
with DER-Asset Optimization



Introductions



Millie Knowlton
Director, Strategy and Business Development



Rob Windle
Vice President, Strategy



Brad Widdup
Director, Distributed Generation



Q1: Which best describes the role of your business's involvement in microgrid projects?

- A. Project Developer - but not owner/operator
- B. Project Owner/Operator - but not a developer
- C. Developer AND Owner Operator
- D. EPC Services
- E. Project Equipment Supplier or Services Provider
- F. Energy Consultant

Q2: Which of the following project stages do you find to be the most challenging?

- A. Project Sizing
- B. Delivering a Contractable Proposal
- C. Funding Approval
- D. Achieving Expected Project Returns
- E. Capturing Upside Monetization Opportunities

CPower – What we do

We maximize the value of our customers' distributed energy resources



Distributed Generation

Maximize resilience and shorten the payback period of solar, wind, and other



Demand Response

Get paid for helping the grid by reducing load.

EnerWise®

Site Optimization by CPower



EnerWise Site Optimization

CPower's AI-driven EnerWise Site Optimization engine helps manage and monetize DERs across multiple energy markets and utility.



Peak Demand Management

Lower your capacity charges by reducing energy when the grid is peaked.



Energy Storage

Turn on-site capacity into revenue.

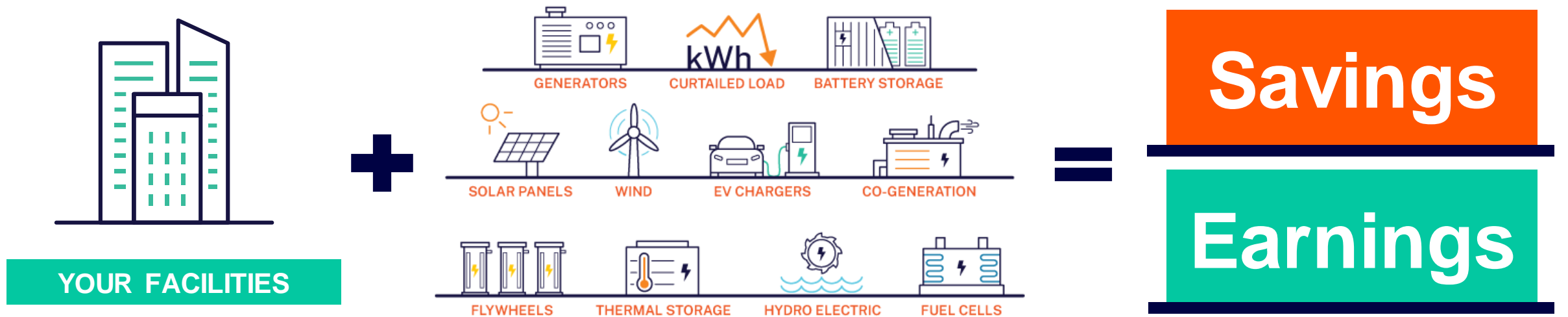


Energy Efficiency

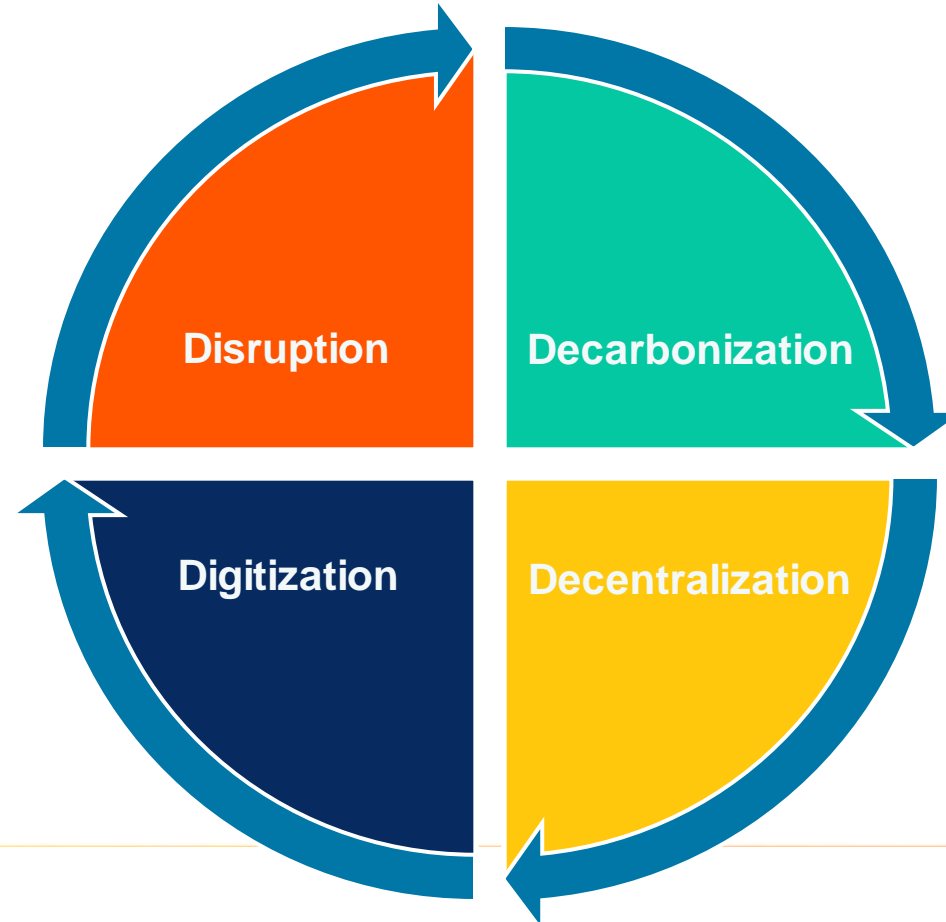
Monetize permanently reduced demand.

We match the needs and capabilities of your organization with the needs of the grid to maximize your energy savings, increase revenue and support a safe, reliable energy grid.

