

The Power to Control.

xtremepower.com

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Our Company

Founded in 2004, Xtreme Power (XP) designs, engineers, manufactures and operates Dynamic Power Resources™ (DPRs™), integrated energy storage and power management systems for Independent Power Producers, Transmission and Distribution Utilities, and Commercial & Industrial End Users, among others. Headquartered in Austin, Texas, XP manufactures from multiple U.S. locations, and is privately held. XP's experienced management team collectively boasts more than 125 years of experience in the energy and clean technology industries. The company's Board of Directors is comprised of former energy and environmental leaders, and its strategic investors bring expertise in everything from supply chain to project execution.

Dynamic Power Resources™

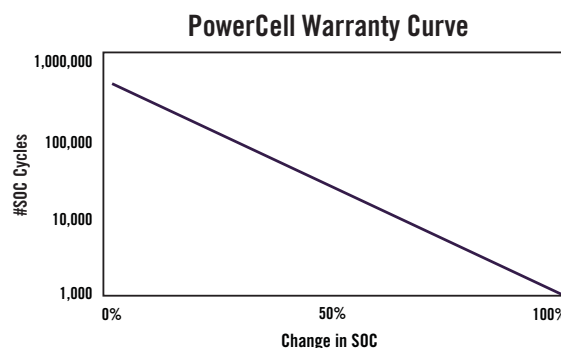
Xtreme Power's breakthrough Dynamic Power Resource™ (DPR™) is a fully integrated energy storage and power management solution. The DPRs consist of safe, efficient PowerCells™ combined with high performance electronics and a configurable control system, with each component sized to address unique power and energy needs. XP integrates all key components into a utility-scale system that operates with existing or planned infrastructure. From project definition through system operation, XP customers benefit from having one point of contact. With high efficiency and minimal operation and maintenance requirements, the DPR offers an attractive total cost of ownership.



PowerCell — Safe and Environmentally Friendly PowerCells are a benign technology; they are non-hazmat rated which means they can be transported using traditional methods, require no special handling or documentation, and do not have any special siting requirements. They are highly recyclable (approximately 95%), and XP ensures that PowerCells are properly recycled at the end of their life. Unlike most competitive energy storage technologies, PowerCells maintain a near ambient temperature during operation, which eliminates many of the risks associated with other technologies.

PowerCells

The PowerCell is a 12-volt, 1 kWh dry cell battery technology with an internal construction that provides each cell with an extremely low internal resistance. This results in high power retention (~98% efficiency) and the ability to rapidly charge and discharge large amounts of power. The uniform characteristics of PowerCells enable them to be assembled in parallel and series matrices, ideally suited for use in utility applications that require power at a megawatt scale. PowerCells are designed to accommodate both deep discharge cycles and small changes in state of charge (SOC), as shown in the warranty curve below.



8 MWh of PowerCells in Double High Racks



Power Electronics

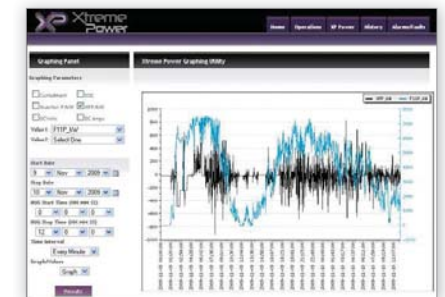


Each DPR includes solid-state, industrial-grade 480 VAC inverter/chargers that deliver megawatts of power (MVA) at a peak operating efficiency 98%. The full four-quadrant power electronics are capable of simultaneously delivering real (watts) and reactive power (volt ampere reactive, or “VARs”), thus enabling the DPR to provide multiple services at the same time. These power electronics have the ability to stay active through grid interruptions, enabling low-voltage and zero-voltage ride

through. The Insulated-Gate Bi-Polar Transistor and Firing Circuit Boards register commands in less than 15 microseconds with command response in less than one millisecond. In response to a control signal, the DPR is capable of adjusting from a fully-rated charge (+MVA) to a fully-rated discharge (-MVA) in less than a second. Power electronics undergo rigorous factory testing before being integrated into a DPR.

