EL Consolidation

IEFC Workshop

F. Duval on behalf of EN/EL

10.02.2010

Main topics on consolidation

1. **Repowering EL Group**
2. **Future of the network**
3. **Selectivity & protections**
4. **Cables**
5. **Substations**
6. **SPS Safety network (Diesel)**

Repowering EL Group

- **48 → 65 people from end 2008 to 2010**
- **40MCHF consolidation budget**
- **Recruitment of experts (a few)**
- **Training newbies (many)**
- **Powering EL means & toolings (diagnostic equipment, network modeling software, maintenance software, organizing documentation, etc.)**
- **Renew 12 main EL contracts with suppliers (general installation, dry transformers, high voltage cubicles, low voltage cubicles, 48Vdc equipment, fiber optic installation, Scada development , high voltage cables, UPS, maintenance contracts, etc.)**
- **Looking for surfaces (workshops, heavy transformers, spare parts storage, offices….)**

Future of the network

An overall network study is under way

Any renovation project run before having a precise idea of the 2020 network is a waste of money

Main principles:

- **Bring 66kV (close) to Meyrin**
- **Separate machine & stable network in Meyrin**
- **Simplify the network for an easier management**
- **Renovate ageing but vital nodes (ME9, ME59, ...)**
- **Develop safety (Diesel) network**

Selectivity & protections

- Segregate protection features from network management functions
- Update protection relays

Main principles:

- Simple is reliable
- Rough standard solution is better than many "tailor made" solutions
- Develop fiber optic network for digital blocking selectivity
- Implement systematic cable "both sides" protection

Cables

- **Develop diagnostic tools for preventive maintenance**
- **Manage & monitor screen current**
- **Evaluate cable installation method; direct in ground, in tubes or in galleries**
- **Evaluate cable technology (aluminum, copper; PIE, XLPE; 3 phase screened, one phase; etc.)**