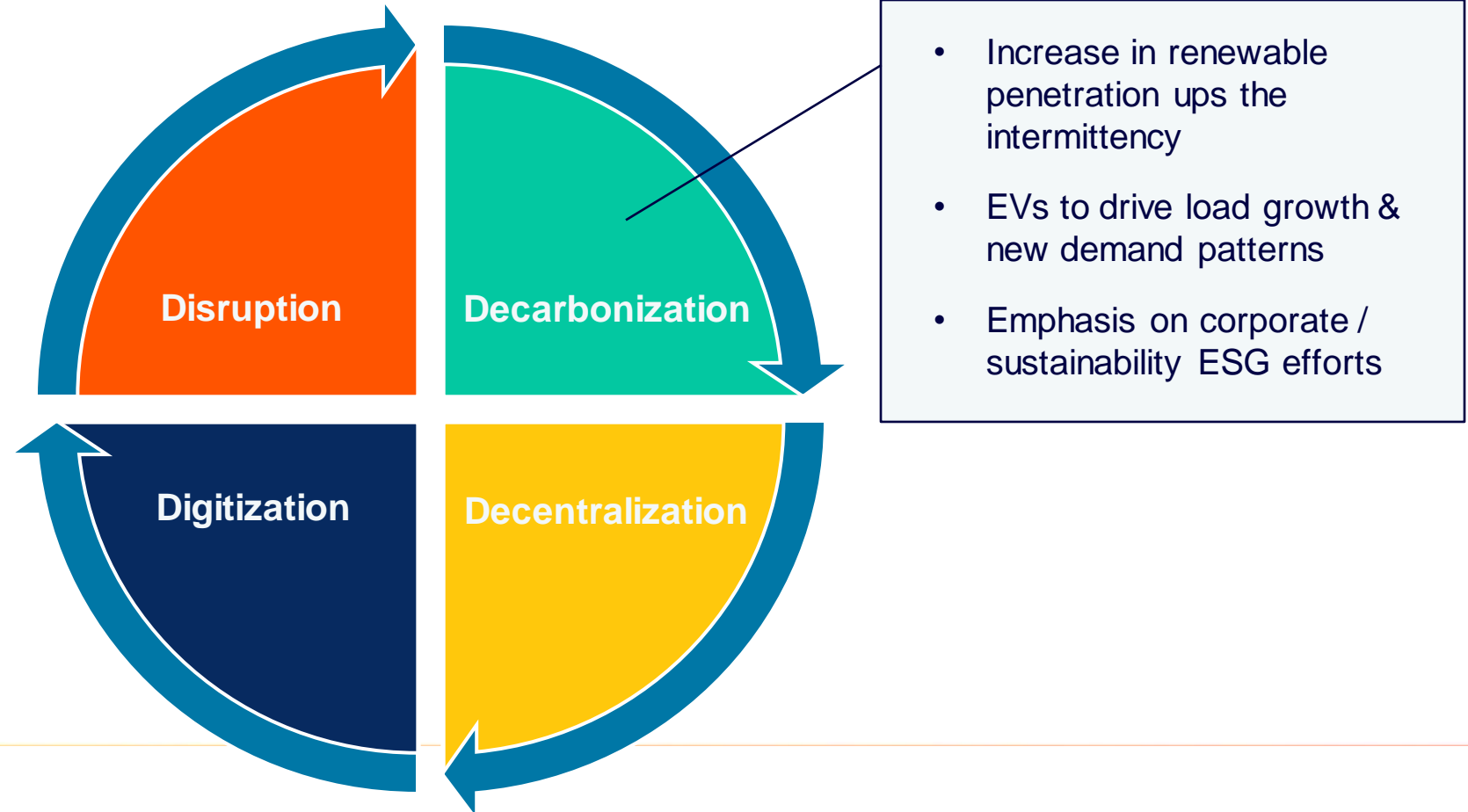
Distributed Energy Resources



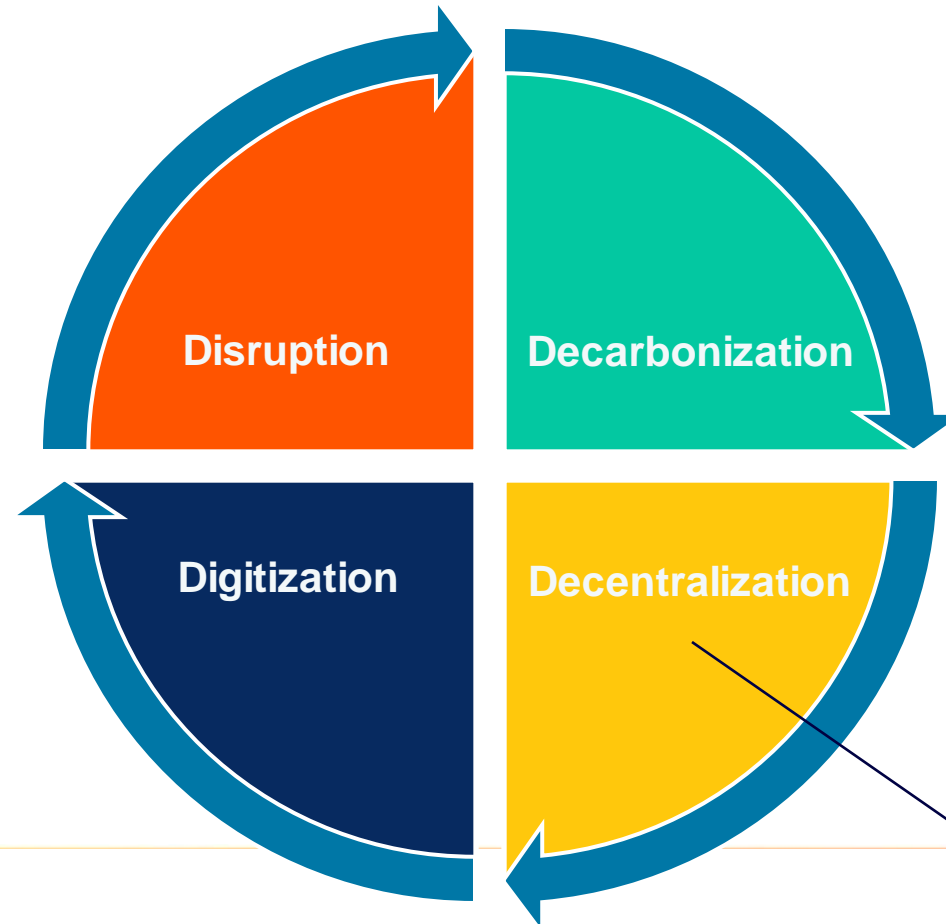
The **4Ds** are driving a paradigm shift on how energy is generated, delivered, and consumed



