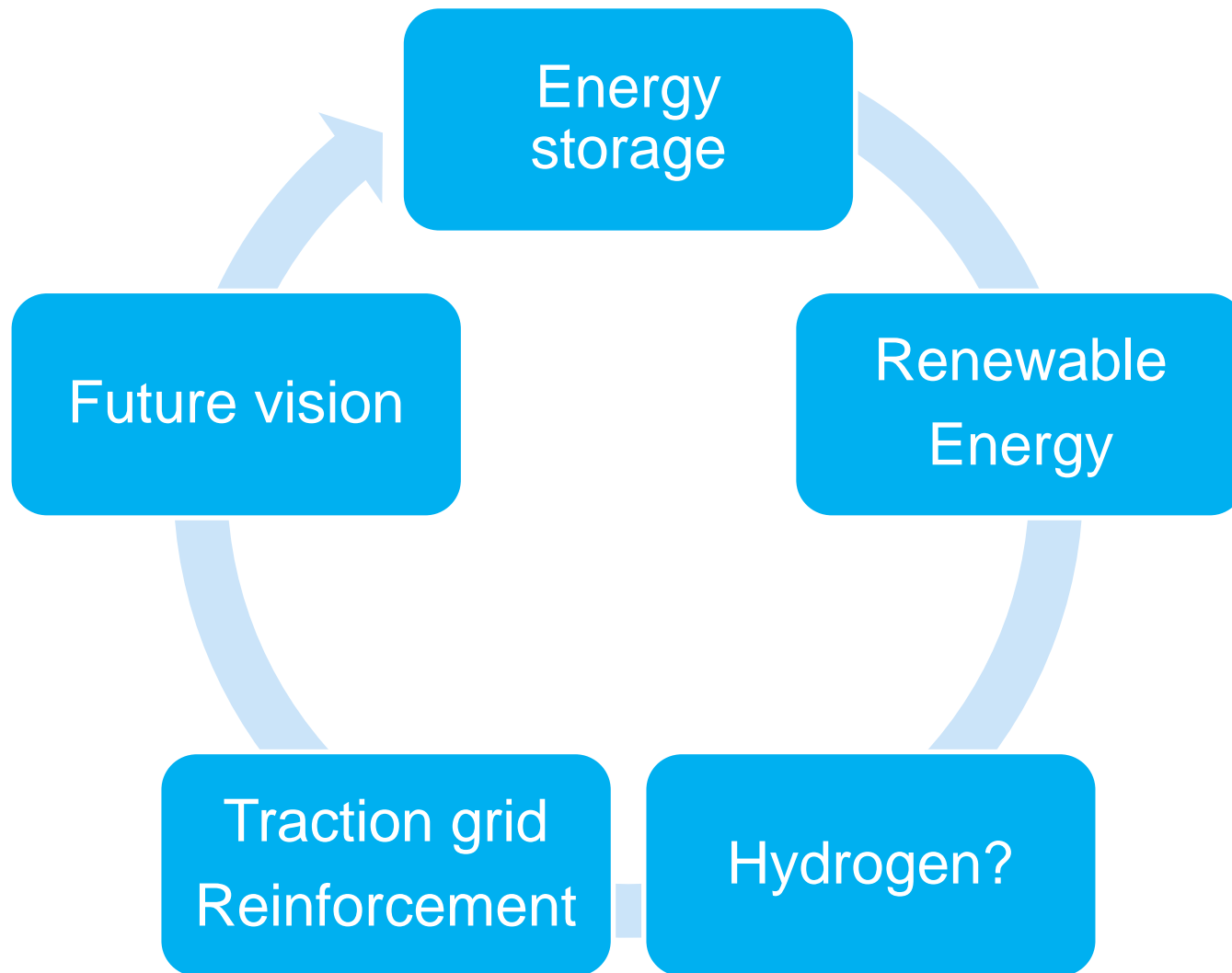


Energy Projects at Infrabel

Koen De Gussemé
Manager Substations & Power
Distribution

11.02.19





The interest of energy storage

- **Infrabel's will to increase the use of renewable energy**
- Reinforce the feeding network at weak places in the grid
- Decrease the ratio between peak power and average power in substations
- Increase the energy efficiency by taking more advantage of braking energy recuperation



11.02.2019

Projects solar: Itterbeek (0,5 – 1 MW)



Projecten solar: Anderlecht (0,5 – 1 MW)





Solar projects

Difficulties:

- Long and small zones: high cabling cost
- Not always access to high voltage network
- Not always an easy access for installation
- Stability of the slopes

Ideas:

- Connection to 3 kV grid in a sectioning station
- Connection to 25 kV overhead lines through 25 kV/400 V transformers