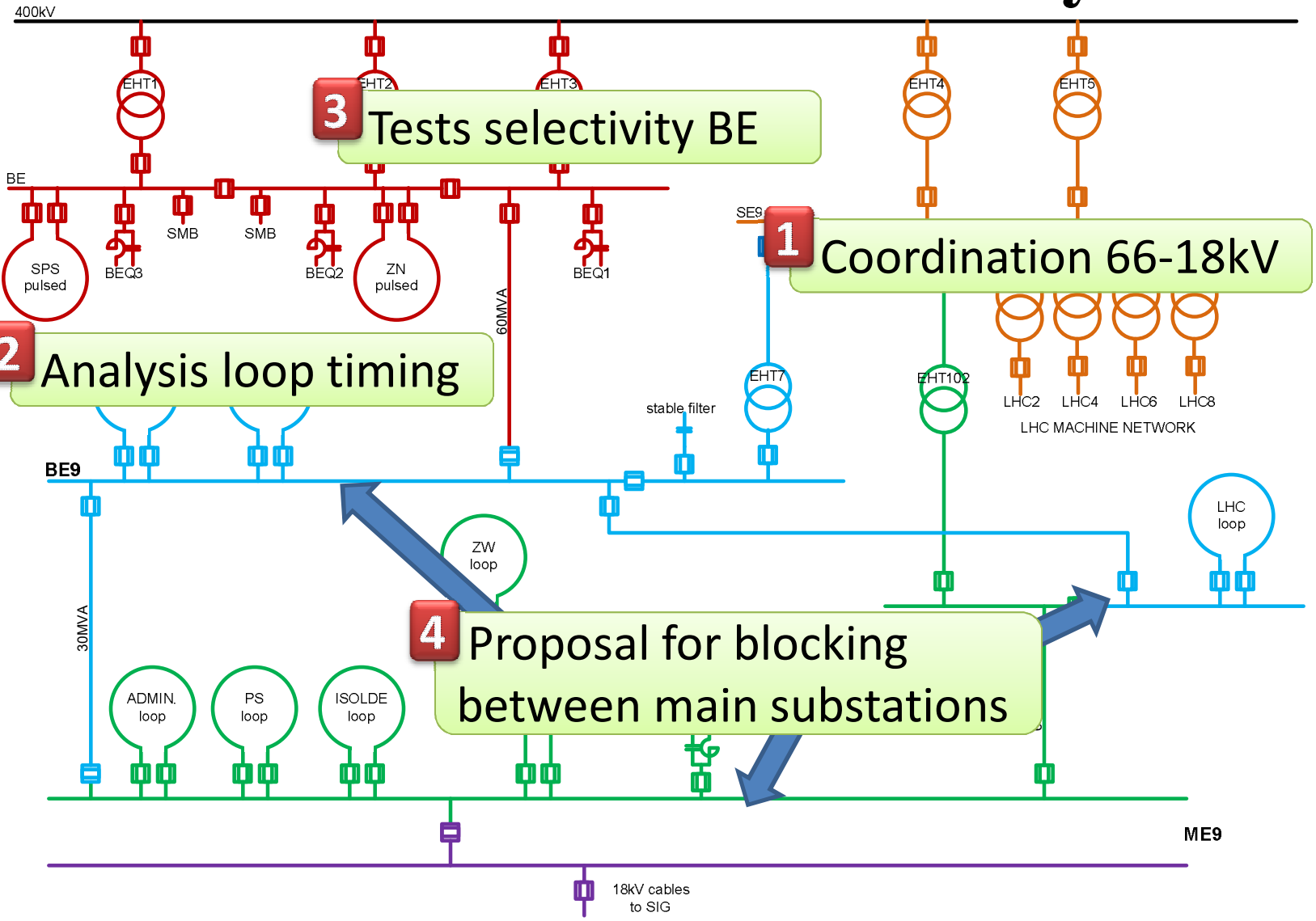
Substations

- **Replace old cubicles by Arc proof cubicles**
- **Evaluate SF6/ Vacuum circuit breaker technologies**
- **Evaluate diagnostic accessories**
- **Modify some existing substations in order to respect installation rules**
- **Improve operability and local/remote supervision**

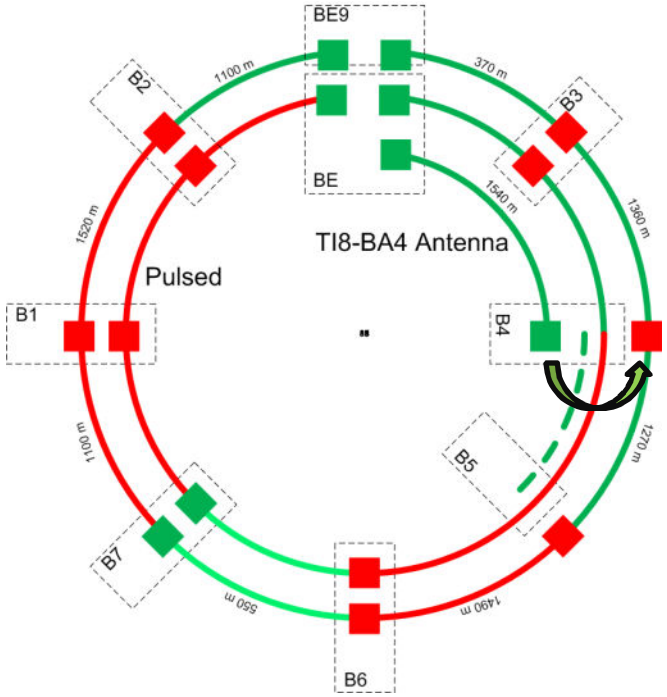
SPS Safety Network

- **Upgrade of the 3.3kV safety network for SPS and North Area**
- **Upgrade of the low-voltage safety substation in BA4 (for TI8, CNGS) and installation of a dedicated Diesel set**
- **Upgrade of the low-voltage safety substation in BA7 (for TI2) supplied from the 18 kV Meyrin safety network**
- **Create safety substations in North area for BA80, BA81, BA82 like done for SPS in 1998-2000.**