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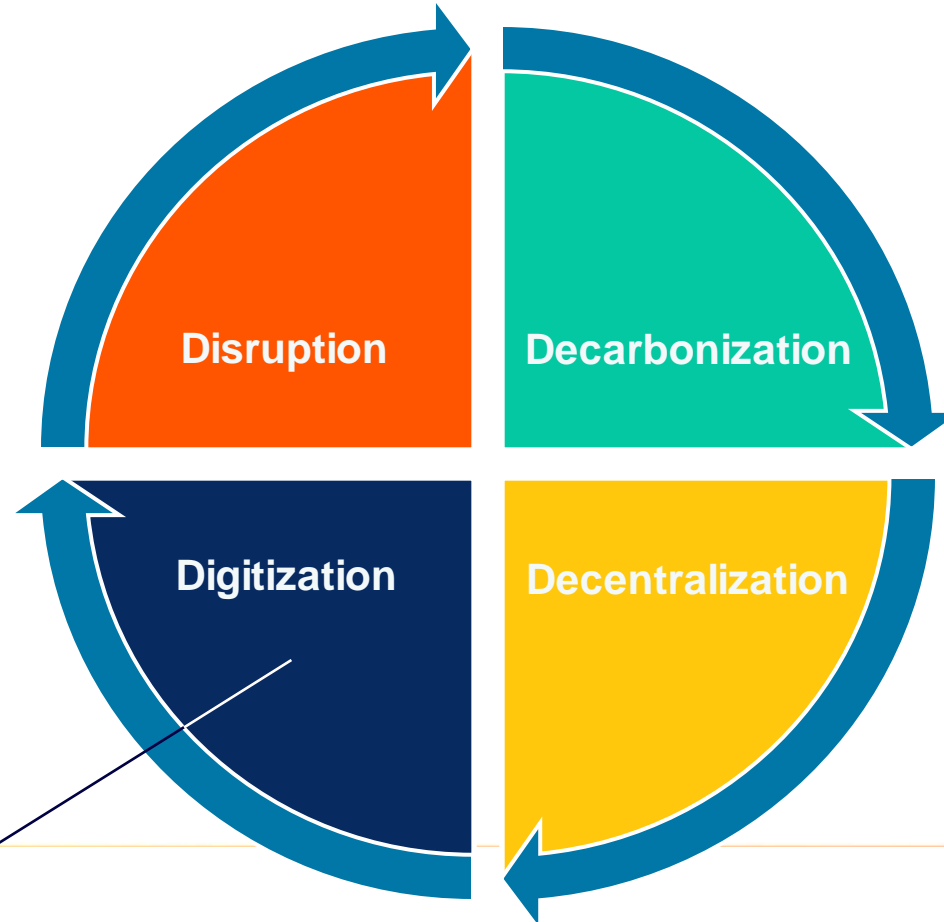


The **4Ds** are driving a paradigm shift on how energy is generated, delivered, and consumed



- Consumers adopting distributed solutions
- Grid defection
- New regulation

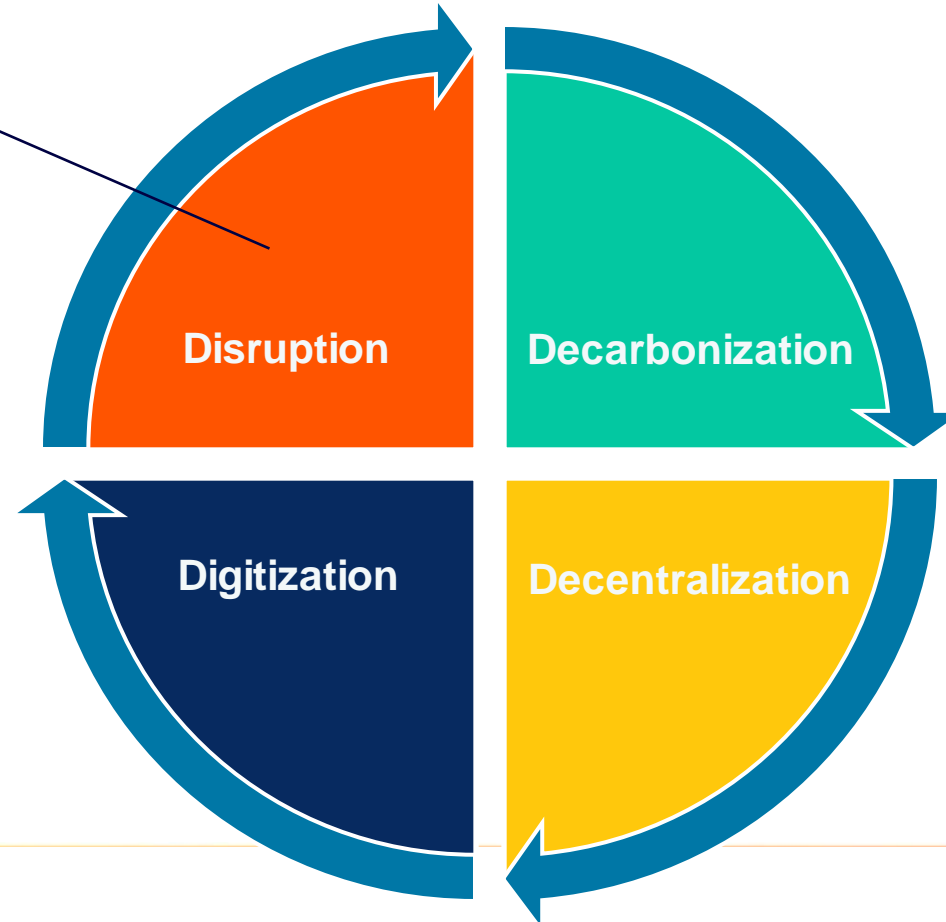
The **4Ds** are driving a paradigm shift on how energy is generated, delivered, and consumed



- AI & telco advancements
- Real-time communications is the norm
- Cost of innovation is falling

The **4Ds** are driving a paradigm shift on how energy is generated, delivered, and consumed

- Increased frequency of extreme weather
- COVID-19



DER Projects are becoming more widespread for several reasons

Over the last several years, multiple, grid-level reliability issues have been prevented or mitigated through the support of demand response participants.



