



Implications and Benefits of Standardized Protection and Control Schemes

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Sochi, Russia, June 2015*

Questions

- > What are we doing?
- > Why are we doing it?
- > How are we doing it?

Engineering Requirements

- > Improvements in quality
- > Improvements in efficiency

Efficiency

- > Effectiveness – the degree to which objectives are achieved, without consideration of the resources being used.
- > Efficiency – the extent to which a resource is used in order to effectively achieve an objective.

Improving Efficiency

- > Standardization
- > Integration
- > Automation
- > Testing versus Monitoring
- > Documentation
- > Object-Oriented Design (OOD)

PACS Engineering Tools

- > Engineering is an important part of asset management
- > Determine and document the application specific functionality
- > Determine and document the integration of devices into the PACS
- > Configure the system
- > Test the system
- > Monitor the system

SAS Engineering Tools

- > Project design tools
- > Configuration tools
- > Documentation tools
- > Testing tools
- > Monitoring tools
- > Analysis tools

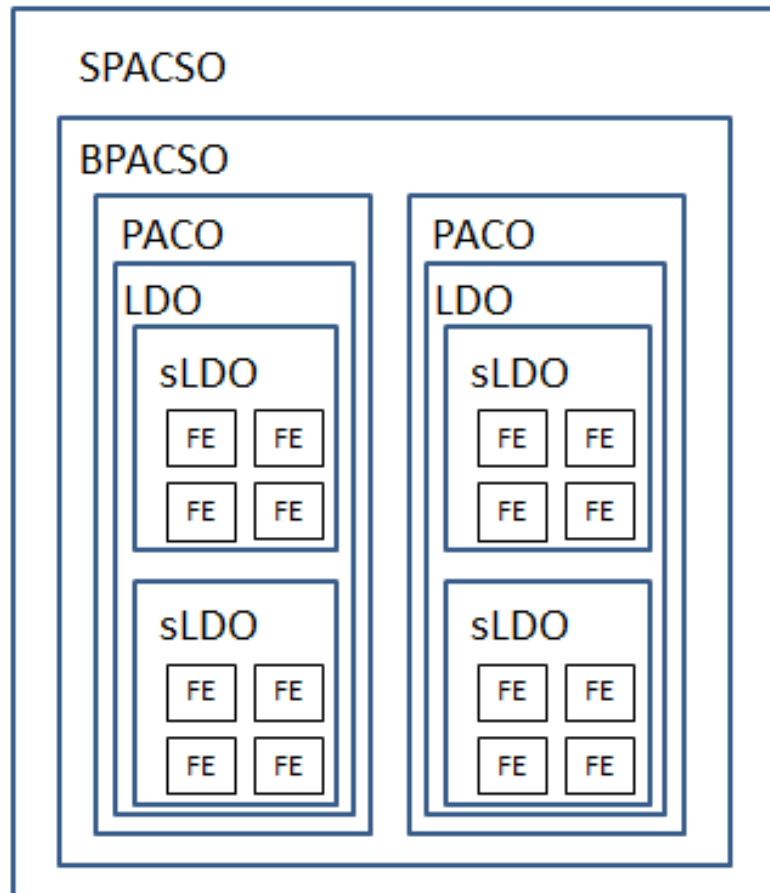
Engineering Tools Requirements

- > Improvements in the engineering process is one of the key requirements for the success of IEC 61850
- > Tools that support different steps in the engineering process are being developed
- > The dream: completely automatic engineering process

