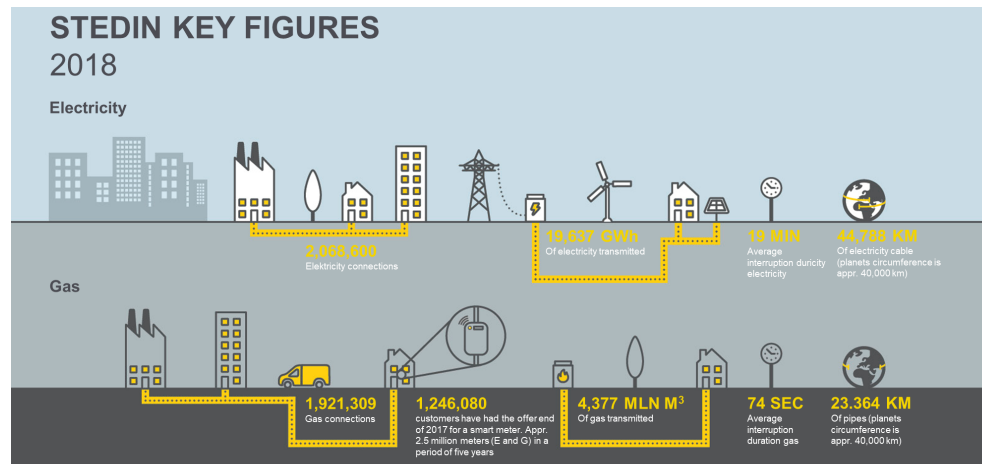


IEC61850 processbus at Stedin

Bas Mulder | 24-04-2020 | Grid Automation

Introduction

- Since 2005 involved in IEC 61850 at KEMA/DNVGL
- OT consultant within Stedin Grid Automation since 2019
- Focus on
 - data communication and telecommunication,
 - IEC standards (61850, 60870-5, 62351)
 - Quality assurance and standardization



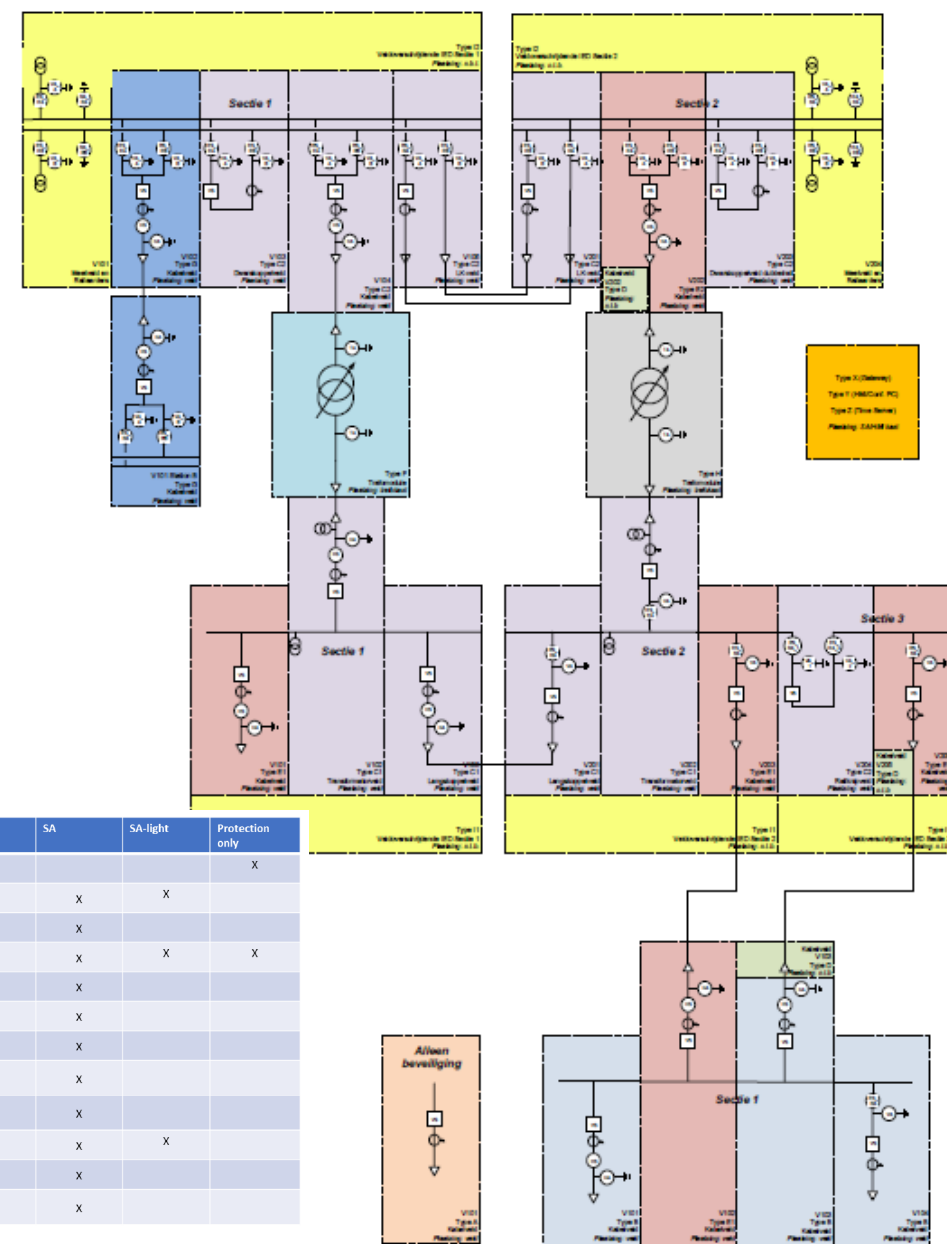
IEC 61850 at Stedin

4TH GENERATION SAS

- One box solution based upon IEC 61850 Edition 2+
- Stedin IEC 61850 implementation profile (PID) for:
 - Data model (Stedin reference model)
 - Communication services (both inside and outside the SAS)
 - Network architecture
 - Cyber security (RBAC, authentication, virtualization, backups)

- Tendering and evaluation in 2018/2019
- Single vendor (Sprecher)
- Modular / building blocks
- First project : MOTA

