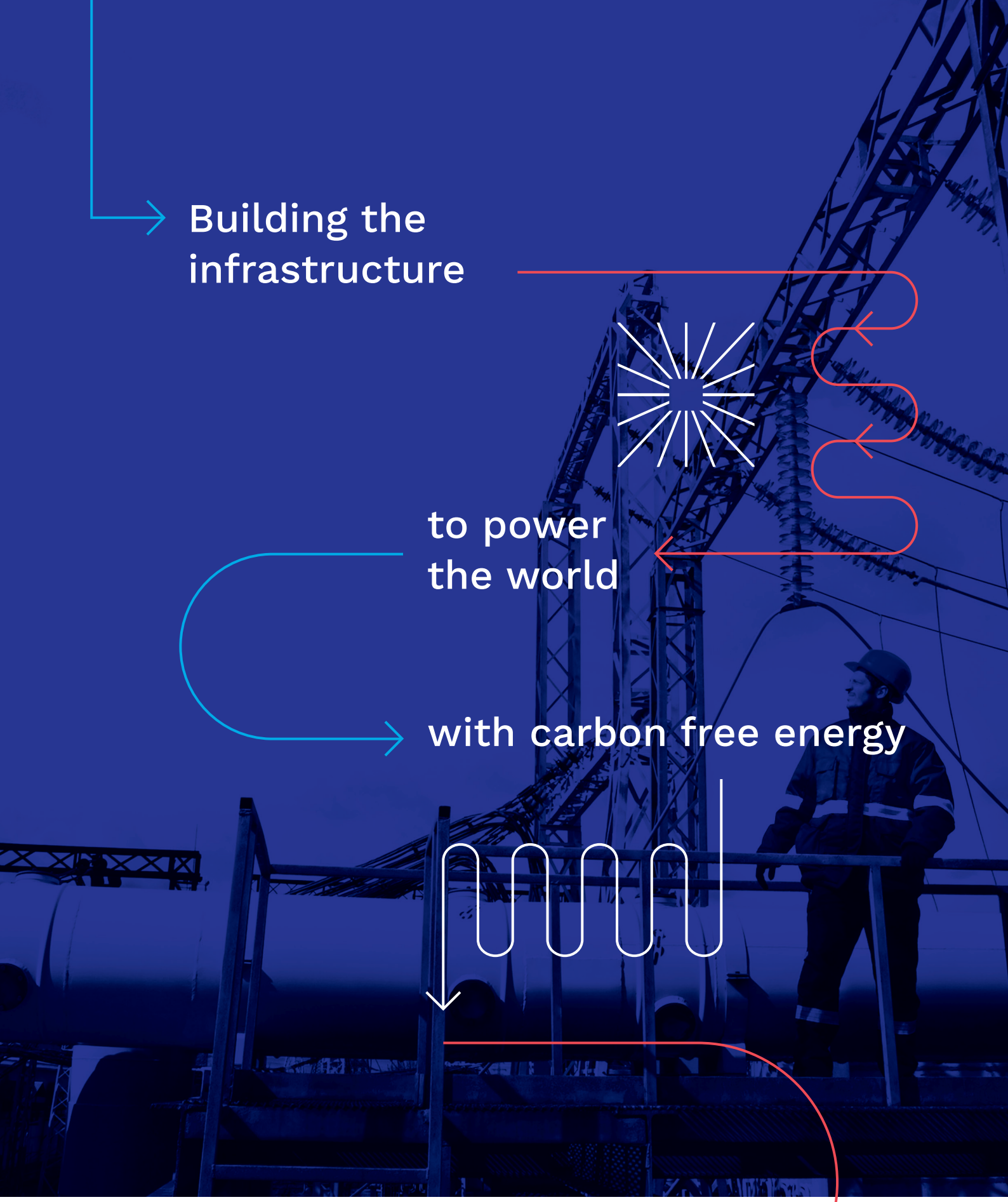

Building the
infrastructure
to power
the world
with carbon free energy

linxon

Linxon helps cities grow, industries expand, and communities thrive by building a crucial part of the power transmission grid. Linxon offers engineering, procurement, management and construction services for execution of large, complex AC power substations including expansions and electrification in four main segments.

