

Grid Communications, Control & Protection Strategy

Transmission 2040
Work Package 6

Future use of communications, control and protection
for economically enhancing grid capacity (2040)

TRANSPower



Trends 1

- 1978: ABB RYZFB/ RPB17 electromechanical non switched distance relay & DCEF
- Separate boxes for (CB Fail), Auto reclose, SCADA (transducers, I/O), local control & metering, protection signalling
- 1988 Areva “Micromho” static distance/ DCEF relay \$100,000
- Separate boxes for CB Fail, Auto reclose, SCADA (transducers, I/O), local control & metering, protection signalling
- 1998: Multifunction SEL321 numerical distance relay \$15,000
- Integrated auto reclose, some SCADA, proprietary “Fast meter”, protocol serial RS232 communication, “Mirrored Bits”
- 85% of the processing used for protection

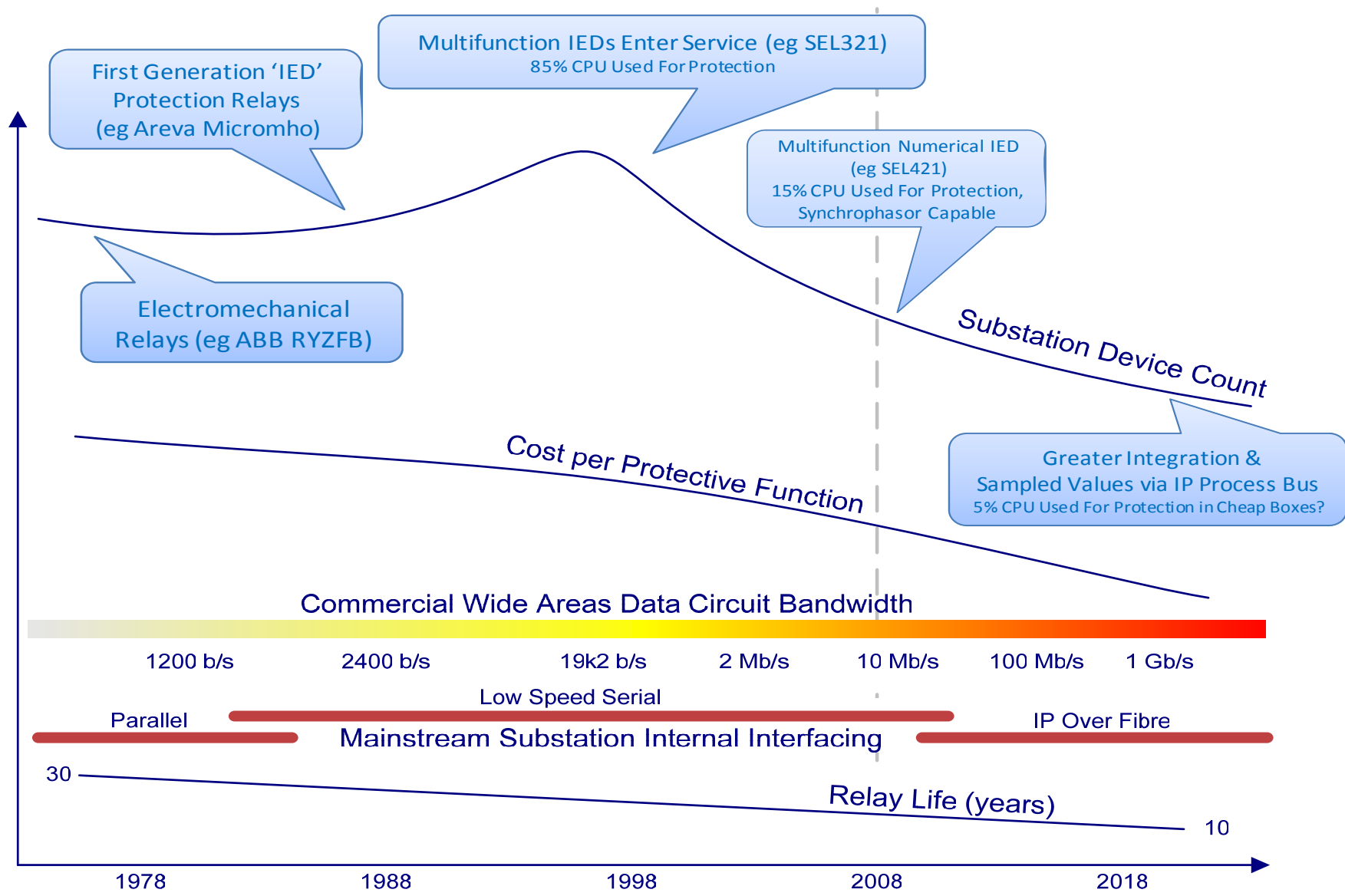


Trends 2

- 2008 Multifunction SEL421 numerical distance relay
- Integrated CB fail, A/R; SCADA; DNP3 (serial), IEC61850 (Station Bus)/ DNPi Ethernet, remote access, PMUs, transient recorder, programming, subcycle (software key)
- 15% of the processing used for protection; 85% for other functions

- 2018 Multifunction station management relay/ IED?
- IEC61850 (Station & Process Bus) inter WAN/ intra LAN station bus and process bus to Merging Units? Plug and play? Remote access, remote firmware and setting downloads?
- 5% of the processing will be for protection?