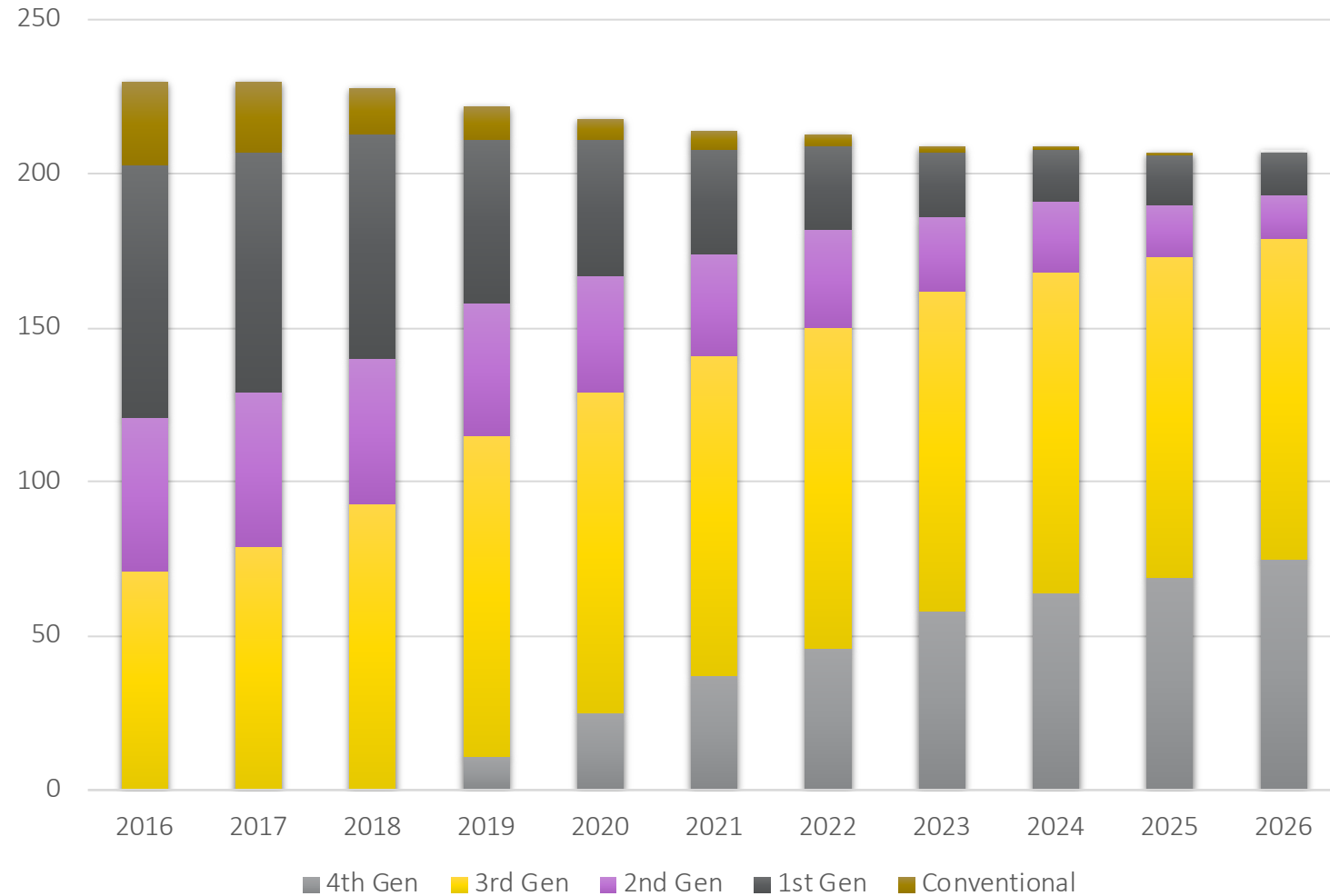
Components	Functionalities	SA	SA-light	Protection only
IED Type A: OC	Overcurrent			X
IED Type B: OC + AC	Overcurrent + Automation & Control	X	X	
IED Type C: OC + freq. + AC	Overcurrent + Frequency + Automation & Control	X		
IED Type D: OC + LD	Overcurrent + Line Differential	X	X	X
IED Type E: OC+ LD + AC	Overcurrent + Line Differential + Automation & Control	X		
IED Type F: OC + TD + AC	Overcurrent + Transformer Differential + Automation & Control	X		
IED Type G: OC+ LD + Dist + AC	Overcurrent + Line Differential + Distance + Automation & Control	X		
IED Type H: OC+ LD + TD + AC	Overcurrent + Line Differential + Transformer Differential + Automation & Control	X		
IED Type I: Freq + AC (Logic Unit)	Frequency + Automation & Control (Logic Unit)	X		
Type X: Gateway units	For the interfacing central OT systems with PAC system	X	X	
Type Y: Substation HMI	Substation single line overview and control panel	X		
Type Z: GPS receiver with (S)NTP-server	Time server in substation	X		



Figuur 2: referentiestation implementatie, inclusief IED types en positionering IED's

What do we have and what's next?