## Building the infrastructure to power the world

**Linxon is a joint venture company set up by SNC-Lavalin and ABB (currently Hitachi Energy) in September 2018, to deliver turnkey electrical AC substation projects.**

Linxon helps cities grow, industries expand, and communities thrive by building a crucial part of the power transmission grid. Linxon offers engineering, procurement, management and construction services for execution of large, complex AC power substations including expansions and electrification in four main segments. Linxon combines the accumulated knowhow of original equipment manufacturer (OEM) and project execution capabilities so that customers benefit from efficient and continuously improved solutions and increased industrial productivity.

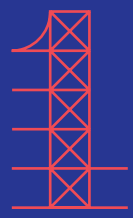
### Parent Partners

Founded in 1911, SNC-Lavalin is a fully integrated professional services and project management company with offices around the world dedicated to engineering a better future for our planet and its people. Creating sustainable solutions that connect people, technology and data to design, deliver and operate the most complex projects. SNC-Lavalin deploys global capabilities locally to our clients and deliver unique end-to-end services across the whole life cycle of an asset including consulting, advisory and environmental services, intelligent networks and cybersecurity, design and engineering, procurement, project and construction management, operations and maintenance, decommissioning and capital.

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, it pioneers technologies and enables the digital transformation required to accelerate the energy transition toward a carbon-neutral future. Hitachi Energy is advancing the world's energy system to become more sustainable, flexible and secure whilst balancing social, environmental and economic value. It has a proven track record and an unparalleled installed base in more than 140 countries.

# We are building the infrastructure to power the world with carbon free energy

We live up to future challenges with the most comprehensive portfolio. AC substations transform voltage between the generating station and the consumer, distributing power to people and industry.



## Act
**as a business partner**

- Single source of responsibility which minimizes risk and reduces project complexity for our customers
- Transparent and open communication which prioritizes our customers' requirements
- Collaborative approach to deliver complete projects according to schedule

## Offer
**dedicated domain expertise**

- An unwavering commitment to the highest safety and quality standards
- Linxon brings unrivalled technology and application knowhow
- Proven track record of delivering end to end, grid compliant solutions in multiple regions
- Ability to manage complexity as demonstrated by extensive global references

## Bring
**long-term value**

- Combining world class power technologies and project delivery
- Enabling stronger, smarter and greener solutions
- Future proofed project execution that help our customers to be ready for the next grid generation
- Predictable and cost-efficient lifecycle solutions

# Values

Our values are the essence of our company's identity. They represent how we act, speak and behave together, and how we engage with our clients and stakeholders.

### Trust

- We care for the wellbeing of each other – physically and mentally
- We act ethically and keep our commitments
- Our customers can rely on us

### Entrepreneurship

- We create value in everything we do
- We act with a strong sense of ownership for the result
- We are curious and find innovative solutions

### Collaboration

- We value the opinion of others and create a spirit of teamwork and openness
- We learn from each other's different perspectives for the better outcome
- We help and support each other

# References

Linxon can, thanks to the unique combination of SNC-Lavalin and Hitachi Energy, deliver large, complex AC power substations building on experience:

- 1,000 references;
- over 100 years of technology expertise; and
- 60 years of substation and electrification project experience worldwide.

# Our global presence


**600**
employees

**5**
hubs

- → North America
- → UK, Ireland & Central Europe
- → Nordics
- → Middle East & Africa
- → Asia Pacific

ZERO

defects

ZERO

harm approach

quality, health, safety, security

and environmental protection

are our core priorities

# HSE, quality and sustainability

Linxon strives to deliver engineering, procurement, design/delivery projects with zero defects and zero harm to people and the environment.

Our core values embrace **quality**, **health**, **safety**, **security** and **environmental protection**.

It is our responsibility to protect the health and safety of our employees, contractors and clients in all of our activities, and to continually improve the environmental performance and quality of our activities to ensure customer satisfaction and trust.