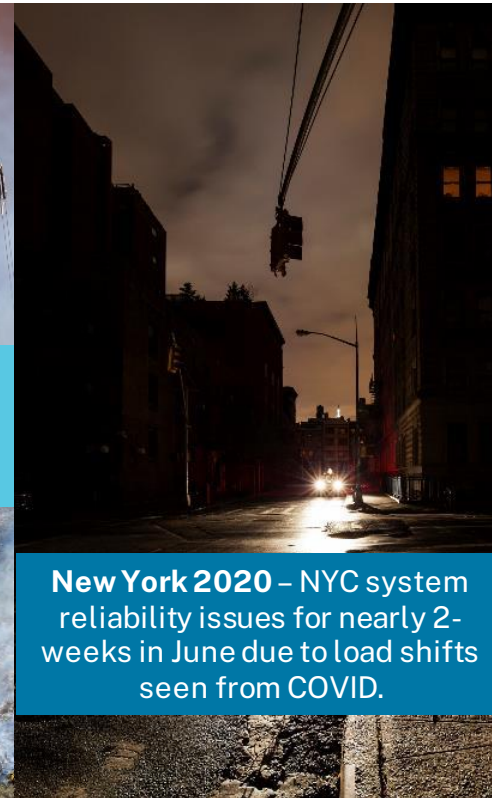
New England 2016,18 – Power plants drop offline due to lightning strike and gas generator tripped offline.



Texas 2019 – Record heat, tight reserves and constrained wind resources stress the grid.
2021 – 100-Year winter storm causes blackouts and fuel constrains



California 2020 – late afternoon peaks (duck curve) from solar penetration, heat waves and forest fires.



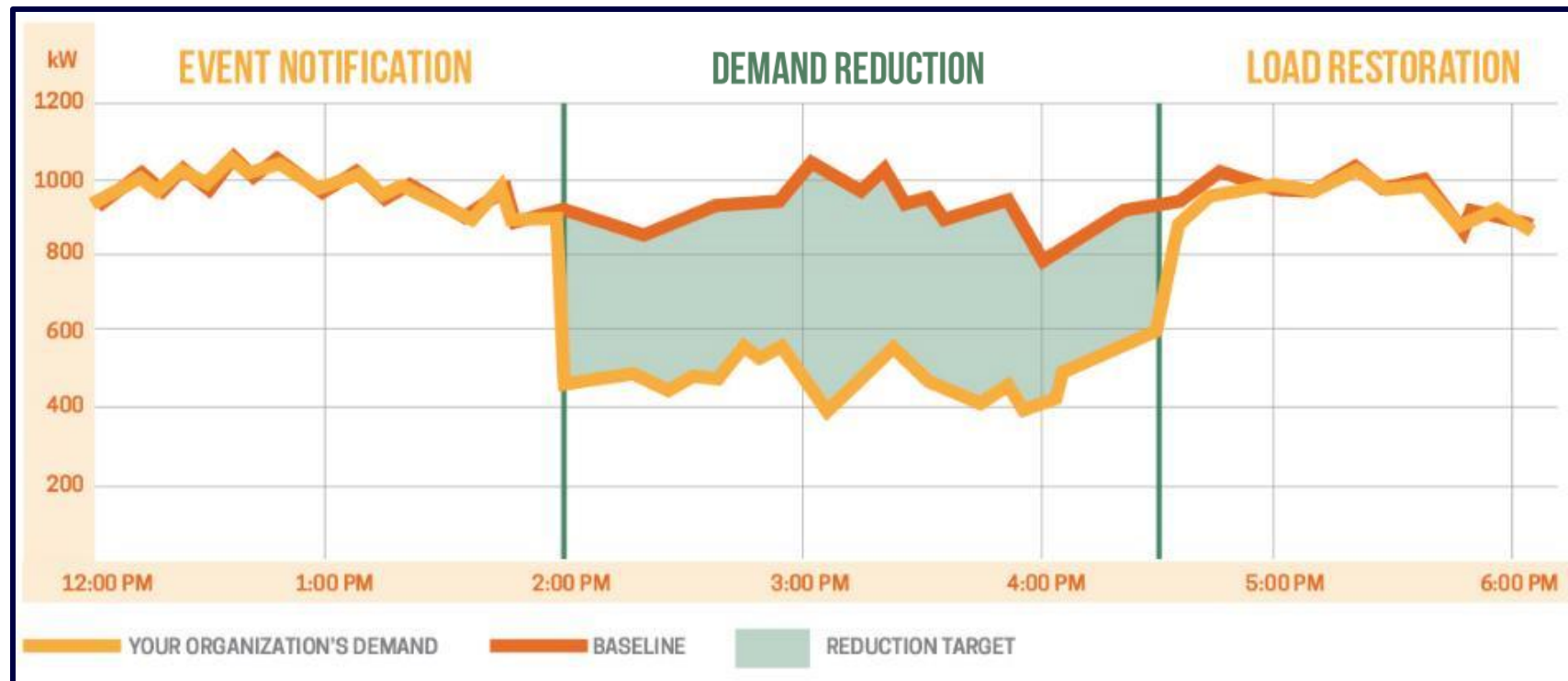
New York 2020 – NYC system reliability issues for nearly 2-weeks in June due to load shifts seen from COVID.



PJM 2022 – Record low temperatures led to near blackout/brownout scenarios.


