



# Global Project Engineering Services

Specialized Installation & Commissioning Services



## with Primary Plus™

Pre-engineered solution set that digitizes XD|GE primary equipment and provides factory installed and configured protection, monitoring, diagnostics and communications.



GE  
Digital Energy





## Increasing Power System Reliability and Efficiency

For over a century, utilities around the world have relied on GE to deliver products and services that increase power system reliability, improve grid resiliency, and responsiveness. As a global leader in providing grid infrastructure products and services, GE supports a broad set of utility applications ranging from transmission and substation automation to distribution networks and smart metering. These solutions work together to enable greater safety, connectivity and increased security of our power system networks.

Offering a large portfolio of end-to-end products for high-voltage transmission systems, coupled with our proven project execution capabilities, XD|GE offers one of the industry's most complete line of high-voltage primary and power equipment. Used to monitor and control vital processes, XD|GE enables utilities to meet the high demands required for reliable electricity.

XD|GE Engineering Services provides an array of comprehensive services for the successful deployment and maintenance of the full suite of high-voltage primary equipment products and business solutions globally.

### Guiding Principles

GE's approach to field engineering and services is based around three key principles: Availability, Competency, and Expertise.

- **Availability:** We are proud of our track record of being able to deploy the appropriate resources globally within the required time frames
- **Competency:** We place a very high value on the continuous professional and personal development of our employees
- **Experience:** We select field engineers with a broad experience base, working with multiple operators in diverse cultures



## Deep Domain Knowledge & Global Project Execution

### Specialized Installation & Commissioning

- Complete logistics management including coordination of ocean and inland transportation
- Comprehensive installation services including receiving, rigging, unloading, and labor (mechanical & electrical)
- System testing for commissioning
- Site acceptance testing

### Post-Sales Service & Support

- Dedicated 24x7 global customer service team to respond to customers
- Emergency response hotline
- Multiple customer support access points including: telephone, e-mail, fax, or web
- Global spare parts reserve
- Global network of maintenance and repair facilities

## Primary Plus



XD|GE offers Primary Plus on all its primary equipment. Primary Plus is a pre-engineered solution set that provides utilities with a means to reduce the time and labor associated with substation construction and expansion, while at the same time utilizing technologies and methodologies familiar to existing resources.

XD|GE's factory installed and configured solutions include:

- Digitized primary equipment by replacing labor-intensive, individually terminated copper wires with standardized physical interfaces and open digital communications
- Electrical protection systems optimized for the equipment and application to monitor and react to fault conditions
- Monitoring and diagnostics of transformers to predict problems and proactively manage performance
- Highly secure and ruggedized communication network equipment including industrial strength wireless, fiber optic multiplexers and Ethernet switches





## Technical Consulting Service

With over a century of experience in delivering products and services from the power plant to the end power consumer (commercial, industrial and residential), GE Digital Energy Services offers customized or standardized services for High Voltage primary equipment. Our experts have the technology and deep domain experience to address your evolving business needs and unique application challenges. Our consultative approach helps utilities with planning and defining where to invest and most importantly, helps to identify how to get the best return on the investment.

The technical consultants ultimate goal is to deliver expert guidance to minimize the risk of non-compliance with the installation, commissioning, and operation of this critical equipment.

## Experienced Project Management Service Engineers

Experienced project managers ensure that the project is executed as planned, on time and on budget.

- Extensive experience in utility and industrial power systems studies, HV substation electrical, civil, and structural engineering and design
- Experienced project management professionals who manage the design, procurement, construction, installation, testing, commissioning, and training for complete turn-key projects or engineered equipment packages
- Robust quality management system assures the highest quality and reliability throughout all phases of the project lifecycle

## Specialized Installation & Commissioning

Helping utility customers successfully achieve their project goals, both operational and economic, is our number one priority. We understand that each customer has a unique system, application, and set of challenges for their high-voltage and ultra high-voltage primary equipment. GE is dedicated to providing the technical experts, training, and support needed to optimize the efficiency and performance of each customer's specific system.

GE offers the following core services:

- Logistics coordination and management of ocean and inland transportation
- Comprehensive installation services including receiving, rigging, unloading, and labor (mechanical & electrical)
- System testing for commissioning
- Site acceptance testing



## Post Sales & Installation Support

XD|GE supports every stage of the technology lifecycle for each critical piece of primary equipment in operation. We continually invest in our people, tools, and processes – working to deliver the highest in customer service performance, every step of the way.