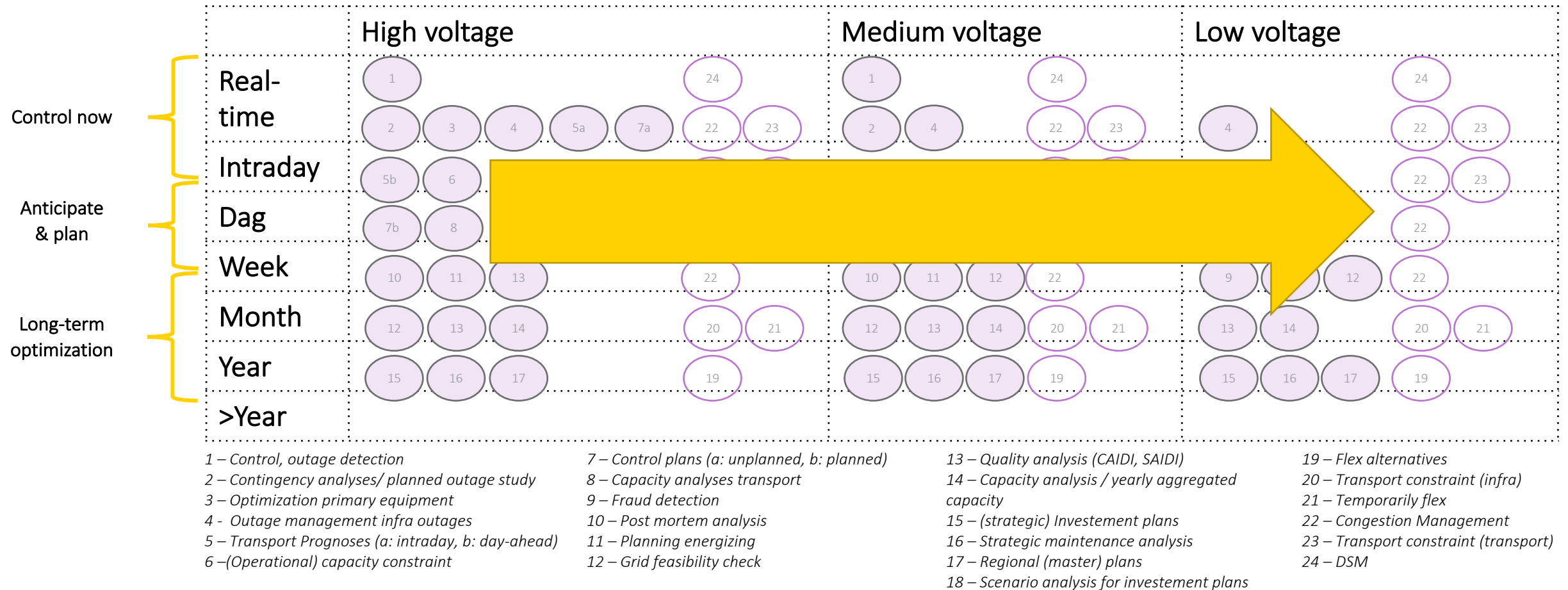
Cumulative amount of SA systems



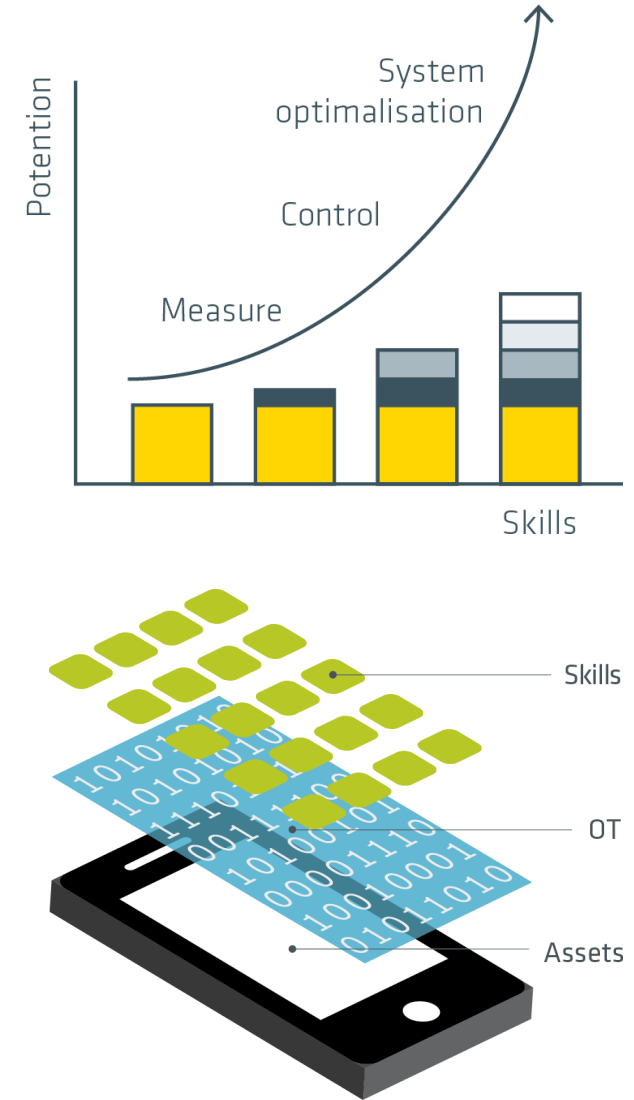
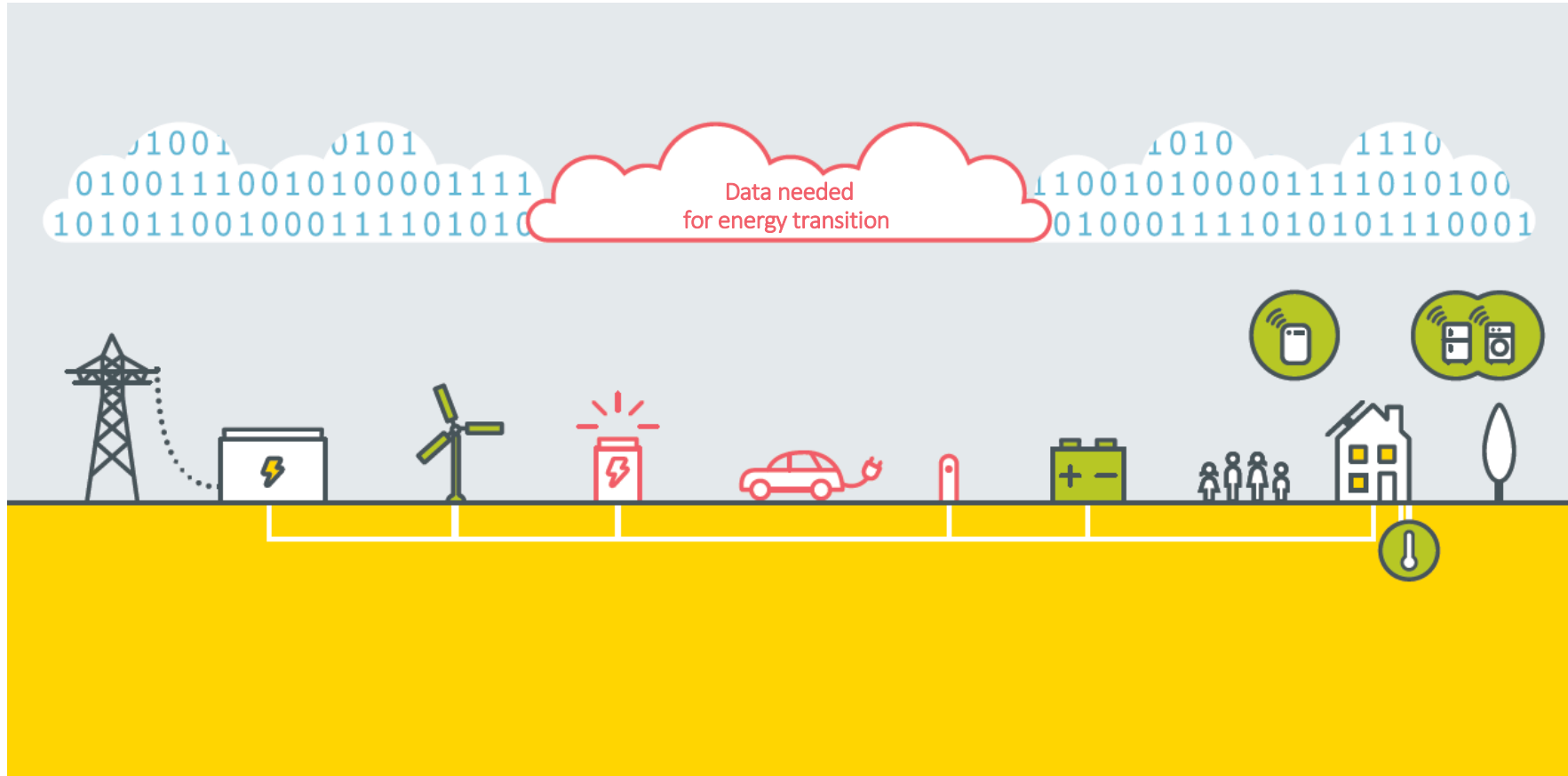
1st gen = RTU system
2nd gen = Proprietary systems
3rd gen = IEC 61850 ed. 1
4th gen = IEC 61850 ed. 2
5th gen = ???