DER Optimization can look like Grid Service Participation (or “demand response”)


DR helps reduce demand when the grid is stressed, or the price of energy is high

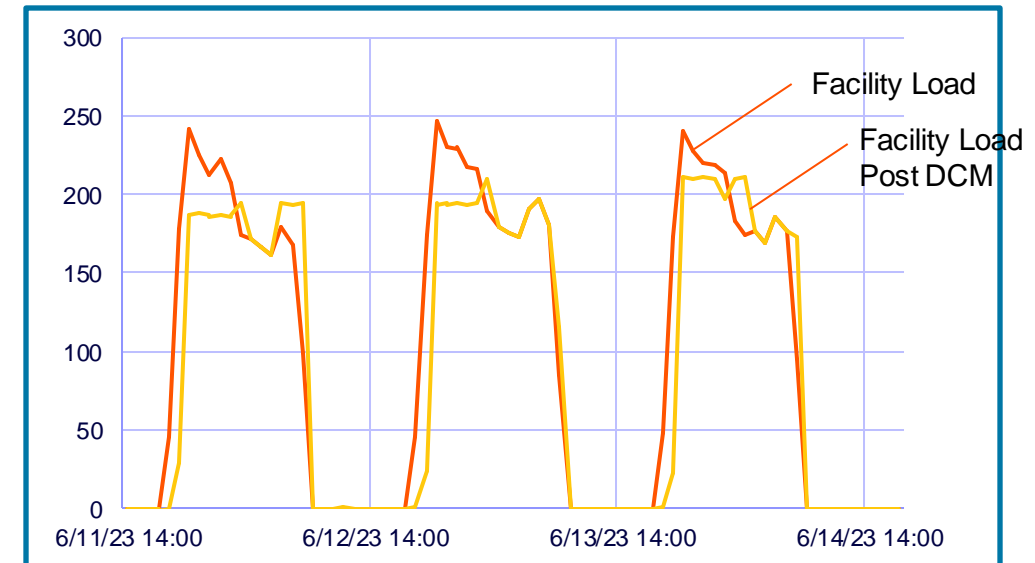
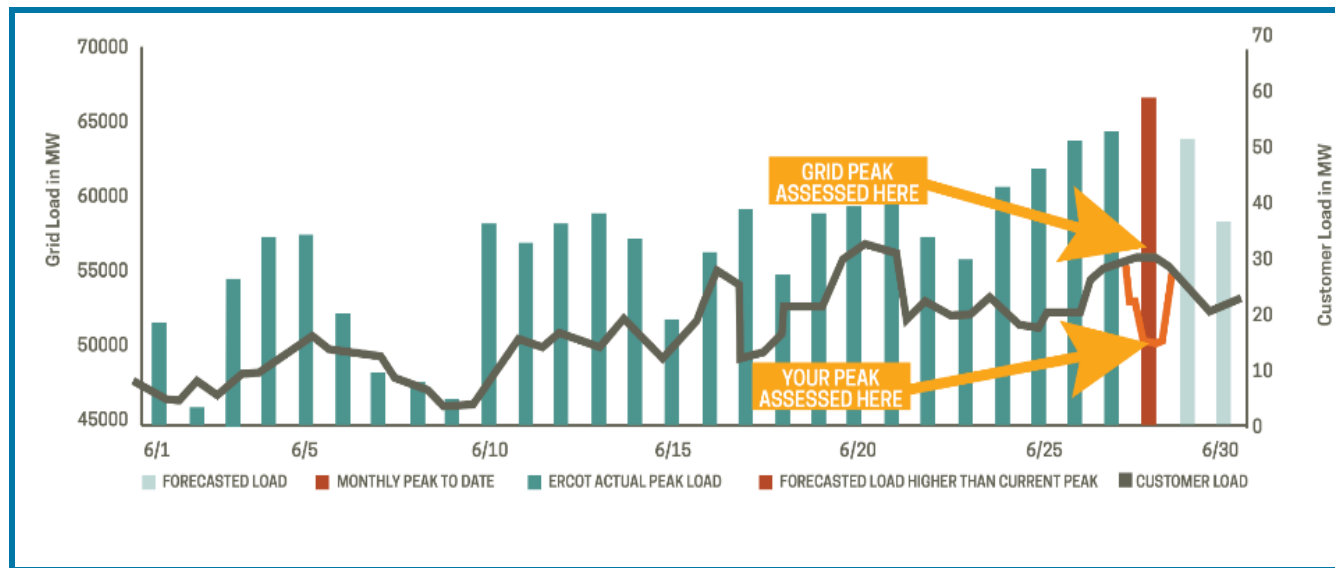


Or Like On-Bill Cost Avoidance...

DER Optimization reduces charges on your electric bill, including monthly demand charges, retail energy charges, and coincident peak charges like CapTag and Transmission Peak

