

Line card for North America

# Hitachi Energy products, systems, software and services

Advancing a sustainable energy future for all

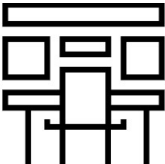
Hitachi Energy serves customers in the utility, industry and infrastructure sectors with innovative solutions and services across the value chain. Together with customers and partners, we pioneer technologies and enable the digital transformation required to accelerate the energy transition towards a carbon-neutral future.

We are advancing the world's energy system to become more sustainable, flexible and secure whilst balancing social, environmental and economic value. Customers rely upon our solutions to plan, build, operate, optimize and maintain their power infrastructure, whilst increasing overall flexibility and resilience. Our solutions enable the safe, reliable and efficient integration, transmission and distribution of bulk and distributed energy generated from conventional and renewable sources.

To deliver maximum value, we have organized our operations around four global Business Units - Grid Automation, Grid Integration, High Voltage Products and Transformers.

## Grid Automation

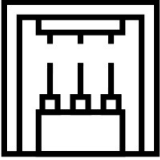
Our Grid Automation hardware, software and services portfolio unites deep domain knowledge and innovative technologies that enable customers across the globe to optimize the critical systems that power, move and connect us. Our digitalization solutions are cost effective, agile and innovative, delivering control, visibility and stability for increasingly complex systems. Through digitalization we can improve reliability and resiliency, and enable a wide range of sustainable choices.

Category	Offering	Description
<b>Grid Automation</b> 	COMBIFLEX® modular relays and COMBITEST relay test system	<p>The proven COMBIFLEX® relay family and modular building system offer flexible and reliable protection solutions for a range of applications. The COMBIFLEX building system features unique flexibility for combining various auxiliary, supervision and simple measurement functions with the protection schemes. The wide range of different mounting and casing alternatives allow the COMBIFLEX based protection system to adjust to any space and functionality requirements.</p> <p>COMBITEST relay test system provides a wide range of testing capabilities. COMBITEST is a finger-safe solution with no exposure to energized components. COMBITEST also provides maximum space savings with compact design and up to six times more test points available than with the traditional solutions.</p>

Category	Offering	Description
<b>Grid Automation (continued)</b>  	Communication networks	<p>Hitachi Energy' wired and wireless communication solutions serve as the foundation for smart and intelligent power systems, seamlessly bringing together industrial IT and OT data on the same network. Our solutions enable the digital transformation of utilities and industry, ensuring the integration of the existing infrastructure, upgradeability to cope with future application requirements, and at the same time, ensuring highest availability and full real time capabilities for critical applications.</p> <p>Combined with enhanced network management features, Hitachi Energy provides an easy to operate communications infrastructure for mission-critical applications and other legacy and new services in utilities. Besides offering broadband operation Telecommunication solutions, Hitachi Energy is also a market leader in Teleprotection solutions over any technology and communication media, as well as offering narrowband communication solutions over HV power lines without need for fiber infrastructure or radio links.</p>
	Enterprise software	<p>The Enterprise Software group has been meeting the unique needs of industries for over 40 years through agile development and close collaboration with our customers. Enterprise Software Solutions enable you to make better decisions faster by providing critical insight into your operations. We enable asset-intensive industries to be more adaptive, collaborative, insightful and predictive, resulting in improved business efficiencies and bottom-line results.</p> <p>Offering includes Energy Portfolio Management. We've combined more than 130 years of engineering know-how in the power and industrial sectors with Hitachi's leading Lumada digital ecosystem, as well as the domain and services expertise of Hitachi Vantara to guide customers in using technology to transform their business.</p>
	Grid edge solutions	<p>Our e-mesh™ portfolio offers end-to-end distributed energy solutions, combining advanced analytics, software technology and hardware systems. Our microgrids and battery energy storage solutions ensure highest penetration of renewables share, increase grid stability and provide reliable power while minimizing CO2 emissions.</p>
	Network control	<p>Network Manager is an integrated real-time monitoring and control platform, which includes SCADA, GMS, EMS, ADMS and DERMS applications for the reliable and secure operation of electrical power networks; ranging from generation, transmission and distribution to railways and airports. Hundreds of customers in the utilities, transportation and industrial sectors around the world rely on Network Manager to efficiently control and manage their power systems for enabling a stronger, smarter and greener grid.</p>
	Digital Substation: protection, control and automation solutions and services	<p>Hitachi Energy' world-class protection, control and monitoring solutions include the Relion® family of intelligent electronic devices, MicroSCADA X grid automation solution, and the modular RTU500 series that digitalize power and automation networks to improve operational efficiency, enhance safety and serve our customers throughout the whole lifecycle. To deliver cybersecure, interoperable and future-proof solutions, our products have been designed to implement the core values of the IEC 61850 and other international standards.</p> <p>Understanding customer needs and expectations, we develop innovative products and systems that solve complex energy and data communication challenges for utilities and industry, ensuring reliable, sustainable power for all. Through our comprehensive cybersecurity offerings we secure your system from end to end, at the process, communication, and network level.</p>

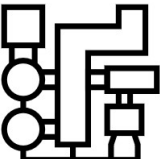
## Grid Integration

Our Grid Integration portfolio spans a wide range of transmission and substation applications, which facilitate reliable and efficient system integration of the future digital electric network with minimum environmental impact. We incorporate the integrated systems, solutions and services of our business's DC and AC fields, including HVDC, Substations, FACTS, Offshore Wind Connections, Semiconductors and Power Consulting, for utility and industrial grid applications, as well as e-transportation solutions.