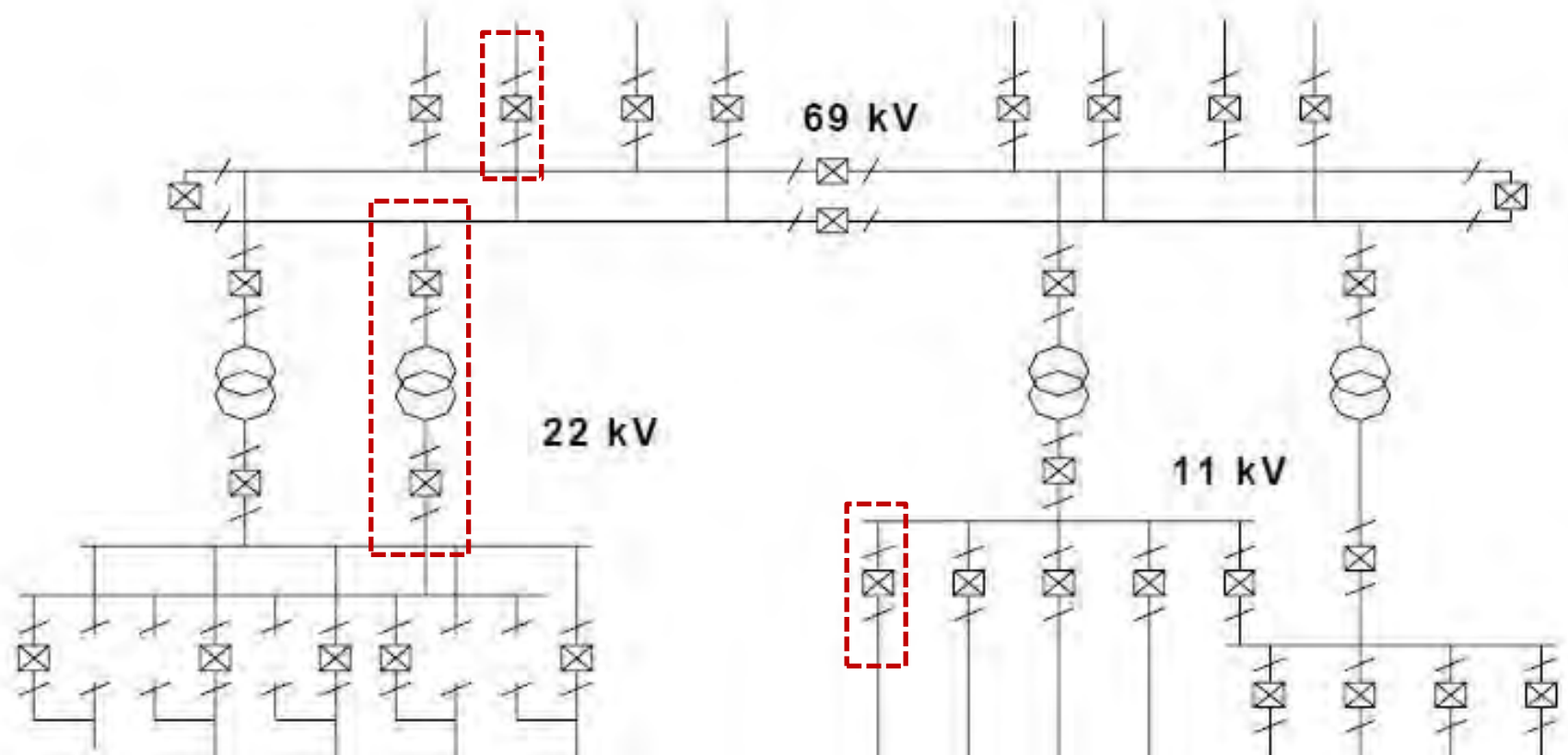
Engineering Process Requirements

- > Requires the implementation of an engineering process based on:
 - > Knowledge of the problem domain
 - > Knowledge of the state-of-the-art technology
 - > Utility standards
 - > Industry standards
 - > Object-oriented design
 - > State-of-the-art tools

