



## Agenda

1

Conventional Substations



2

Digital Substations

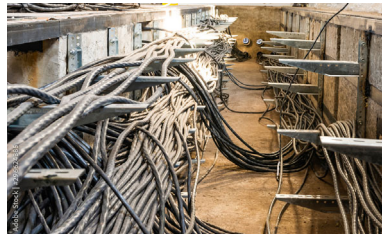


3

Transpower Digital Sub Project



## Conventional Substations



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# Digital Substations

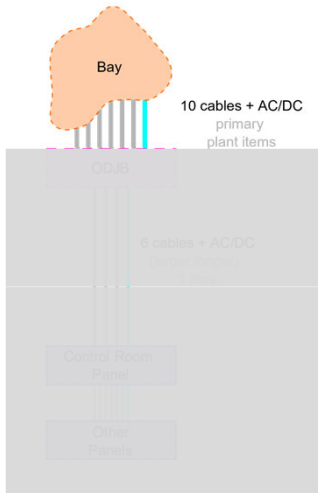
What exactly are they?

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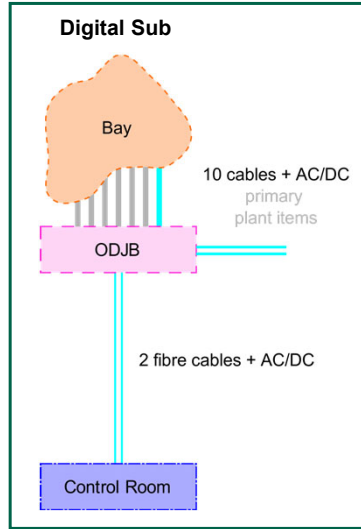
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## Digital and Conventional Comparison

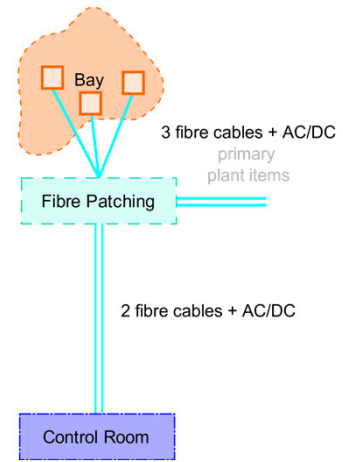
**Conventional Sub**



**Digital Sub**



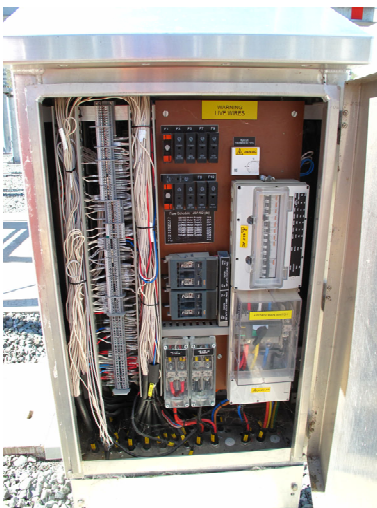
**Digital Sub Pro**



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## Conventional Substation Equipment

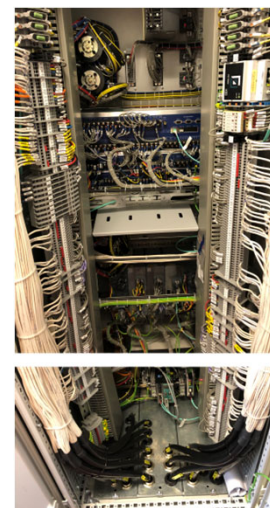
Outdoor Junction Box



Front Protection Relay



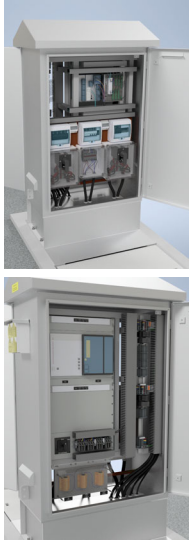
Rear Protection Relay



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## Digital Substation Equipment

Outdoor Junction Box



Digital Substation Example



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# Simple or complex?

