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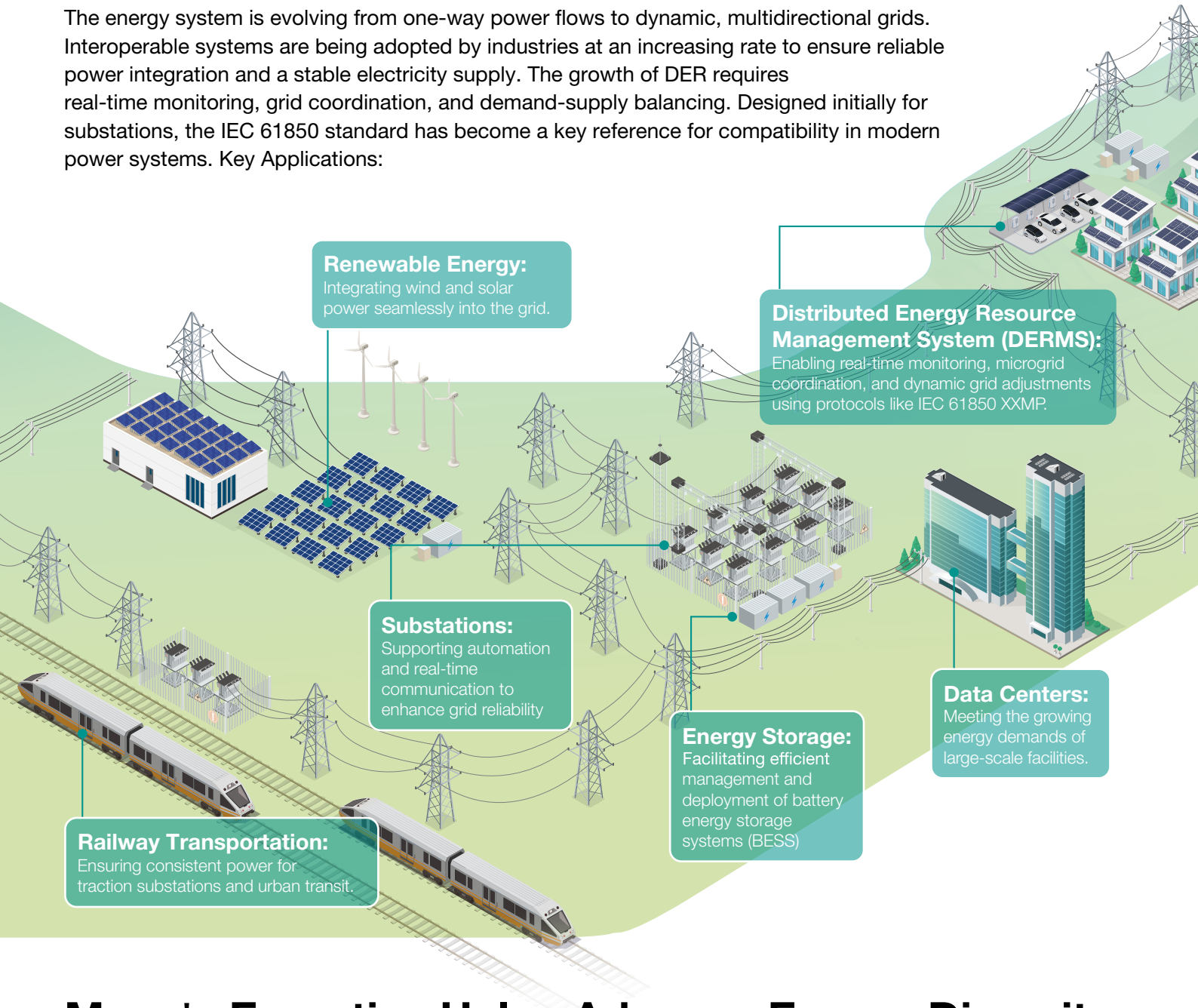
MOXA®

Unlocking the Future of Power Systems

Shaping the Grid Beyond Traditional Boundaries with IEC 61850 Standard

Enhancing Power Systems with IEC 61850 Interoperability

The energy system is evolving from one-way power flows to dynamic, multidirectional grids. Interoperable systems are being adopted by industries at an increasing rate to ensure reliable power integration and a stable electricity supply. The growth of DER requires real-time monitoring, grid coordination, and demand-supply balancing. Designed initially for substations, the IEC 61850 standard has become a key reference for compatibility in modern power systems. Key Applications:



Renewable Energy:
Integrating wind and solar power seamlessly into the grid.