### Linxon commits to:

- → comply with relevant safety laws, regulations and industry standards to ensure all employees, contractors and clients return home safely at the end of each working day
- → protect our people, physical and digital assets against unplanned events
- → embed corporate social responsibility and ethics principles into our business practices
- → improve quality management to guarantee project safety, prevent quality incidents and ensure compliance at every stage of the EPC process
- → identify and understand customer expectations, and work relentlessly to meet or exceed them by motivating, training and developing our people, and leveraging our partners' and suppliers' strengths

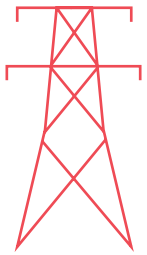
### Linxon commitments include:

- → encouraging Q&S responsibilities in employees and third parties via standards, education, training and coaching, supervision and effective communication
- → setting measurable annual objectives and targets to continually improve our performance, and vigilantly guard against complacency in company-related activities
- → transparency and communications with stakeholders regarding Q&S performance
- → working with our supply chain to achieve Q&S performance excellence

# Our expertise

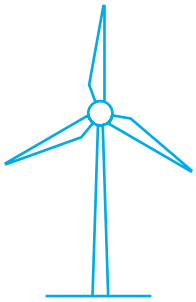
Deep technological knowledge, digital know-how and project management expertise make Linxon a true partner for reliable, sustainable substation solutions.

## Linxon substation application and electrification project experience includes:



**Boosting capacity, enhancing reliability and increasing availability of the transmission and distribution network** for utility customers with proven substation designs and innovative grid technologies

**Creating reliable supplies of power that support efficient use and management of electricity**, while enhancing operational performance facility-wide for our customers

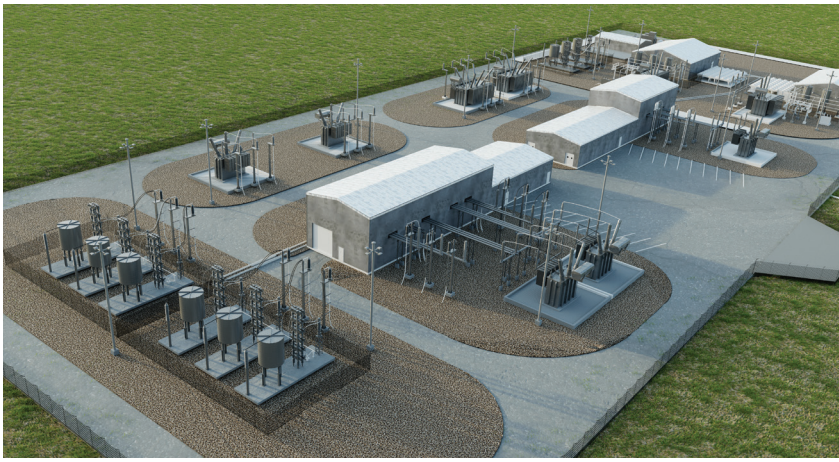


**With a global footprint and local presence that ensures complete support over the life of a substation**, Linxon is a partner customers can rely on

**Integrating and interconnecting cleaner energy** while helping to maintain grid reliability and secure power supplies for the renewable energy sector

## The digital twin and building information modeling (BIM)

Linxon's digital ecosystem delivers projets in a consistent, predictable and efficient fashion. Building information modeling (BIM), augmented reality and LiDar are deployed in many of our projects from engineering through execution and commissioning.



# Our portfolio

## Turnkey substation and electrification solutions for power transmission, power generation, transportation and data centers

Linxon offers engineering, procurement, management and construction services for execution of electrification projects and/or of large, complex AC power substations and expansions in four main applications:

### 1. Utilities (transmission and distribution)

- → Upfront planning and systems studies
- → Design for optimization and full project execution
- → Full system maintenance and life extension services
- → Expertise in cutovers and sequencing to work within site limitations
- → Ensure optimal solutions for our clients

### 2. Conventional generation

- → Flexible and reliable solutions for effective integration of power from conventional generation plants
- → Efficient transmission and distribution to residential, commercial and industrial consumers
- → Comprehensive domain knowledge, global experience, continuous innovation and funding solutions
- → Optimized turnkey substation solutions that support local grid code compliance
- → Customer support throughout the lifecycle of the substation including brownfield upgrades and rehabilitation
- → Interconnections with existing utility switchyards