 Coincident Peak Management, also known as cap tag management

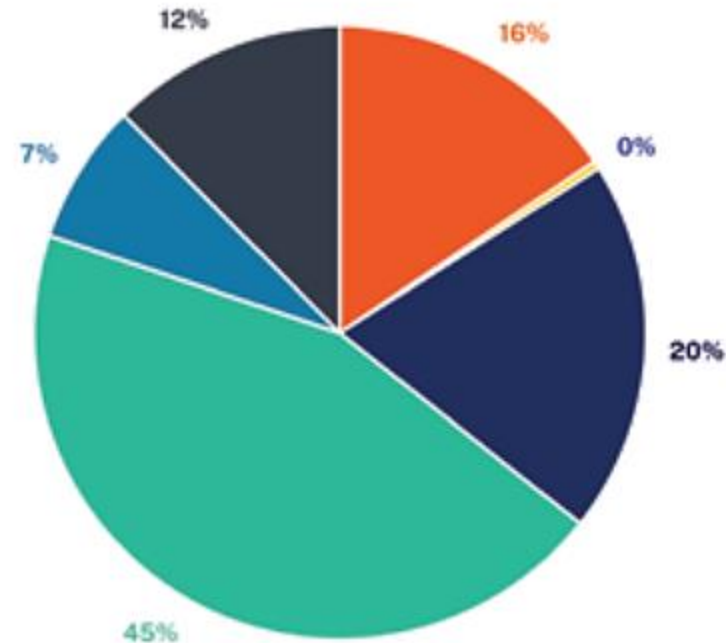
 Site-level demand and energy savings



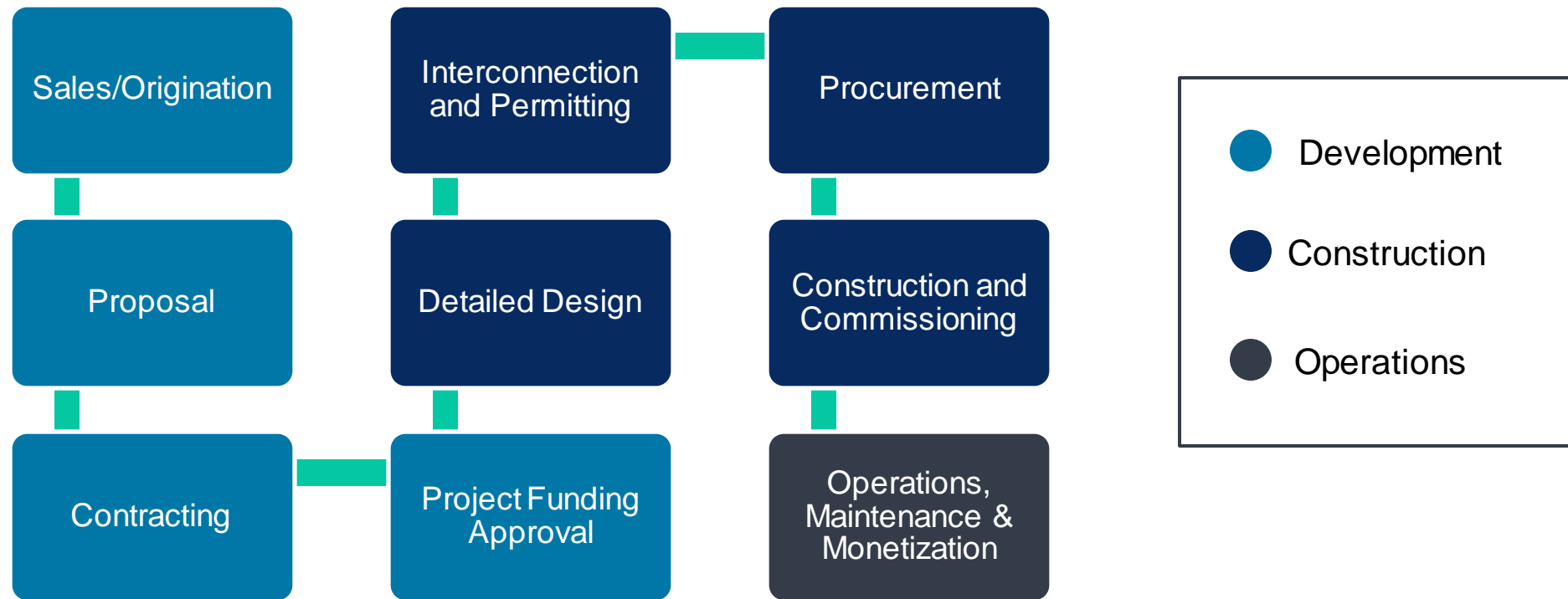
But ideally delivers all value streams across both Grid Services and On-Bill Cost Avoidance

Battery Earnings

- PJM Capacity Performance
- PJM Economic (LMP)
- Demand Charge Management
- PJM Sync Reserve
- PJM Frequency Regulation
- Coincident Peak Management



DER Optimization Answers Monetization Concerns in the Lifecycle of a Microgrid





Q3: In which project lifecycle stage do you think DER Optimization plays the biggest role?

- A. Proposal
- B. Contracting
- C. Funding
- D. Operations

Monetization Considerations at Proposal & Contracting Stages

Proposal

Full Value Stack Visibility

- Informed System Sizing
- Options to Make Projects "Pencil"
- "Right sizing" all stakeholders financial contributions

Contracting

Justification of Customer Payments

Modeling Trade-offs

- Multiple Assets at Single Account

A Tale of Two Microgrid Projects: Proposal & Contracting

Two microgrid facilities move through proposal stage – one with DER Optimization to address monetization concerns, one without.



Microgrid 1 – Uses DER Optimization

System Sizing:

- On-bill AND grid services
- BESS size influenced by value
- Generator permitted for grid services.

Estimated Revenue:

- \$20k-270k/MW-yr Grid Service Revenue
- \$2k-200k/MW-yr On Bill Savings



Microgrid 2 – Uses “Sales Estimating” Software

System Sizing:

- On-Bill value only
- BESS size primarily reflects minimum size to meet resiliency needs
- Generator cost are reduced by purchasing an emergency-only model.

Estimated Revenue:

- \$0 Grid Service Revenue
- \$2k-200k/MW-yr On Bill Savings

Monetization Considerations for Funding

Project Funding
Approval

Value Stream Diversification

- Merchant and Contracted
- Performance Risk Mitigation
- Realizing Upside

Proforma Confidence

- Simulation vs. Execution Accuracy/Linkage
- Accurate Monetization Limits

Monetization Considerations for Ongoing Operations

Operations,
Maintenance &
Monetization

Impact of Constraints on Returns

- Facility Operations
- DER Assets
- Regulatory

Operational Results Correlation to Proforma

- Performance Reporting & Monetization
- Capitalizing on Upside Opportunities

A Tale of Two Microgrid Projects: Operations

Two microgrid facilities move through Operations stage – one with DER Optimization to address monetization concerns, one without.



Microgrid 1 – Uses DER Optimization

Financial results: Results correlate closely to proposal stage plan, co-optimization based on real-time price signals and capture of upside events.

Reporting and settlement: Transparent and predictable payments that align with ISO/program disbursements; timing expectations set at contract are met reliably

Compliance: Compliance constraints built into site configuration and asset scheduling



Microgrid 2 – Without DER Optimization

Financial results: Some deviation from sales estimates due to different provider logic, “fixed in” to program plan with no upside potential

Reporting and settlement: Primarily on-bill value created, lack of reporting expectations from early project stages

Compliance: Some amount of program/asset compliance burden remains with owner/operator