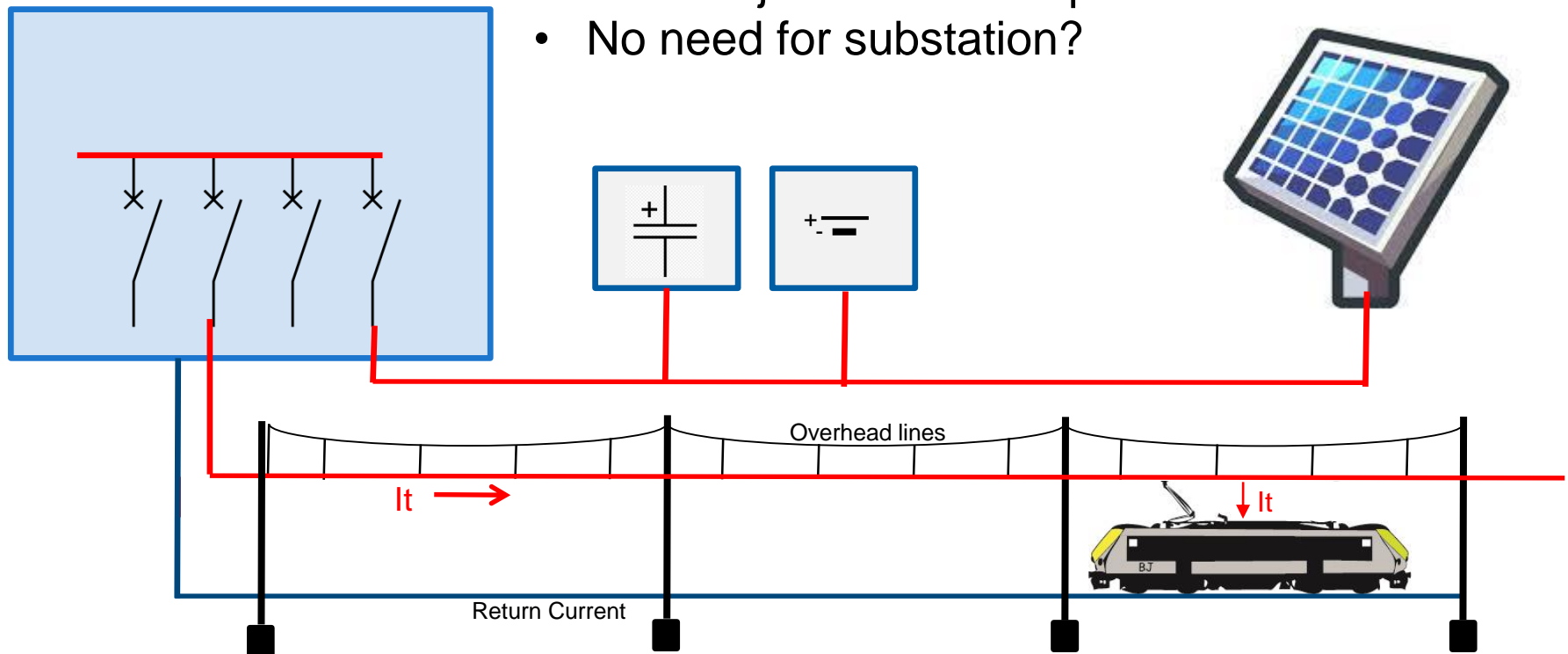
Future project connection of solar on 3 kV