Our support resources offer multiple touch-points and connection options to ensure support for utilities located around the world. Support resources and tools include:

- 24x7 global customer service
- Operators available to respond to customer requests
- Emergency response hotline
- Several customer support access points available to ensure timely support (telephone, e-mail, fax, or web)
- Warranty backed by the strength of GE
- Global spare parts reserve
- A global network of maintenance and repair facilities

## Global Network of Field Service Engineers

We have a global pool of highly trained and experienced field service engineers with a passion for safety, compliance and quality. Our teams are committed to doing things the right way.

GE's global network provides utilities with access to the right people with the right skills and resources at a time when they need them most – providing critical support to ensure power system reliability and efficiency.

The majority of GE's field service engineers are strategically located close to our customers, supported by a flexible global team of specialists to deliver fast and responsive service, 24 hours a day, 7 days a week.

## Long-term Maintenance

To reduce maintenance costs and extend the usable life of these critical assets, GE offers a number of options to our customers. From long-term service and maintenance contracts to more advanced remote product monitoring, diagnostics, and spare parts stocking, GE offers flexible and customizable service plans to satisfy the needs of each customer.

## Advanced Remote Monitoring & Diagnostics

Leveraging GE's Primary Plus offering of advanced protection, control and monitoring solutions, utilities are provided with the means to optimize primary equipment. Detailed and accurate diagnostic information provide utilities with advanced notification of potential failures, before they become catastrophic events, allowing utilities to maintain greater power system reliability, efficiency and security.





## HV Equipment Offering

From inception to delivery and through the total life of the asset, the XD|GE Project Engineering Services team provides a wide range of value added services to meet utility needs and address the unique challenges of each application. HV equipment and service solution offerings from XD|GE include:

### Transformers

- <500 – 1,100kV rated voltage
- Transformer types: power, auto, reactor, HVDC converter, arc furnace, railway traction and cast coil
- Services:
  - » Transformer rigging services
  - » Assembly services
  - » Vacuum oil filling process
  - » Hot oil circulation
  - » Preventative maintenance and support

XD|GE's power and auto transformers are offered with three phase ratings from 20 to 1500 MVA, voltage ratings from 69 up to 765kV, and single phase ratings to 1000 MVA, 1000KV. Three phase auto transformers are available with ratings to 765kV, 1500 MVA, and single phase auto transformers to 1000kV, 1500 MVA.

Shunt reactors are core to XD|GE's portfolio, with more than 600 units installed, at 500kV or higher, in various regions around the world. XD|GE's advanced core design provides high performance and reliability by reducing total losses, partial overheating, core noise, and vibration. Rectifier transformers can be supplied with ratings ranging from 35kV to 220kV, and up to 140MVA and have been designed to withstand the extreme operating and environmental conditions found in heavy industrial applications.

Arc furnace transformers are available in AC and DC supply, with capacities up to 200 MVA with 35kV single-core design, up to 160 MVA with series voltage regulation, and up to 100 MVA with a primary voltage of 110kV.

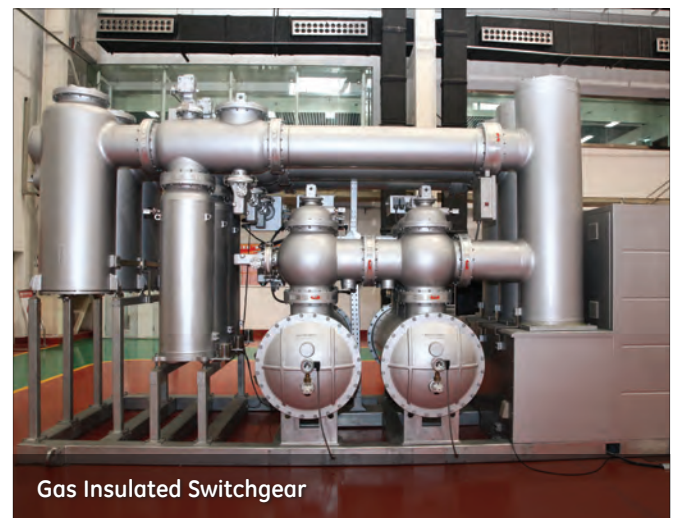
### Gas Insulated Switchgear (GIS)

- 72.5 – 800kV rated voltage
- Conventional and hybrid configurations
- High reliability, exceptional environmental and seismic characteristics
- Services:
  - » On site assembly and commissioning
  - » SF<sub>6</sub> gas system verification and testing
  - » Routine maintenance inspections
  - » Partial discharge monitoring
  - » On-line diagnostics