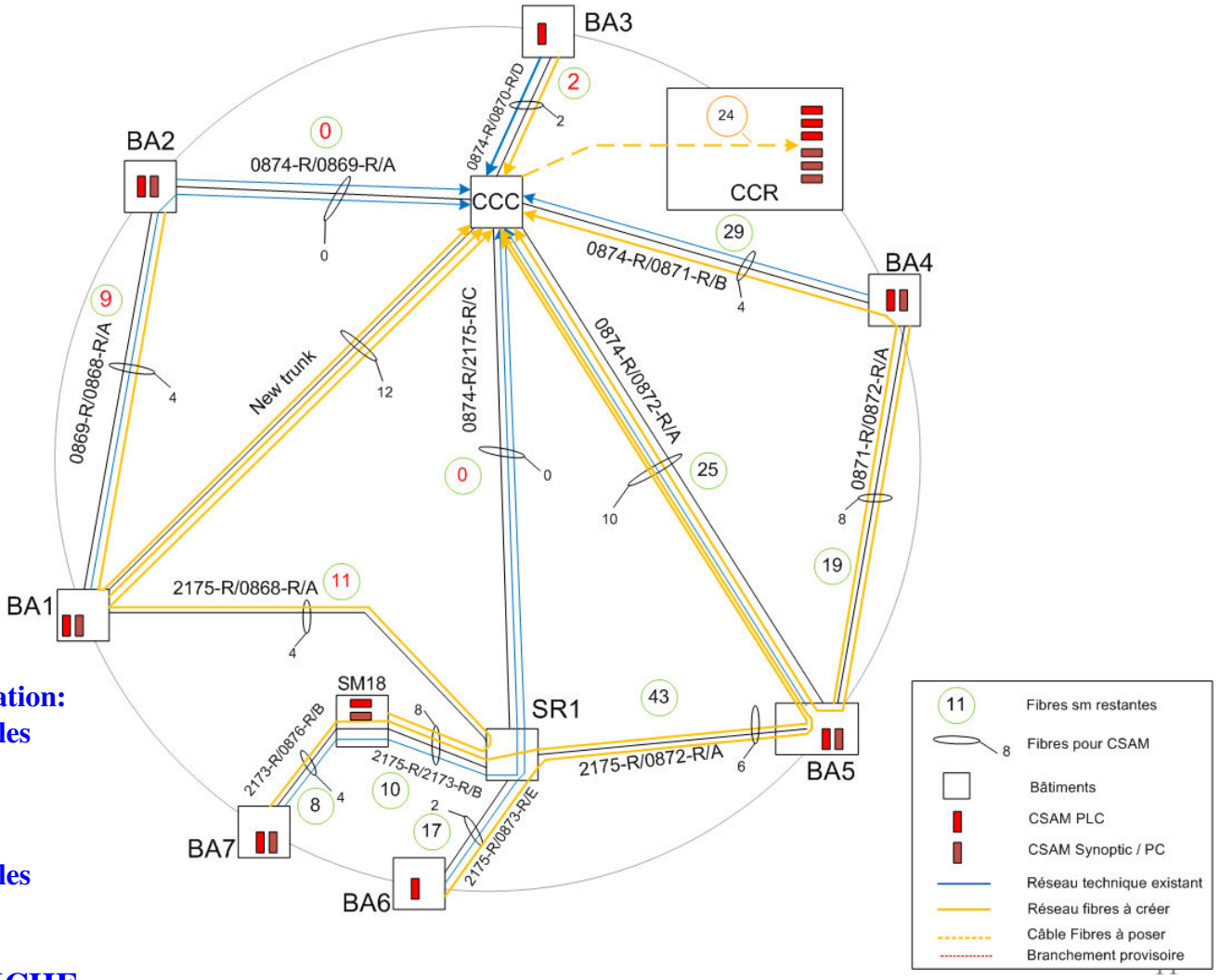
Done in 2009 Selectivity



Done in 2009
Emergency connection:
TI8/CNGS ←→ SPS loop BA4



Done in 2009
CSAM + Surface Fiber network



LHC Surface link consolidation:
- 60 km of optical fibre cables
- 2000 optical connections