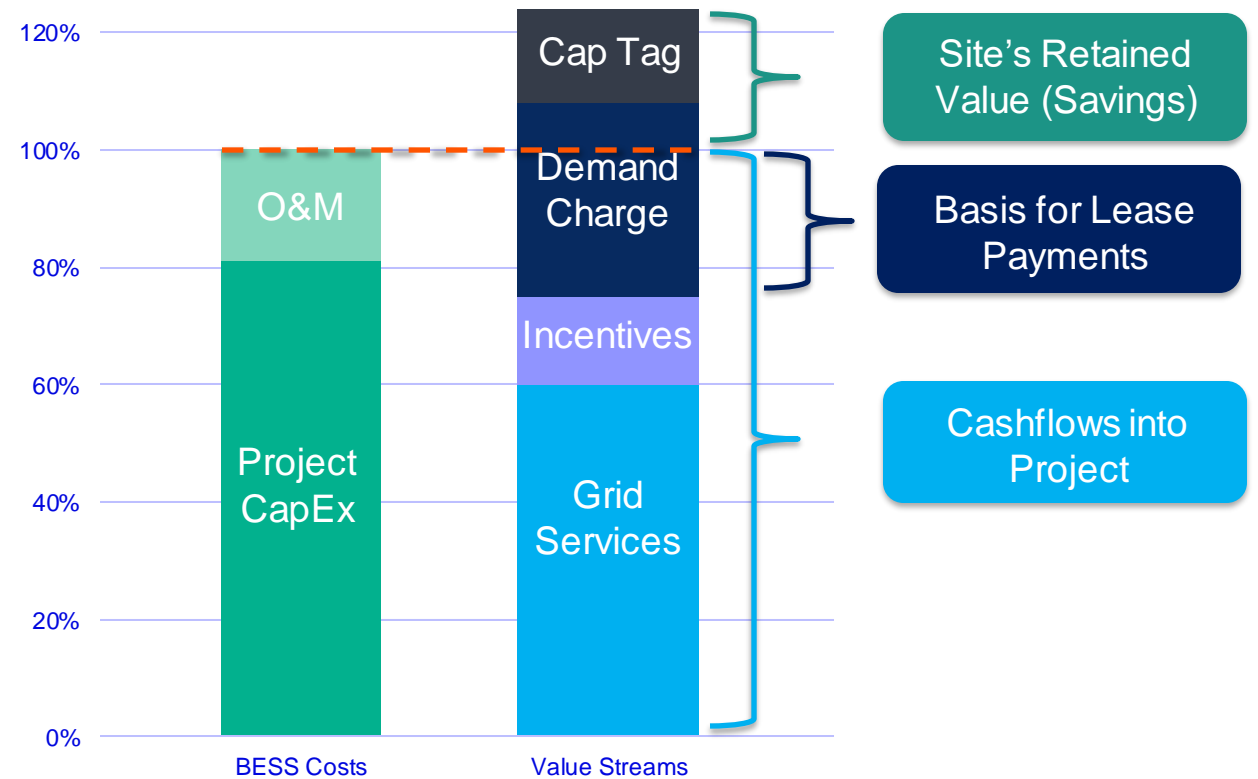
Microgrid Project Financial Overview

Microgrid Project Costs:

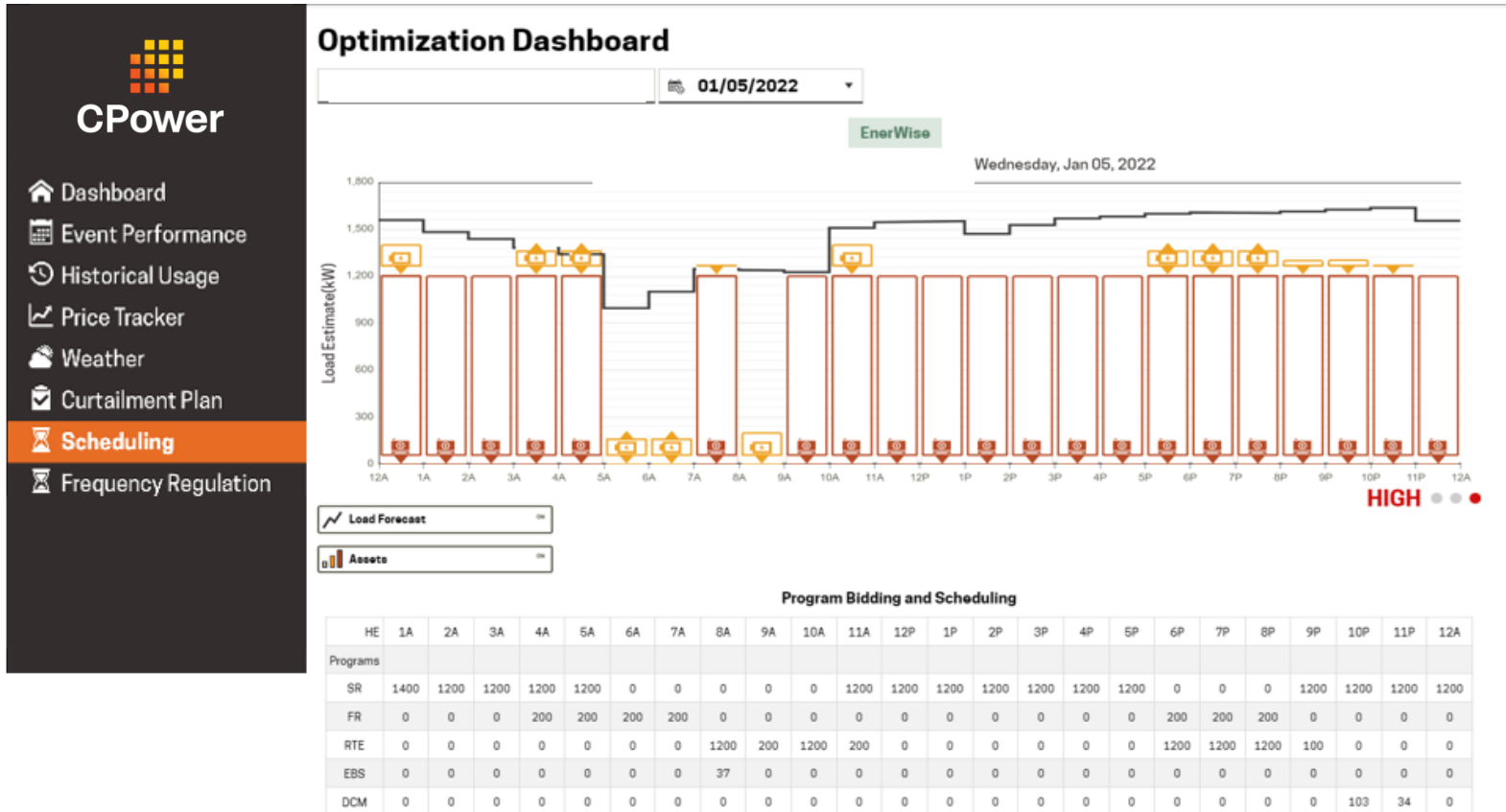
- Design/Engineering, Equipment, and Construction
- Permitting, Interconnection, other fees
- Annual Operation & Maintenance costs

