

## Quantum Proing references on NL projects

### AVR 220/33kV

Scope of work: Basic design, 220/33kV, 600MVA AIS substation

Description:

- SLD,
- Layout 2D/3D,
- Side views,
- Power cables ratings and routings,
- Equipment inquiry documentation,
- Control and protection concept.

### Substation for connection of solar park MDS

Scope of work: Basic design 220/33kV, 65MVA AIS substation

Description:

- SLD,
- Layout 2D/3D,
- Side views,
- Power cables ratings and routings,
- Equipment inquiry documentation,
- Control and protection concept.

### Meeden 110kV

Scope of work: Detail design, Telecom panels design

Description:

- Design of new fiber optic panels and new telecom panels (circuit diagrams, layout, cable lists, part lists),
- Modification of existing telecom panels drawings,
- Equipment inquiry documentation.

### Borssele 150kV

Scope of work: As Built, land substation for offshore wind farm

Description:

- As Built of 21 panel,
- Reverse engineering of telecom panels according to available cable lists and telecom panel typical drawings.

### Eenmshave Robbeplaat

Scope of work: Reverse engineering/As Built

Description:

- Preparation of complete documentation for the current state of 23 control and protection panel according to all available documentation, site investigations and photos of the actual panels.

### Twence 110kV

**Scope of work: Detail design, separation of ownership between grid owner and private company**

**Description:**

- Complete drawing package for building new control/protection panels for two 110/10kV transformers,
- Complete package for disassembling existing transformer control/protection panels,
- Complete package for implementation of new control protection panels in existing system.

### Breda 150kV

**Scope of work: Basic design, 150kV SS based on bay replacement model**

**Description:**

- Preparation of SLD in stages of SS renovation,
  - Preparation of 2D Layouts in stages of SS renovation,
  - Load forces calculations for new and existing equipment (existing, temporary and final situation).
- NOTE: After basic design has been accepted, we were assigned with detail design, design for construction and as built (see below).

### Almelo Mosterdpot 110kV

**Scope of work: Detail design, Conversion of 110kV line to transformer bay**

**Description:**

- Preparation of 2D Layout & Sections for line bay,
- Preparation of 2D Layout & Sections for transformer box,
- 3D modelling of existing bay according to Point Cloud input,
- 3D modelling of new transformer, transformer box and associate equipment and producing complete 3D model of the final situation,
- Design of new primary equipment steel supports (3D models, sc forces calculations, structural study, overview and workshop drawings, clamps summary)
- Earthing grid modelling and calculations for new trafo box, modeling and re-design/re-calculation of existing earthing grid.
- Lightning protection calculation, drawings and calculations.

### AEB Power plant

**Scope of work: Basic design for adding 50kV and 10kV installation**

**Description:**

- Preparation of SLD and KLD,
- Preparation of 2D Layouts/Sections of 10kV AIS and 50kV GIS installations
- Preparation of 2D Layouts/Sections of 10kV and 50kV building,
- Load flow and short circuit studies,
- Equipment inquiry documentation.

### Meeden 380kV

**Scope of work: Detail design, renovation of secondary system**

**Description:**

- Preparation of technical documentation for replacement of existing secondary control & protection panels for line bays Zwolle WIT and Eemshaven Zwart,
- Installing new bay controllers central unit panel.

### Delesto 220kV & 66kV

**Scope of work: Detail design, separation of ownership between grid owner and private company**

**Description:**

- Complete drawing package for building new control/protection panels for two 110/10kV transformers,
- Complete package for disassembling existing transformer control/protection panels,
- Complete package for implementation of new control protection panels in existing system.

### EBoiler 24kV

**Scope of work: Detail design, adding new 24kV system for supply of three new EBoilers (150MVA)**

**Description:**

- Preparation of 2D and 3D layouts
- Design of steel supports for IPB and CBD (3D models, structural study, overview and workshop drawings)
- Update of existing earthing grid in order for new transformer to be placed,
- Design of transformer's lightning protection,
- Design of transformer box,
- Design of control, protection, interface and synchronization panels for insulation transformer,
- MV Cables calculations and selection,
- Protection coordination study,
- SLD update,
- Preparation of technical specification for equipment ordering (MV Switchgear, Power Transformer, Protection relays),
- MV SWGR secondary drawings review.

