



# Wind Energy Solutions



building a smarter, unified business foundation  
Connect. Manage. Automate.



## Wind Farm Challenges Require Robust Solutions

### A Unified Approach to Wind Farm Technology.

The wind energy industry is growing rapidly on a global basis. Government initiatives around the world are requiring more power to come from renewable, “green” sources such as wind, solar, geothermal and others. Towards that, goals have been set for wind energy to represent up to 20% of all power generated by 2030, driving significant industry growth over the next 20 years.

A key success factor is siting of the wind farm – developing wind farms where sufficient wind resources exist. Some farms are located near population centers where social acceptance (Not In My Back Yard) factors arise, however, the majority exist in isolated areas where climatic and environmental extremes present challenges for equipment installation, operation and maintenance.

As wind farm technology advances and the industry continues to grow, turbine capacity will continue to increase while improving the operating efficiency.

The combined impact of wind farm siting conditions and evolving turbine technology place increased demands on the physical infrastructure. To optimize operational reliability, innovative infrastructure solutions are necessary to deliver greater system availability, uptime, on-site safety and asset protection.

## Generate Wind Energy More Reliably

### Overcome Challenges. Optimize Benefits.

Expertise is required to design and deploy the entire spectrum of the physical infrastructure to maintain optimum wind farm operations. Risks due to harsh and remote locations demand robust physical infrastructures. To harness the power of the wind, significant control systems are required to manage the optimum configuration of each turbine, while control of the overall wind farm is critical to deliver electrical to the utility grid. The need for remote monitoring capabilities is driving the convergence of control and communication systems presenting further technology challenges.

To meet these requirements and avoid interdependent risks, a unified approach to the physical infrastructure is vital. A point of failure within any one system impacts the performance of the overall physical infrastructure and creates risk. For example, an improper installation of the grounding infrastructure at one tower can lead to turbine downtime or damage shared cabling which in turn can result in lost productivity for the entire wind farm. A holistic approach to infrastructure design and deployment, offers distinct advantages for the wind industry:

- Maximum availability by deploying systems designed for the harsh conditions encountered on a wind farm
- Faster installations by employing a modular approach to construction
- Enhanced on-site safety for initial construction and for ongoing operations, ensured through implementation of best practices and subsequent audits
- Improved wind farm uptime through an integrated and rugged control network





### Key Benefits

- Leverage real-time information to enhance visibility, security, safety and compliance across the enterprise
- Reduce infrastructure and systems complexities while increasing functionality and manageability of mission critical capabilities
- Achieve flexibility through deployment of a platform-agnostic, open standards-based architecture
- Improve productivity and customer satisfaction by delivering higher levels of availability and reliability
- Converge and optimize critical systems, leveraging and reusing existing assets/ investments for maximum ROI
- Drive tangible infrastructure and business process improvements while reducing operational costs and mitigating risk
- Create a sustainable infrastructure for securing energy efficiencies and establishing global best practices

### Unified Physical Infrastructure



communication



computing



control



power



security

## Panduit's Unified Physical Infrastructure: A Guiding Vision

### For a Smarter, Unified Business Foundation

The growing interdependence of systems and applications, and the increased demands that they place on physical infrastructures, requires the integration of traditionally disparate and proprietary systems. This trend is dramatically changing infrastructure design, management strategies and effective synchronization of critical systems, opening the door for seamless convergence and interoperability of all core business systems.

Panduit provides flexible, end-to-end solutions for the physical infrastructure that drive operational and financial advantages, allowing businesses to minimize risk and heighten agility. Tailored by industry and customized by application, Panduit solutions span the core systems necessary to transform a business, from data center to facility operations to next generation intelligent buildings.

Panduit has developed the industry's most comprehensive and holistic approach to a Unified Physical Infrastructure and can help enterprises align, converge and optimize critical systems – communication, computing, control, power and security – to build a smarter, unified business foundation.

This approach enables the use of an open standards-based, service-oriented architecture framework and is designed to deliver tangible infrastructure and business process improvements for increased functionality, interoperability and manageability of mission critical operations across the enterprise.

## Unify Your Approach to Wind Generation

### Minimize Risk. Maximize Performance.

Panduit understands the challenges of today's wind industry. To realize maximum return on investment, robust end-to-end solutions that offer maximum reliability, productivity and safety must be planned and deployed throughout the infrastructure.

Panduit's Wind Energy Solutions embody risk management and systems integration in all areas of the wind farm by aligning critical systems to support the delivery of maximum power generated. Best practice methodologies, end to end support and a comprehensive portfolio of solutions make Panduit the leading provider of robust physical infrastructure solutions for meeting wind energy demands:

- Leveraging operational efficiencies aimed at maximizing wind farm output
- Targeted solutions engineered for maximum reliability and extended service life in harsh environment applications
- Innovative product and installation tooling systems designed for ease and speed of deployment to save on-site field time
- On-site safety systems to protect personnel and equipment throughout the lifecycle
- Remote systems management capabilities to identify equipment failures, expedite maintenance, and reduce mean time to repair
- Integrated solutions approach to support control, compute, and communication convergence to help our customers realize the business objective of maximizing energy delivery to the grid

### Unified Physical Infrastructure





## Connect. Manage. Automate.

### Panduit's Full Range of Wind Energy Solutions

*Based on the principles of a Unified Physical Infrastructure approach, Panduit is the wind industry's only single source supplier of complete end-to-end solutions across all areas of wind farm that offer greater reliability, enhanced safety and maximum productivity.*

**Grounding and Bonding** – A comprehensive grounding solution featuring a direct burial compression grounding system that is rugged and simple-to-install, which can be quickly and safely applied in all weather conditions.