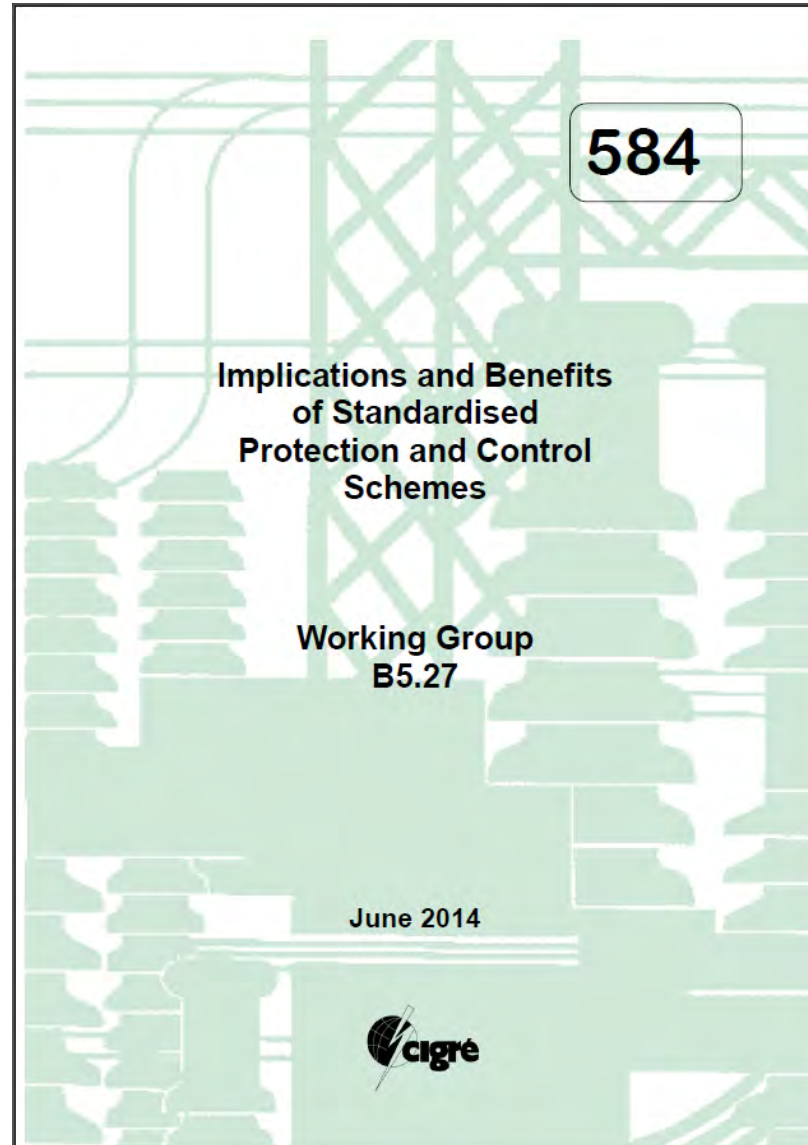
Object-Oriented Engineering



Bay examples



CIGRE Brochure 584



CIGRE B5.27 Members

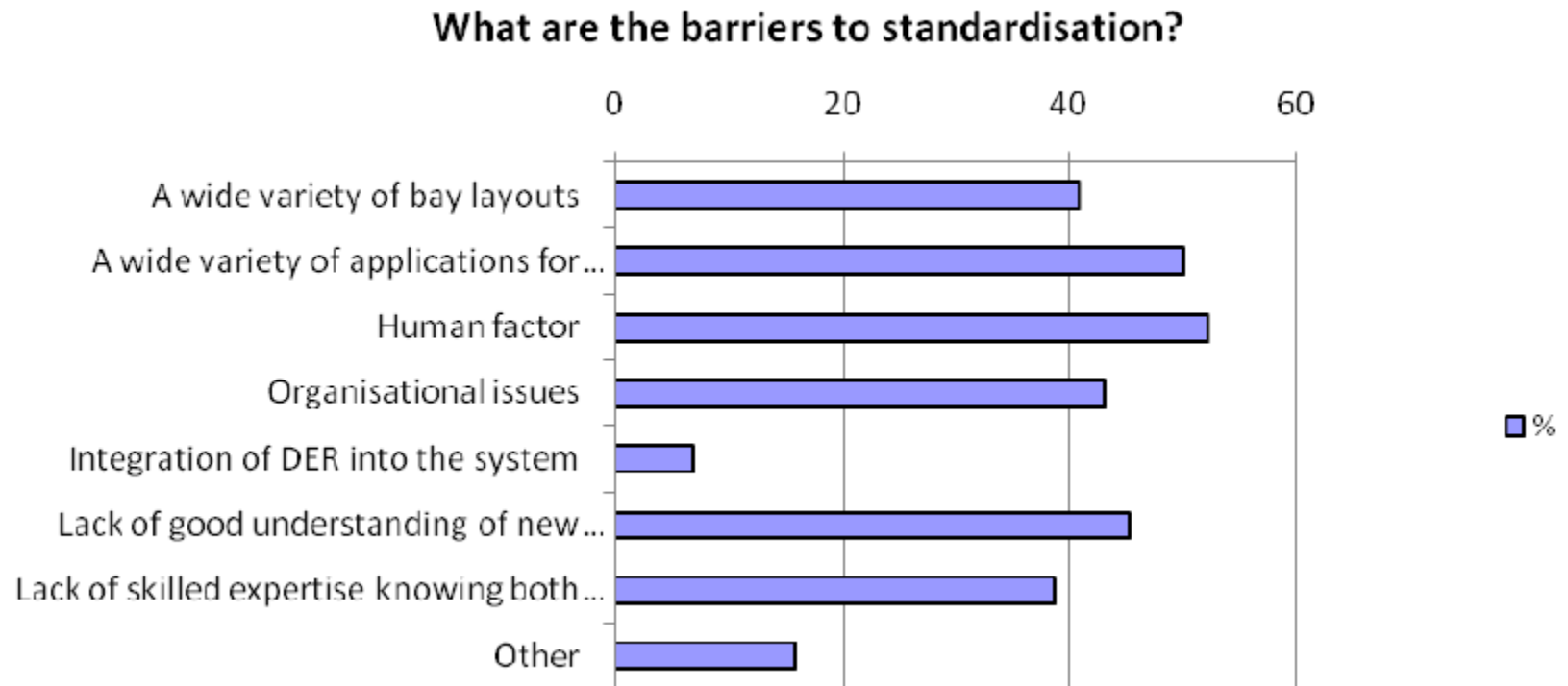