Microgrid Value Streams:

- Grid Services Revenues
- On-bill savings
- Financial incentives for Renewables and/or Storage

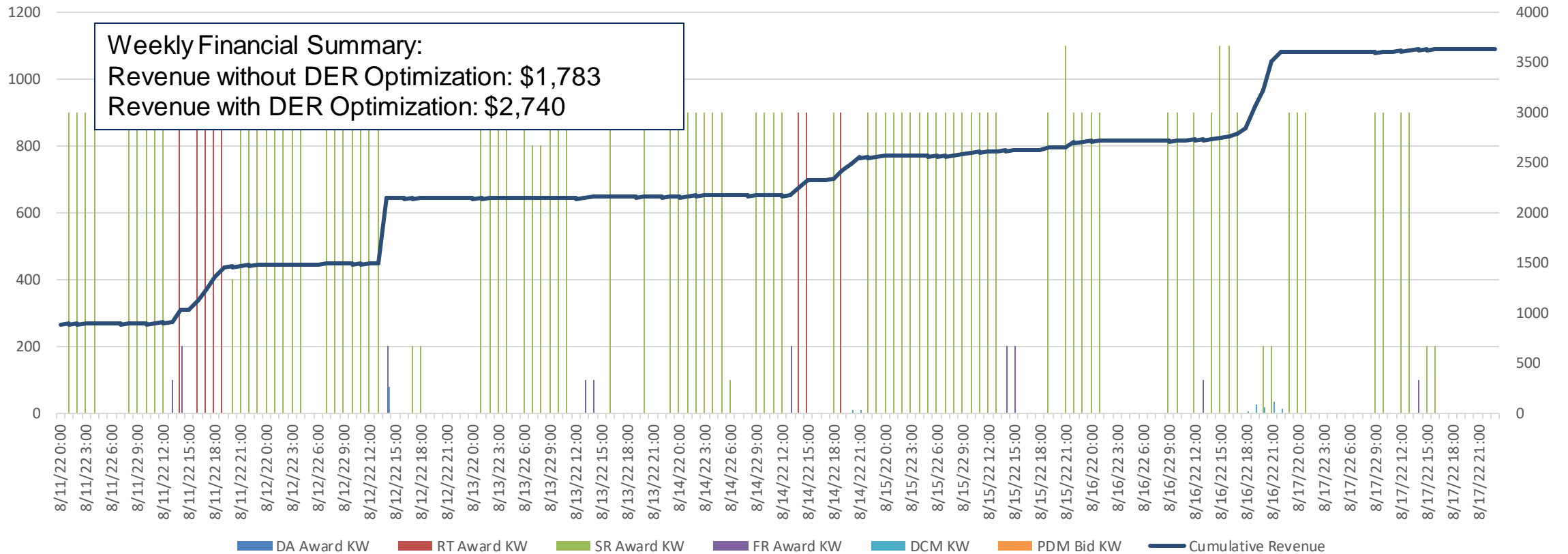


A typical day for a Microgrid Project Using DER Optimization



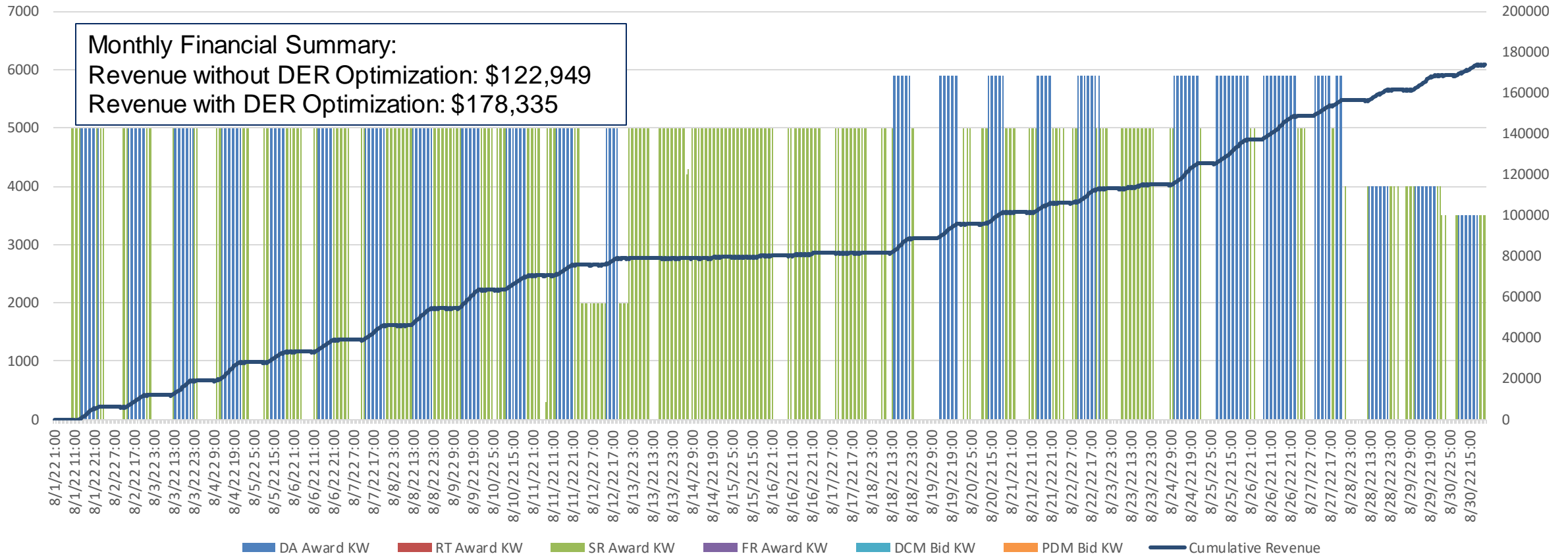
Incremental Revenue with DER Optimization

DER Optimization with Multiple Asset Types



Incremental Revenue with DER Optimization

DER Optimization with a Single Asset



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