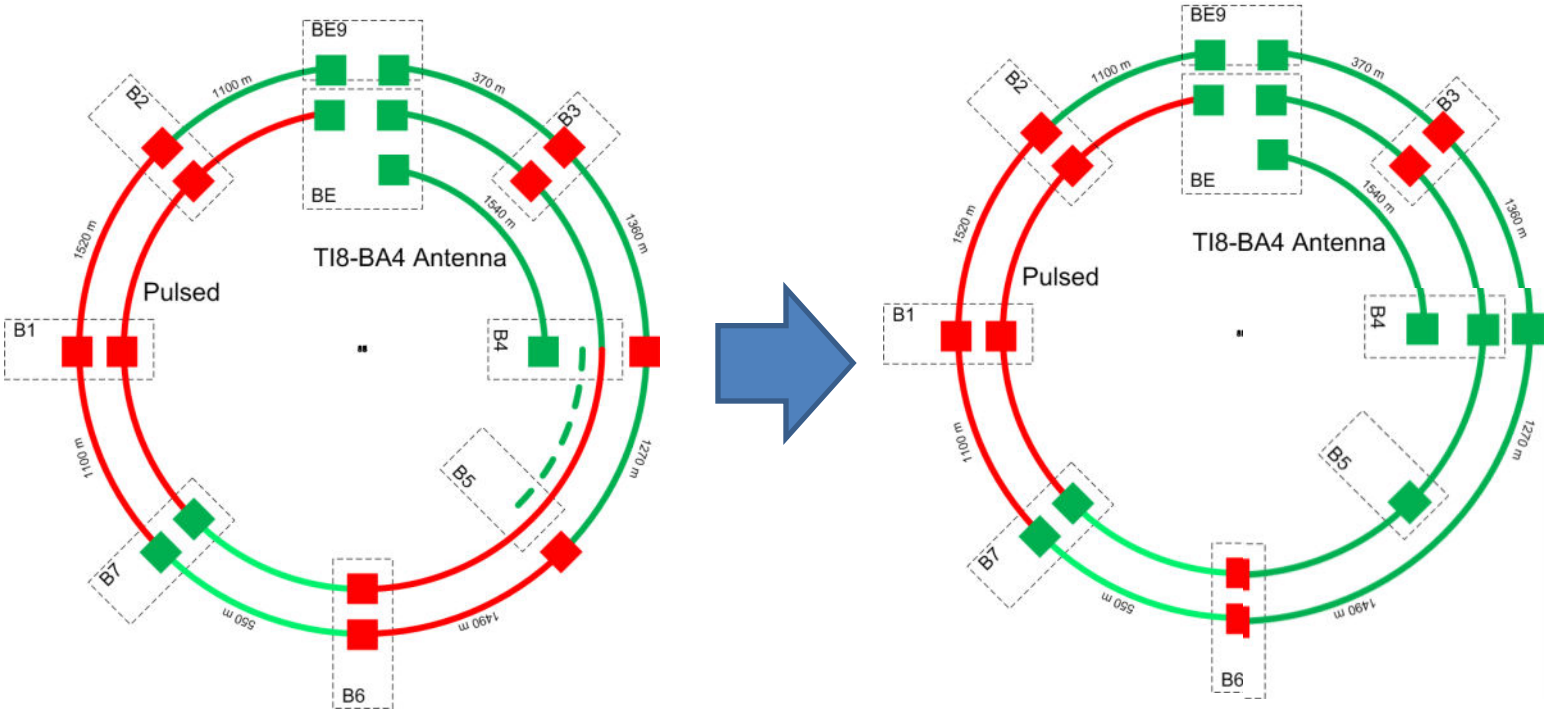
CSAM:
- 15 km of optical fibre cables
- 1000 optical connections