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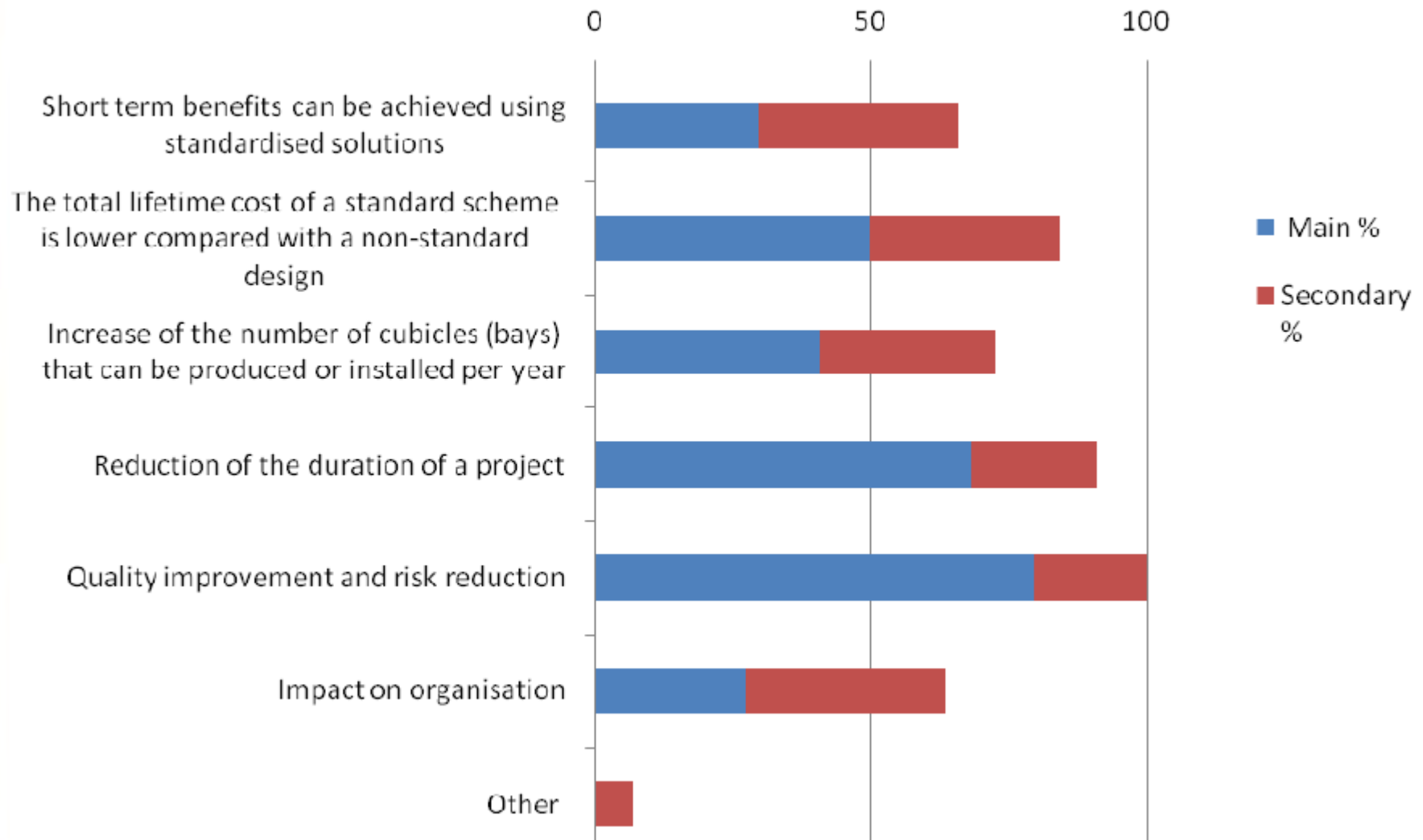
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Barriers to Standardization