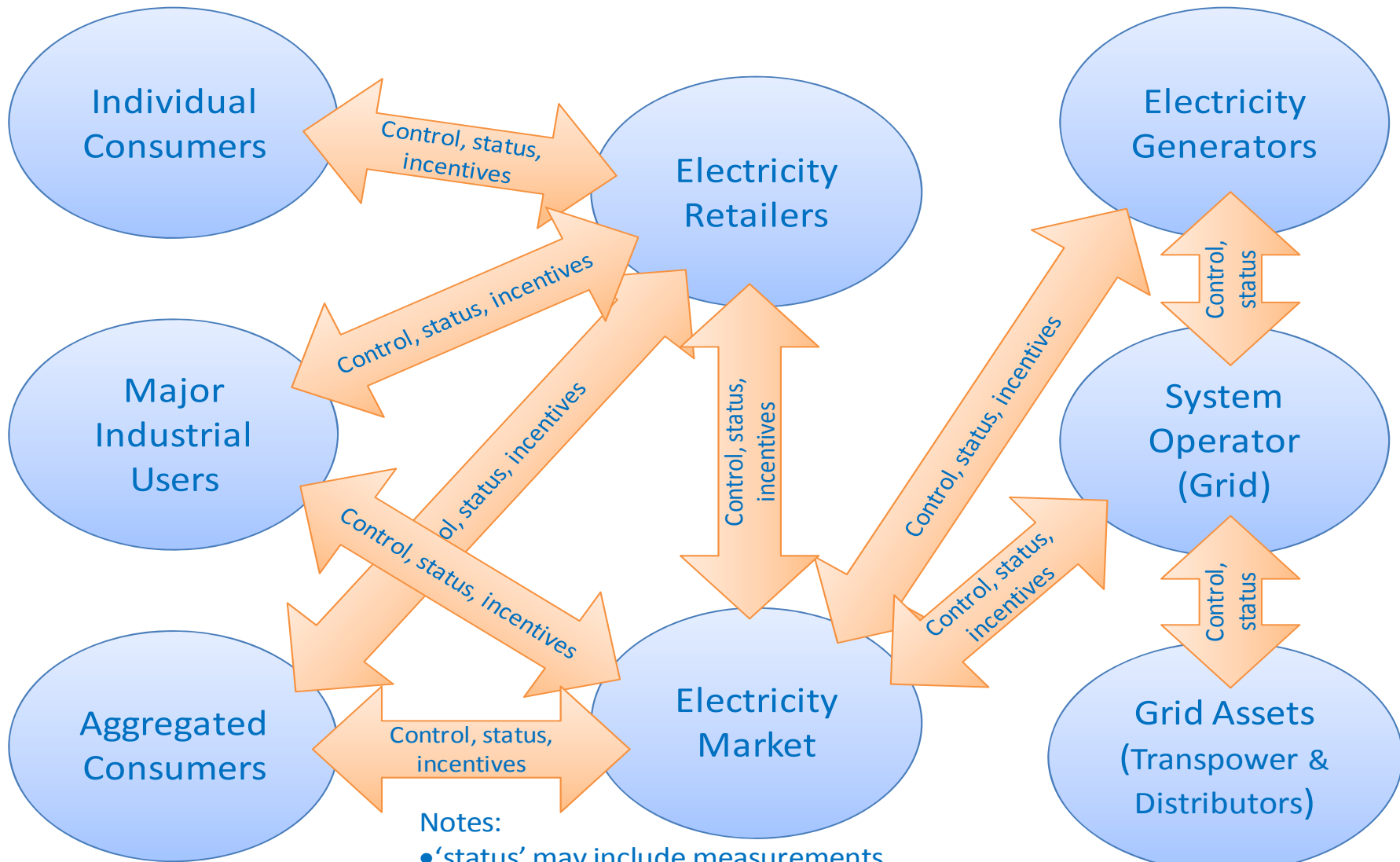




Trends 3

- More integration: more in less, smaller and cheaper boxes?
- By 2030; typical substation, 6 boxes? (Electra; De Mesmaeker)
- By 2040; 3 boxes?
- Greater interoperability (plug and play)?
- Self setting unit/ distance protections?
- More inter substation relay communication?
- Large number of SPS's & WAP's?
- Remote configurable/ setting changes?
- Short life cycle (10 years?), no routine maintenance?
- CIM?
- Very high level of expertise, support & training required?
- Centralised (overseas) support? Eg SVC turn key support?
- Security a major issue?
- SMART GRIDS?





Notes:

- 'status' may include measurements
- only a fractional component of the necessary integration is shown.