200 kW

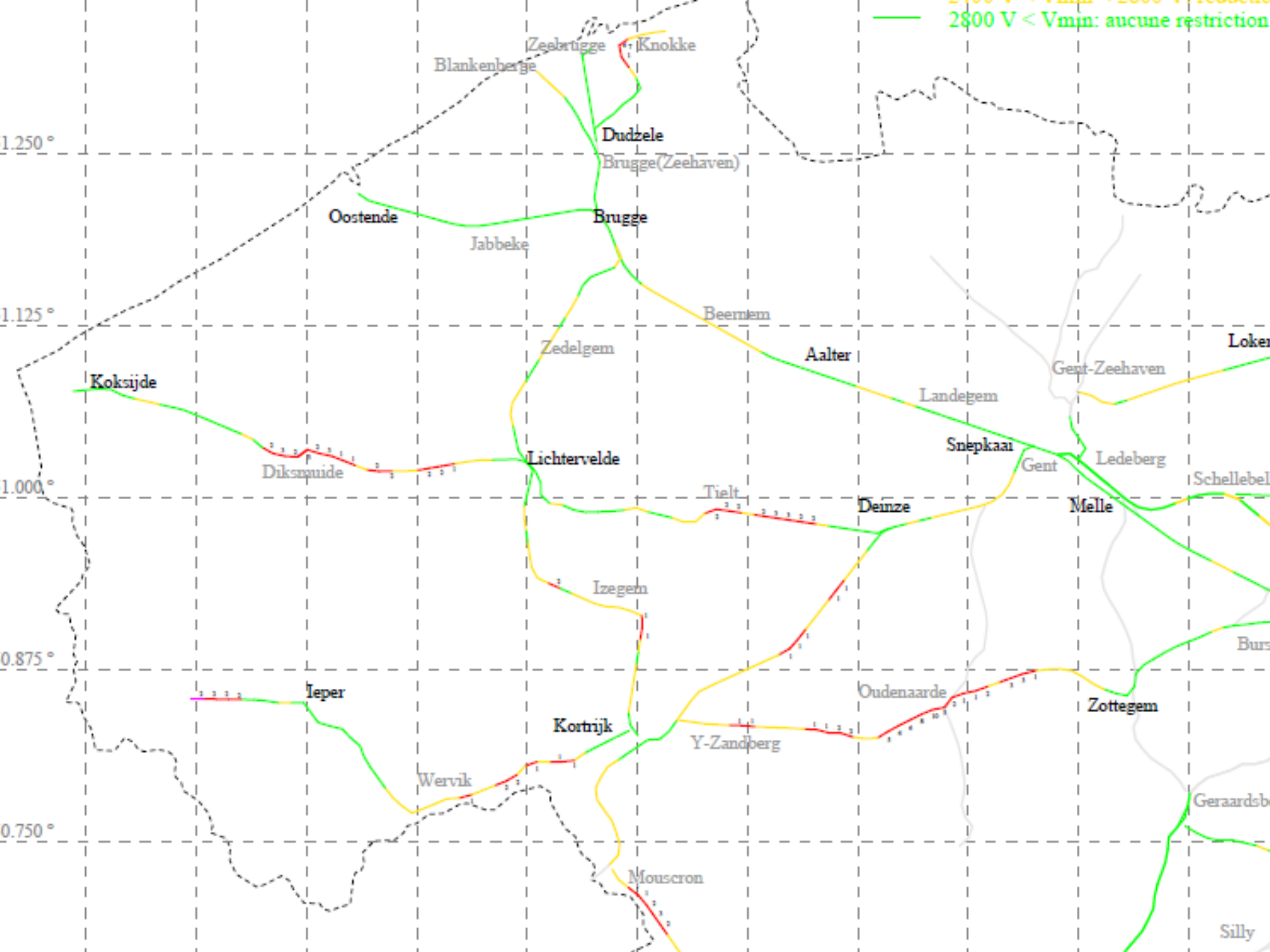
Renewables + storage on 3kV

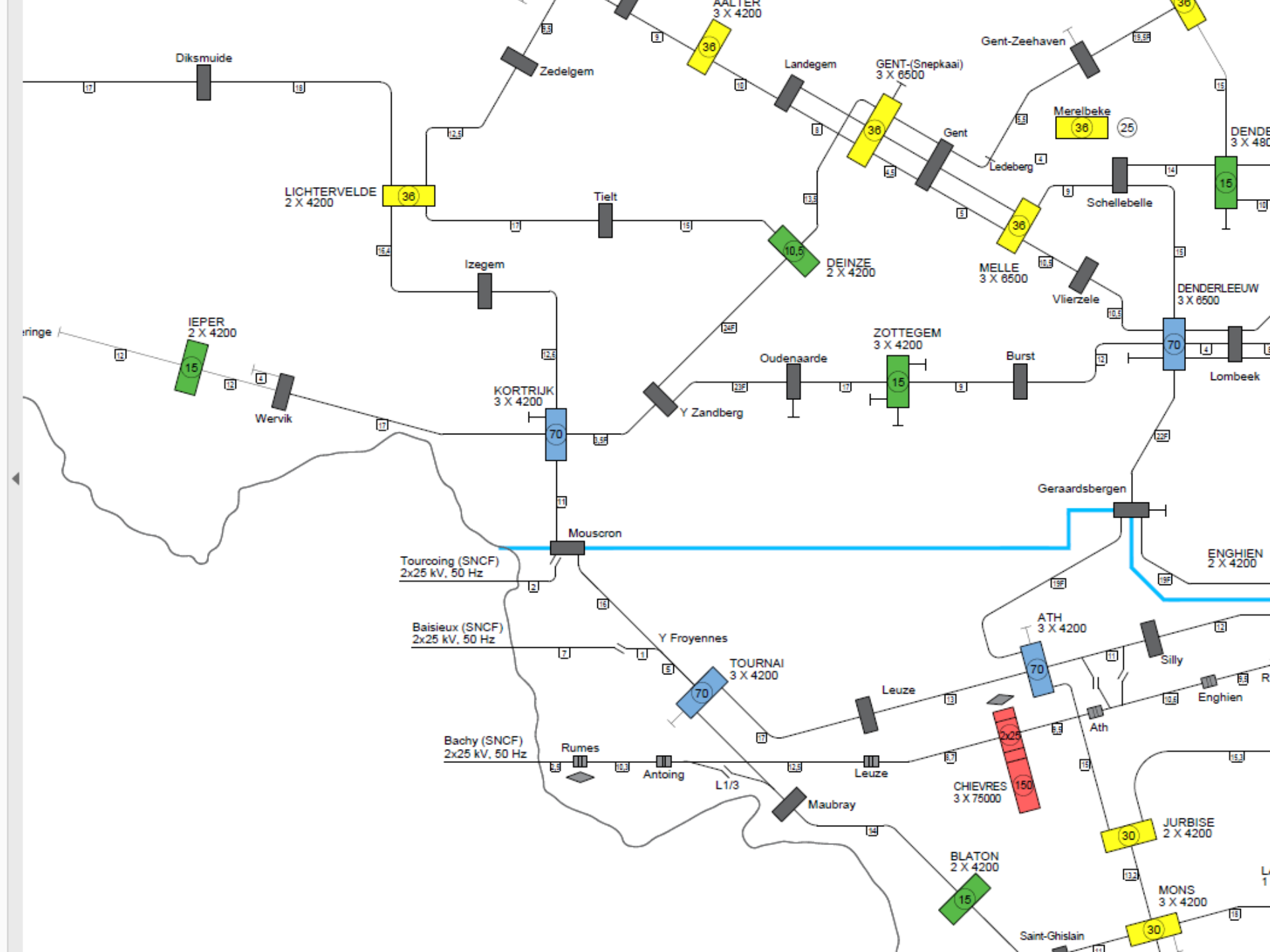
- Recuperation of braking energy
- Direct injection of local production
- No need for substation?