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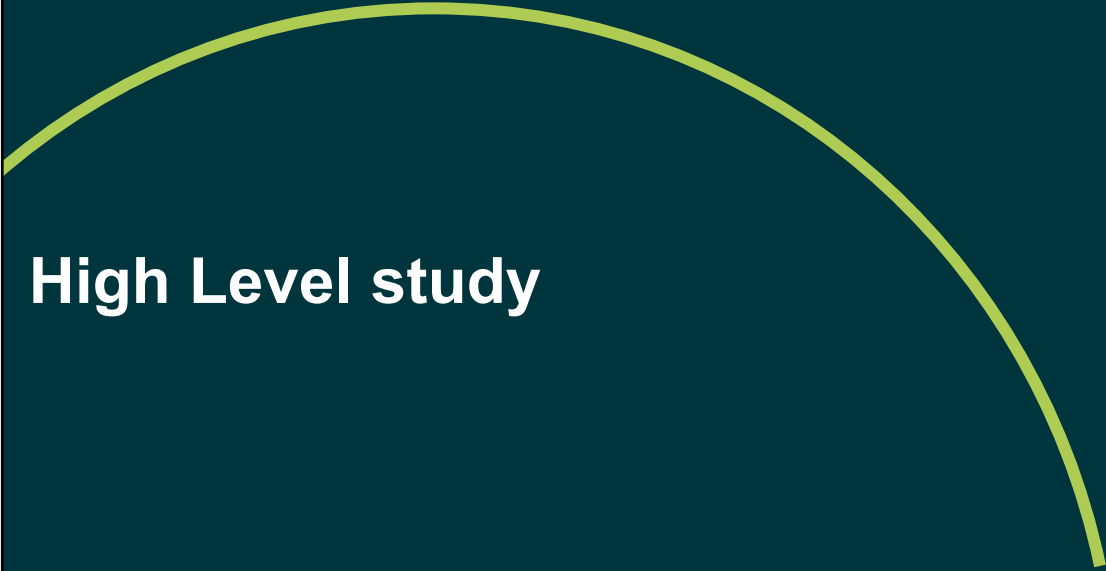
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# Transpower Project

1. High Level Study
2. Testing Panel Design
3. Standard design

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# High Level study

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## Product Assessment

ABB SMU615



GE MU320E

### IEC 61869-9

IEC 61850 is a standard applied to the design of electrical substation automation systems, which defines fast communication of events (GOOSE) or data set samples (Sampled Values) through Ethernet frames. Standard naming and object modeling are based on a Substation Configuration Language (SCL), describing data exchange at device and substation levels.

### IEC 6

### IEC

SEL401



### IEC 61869-13:2021

Instrument transformers - Part 13: Stand-alone merging unit



high availability

Parallel Redundancy Protocol

Availability Seamless Redundancy (HSR)

AMU



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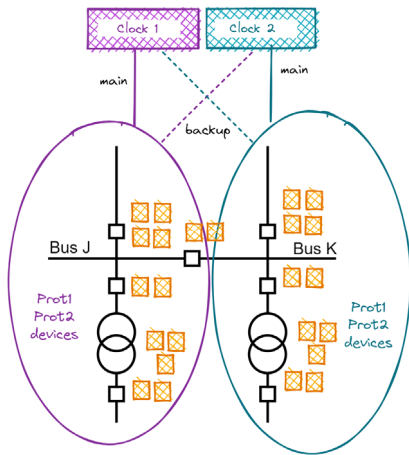
## Other equipment?

1. Bus Bar
2. Bus Coupler
3. Capacitor Bank
4. Feeder
5. Line
6. Transformer

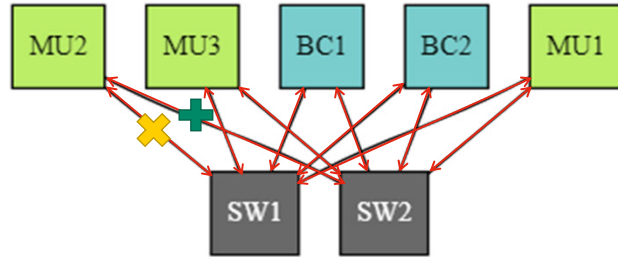
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## Architecture