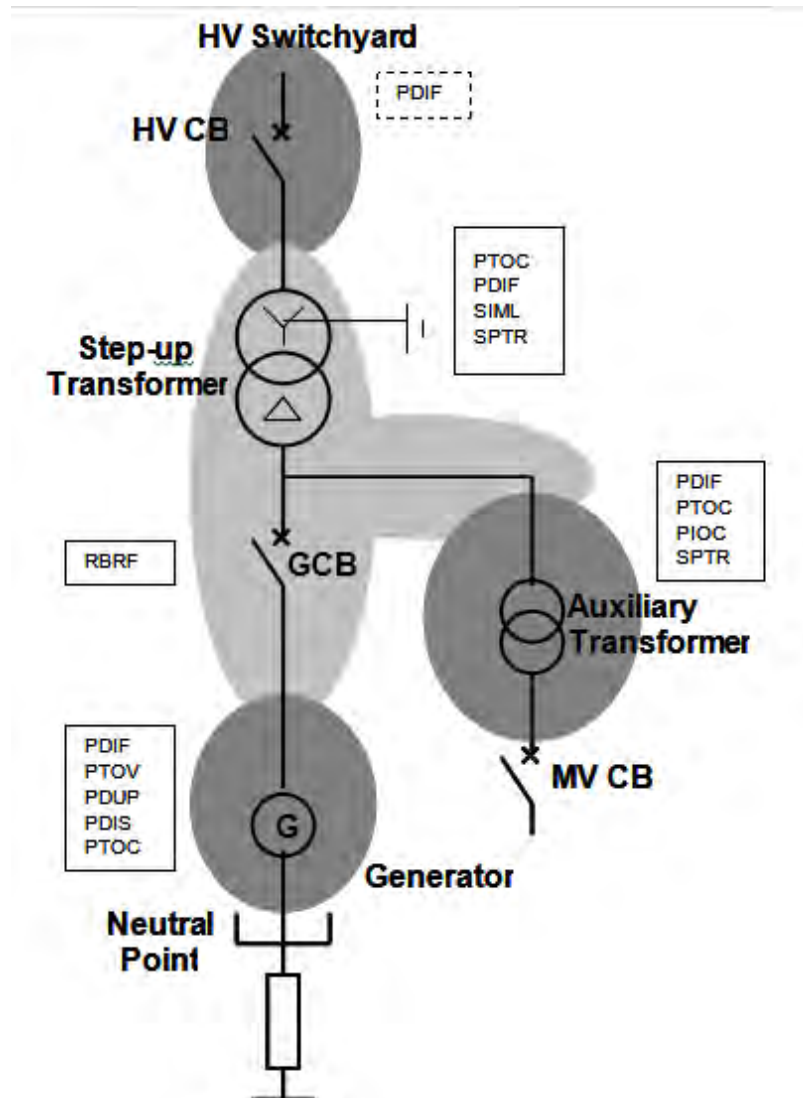
Benefits of Standardization



Standardization Process- 1