Digital grid

Digital grid: a common base for real-time to long-term insight and control of the grids.



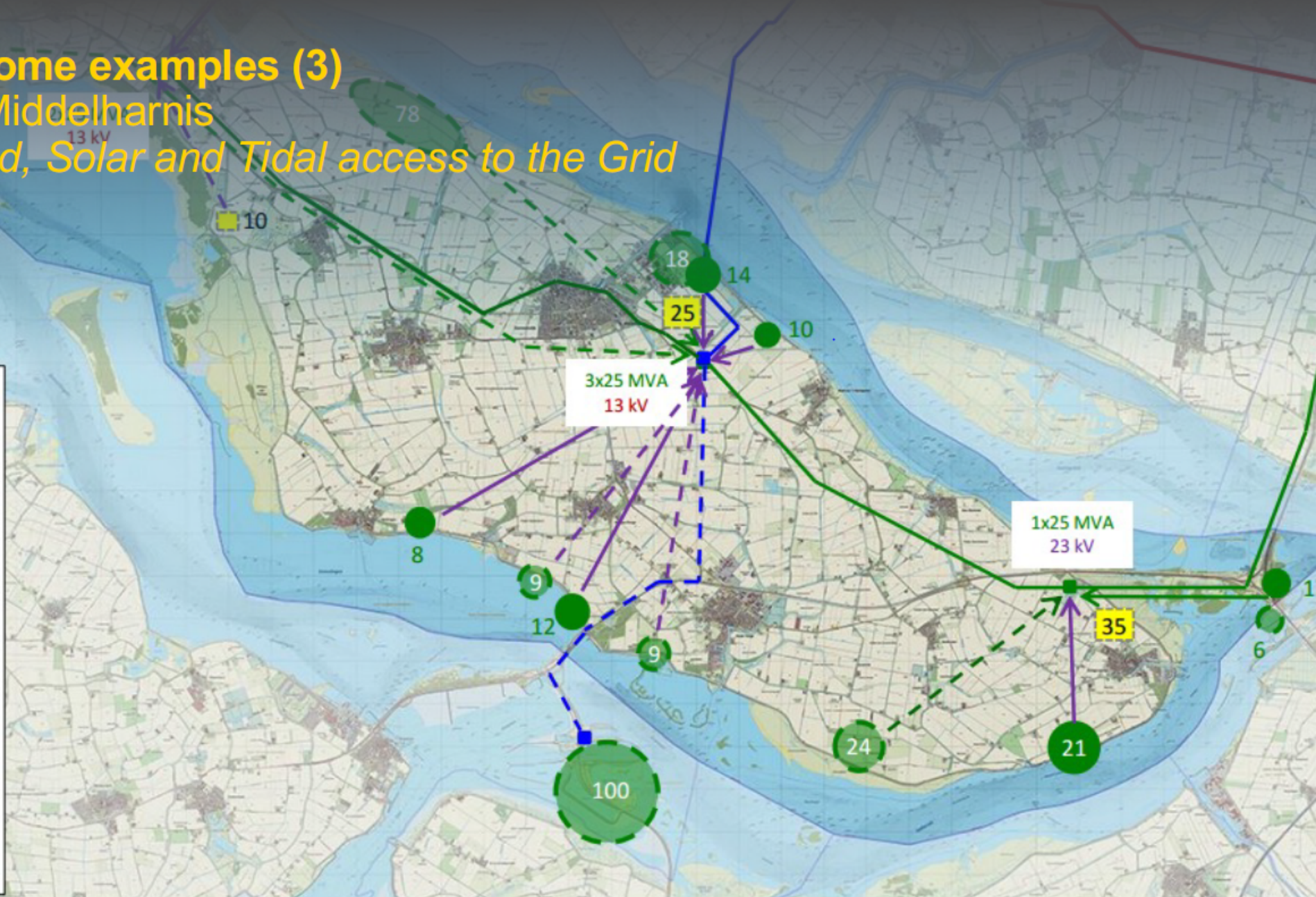
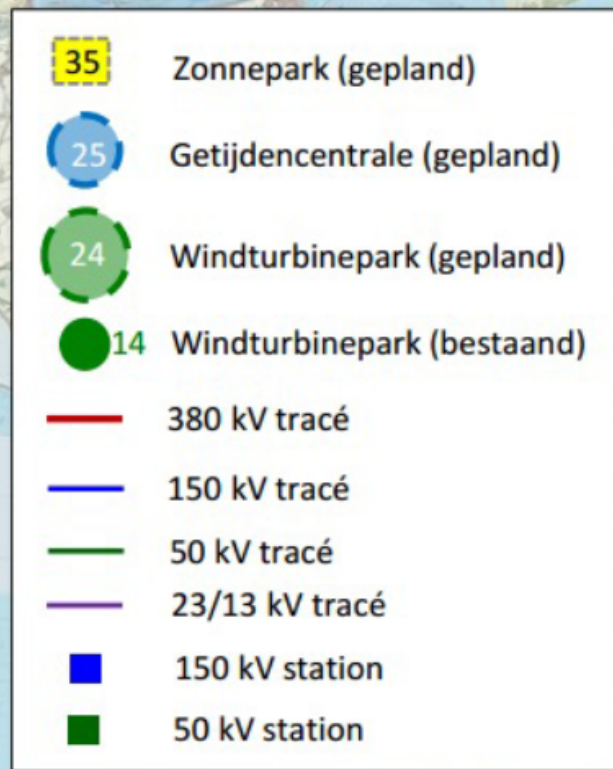
Asset, OT and Skills, what's the relation?