Total project value: 2MCHF

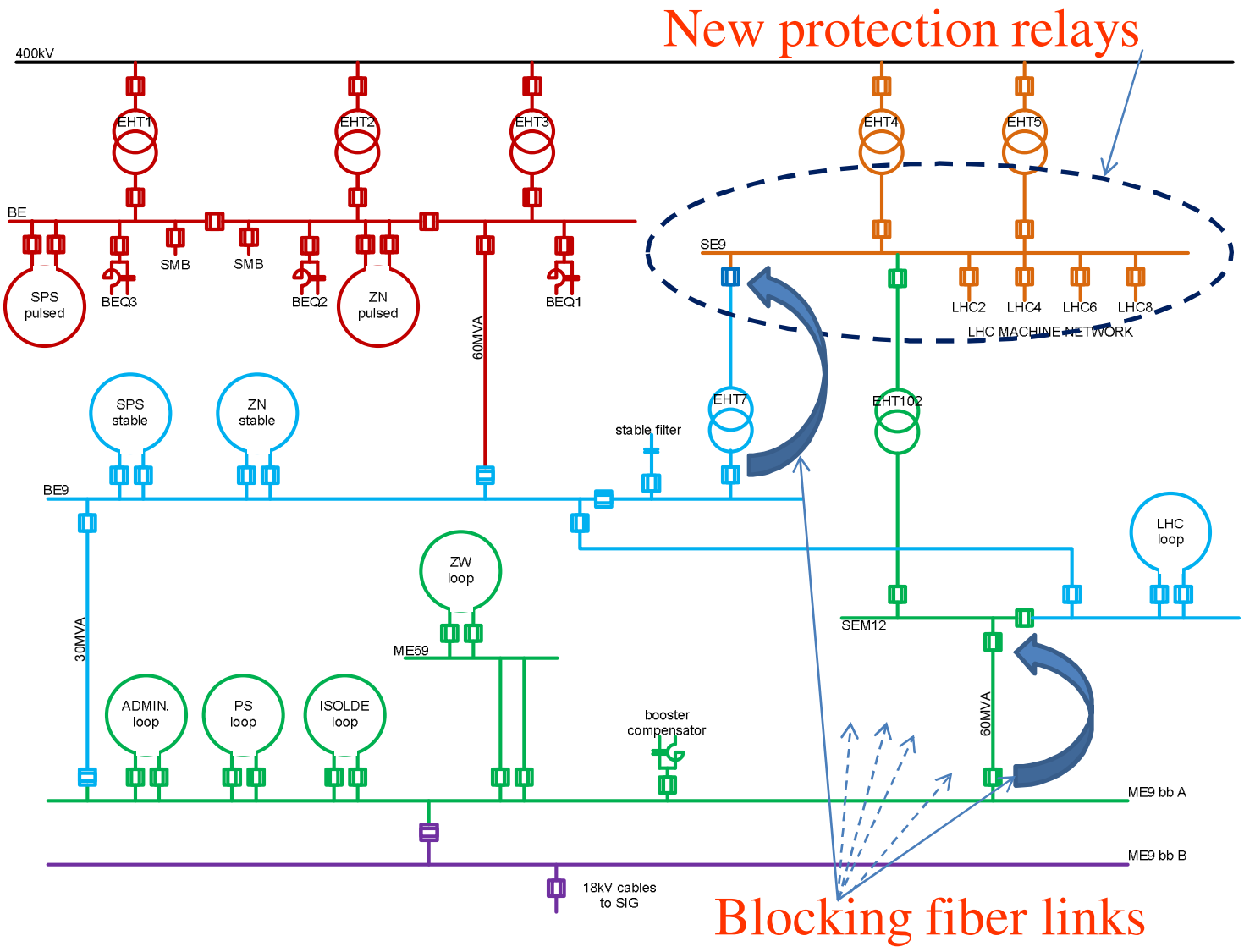
Done in 2009

- **Selectivity improvement**
- **Doubled BE/BE9 link; 30MVA to 60MVA**
- **Installed emergency connection from TI8/CNGS power cable to SPS loop**
- **Purchased 10kM of 18kV cable for 2010 SPS cable consolidation plan; BA5 to BA6**
- **CSAM fiber optic network + consolidation of LHC surface links; 2MCHF**