Category	Offering	Description
<b>Grid Integration</b> 	Digital offerings	<p>Modular Advanced Control for HVDC (MACH™) control provides advanced fault registration and remote-control functions. This design allows the HVDC and FACTS system to be controlled and protected in the most reliable way throughout its lifetime.</p> <p>Fully digital substation system from process level to network level which increased safety, interoperability, Smart Grid communications capability, availability, productivity and reliability, and reducing the overall substation costs.</p>
	HVDC	HVDC (high-voltage direct current) is a highly efficient alternative for transmitting large amounts of electricity over long distances and for special purpose applications. HVDC's offering includes products, systems, and solutions as well as engineering and consulting services for HVDC light, HVDC Classic, and MACH Control and Protection System.
	FACTS	FACTS (Flexible Alternating Current Transmission Systems) technologies provide more power and control in existing AC as well as green-field networks and have minimal environmental impact. FACTS's offering includes Static Var Compensators (SVC), Static Compensators (STATCOM), Fixed Series Compensators, Static Frequency Converters, Synchronous Condenser System and Thyristor Controlled Series Compensation.
	Substations	Substations' offering includes optimized turnkey solutions and engineered equipment packages for Air-Insulated Substations, Gas-Insulated Substations, Hybrid Substations, Mobile Substations, Containerized and prefabricated substations and Digital substations.
	Electric Vehicle Charging Solutions	Grid-eMotion Fleet provides complete grid-to-plug charging solutions for electric vehicle fleets. Based on a modular and scalable technology platform, Grid-eMotion Fleet provides optimized turnkey solutions, as well as engineered equipment packages tailor-made to meet various fleet charging applications.
	Consulting	Power Consulting offers a wide range of consulting services in the areas of transmission and distribution systems, renewable energy integration, transportation electrification, energy efficiency, power market analysis, asset evaluation, industrial systems, grid planning and more.


## High Voltage Products

Hitachi Energy is a leader in high-voltage technology, offering a wide range of high-voltage products up to 1,200-kilovolt (kV). We help to enhance the safety, reliability and efficiency of power networks while minimizing environmental impact. Our technology leadership continues to facilitate innovations in areas such as ultra-high-voltage power transmission, enabling smart grids and enhancing eco-efficiency.

Category	Offering	Description
<b>High Voltage products</b> 	Air insulated switchgear	Dead Tank and Live Tank Circuit Breakers (single and 3 phase operations), HV Disconnect Switches, PASS Hybrid Breakers
	Gas insulated switchgear	SF6 and EcoGas solutions, Indoor and Outdoor, packaged solutions (IGA)
	Generator circuit breakers	80-1800 MW solutions with interrupting capacity up to 825 kAIC
	Arresters	Distribution, substation and transmission solutions
	Capacitors & filters	<p>LV-HV solutions, capacitors cans, distribution and shunt banks, metal enclosed capacitor banks, active and passive filter solutions</p> <p>Air cooled reactors and battery energy storage solutions</p>
	HV instrument transformers	Station Service Voltage Transformers (SSVTs), Current Transformers (CT), Voltage Transformers (VTs), Combined Current Voltage Transformers (CCVTs), Inductive Voltage Transformers (IVTs) and Combos


## Transformers

Through our innovative and diverse Transformers team and pioneering technology we transform energy to add social, environmental and economic value - powering future generations.

Category	Offering	Description
	Distribution	Includes pole-mount (up to 315 kVA) and pad-mounted transformers (25 kVA – 25 MVA; less than 69 kV)
	Dry-type	Full range of dry-type transformers (no oil) up to 63 MVA with primary voltages through 72.5 kV
	Power	Complete range of power transformers up to 1200 MVA and up to 800 kV, including digitally enabled, GSU, sub-station, phase-shifter, shunt reactor and HVDC converter applications
	Transformer components	Components include bushings, tap-changers, switching plus digital and conventional monitoring devices
	Digital offerings	TXpert™ Ecosystem is an open, scalable environment for the digitalization of transformers, designed to allow data-driven intelligence and decision making in the operations and maintenance (O&M) of transformers. It is a complete suite of products, software, services and solutions that work together enabling simple steps in your digitalization journey.

## Service & Consulting

We offer an array of services - from traditional to advanced - for our products and systems that are offered a-la-carte or within an agreement. These five main services support our customers in planning; building; operating and maintaining their grids.

Category	Offering	Description
	Install and commission	Understanding electrical power equipment and systems is what we do in Hitachi Energy. Integrating investments from factories into daily operations is our specialty. We provide a wide range of turnkey installation and commissioning services that help customers ensure a smooth start.
	Train and develop	Understanding grid assets can be complex. Hitachi Energy leverages a range of techniques (physical inspections to field remote assessments) to generate insights, offer targeted recommendations, and advise on the best path forward. Leveraging a century of manufacturing, and technology excellence to deliver engineering studies, asset investment planning and much more.
	Assess and advise	Understanding grid assets can be complex. Hitachi Energy leverages a range of techniques (physical inspections to field remote assessments) to generate insights, offer targeted recommendations, and advise on the best path forward. Leveraging a century of manufacturing, and technology excellence to deliver engineering studies, asset investment planning and much more.
	Maintain and sustain	Maintenance offerings for assets and systems to drive sustainable performance: from corrective, preventive, predictive to reliability-centered maintenance. Leveraging cutting-edge tools and models (e.g. sensors, communication, performance models), we accompany customers into the future of service, allowing them to realize and leverage the impact of continued service advancements.
	Upgrade and replace	Making the decision when to revitalize an asset or systems can be complex. Utilizing our vast experience and analytic capabilities, Hitachi Energy simplifies the decision-making to upgrade, retrofit or replace a system or product, by evaluating all options and presenting the best path forward to meet your specific requirements. When coupled with Hitachi Energy' unparalleled project experience a winning combination of success is formed.