Template

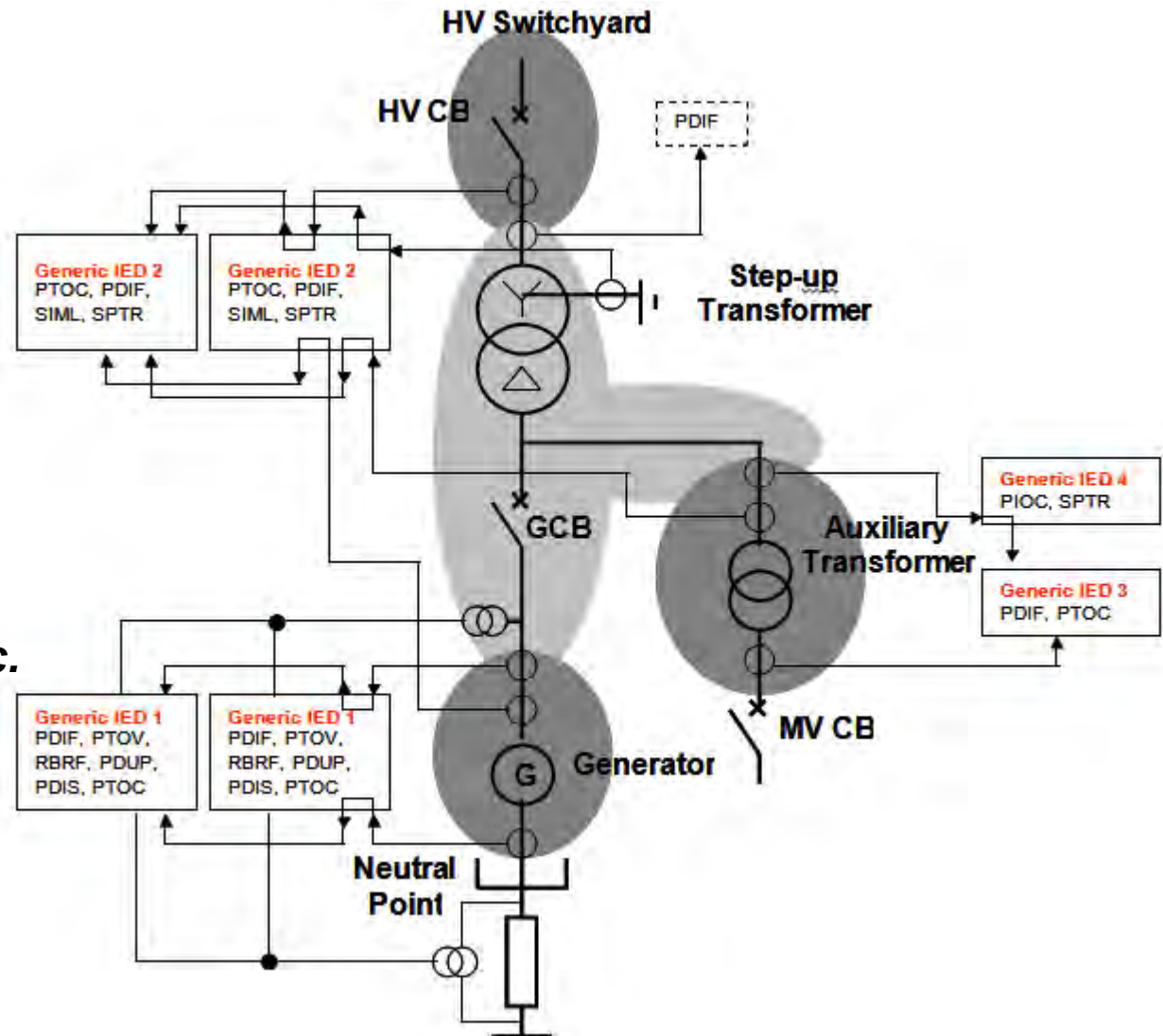
- functional req.
- items generic
- SSD rec.