Control System

XP's Real-Time Control System (RTCS) allows for seamless operation with the grid without the need for a full-time operator. Customized to meet specific project needs, the RTCS monitors conditions both internal and external to the DPR, maintains a safe operating environment and allows users to remotely change settings in real time. Following current Cyber Security standards, the RTCS is composed of three main components to control the DPR and record data: 1) a web-based user interface; 2) a supervisory control and data acquisition (SCADA); and 3) a data server. The RTCS also takes readings from any third-party SCADA, communication protocols, and voltage and current data to accurately provide the required system response. This combination of robust processing and flexible operation allows XP to program a variety of services.



System Integration

It is difficult to overstate the importance of XP's System Integration, which seamlessly integrates the DPR with a customer's infrastructure. Each DPR is fully tested and field-ready before shipment. The XP team installs and commissions all equipment in a timely manner, ensures communication and cooperation with the project's equipment and software, and provides onsite training. XP also provides turnkey client solutions. Although the XP team typically assumes responsibility for the project's Balance of Plant, XP is open to a variety of scope splits, depending on the needs and capabilities of customers.



One Solution for Many Applications

Ramp Control and Smoothing: DPR monitors output from a renewable generation source on a microsecond basis and automatically responds by either absorbing or supplying power so the grid receives smooth, clean power at a desired MW/minute rate.

Firming/Shaping: Coupling a DPR with a renewable generation forecast allows the customer to reduce day-ahead scheduling deviations, reshape output to deliver power during peak demand times and better organize power deliveries regardless of whether the renewable asset is generating power. In the event of an inaccurate forecast, the DPR automatically supplies or absorbs power within microseconds to ensure delivery on the day-ahead output schedule.

Curtailement Capture: The DPR system can store curtailed energy for redistribution as needed, whether it be from nature's as-available clean fuel from solar or wind projects, existing on-site generation supply, or from energy delivered through the transmission or distribution systems

Responsive Reserves: DPR's unique sizing scheme allows customers to increase its storage capacity (MW) and act as a responsive supply resource (MWh) for extended time periods via Automatic Generator Control (AGC).

Frequency Response (Primary Control): For conditions such as generator droop response and turbine-generator rotating inertia, the DPR can correct frequency deviations on the transmission grid utilizing power injections and withdrawals automatically and in real time.

Frequency Regulation (Secondary Control): The DPR can provide frequency support during loss of generation or system disturbance, responding to both AGC signals and/or frequency deviations with sophisticated control algorithms to help maintain nominal grid frequency automatically and in real time.

Voltage Response: Utilizing four power quadrant technology, the DPR has the ability to supply and absorb reactive power (VARs) while simultaneously supplying or absorbing real power (watts). This allows the system to maintain a target power factor while providing other functions that require real power management (such as services mentioned in this section).

Emergency Backup: The DPR acts as a backup power reserve by providing power when the grid experiences disturbances. The seamless transfer from the grid to the DPR ensures reliability and improved power quality for critical loads, transmission or distribution infrastructure and generation.

Blackstart Capability: In the event of an area-wide grid outage, the DPR provides the power required to return baseload operating units to full capacity without relying on auxiliary power or the external transmission network.

Transmission & Distribution Upgrade Deferral: In the place of costly T&D upgrades, DPRs can be used to supply power resources appropriately sized for incremental increases in load, as well as to enhance grid reliability for weak and/or congested T&D lines or substations enabling utilities to defer, replace or complement existing or proposed transmission or distribution infrastructure upgrades.

Transmission & Distribution Capacity Utilization: Rather than building transmission lines to meet expected peak demand, T&D utilities can build transmission lines to meet the majority of load and implement a DPR at any point from generation to load to meet infrequent peak-demand periods, as well as to enhance grid reliability.

Peak Shaving/Load Leveling: By charging during off-peak times for use during on-peak periods, customers can reduce energy costs by both lowering demand charges and taking advantage of favorable time-of-use rates or lower cost off-peak power. The grid sees a more ideal and level load, and customers maintain current operations and consumption patterns while decreasing electric bills.

