Concerto™

SOLUTION BRIEF

DER Market Participation: Reserve Markets

The role of the transmission system operator (TSO) is to manage the security of the power system in real-time and coordinate the supply of – and demand for – electricity in a manner that avoids fluctuations in frequency or interruptions of supply. DER participation allows regional TSOs to ensure grid reliability using clean, distributed technologies alongside traditional thermal generation. Advances in technology and business models have enabled distributed energy resources (DERs) to participate in global balancing reserve markets. This means that facility owners, energy providers, utilities and regulators can work with the TSO to support grid stability while saving costs and reducing carbon emissions.

Examples include:

- Residential inverter-based assets provide **primary reserve** capacity using a frequency-watt mode
- Backup generators and process loads provide **secondary reserve** capacity following a 1 to 3 second setpoint
- Large industrial loads provide **tertiary reserve** capacity responding to a 15-minute notification period

The Virtual Power Plant Solution

Generac Grid Services' grid balancing software platform, **Concerto™**, is a DER orchestration solution that enables devices along the distribution grid to participate in reserves markets, also known as ancillary services. Through advanced monitoring, control and optimization, Concerto provides real-time frequency support by reserving capacity within a fleet of DERs and responding to automatic generation control (AGC) activation signals every 2 to 4 seconds. Where faster frequency response is needed across a localized fleet, a frequency-watt droop curve is sent to the battery, and the battery dispatches to respond to local frequency changes. Concerto dispatches devices in an orchestrated manner that meets participation commitments while ensuring technical and operational constraints are observed at the device level.

CONCERTO PERFORMS REAL-TIME OPTIMIZATION OF DERS IN ALL REAL-TIME BALANCING RESERVE MARKETS

Day Ahead	Day Of	< 15 Minutes	< 5 Seconds
AI Powered Energy Analytics	Energy Optimization	Real-Time Energy Trading	Real-Time Power Optimization	Distribution Center Optimization

Concerto

ACCURACY

Real-time monitoring, control and optimization allows Concerto to dispatch a fleet of DERs to a new AGC setpoint every 2-4 seconds.

SPEED

Real-time optimization and control allow Concerto to control a portfolio of DERs to a new AGC setpoint every 2-4 seconds.

AGILITY

Concerto scales with you to provide sustainable long-term value to clients looking to participate in markets at all levels of the power delivery system.

SCALABILITY

Designed to match the highly distributed nature of the system, Concerto is able to optimize the dispatch of hundreds of thousands of DERs every second.

How It Works

1. CAPACITY RESERVATION

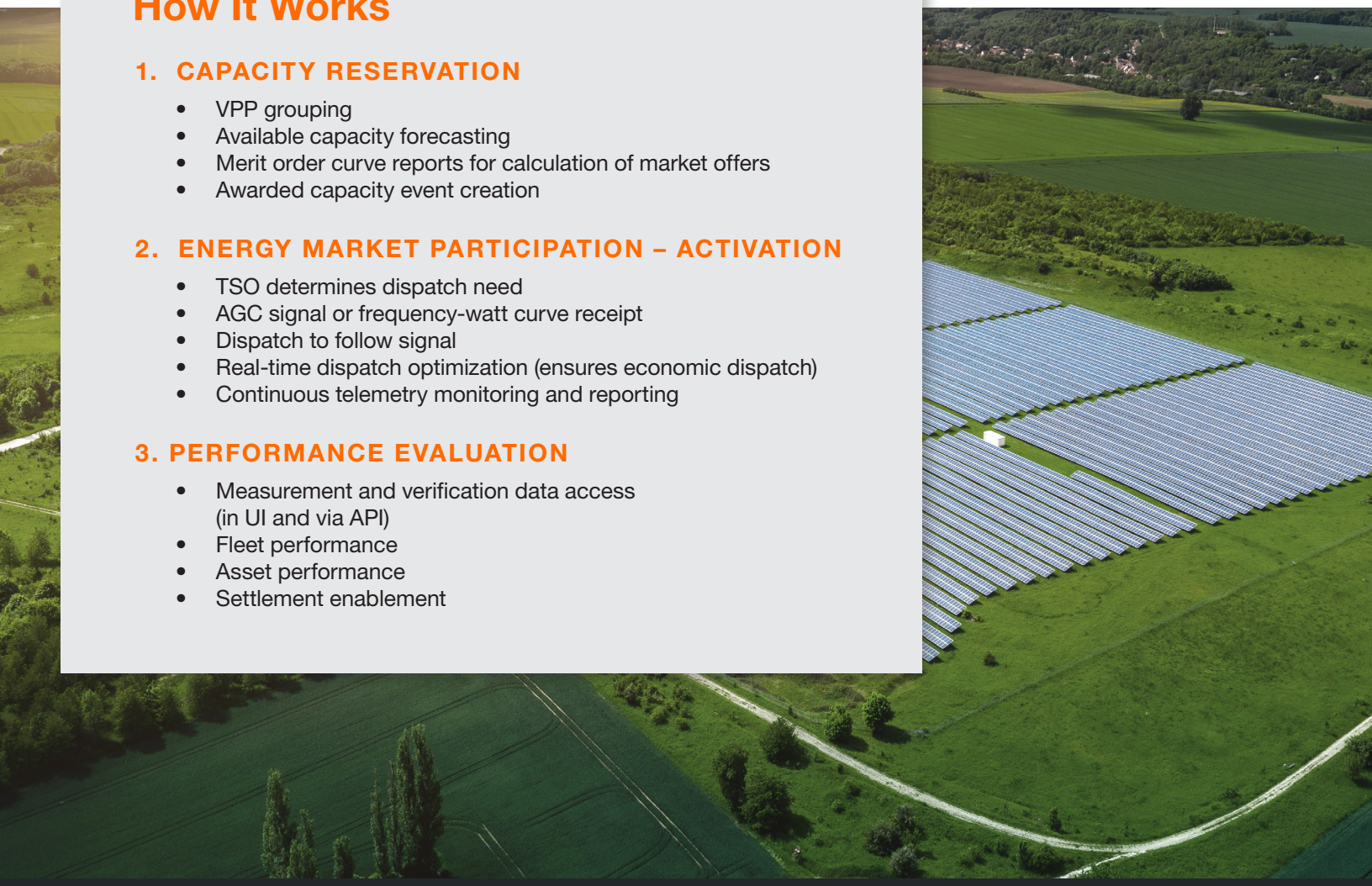
- VPP grouping
- Available capacity forecasting
- Merit order curve reports for calculation of market offers
- Awarded capacity event creation

2. ENERGY MARKET PARTICIPATION – ACTIVATION

- TSO determines dispatch need
- AGC signal or frequency-watt curve receipt
- Dispatch to follow signal
- Real-time dispatch optimization (ensures economic dispatch)
- Continuous telemetry monitoring and reporting

3. PERFORMANCE EVALUATION

- Measurement and verification data access (in UI and via API)
- Fleet performance
- Asset performance
- Settlement enablement



ABOUT GENERAC GRID SERVICES

Generac Grid Services is a group of Generac, a leading designer and manufacturer of energy technology solutions and other power products. Generac Grid Services is changing the way the world generates and uses electricity. From turnkey solar + storage solutions, to backup generators, additional distributed energy resources and virtual power plant software, Generac Grid Services is accelerating the world's transition to a cleaner, more reliable power grid.

GENERAC GRID SERVICES

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