Standardization Process- 2

Defined scheme

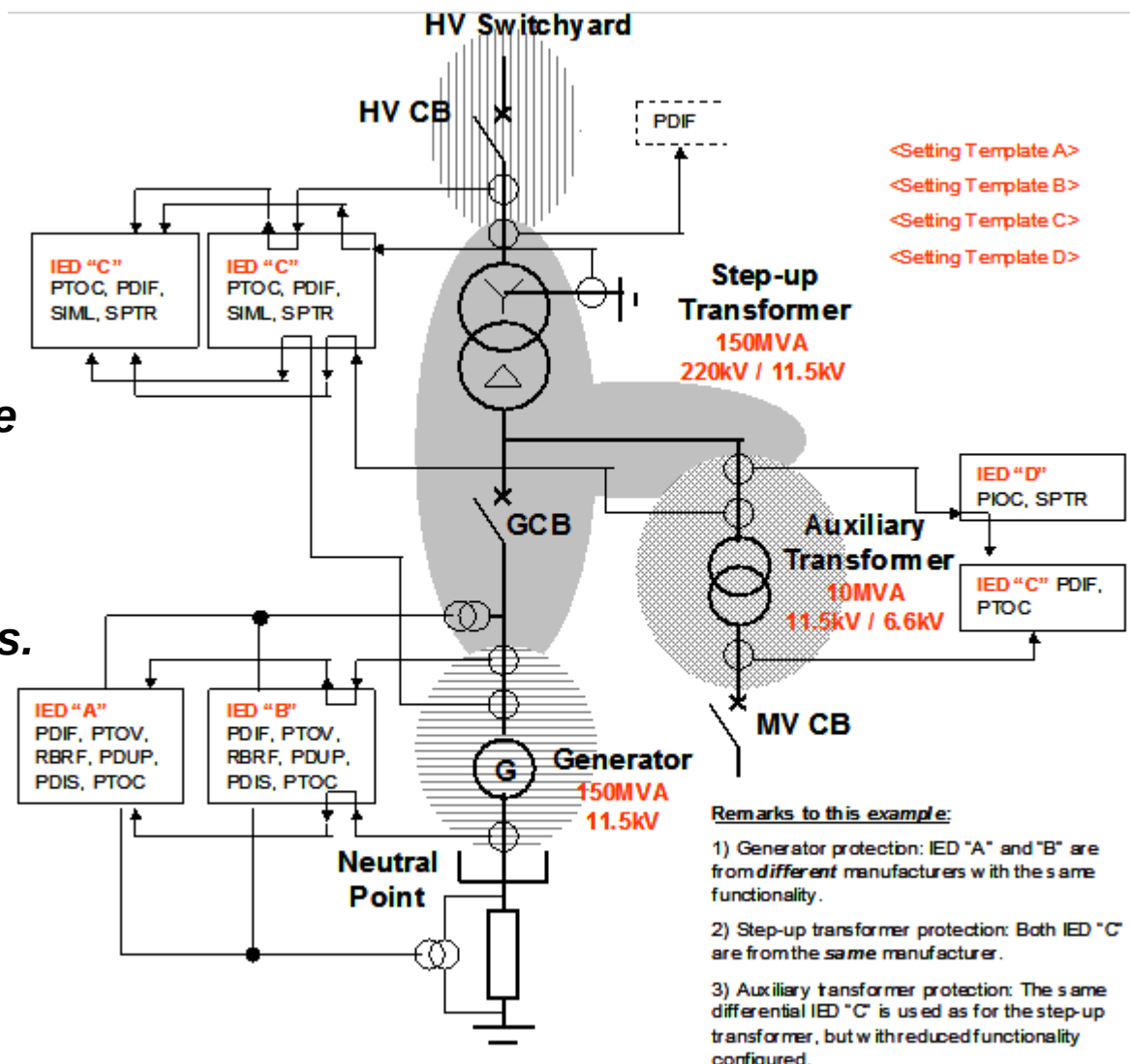
- **CB, CT/VT...**
- **signal list**
- **abstract IEDs**
- **ISD- IED spec. desc.**
- **compared w. ICD**