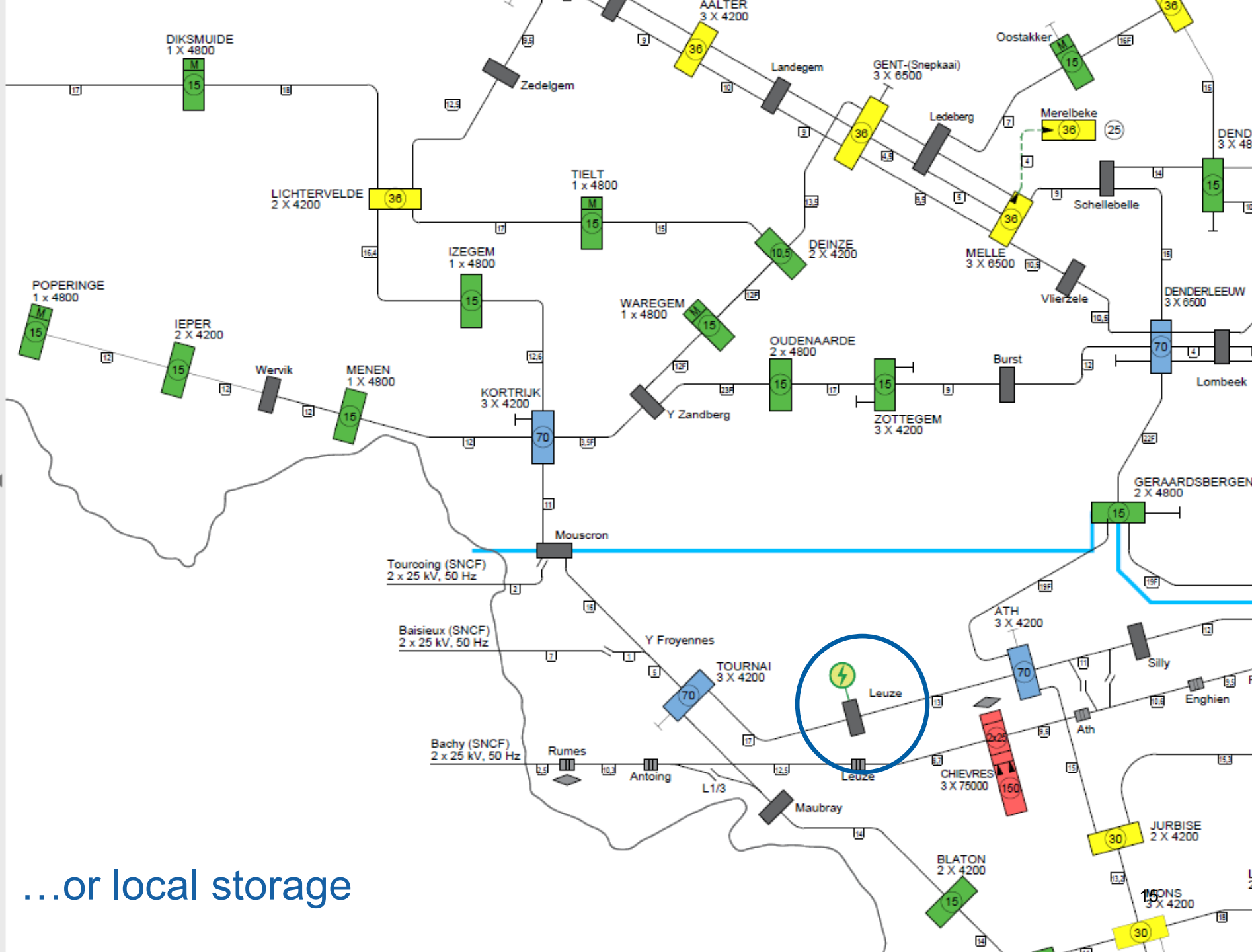
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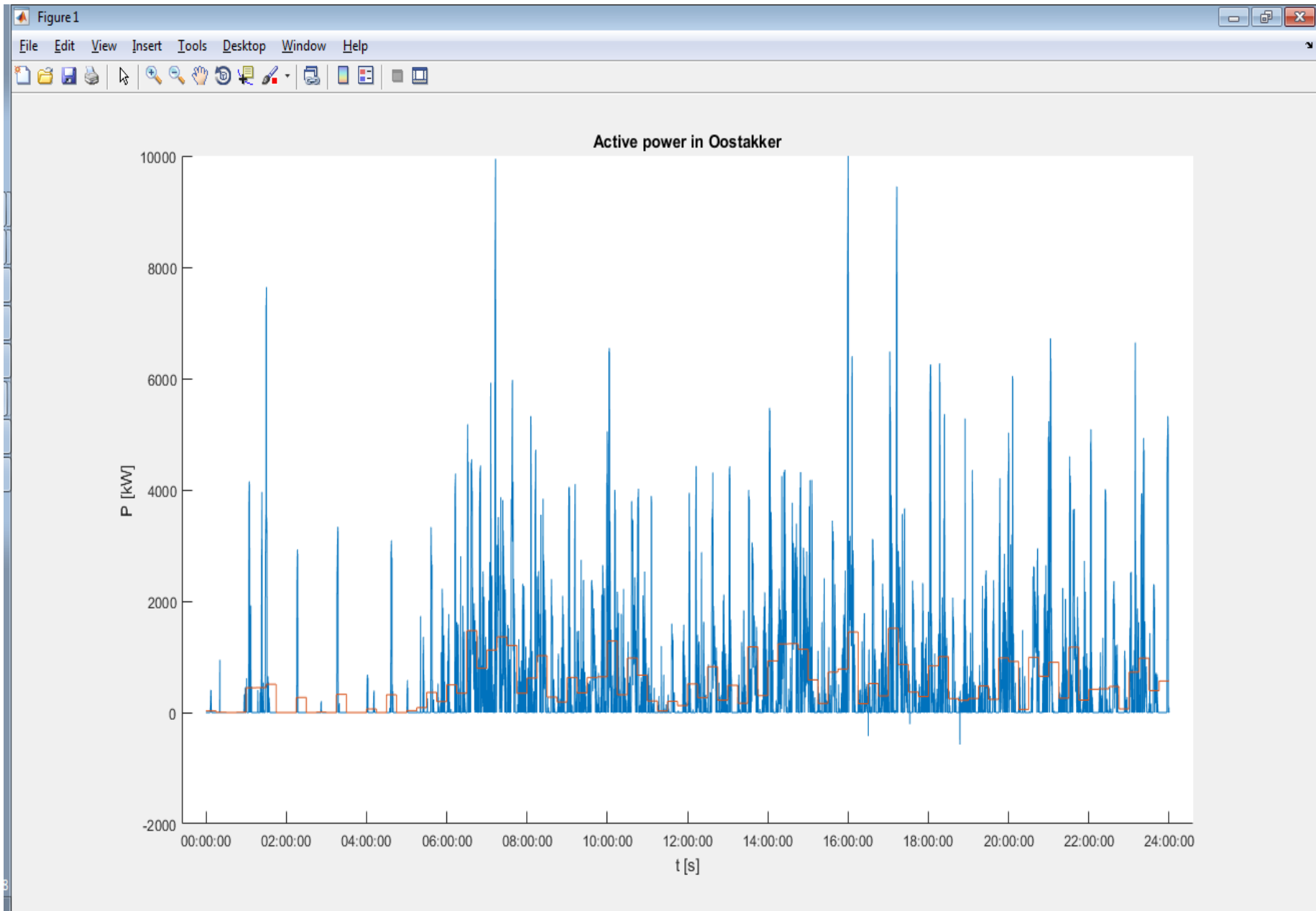