PTP Master and Backup

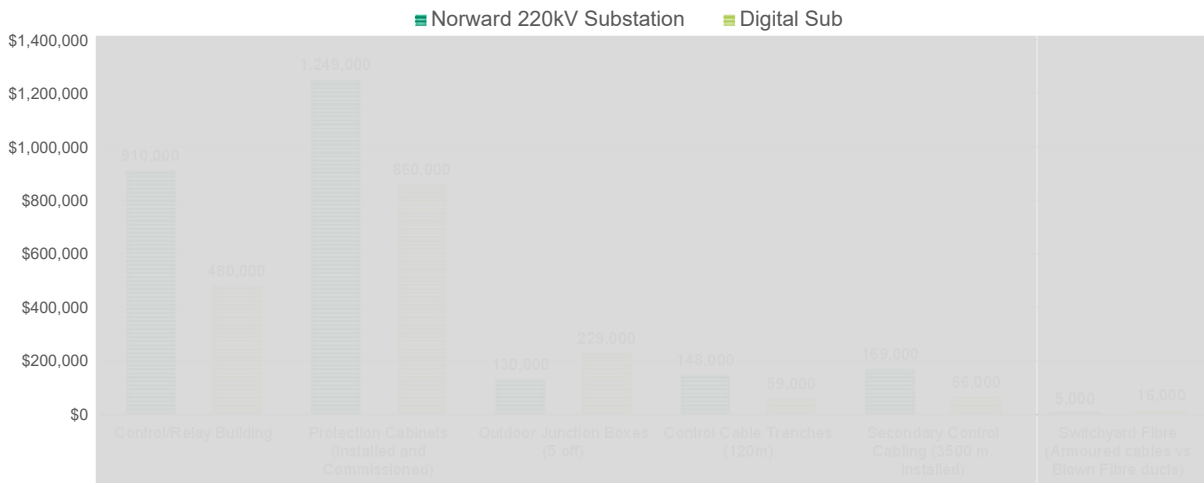


PRP – Parallel Redundancy Protocol



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## Costing



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**Pros**



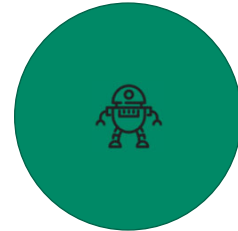
Communication



Cost Reduction



Flexibility



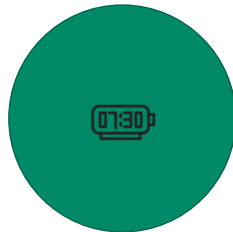
Opportunity

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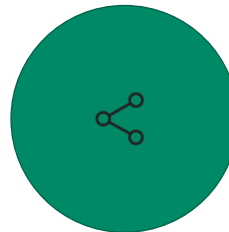
—  
**Cons**



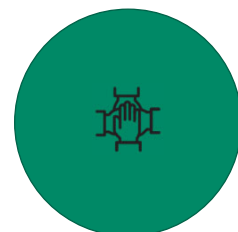
Reliability



Time Synchronisation



Integration



Retraining Workforce

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## Digital Substation Testing Panels

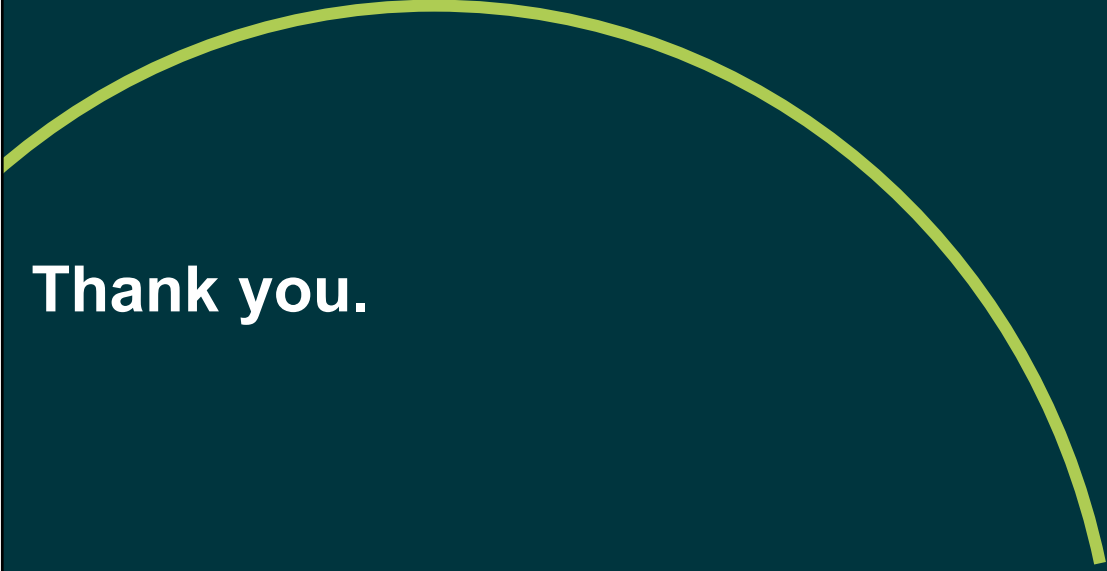


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# Standard Design


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**Thank you.**

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