Standardization Process- 3

Applied Standard Scheme

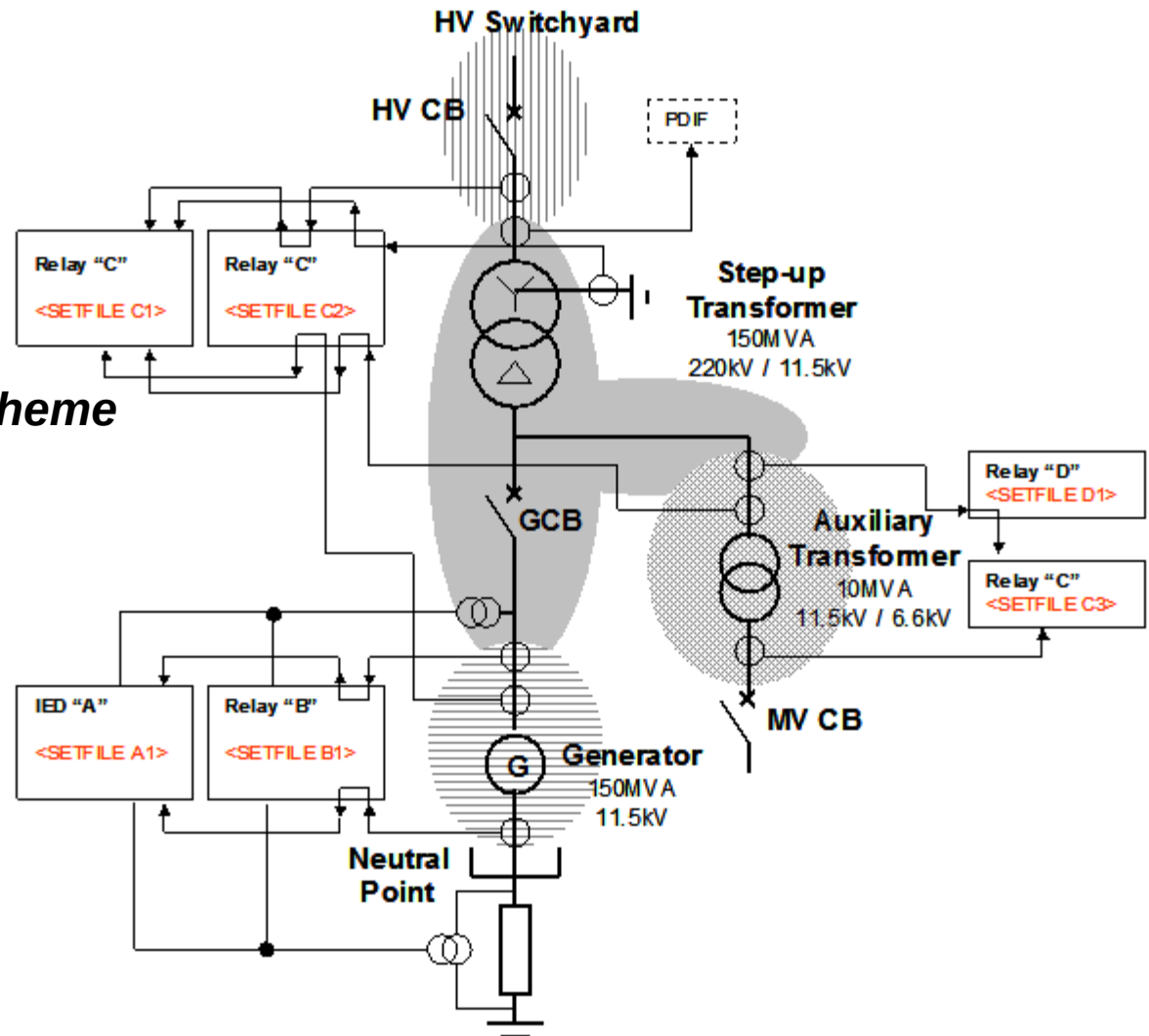
- *use of approved IEDs*
- *global settings*
- *protection logic*
- *performed by scheme s.*
- *type testing*



Standardization Process- 4

Instantiated Standard Scheme

- *site specific*
- *settings*



Standardization Process

	Phase	Bay	PAC Devices	Plant Application / Substation	What it means
A	Standard scheme – template	G	G	G	Totally generic SSD , ISD
B	Standard scheme – defined	S	G	G	All HW interfaces fixed SSD
C	Standard scheme – applied	S	S	G	IEDs fixed ICD , IID
D 1 2	Standard scheme: Instantiated Instantiated with small variations	S	S	S	Everything fixed, also settings (= standard scheme applied in reality) SCD , CID

S = specific; G = generic; B and C can be one step.

SCL Files

- > Substation Specification Description ***.SSD**
- > IED Capability Description ***.ICD**
- > Substation Configuration Description ***.SCD**
- > Instantiated IED Description ***.IID**
- > Configured IED Description ***.CID**
- > *IED Specification Description ***.ISD***

Conclusions

- > Utility standards can help significantly improve the efficiency and quality of the engineering process
- > IEC 61850 creates the foundation for the development of a new way for engineering PAC systems
- > What we need is tools that can take advantage of this technology



Thank you for your attention!