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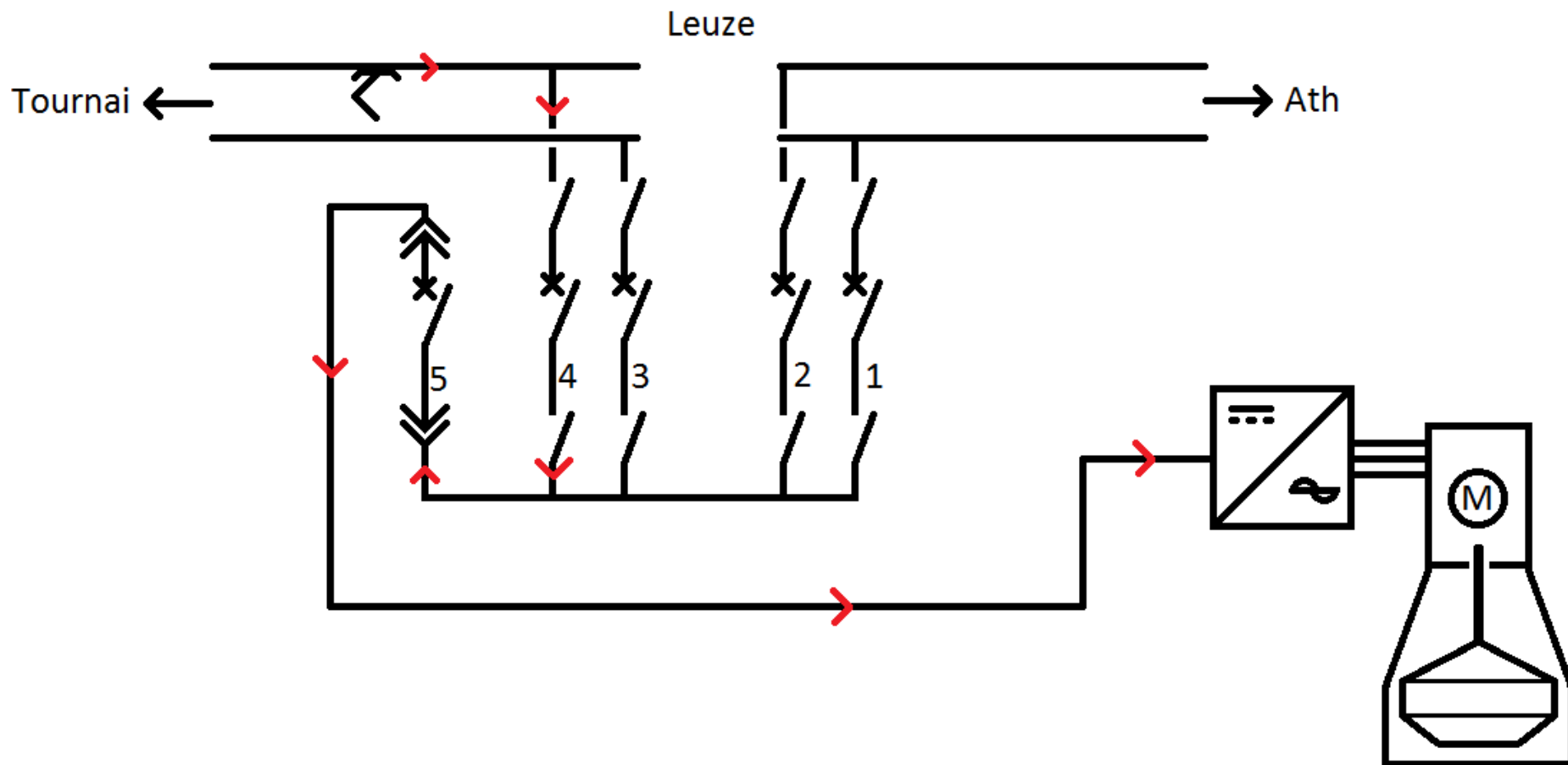