What do we do, some examples (3)

Substation 50 kV Middelharnis

which will give Wind, Solar and Tidal access to the Grid



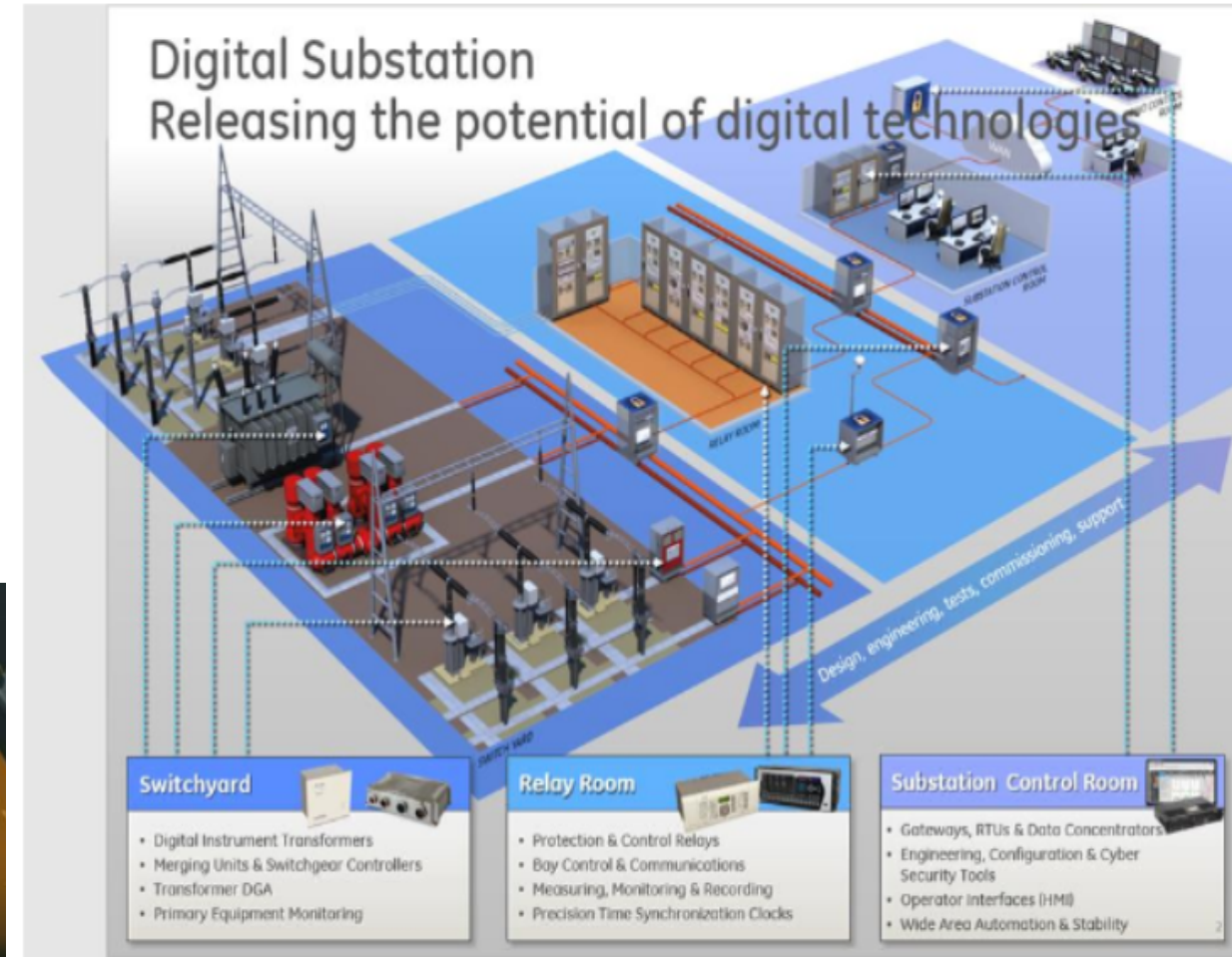
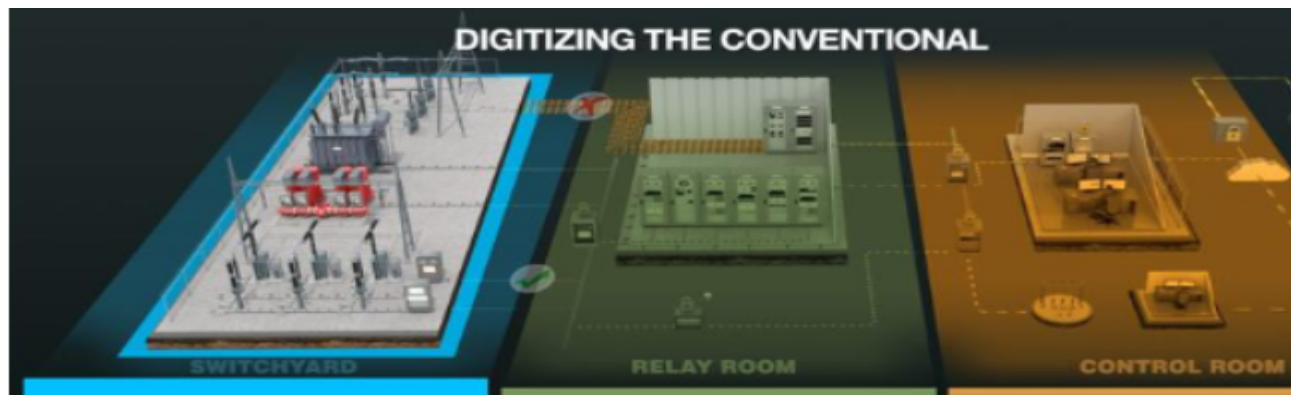
Global view 50 kV grid Middelharnis area



