Customer needs
DONG Energy distributes power to approximately 1 million customers across three grids serving the cities of Copenhagen, Fredriksberg, and region of Northern Zealand in the heart of Denmark. These grids consist of approximately 20,000 km of cable and overhead lines, and approximately 10,000 transformer stations.

DONG Energy was looking for an experienced partner to implement a reliable communication network for the medium-voltage grid to ensure the highest grid availability for the Danish capital and its surroundings. DONG specified a distribution network with the following requirements:

- An integrated communication solution to accommodate a wide range of different interface types
- State-of-the-art Ethernet services such as:
  - SCADA communication, based on IEC 60870-5-104 protocol
  - Interface for Voice over IP as well as for traditional telephony
- Mission critical applications
  - Teleprotection for protection of the electrical grid
  - Highest availability with shortest possible communication interruptions in case of failure
- No-single-point-of-failure network architecture
- Bandwidth to accommodate administrative applications

ABB’s solution
ABB supplied the utility-hardened optical communication platform, FOX515, with integrated teleprotection, Ethernet and data functionality. The implementation of SDH (Synchronous Digital Hierarchy) technology offers high bandwidth (155 Mbit/s), to accommodate both operational and administrative applications. ABB’s network design is based on different protection mechanisms, such as 1+1 SDH path protection and RSTP (Rapid Spanning Tree Protocol, IEEE802.1w), to secure the highest possible network availability.

Customer benefits
- High network availability
- High fault tolerance
- A future-proof, scalable solution using well-standardized protocols (eg, SDH)
- Minimal OPEX (Operational Expenditure), based on highly integrated FOX515 equipment and user-friendly GUI (Graphical User Interface)
- Unified network for operational and administrative purposes
**Project details**

To accommodate operational SCADA and administrative intranet applications, FOX515 is equipped with Ethernet interfaces. The Ethernet-over-SDH implementation is based on standardized GFP (Generic Framing Protocol, ITU-T 7041) encapsulation. In order to avoid closed loops (rings), RSTP is applied at the Ethernet layer.

Different Ethernet applications can run on the same physical network. VLANs (Virtual Local Area Networks, IEEE802.1Q) were used for segregation of the different applications, providing better security, improved performance, simplified administration and reduced costs. Such networks allow all services, including SCADA and VoIP, to be transported over a single network, separated by dedicated VLAN ports.

OPEX is minimized by the unified FOX515 configuration tool (USCT), which allows easy maintenance and supervision of the different applications via a single user-friendly graphical software tool.

**Scope of supply**

- FOX515 SDH communication platform
- Integrated Ethernet solution
- Integrated teleprotection solution
- Installation, testing and commissioning
- Customer training

**FOX family solution**

The FOX family offers a modern SDH solution, designed and type-tested for harsh utility environment. No other multiplexer solution offers such a utility-oriented service spectrum, from teleprotection to Gigabit Ethernet-over-SDH and WDM (Wave-length Division Multiplexing). ABB takes particular care to ensure that its communications systems are easy to upgrade and to maintain, protecting investments and minimizing maintenance costs.

For more information please contact:

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