Distributed Energy Resource Management System (DERMS):
Enabling real-time monitoring, microgrid coordination, and dynamic grid adjustments using protocols like IEC 61850 XXMP.

Substations:
Supporting automation and real-time communication to enhance grid reliability

Energy Storage:
Facilitating efficient management and deployment of battery energy storage systems (BESS)

Data Centers:
Meeting the growing energy demands of large-scale facilities.

Railway Transportation:
Ensuring consistent power for traction substations and urban transit.

Moxa's Expertise Helps Advance Energy Diversity

9,700+
Substation network deployments in transmission and distribution systems

48+ GWh
Energy Storage System managed

7 Out of 10
Top global wind turbine players are deploying Moxa solutions

80+ GWh
Solar energy monitored by Moxa's device connectivity solutions

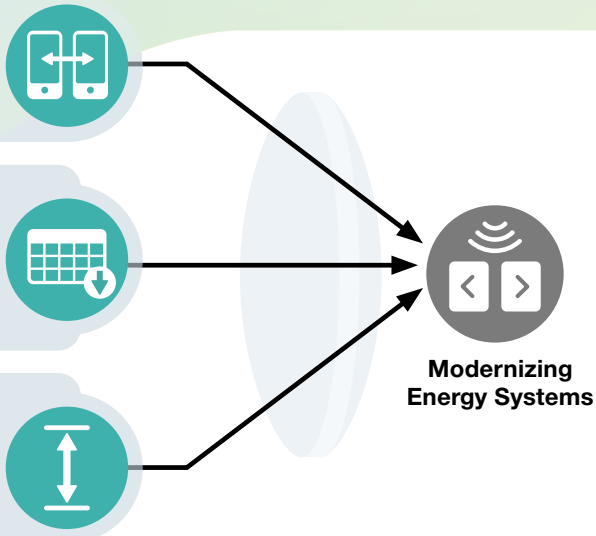
Modern Energy Systems Hurdles

Modernizing substations and multidirectional communication in the energy system present a set of challenges:

Interoperability
Diverse vendors and protocols often create integration barriers, complicating communication between devices.

Data Management and Monitoring
Managing the massive data flows required demands fast and reliable exchange. Inefficient systems can disrupt the integration of smart grid components.

Scalability
The lack of a flexible system design restricts the integrate of new technologies, limits scalability, and reduce the reliability and efficiency of smart grid operations.



A Universal Standard for Energy Integration

IEC 61850 provides a unified, open, and non-proprietary standard for communication across diverse energy applications. IEC 61850 delivers three key benefits:

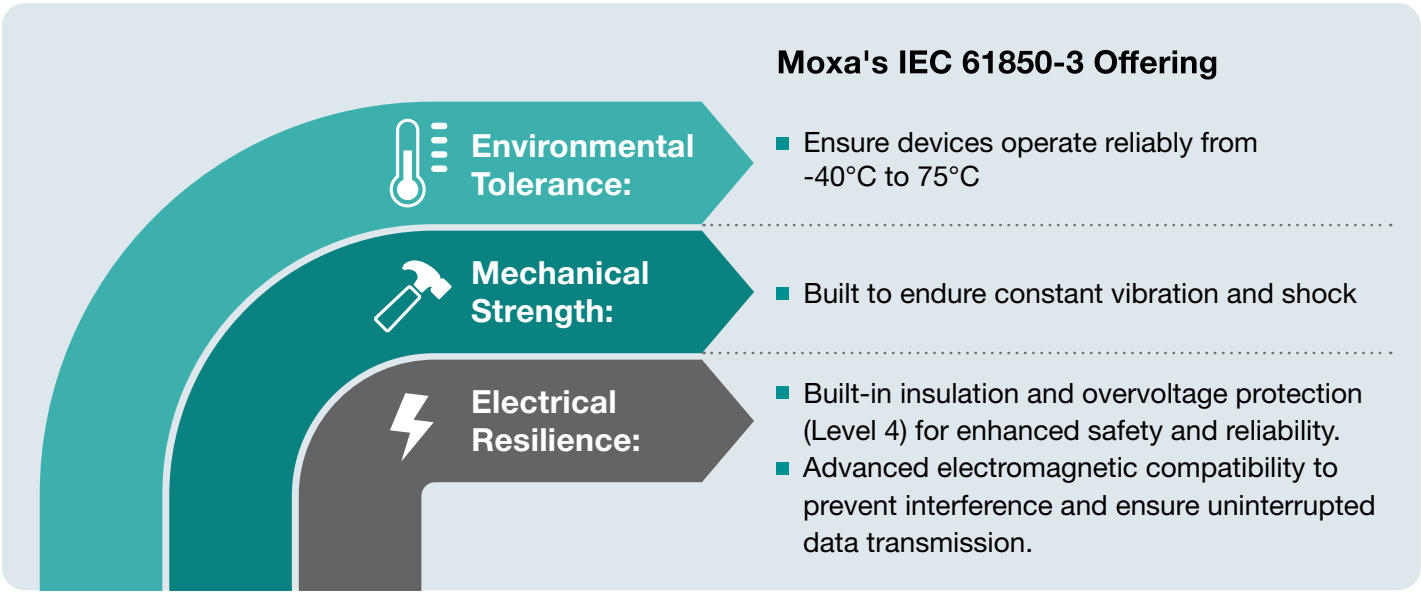
Standardized Communication
Supporting Ethernet-based communication, the standard defines protocols such as MMS, GOOSE, and Sampled Measured Values (SMV) to streamline device communication and enhance system efficiency.

Validated Interoperability
With rigorous testing and validation standards, IEC 61850 ensures seamless integration of hardware from multiple vendors, simplifying system upgrades and modernization.

Unified Data Model for Consistency
The Logical Node (LN) model offers a standardized structure and language, improving data consistency and enabling real-time operations across energy systems.

From Core to Shell: Reliable Connectivity, Rugged Performance

Moxa's communication product solutions not only fulfill **IEC 61850 communication** protocols but also comply **with IEC 61850-3 Edition 2 standards**. These stringent requirements ensure:



IEC 61850-3 devices are essential for the reliable operation of critical infrastructure like substations and power plants, including renewable energy and microgrid systems, in harsh environments.

Why Moxa

Moxa combines advanced communication technologies with rugged hardware design to ensure reliable performance in the most demanding environments. In addition, Moxa provides a comprehensive IEC 61850-3 Class 1 and Class 2 product portfolio, designed to meet progressively advanced communication requirements—from basic to high-performance devices—empowering utility operators, energy companies, and industrial players to build reliable, scalable, and future-proof power systems.

Industrial Ethernet Switches

DIN-rail Managed Switches

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
PT-G510	10-port Layer 2 full Gigabit PRP/HSR managed Ethernet switches	—	●
PT-G503	3-port full Gigabit managed redundancy boxes	—	●
PT-510	10-port Layer 2 DIN-rail managed Ethernet switches	—	●
PT-508	8-port Layer 2 DIN-rail managed Ethernet switches	—	●
EDS-G4014	8G+6 2.5GbE-port full Gigabit managed (LV & PoE models) Ethernet switches	●	—
EDS-G4012	12G-port (with 8 802.3bt PoE port option) full (LV & PoE models) Gigabit manage	●	—
EDS-G4008	8+4G+2 2.5GbE-port managed Ethernet switches	●	—
EDS-4014	8+4G+2 2.5GbE-port managed Ethernet switches	●	—
EDS-4012	8+4G-port (with 8 802.3bt PoE port option) (LV & PoE models) managed Ethernet	●	—
EDS-4009	9-port managed Ethernet switches	●	—
EDS-4008	8-port (with options of 4 802.3bt PoE ports or 4 Giga (LV & PoE models) uplink ports) managed Ethernet switches	●	—
EDS-G508E/G512E/ G516E	Full Gigabit managed Ethernet switches	●	—
EDS-528E	24+4G-port Gigabit managed Ethernet switches	●	—
EDS-518E	14+4G-port Gigabit managed Ethernet switches	●	—
EDS-510E	7+3G-port Gigabit managed Ethernet switches	●	—
MDS-G4028-4XGS	4XG+24G-port full Gigabit modular managed Ethernet switches	●	—
MDS-G4020-4XGS	4XG+16G-port full Gigabit modular managed Ethernet switches	●	—
MDS-G4012-4XGS	4XG+8G-port full Gigabit modular managed Ethernet switches	●	—
MDS-G4028	28G-port full Gigabit modular managed Ethernet switches	●	—
MDS-G4020	20G-port full Gigabit modular managed Ethernet switches	●	—
MDS-G4012	12G-port full Gigabit managed Ethernet switches	●	—