Digitalization @ Stedin

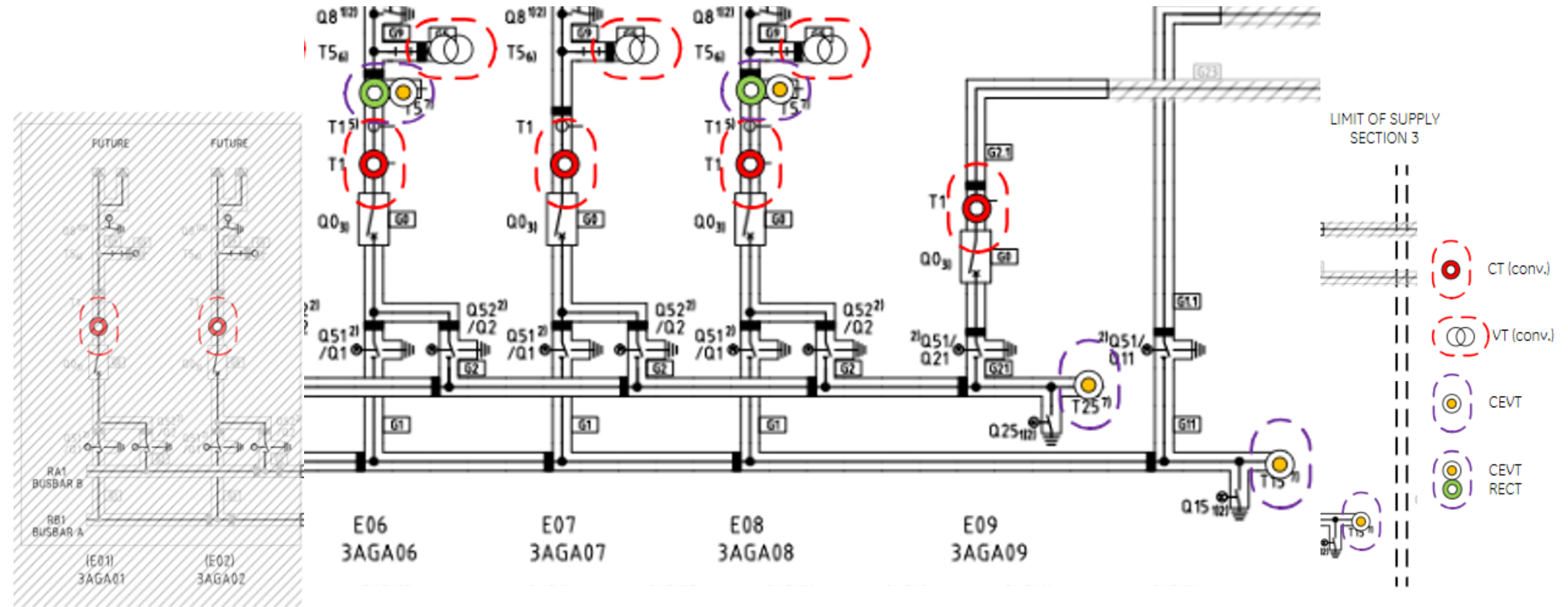
PROCESS BUS PILOT MIDDELHARNIS

- Advantages of a process bus
 - Space saving
 - Improved safety & reliability (no open circuits)
 - Reduced CT saturation
 - Easy replacement and simple extensions on the bus
 - Single source of very accurate data
 - Multi vendor and it is awesome!