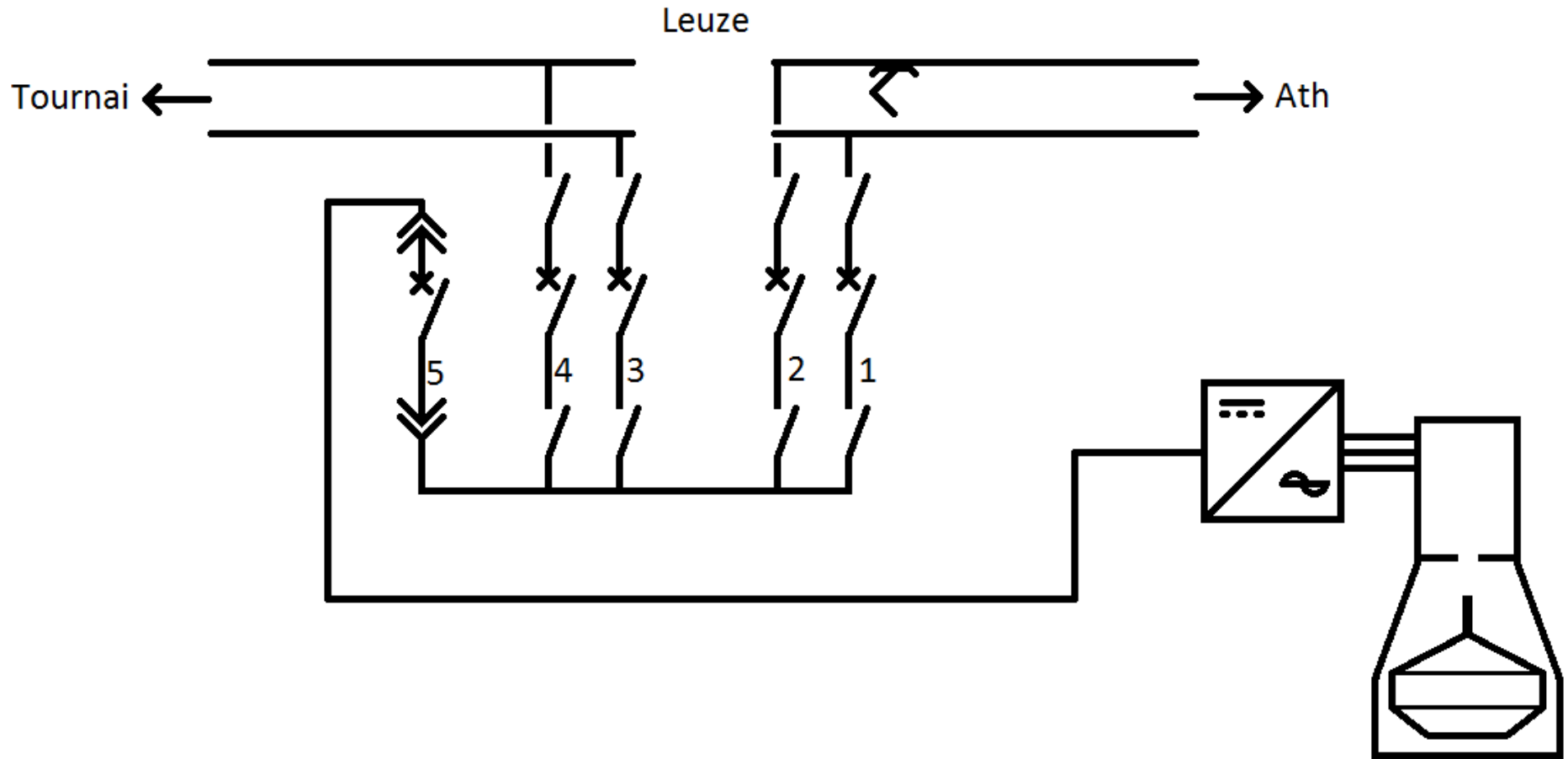
The interest of energy storage

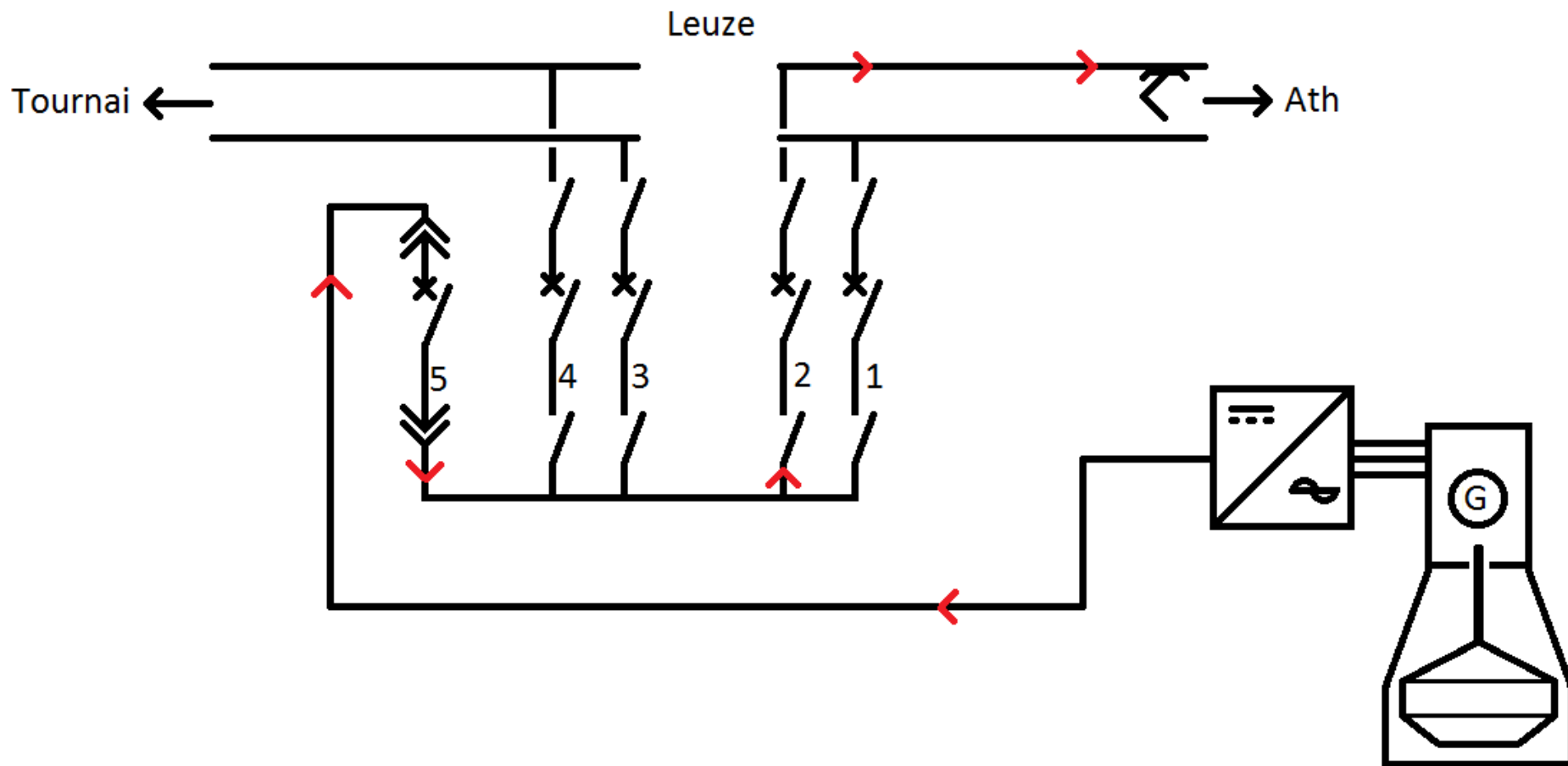
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Storage with a flywheel: partners