Industrial Ethernet Switches

Rackmount Managed Switches

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
PT-G7828	28-port Layer 3 full Gigabit modular managed Ethernet switches	—	●
PT-G7728	28-port Layer 2 full Gigabit modular managed Ethernet switches	—	●
PT-7528	28-port Layer 2 managed rackmount Ethernet switches	—	●
RKS-G4028	28G-port (with 802.3bt PoE option) full Gigabit modular managed Ethernet switches	—	●

PoE Switches

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
EDS-G4012	12G-port full Gigabit managed Ethernet switches with an 8 802.3bt PoE port option	●	—
EDS-4012	8+4G-port managed Ethernet switches with an 8 802.3bt PoE port option	●	—
EDS-4008	8-port managed Ethernet switches with options of 4 802.3bt PoE ports or 4 Gigabit uplink ports	●	—
EDS-G512E	12G-port (with 8 PoE+ ports option) full Gigabit managed Ethernet switches	●	—
EDS-P506E-4PoE	4+2G-port Gigabit PoE+ managed Ethernet switches with 4 IEEE 802.3af/at PoE+ ports	●	—
MDS-G4028-4XGS	4XG+24G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option	●	—
MDS-G4020-4XGS	4XG+16G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option	●	—
MDS-G4012-4XGS	4XG+8G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option	●	—
MDS-G4028	28G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option	●	—
MDS-G4020	20G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option	●	—
MDS-G4012	12G-port full Gigabit managed Ethernet switches with an 8 802.3at/af PoE+ port option	●	—
RKS-G4028	28G-port full Gigabit modular managed Ethernet switches with 802.3at/af PoE+ port option	●	—

Industrial Secure Routers

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
EDR-G9010	8 GbE copper + 2 GbE SFP multiport industrial secure router	●	—
EDR-G9004	2 Gigabit copper + 2 Gigabit copper/SFP combo port industrial secure routers	●	—
EDR-8010	8 FE copper and 2 GbE SFP multiport industrial secure routers	●	—

Industrial x86 Computer

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
DA-680	Intel® 8th Gen CoreTM processor, 1U rackmount computers with 8 Gigabit Ethernet ports, 8 to 16 serial ports	●	—
DA-681C	Intel® 7th Gen Core™ processor, 1U rackmount computers with 6 Gigabit Ethernet ports, 12 isolated serial ports	●	—
DA-682C	Intel® 7th Gen Core™ processor, 2U rackmount computers with 2 expansion slots	●	—
DA-720	Intel® 6th Gen Core™ processor, 2U rackmount computers with 3 PCIe expansion slots	●	—
DA-820C	Intel® 7th Gen Xeon® and Core™ processor, 3U rackmount computers with PRP/HSR card support	●	—
DA-820E	Intel® 13th Gen Xeon® and Core™ processor, 3U rackmount computers, hot-swappable power module, -40 to 70°C operating temperature	●	—

Industrial Ethernet Gateways

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
MGate 5119	1-port DNP3/IEC 101/IEC 104/Modbus-to-IEC 61850 gateways	●	—
MGate 5192	1-port IEC 61850-to-DNP3/IEC 101/IEC 104/Modbus gateways	●	—

Industrial Serial Device Servers

SERIES/MODELS		IEC 61850 Class-1	IEC 61850 Class-2
NPort S9450I	4-port rugged device servers with managed Ethernet switch	●	—
NPort S9650I	8/16-port rugged device server with managed Ethernet switch	●	—

Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With 35 years of industry experience, Moxa has connected more than 102 million devices worldwide and has a distribution and service network that reaches customers in more than 85 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

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For more information
Call 1300 36 26 26 | sales@colterlec.com.au | www.colterlec.com.au