### 3. Renewable generation

- → Completed several onshore and offshore wind substation projects – leveraging our experience from around the globe in this area
- → Supporting our customers to achieve return on investment with competitive and optimized solutions as the costs of wind and solar energy come down
- → Addressing demand for grid stabilization and energy storage with innovative solutions
- → Consistent and clear focus on maintaining project schedule to ensure our customers meet their commercial generation obligations

### 4. Transportation

- → Traction power substations (built in place and containerized solutions)
- → Switching and paralleling stations
- → AC and DC applications
- → Wayside energy storage systems
- → Feasibility and reliability studies – RAMS
- → System studies and traction power simulations
- → SCADA systems for railway applications
- → Design, erection, testing and commissioning of third rails and power rails from 750 V DC to 3000 V DC consisting
- → High speed, metro, light rail and monorail applications

### 5. Data centers

- → A turnkey approach
- → Redundancy and reliability
- → Modular systems
- → Digital substation solutions
- → Sustainable systems

## Digital substations – advancing the state-of-the-art

- → Enhances controllability and reliability while optimizing operating costs
- → Reduced risk of electrical shock
- → Predictive maintenance capabilities
- → 'Future proof' remote control via IEC 61850 international standards
- → Savings:

Up to

↑ 80 % copper cable reductions

↓ 60 space reductions in relay house

↓ 40 % reduction in installation time

↓ 50 % outage time reduction during secondary system upgrades

- → Real time supervision and control, smart asset management, planning and maintenance optimization

# Conventional generation

## Substation innovations connecting conventional generation

We design and deliver turnkey solutions that help our customers fulfil their plans exactly, providing the highest lifecycle value and the lowest possible risk.

Connecting critical loads to the electricity grid and expanding power system infrastructure demands significant planning and engineering to ensure a constant, dependable supply of power. Linxon delivers optimized EPC substation solutions that help cities to grow, industries to expand, utilities to operate reliably and communities to connect.

Our global footprint and local presence ensures complete support over the lifetime of a substation. Regardless of size or scope, making projects easier for customers is our specialty. From ultra-high transmission substations to industrial electrification, Linxon is a partner customers can rely on.

### Fadhili

Middle East and Africa

Linxon has supplied a 380-kV gas-insulated switchgear (GIS) substation to Fadhili Plant Cogeneration Company (FPCC). The substation will help boost transmission capacity and ensure reliable power supply at a new 1,549-megawatt (MW) combined cycle power plant in the Al Fadhili area near Jubail in eastern Saudi Arabia.

About 400-MW of electricity as well as around 1550 tons of steam per hour from the power plant's output will be used to operate the adjacent Fadhili gas processing complex, which will in turn supply natural gas for the plant's five generating turbines. The balance of electricity output will be delivered to the Saudi state grid, and is enough to supply electricity to about 1.1 million Saudi households nationwide.

The state oil company, Saudi Aramco, is developing the Fadhili project, which is a key part of a master plan to boost production and supply of clean-burning natural gas in the Kingdom of Saudi Arabia in order to reduce its dependency on oil as power generating fuel, in line with Saudi Vision 2030.

The supply for the Fadhili project covers construction of a new 36-bay indoor 380-kV GIS substation including protection, metering, control, communication and SCADA equipment, as well as modification of associated existing substations.The substation's automation system enables it to be remotely controlled from the Load Despatch Center (LDC) via the SCADA and communication system, and gateway. In addition to an IEC 61850-based Control and Protection system, Linxon also provided all related civil design and construction, security, and mechanical works according to Saudi Electricity Company (SEC) specifications.

**Main data**

**Customer:** **Doosan Heavy Industries**

**Location:** **Saudi Arabia**

**Year of award:** **2016**

**Year of commissioning:** **2018**

**Application:** **Conventional generation**

**Voltage rating:** **220 kV - 400 kV**

The fast-track project required partial energization within 18 months of the contract award to meet an early steam operation milestone. Linxon/ABB achieved full energization of the complete substation in August 2018, three months ahead of schedule. It is important to note that the pilot class 1 HCIS 2017 security standards were implemented at the substation within the same period.

Operationally, the power plant substation is important because the Fadhili gas plant complex is expected to process up to 2.5 billion standard cubic feet per day (SCFD) of natural gas from offshore and onshore fields. This processing plant will help to boost Saudi Arabia's natural gas supply by 2020, and deliver new opportunities for steel, aluminium and downstream value-added industries within the country.