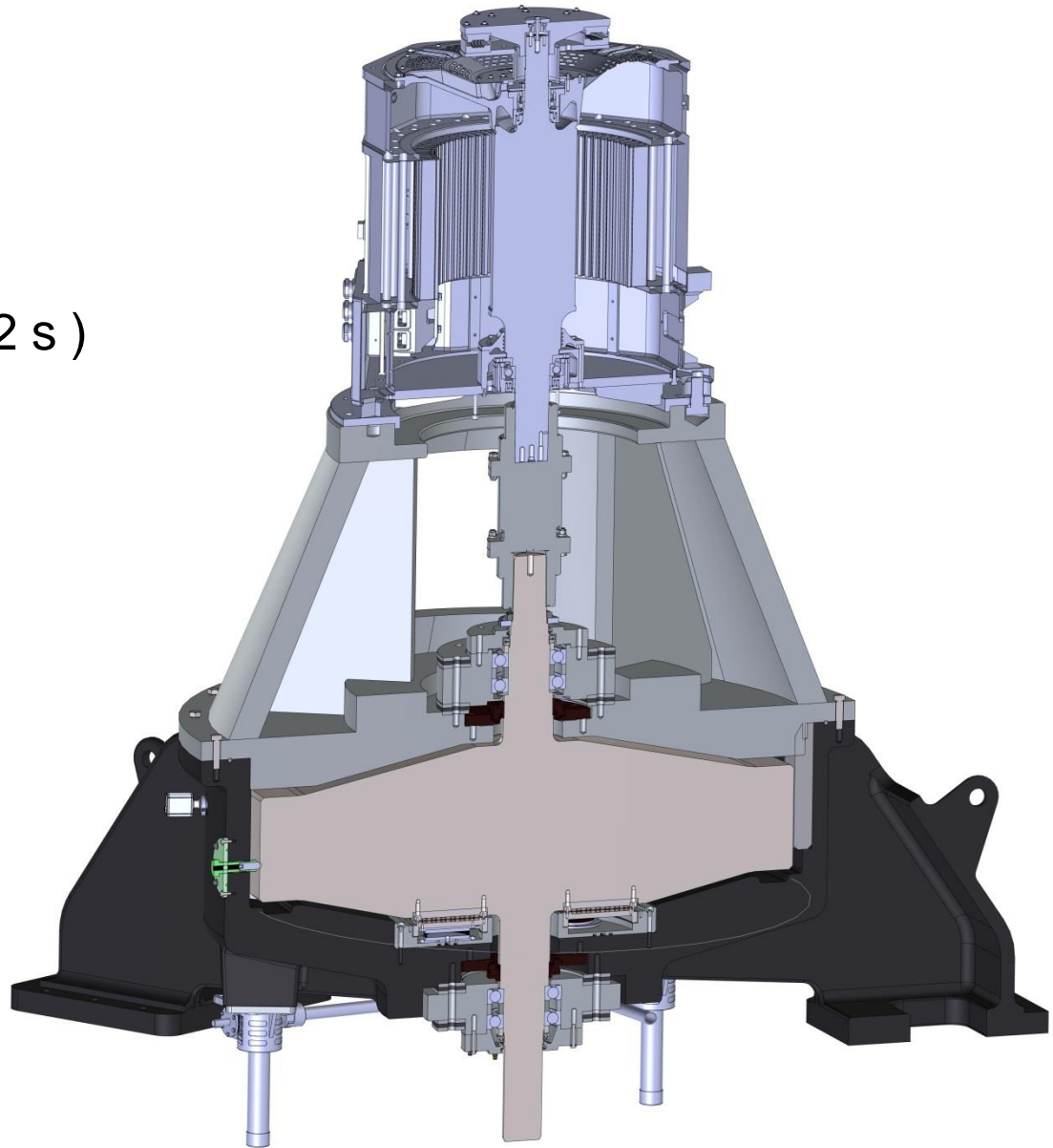








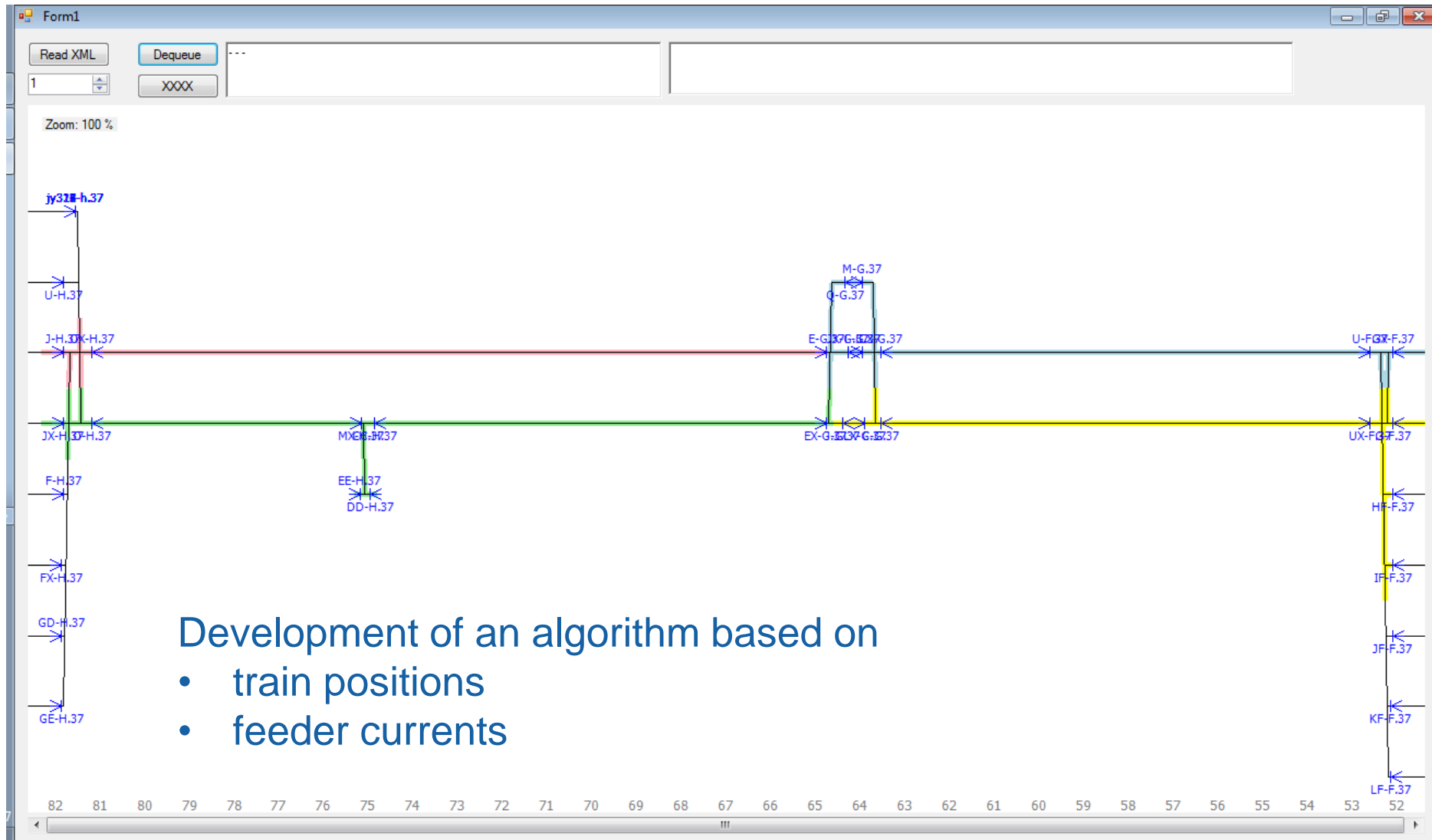
- Energy: 26,1 kWh
(= 3 MW during 31,32 s)
- Power: 3 MW
- Vitesse: 4000 rpm
- Rotating part: 5 T,
diameter of 1m50
- Noise: up to 120 dB(A)