### CBC 24kV

**Scope of work: Basic design, adding new 24kV substation in sugar mill**

**Description:**

- Preparation of preliminary documentation needed for erection of MV SWGR with accompanying equipment & structures (housed in portable container),
- Preparation of preliminary documentation needed for the erection of two 20/10kV transformers with accompanying equipment & structures,
- MV cable routing.

### Breda 150kV

**Scope of work: Detail design for complete rebuilt of existing substation in stages**

**Description:**

- Preparation of SLD in stages,
- Preparation of layout 2D and 3D modelling of complete substation in stages,
- Preparation of HV, LV, control and telecom cables in temporary stage,
- Design of new earthing grid in stages,
- Design of new lightning protection system in stages,
- Design of control & protection systems for mobile GIS units for temporary stage,
- Design of control & protection systems for AIS system in final situation,
- Design of tertiary systems (telecom, AC, DC, Batteries) for temp and final stage,
- LV cable calculation for temp and final stage,
- Structural analysis of station and transformer gantries and reinforcement design (3D models, SC forces calculations, structural study, overview and workshop drawings, clamps summary),

### **Meerstad 110kV**

**Scope of work: Basic design, solar park/BESS connection station**

**Description:**

- Preparation of substation layout in 2D based on "bay replacement model",
- Preparation of sections for typical bays in 2D,
- Preparation of layout of battery storage in 2D,
- TR box concept
- Preparation of control/MV SWGR building layout

### **Goes de Poel, 150kV**

**Scope of work: Detail design, Transformer bay and transformer box design**

**Description:**

- Preparation of layout and side views in 2D for transformer bay,
- Design of transformer box and accompanying equipment,
- Design of primary equipment's steel support structures (3D models, SC forces calculations, structural study, overview and workshop drawings, clamps summary)
- Detail design for new gantry (3D models, sc forces calculations, structural study, overview and workshop drawings, clamps summary)

### **Project: Port of Amsterdam**

**Scope of work: Construction support design, 50kV, 10kV, 0.4kV**

**Description:**

- LV cable calculations,
- Cable routing,
- Design of new earthing grid,
- Protection coordination study,
- Protection settings calculations.

### **Project: Sunspace**

**Scope of work: Construction support design, 110kV**

**Description:**

- Preparation of steel support structures for HV cables
- HV cables routing

### **Project: Terwinselen**

**Scope of work: Detail design of mobile GIS units control protection and AC/DC supply containers for three mobile GIS units with 4 bays each.**

**Description:**

### **Weiwerd**

**Scope of work: Reverse engineering/As Built**

**Description:**

- Preparation of complete documentation for the current state of 50 control and protection panel according to all available documentation, site investigations and photos of the actual panels.

## BESS AMETHYST

**Scope of work:** Construction support design, 50kV, 20kV, 10kV

**Description:**

- SLD and KLD updates
- Layouts update
- Design of new earthing grid,
- LV cable calculations,
- Cable routing,
- Preparation of block diagrams
- Protection coordination study,

## BP Redesign

**Scope of work:** Detail design of typical stand alone and bus bar mounted lightning posts up to 12.5m

**Description:**

- Structural and material fatigue study
- 3D modelling
- Workshop drawings
- Preparation of typical lightning poles documentation for three different situations BP HR, BP

## GTB150

**Scope of work:** Detail design for extending the existing substation with 6 new line bays

**Description:**

- SLD
- Layouts and sections
- Extension of existing earth grid
- Design of new primary equipment steel supports (3D models, SC forces calculations, structural study, overview and workshop drawings, clamps summary)
- Design of new gantry
- Design of complete control & protection systems for new bays
- Design of complete tertiary systems (telecom, AC, DC, Batteries)
- Incorporation of new bays in existing BBP system and interlocking scheme
- Cable routing
- Block diagrams

## GTB150 E-Boiler

**Scope of work:** Detail design of new 150/20kV TR bay

**Description:**

- SLD/KLD
- Layouts and sections
- Design of new primary equipment steel supports (3D models, SC forces calculations, structural study, overview and workshop drawings, clamps summary)
- Design of earth grid and lightning protection
- Design of complete control & protection systems for new TR bay
- Design of complete tertiary systems (AC, DC, Batteries)
- Design of control, protection and interface panels on remote ends
- Cable routing
- Block diagrams