Digitalization @ Stedin

PROCESS BUS PILOT MIDDELHARNIS

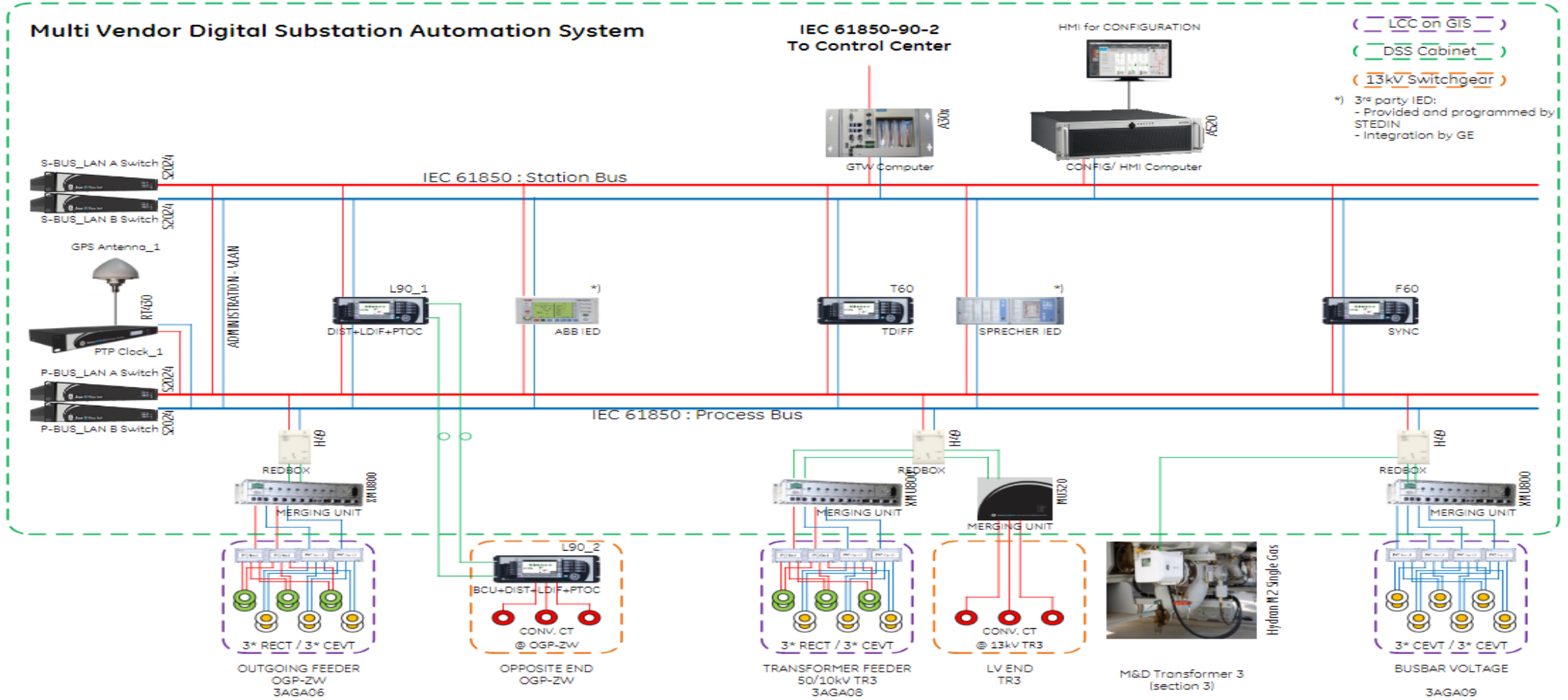


Digitalization @ Stedin



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PROCESS BUS PILOT MIDDELHARNIS

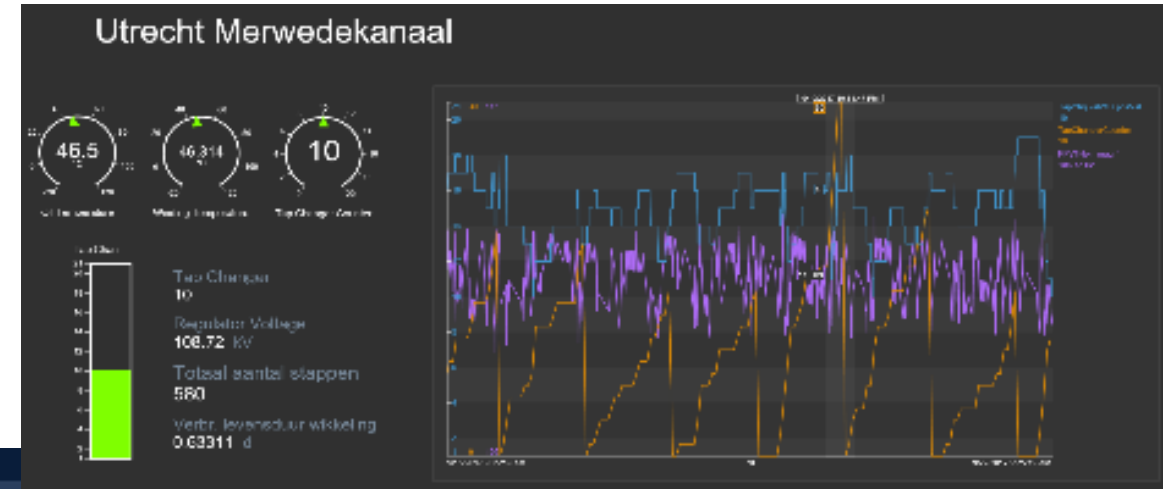
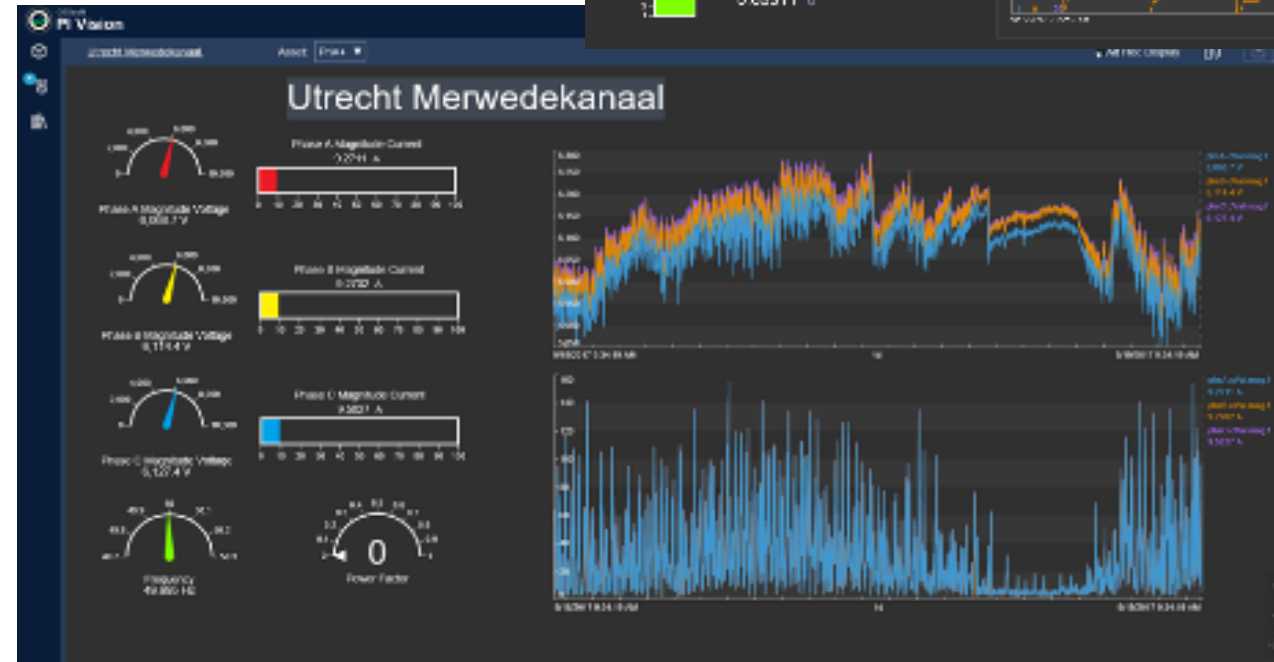
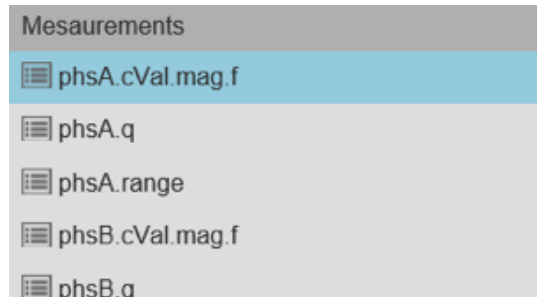
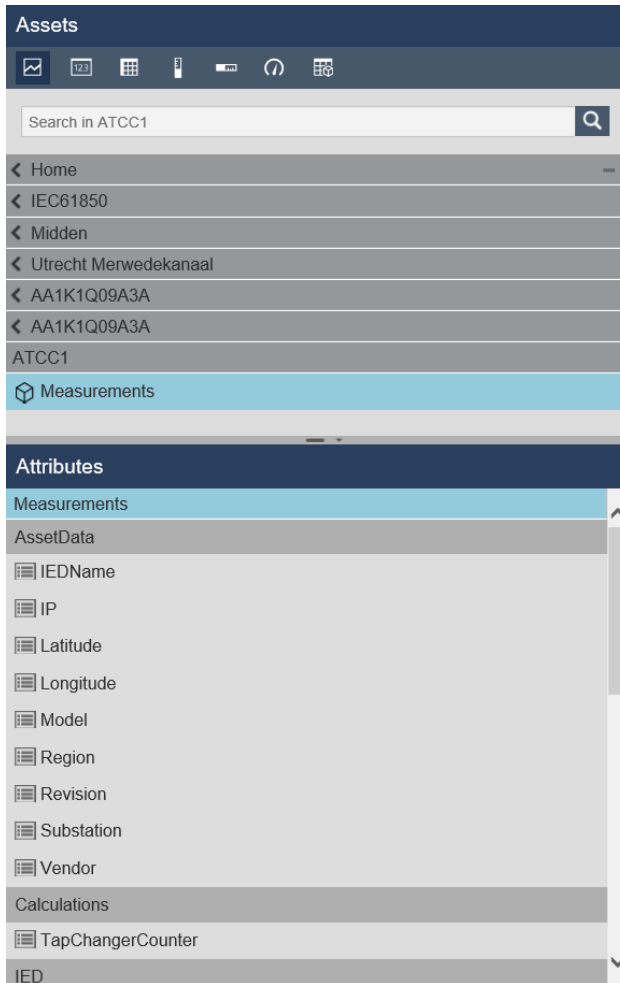