To do in 2010
SPS loops renovation

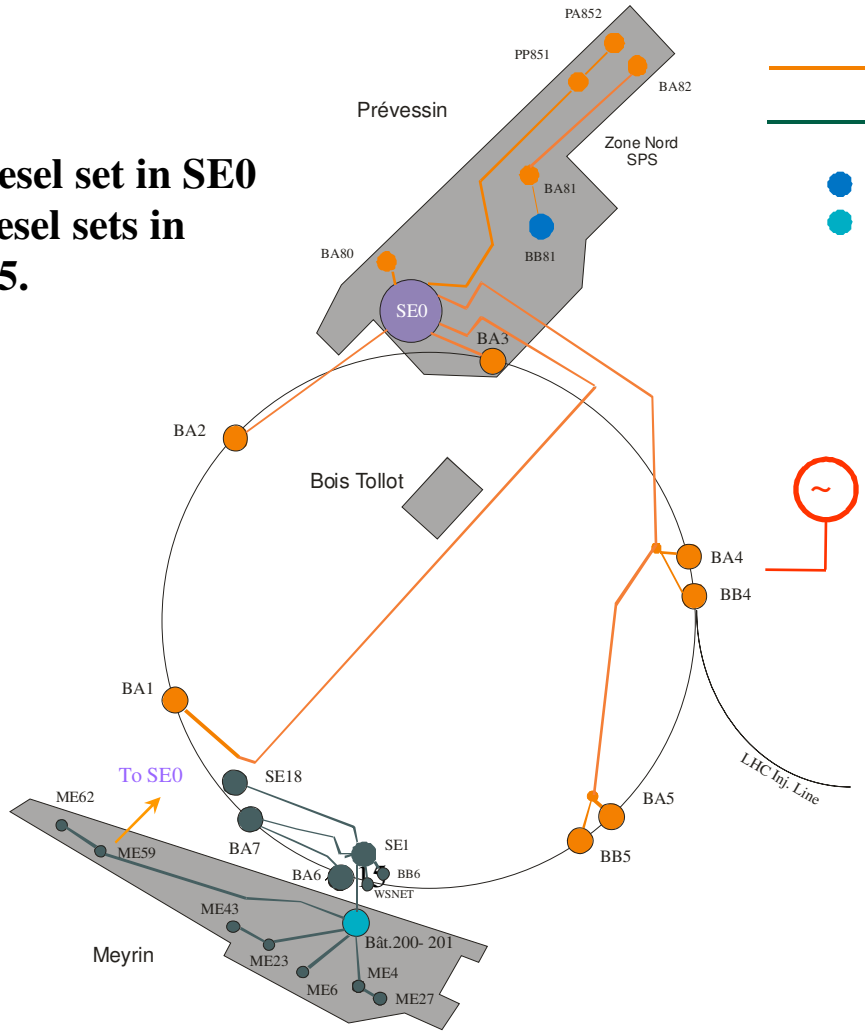


To do in 2010 Selectivity



To do in 2010
Safety network on SPS & NA

Options to study :
- **Dedicated 3.3kV Diesel set in SE0**
- **Dedicated 400 V Diesel sets in SE0, BA1, BA2, BA5.**



Studies for BA7 : upgrade of the low-voltage safety substation

Studies for BA4 : upgrade of the low-voltage safety substation + dedicated Diesel set

To do in 2010

- **Study and finalize overall network evolution 2010-2020**
- **Renovate BA4 and BA5 substations**
- **Replace BA5 to BA6 cables**
- **Implement fiber optic network for digital blocking selectivity**
- **Implement new protection relays in some key points (66kV, etc.)**
- **Studies for a safety network on NA & SPS**