**Wire and Cable Management** – Strong and durable solutions for cable routing, bundling and protecting that reduce installation time while providing for quick maintenance when needed.

**Safety** – Intuitive safety signage and LOTO devices that enable worker and equipment protection, minimize opportunity for human error and aid in standard compliance.

**Connectivity and Cabling** – Comprehensive end-to-end copper and fiber cabling systems, including industrial connectivity, that offer ease of deployment and proven performance to ensure availability, reliability, scalability and security of mission critical systems.

**Power Connections** – A wide variety of high-performance lugs, terminals and ferrules that offer enhanced reliability in the toughest environments. Industry leading installation tooling drives faster, more consistent installations.

**Labeling and Identification** – A comprehensive line of customizable solutions including printers, software, on-site systems and a full range of labeling that enables efficient infrastructure management while reducing mean time to repair.



## The Panduit Difference

### Realize Benefits Across the Enterprise.

Panduit provides leading expertise in the physical infrastructure, creating reference architectures based on industry best practices, to enable tangible improvement in efficiency and productivity.

All of Panduit's solutions meet or surpass rigorous quality management standards to assure compliance with industry requirements. Our unique, robust partner ecosystem also offers a lifecycle of services for innovative modeling, predictable execution and operational excellence.

Panduit is the only vendor with a comprehensive, integrated physical infrastructure solution portfolio. Designed as a "system" rather than discrete components, Panduit helps mitigate risk associated with the physical infrastructure across electrical and network systems. For example, Panduit's infrastructure for wind energy ranging from grounding to network cabling to safety systems address uptime needs from a solution perspective with maximum safety and reliability.

Specifically, Panduit's direct burial grounding system can be safely deployed in all weather conditions, significantly reducing risk to installers while delivering full inspectability and high performance as the only solution that is IEEE Std. 837™-2002 compliant. Our keyed fiber cabling system guards against accidental and intentional disruptions of control and compute networks, enhancing security during installation and installed, to contribute to optimum system availability. And, our safety system ensures application of best-in-class, standard compliant solutions to enhance employee safety and avoid unplanned downtime. This comprehensive approach to infrastructure design, deployment and management allows benefits to be realized across the entire enterprise.





## Real-World Solutions to Ensure the Success of Our Customers

*With a proven reputation for excellence and technology innovation, a robust ecosystem of global partners and long-term alliances with top industry leaders, Panduit is a valuable, trusted partner offering strategic vision and real-world solutions to ensure the success of our customers.*



### Innovative Technology Leadership

Panduit is an industry leader in developing innovative technology solutions that meet the rapidly evolving needs of our customers around the world. Our commitment to continued leadership is supported by significant on-going investment, dedicated manufacturing facilities, strategic technology alliances, and collaborative R&D with other industry leaders.



### Global Business & Commitment

Panduit's ongoing commitment to excellence and our technology alliances with key industry leaders such as Cisco Systems, EMC, Emerson, IBM, etc., enables our highly skilled and knowledgeable global sales, systems engineering, and technical support teams to engage with critical customer challenges that range from initial problem determination all the way to resolution. Local specialists, trained to global standards and competencies, provide consistent regional support that brings value to local business. Our global value chain, which combines manufacturing, distribution and service, provides prompt responses to customer-related issues, and streamlines procurement and delivery to any global destination.



### Best-in-Class Partner Ecosystem

Panduit employs a consultative approach to identify customer needs and engage appropriate partners in a collaborative fashion to serve our customers. Panduit's robust ecosystem of architects, consultants, engineers, designers, systems integrators, contractors and distributors offer a full portfolio of lifecycle services. Our partners are trained on relevant services to Plan & Design, Build & Deploy and Maintain & Operate to deliver predictable and measurable results.



### Worldwide Alliances

Panduit has established long-term strategic alliances with top global industry leaders such as Cisco Systems, EMC, HP, IBM, Liebert and Rockwell Automation to develop and integrate innovative, holistic solutions for our customers. We continually invest in relationships and resources for solving our customers' greatest business challenges.



### Eco-Sustainability & Global Citizenship

With a long-standing commitment to environmental excellence, Panduit continually develops and implements solutions designed to protect, replenish and restore the world in which we live and operate. This commitment is demonstrated by Panduit's LEED-certified new world headquarters and future green building plans using its own revolutionary Unified Physical Infrastructure vision to enable convergence of critical systems for driving sustainability.

**Make Generating Wind  
Energy More Reliable.  
Call or visit us online,  
we can show you how.**

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