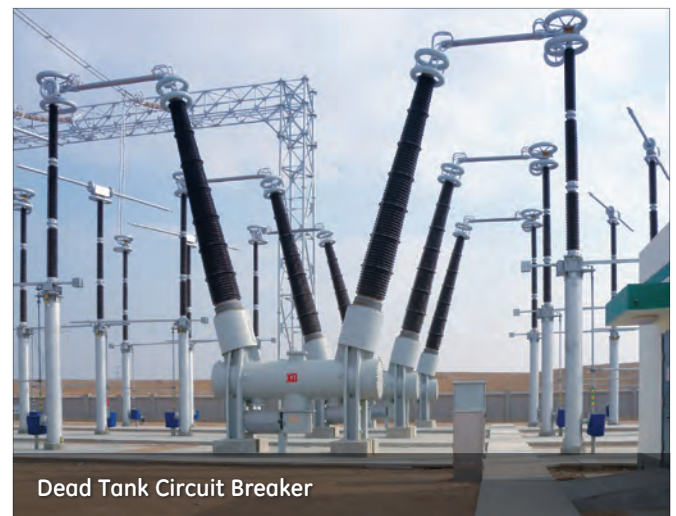
XD|GE provides a highly reliable, compact GIS that lowers installation space and reduces maintenance requirements. Designed with light-weight, durable aluminum enclosures, total load on the foundation and building floors is significantly reduced. The XD|GE GIS requires a low level of maintenance throughout the life of the product. The main components including circuit breakers, disconnectors, earthing switches, and operating mechanisms are designed for a normal operation of more than 30 years.



Transformer



Gas Insulated Switchgear



Dead Tank Circuit Breaker

### High Voltage Circuit Breakers

- Live Tank (72.5-550kV) & Dead Tank (72.5-800kV) rated voltage
- Unique breaker unit construction minimizes maintenance and inspection
- Services:
  - » On site assembly and commissioning
  - » Insulating parts verification and testing
  - » Preventative maintenance and support
  - » SF<sub>6</sub> gas analysis

The XD|GE breaker offerings are robust in design and are based on proven technology, yielding high quality products suitable for an extensive range of applications. XD|GE's breakers are compact in design and construction with advanced arc extinguishing technology and self-blast interrupting capability which significantly reduces product size and improves reliability.

### High Voltage Disconnect Switches

- 72.5 – 800kV rated voltage with superior anti-corrosion properties
- All configurations include double/single break
- Horizontal and vertical designs

The high voltage disconnect switch portfolio from XD|GE is broad in both voltage level and design configuration, providing solutions for all utility applications.

### Arrestors and Insulators

- >55kV rated voltage
- ANSI® (distribution through station class) and IEC® rated arresters
- Solid core post and composite insulators

The XD|GE facility has been producing arrester metal oxide varistor, MOV, disks for over 30 years and is the largest arrester production facility in China. In addition, its separate production facilities design and build the Porcelain and Silicone housings used in their arrester products, ensuring control of the availability and quality of these components.

### Current and Capacitive Voltage Transformers

- 69 - 550kV SF<sub>6</sub> gas insulated current transformers
- 69 - 1,100kV capacitive voltage transformers

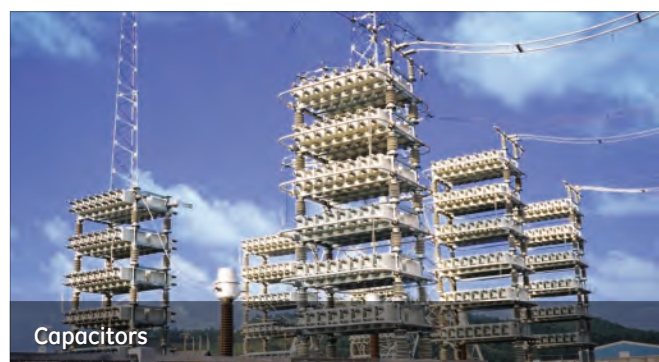
XD|GE has been offering high-accuracy (0.1% rated), innovative, and reliable CT's & CVT's/CCVT's solutions that may be applied to transmission systems ranging from 72.5kV to 1100kV.

The capacitors utilized in the CVT's are manufactured in XD|GE's state of the art, 120,000 sq yard facility which also manufactures Shunt Capacitors, Filter Capacitors, and HVDC Shunt Capacitors.

### Capacitors

- 25kVAR to 1,000kVAR
- 2,400 Volts to 25,000 Volts. 50Hz and 60Hz
- Internally fused, externally fused, fuseless capacitors and equipment
- Heavy duty designs for increased durability, harmonic/transient tolerance

The XD|GE capacitor offering ranges from stand alone capacitor units to highly engineered banks for voltage and var stability solutions. Internally fused, externally fused, and fuseless designs provide flexibility under all design considerations.





# GEDigitalEnergy.com



## Digital Energy

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