# Utilities

## Serving utilities with engineering and program efficiency

Linxon's knowledge of utility standards and procedures, and its unique ability to integrate and implement equipment innovations, are key to meeting the needs of our customers.

Linxon solutions combine state-of-the-art technology, such as compact GIS systems, and proven project management capability including complex phased schemes. Linxon customers can rely on the prompt delivery of robust, reliable and efficient electrical systems that make the best possible use of an available substation site.

Our turnkey solutions incorporate the following works:

- → design, manufacture, supply, delivery, installation and commissioning of established ABB Power Products
- → an advanced range of Substation Automation and Protection Systems
- → a considered approach to demolition/removal of redundant substation assets
- → carefully planned site remediation and temporary/ permanent service provision
- → an optimized civil and GIS building solution

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## Värtan
### Europe

Linxon is delivering a turnkey urban compact substation to Ellevio, one of Sweden's leading distribution network operators. The project site is located close to Värtan harbour and Norra Djurgårdsstaden in the very center of the capital of Sweden.

This is the largest substation project that Ellevio has ever undertaken. As the third large substation contract award for Linxon in Sweden, it is a testament to Linxon's leading position in the Scandinavian market for large EPC substations.

Approximately 1.5 million citizens will ultimately benefit from the refurbishment of Stockholm's electricity grid. In this project, compactness is absolutely key due to existing space constraints. This EPC (Engineering, Procurement, Construction) project also poses high demands on coordination between all the involved project functions as well as sub-suppliers which Linxon will expertly manage, building on its well-earned reputation for successfully delivering complex substation projects.

The Värtan 220 kV substation will contain state-of-the-art products from Hitachi Energy – primarily two indoor switchgears to modernize and increase the reliability of the substation. The indoor technology has been chosen because this enables the construction of the substation on a smaller footprint – an important consideration when space is at premium. Also included are power transformers, shunt reactors and a new control and protection system, all these will increase the transmission capacity.

**Main data**

**Customer:** Ellevio

**Location:** Europe

**Year of award:** 2020

**Application:** Utilities

**Voltage rating:** 220 kV - 400 kV

As Stockholm's population grows, there is a need to strengthen and renew its electricity grid to secure future transmission capacity. To achieve this, over fifty projects need to be implemented over the next 20 years; the Värtan refurbishment is a vital part of that effort.

The existing substation has been operational since 1948 (despite a major technological shift in the 1970s). The station has now reached the end of its technical lifespan and it no longer has the required capacity to meet the energy needs of tomorrow.

On-site civil works is planned to start during the summer 2021 and the project duration is estimated to 5 years.

# Renewable generation

## For renewable generation, substations that meet the demands of tomorrow

We support our customers in the creation of stronger, smarter and greener grids that are adapted to meet the changing needs of an evolving power landscape.

For power and water systems, Linxon solutions enhance the capacity, reliability and availability of transmission and distribution networks with proven substation designs and innovative grid technologies. Linxon solutions facilitate the integration and interconnection of cleaner energy supplies, and help to maintain grid reliability and secure power supplies. We are focused on grid stability, reliability and code compliance.

We challenge ourselves to deliver technical solutions that help our renewable energy customers meet their commitments. We have also implemented innovative delivery solution for both civil and demolition works by minimizing the use of non-sustainable materials.

### **Vineyard Wind**
### North America

Linxon is delivering a turnkey 220/115-kilovolt (kV) substation to Vineyard Wind. The substation will connect clean, renewable energy to the ISO New England power grid from the first utility-scale offshore wind project ever built in the United States.

The agreement, contingent upon the project reaching financial close, ensures that tradespeople in Massachusetts will be hired to install the substation under a Project Labor Agreement (PLA).

The design plans make every effort for the substation to blend in with its surroundings and use the highest environmental protection standards. Once the project is operational, it will provide a necessary connection point for clean, renewable energy to the Massachusetts grid. The project will generate cost-competitive electricity for more than 400,000 homes and businesses across the Commonwealth of Massachusetts and is expected to reduce carbon emissions by more than 1.6 million tons per year.