Digitalization @ Stedin

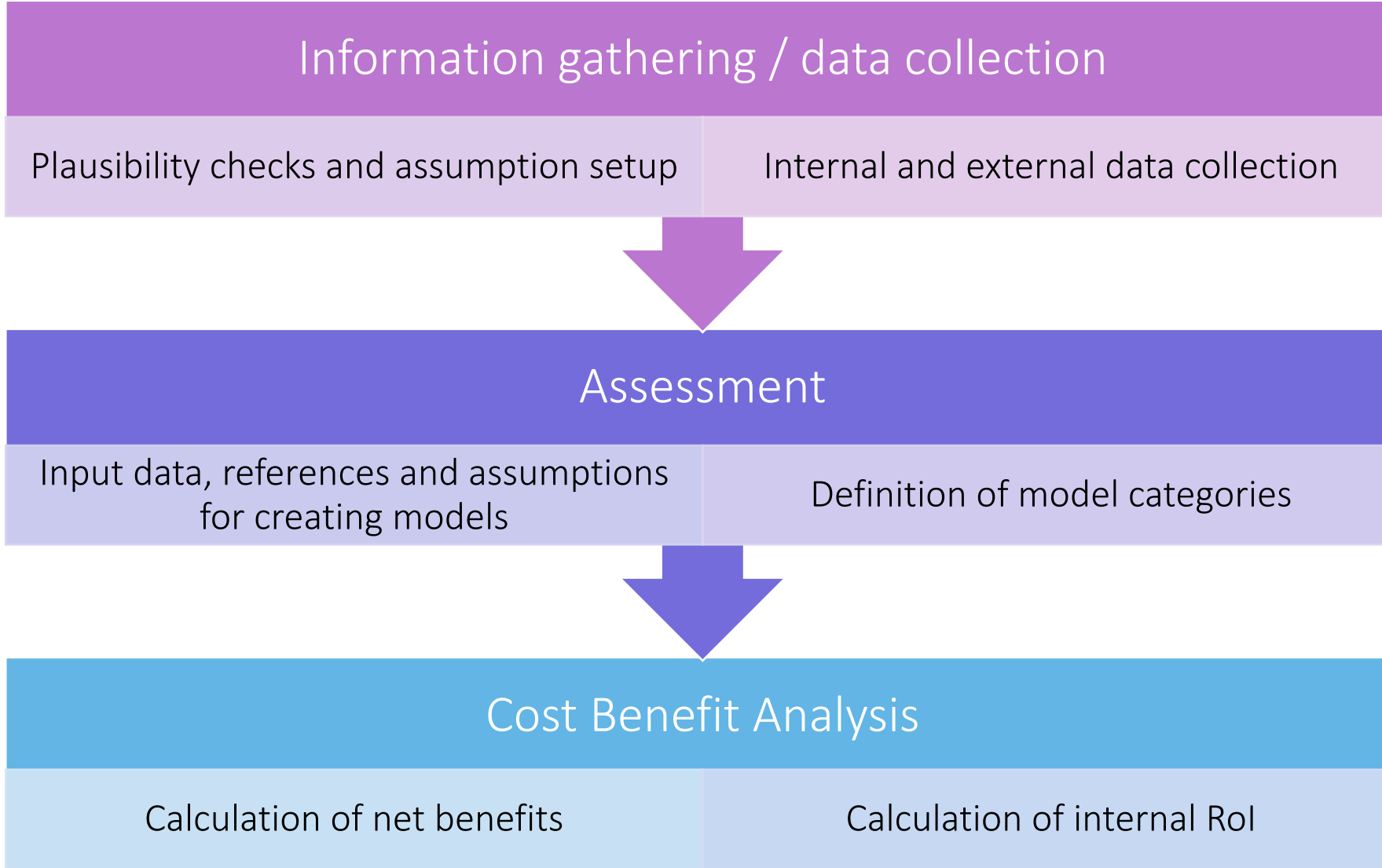


Digitalization @ Stedin

IEC 61850 source data management



Costs vs benefits



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FOR THE NEW
ENERGY GENERATION



THANK YOU

Questions and Answers

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