Energy storage

- Short term: recuperation of braking energy + smoothing of power
5 MW 100 kWh 100 cycles per day
- Storage of produced energy
500 kW 1000 kWh 1 cycle per day
- UPS
100 kW 1000 kWh 1 test cycle per month
2 kW 10 kWh 1 test cycle per month

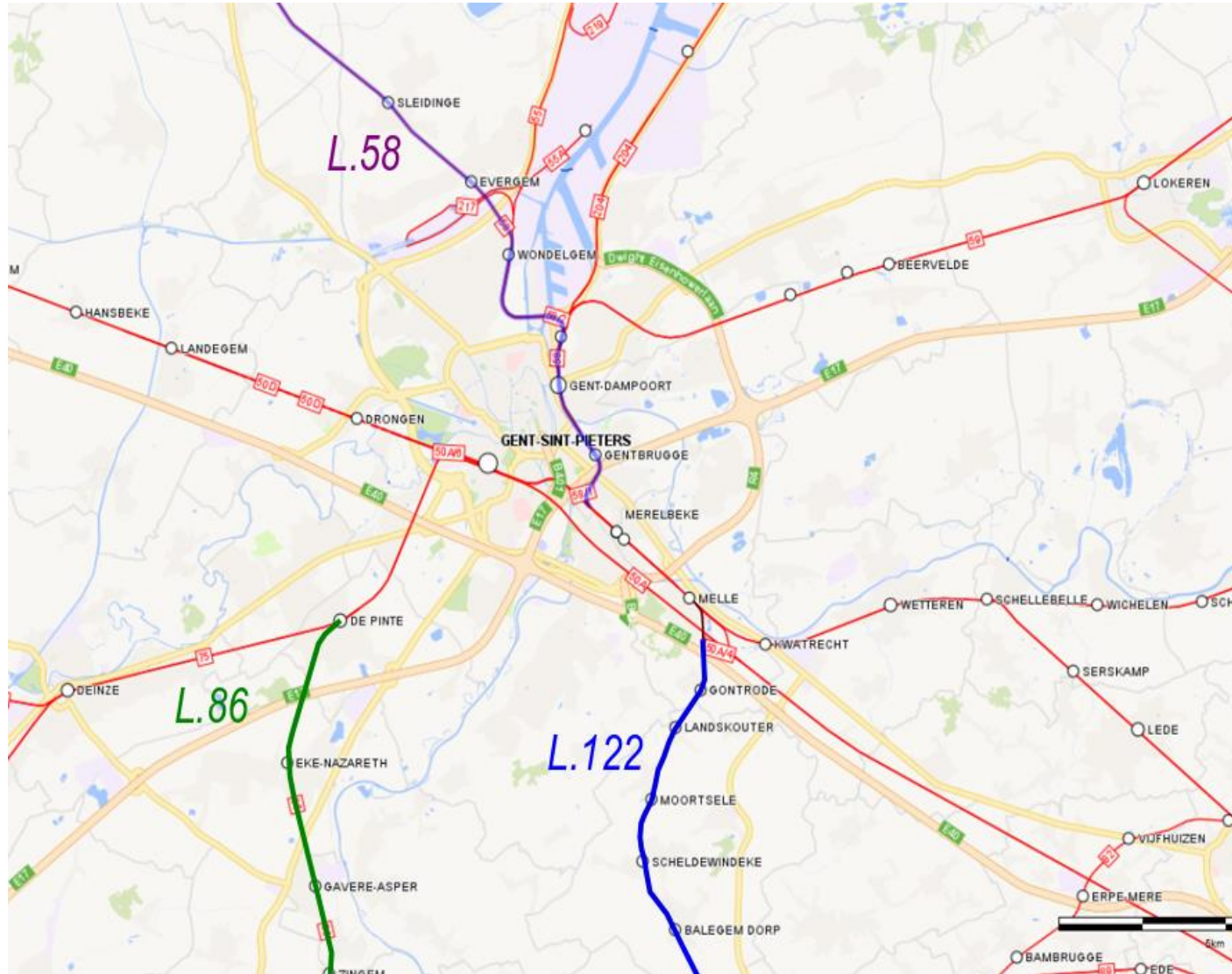


Hydrogen?

Still in brainstorming phase

- Only a few non-electrified lines remaining (8 % of network)
- Produce H2 ourselves → decrease of ratio maximum power/average power
- Use the H2 for our cars and vans
- Use the H2 for our work trains
- Promote H2 trains on non-electrified lines





Conclusion

Increasing the energy efficiency:

- Increase the average voltage on the weakest places
- Increase the possibilities for energy recuperation

More efficient use of our network

- Better ratio between peak and average power
- Immediate use of renewable energy
- Produce H2 when no traction power is needed

Trade off between overhead lines and other green technologies



QUESTIONS