The substation, which will commence construction in 2021 and be fully commissioned by 2023, will guarantee local jobs for the next 25 years in both operations and maintenance.

**Main data**

**Customer: Vineyard Wind, US**

**Location: North America**

**Year of award: 2020**

**Year of commissioning: 2023**

**Application: Renewable generation**

**Voltage rating: 132 kV - 220 kV**

# Transportation

## For rail substation applications and mass transit transmission

Linxon substations for rail ensure reliable power delivery to the line and vehicles so main line trains, metros and mass transit networks stay on track. Optimized rail electrification solutions ensure reliable supplies of AC and DC power are available to support high performance and efficiency.

We design, construct, test and commission complete traction power supply systems for both long distance rail and mass transit applications.

We specialize in high-voltage, traction and auxiliary power for:

→ light/metro lines

→ high-speed lines

→ main lines and freight lines

We provide design, engineering, surveying, as well as grid compliance and approvals:

→ EMC, earthing and bonding

→ RAMS

→ stray currents

→ braking energy recovery solutions

→ power quality solutions

Linxon provides not only complete end-to-end solutions, but also extended support during initial operation.

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## Bangalore Metro Rail Corporation (BMRCL)

### Asia Pacific

The Bangalore Metro Rail Corporation (BMRCL) has awarded Linxon the complete power supply package (including third rail) for the new lines of the Phase II corridor Urban Mass Rapid Transit System in the city of Bangalore, India.

The Bangalore Metro has been operational since June 2011 when it became the first metro system to operate in South India and the first metro rail project in India to be commissioned with 750 V DC third rail on standard gauge. The metro is a major contributor in reducing Bangalore's carbon emissions and has become a core element of the city's plan to become more environmentally friendly.

The Linxon scope involves engineering, project management, supply, erection, testing and commissioning for the complete power supply scope for the new lines of the Phase II corridor. The project consists of traction substations, auxiliary substations (along with power cables), a 750 V DC third rail system and a Supervisory Control and Data Acquisition System for the complete electric traction power. Linxon will also supply a maintenance planning system to BMRCL as part of the project; this will be installed at BMRCL's Operation Control Centre and integrated with the Supervisory Control and Data Acquisition System.

**Main data**

**Customer:** Bangalore Metro Rail Corporation (BMRCL)

**Location:** Asia Pacific

**Year of award:** 2021

**Year of commissioning:** 2024

**Application:** Transportation

**Voltage rating:** 115 kV AC/22 kV AC/750 V DC

# Data Centers

## Serving data center operators with specialized designs for reliable power

Adequate and reliable power is essential for data centers, making substations the lifeline for these mission-critical loads. With extensive experience engineering and building HVAC substations, Linxon has the expertise to meet the unique performance requirements of hyperscale data centers that depend on consistent and reliable power.

Our data center areas of expertise consist of:

- → Serving data center operators with specialized substation designs for redundancy and reliability
- → Upfront planning and systems studies including short circuit calculations
- → A turnkey approach from site development and engineering to optimized designs and full project execution
- → Expertise in cutovers and sequencing to work within site limitations
- → AIS, GIS, and Hybrid solutions (sustainable non-SF6 equipment is available)
- → Modular systems that enable faster deployment and digital substations that provide automation, communication and lower O&M costs

With a focus on reliability, availability and safety, Linxon is one of the top EPC companies for data center substations.

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### **Cumulus Data Center Project**
### North America

Talen Energy has selected Linxon to deliver three greenfield substations for their Cumulus Data Center Project in Salem Township Pennsylvania.

The substations will be connected to the 2,500 megawatt (MW) Susquehanna nuclear power plant which generates carbon-free electricity. A portion of the energy from the substations will supply power to a newly designed 400,000 square foot Cumulus data center campus that will be located within close proximity to the plant.

Linxon will supply a turnkey solution utilizing products from Hitachi Energy for the 500/69 kV GIS, the 230/69 kV GIS and hybrid substations, requiring fast track design, engineering, permitting, civil work, procurement, construction and commissioning activities.

**Main data**

**Customer: Talen Energy**

**Location: North America**

**Year of award: 2021**

**Year of commissioning: 2022**

**Application: Data Centers**

**Voltage rating: Above 400 kV**

linxon.com

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