



External point of view from
Distribution Network
Operator: Balancing
changing market with more
renewable and more need
for storage; possible roles
for railway

alliander

Working together towards
a sustainable future

alllander

Alliander, a Dutch energy grid company

allliander



Customers

- Customers: 3 million
- In 144 municipalities and 5 provinces
- Availability of energy: 99.99%
- Installed smart meters: 1.6 million
- Customers feeding energy to the grid: 144,200

Employees

- Employees: 5,755
- Employee satisfaction 70%

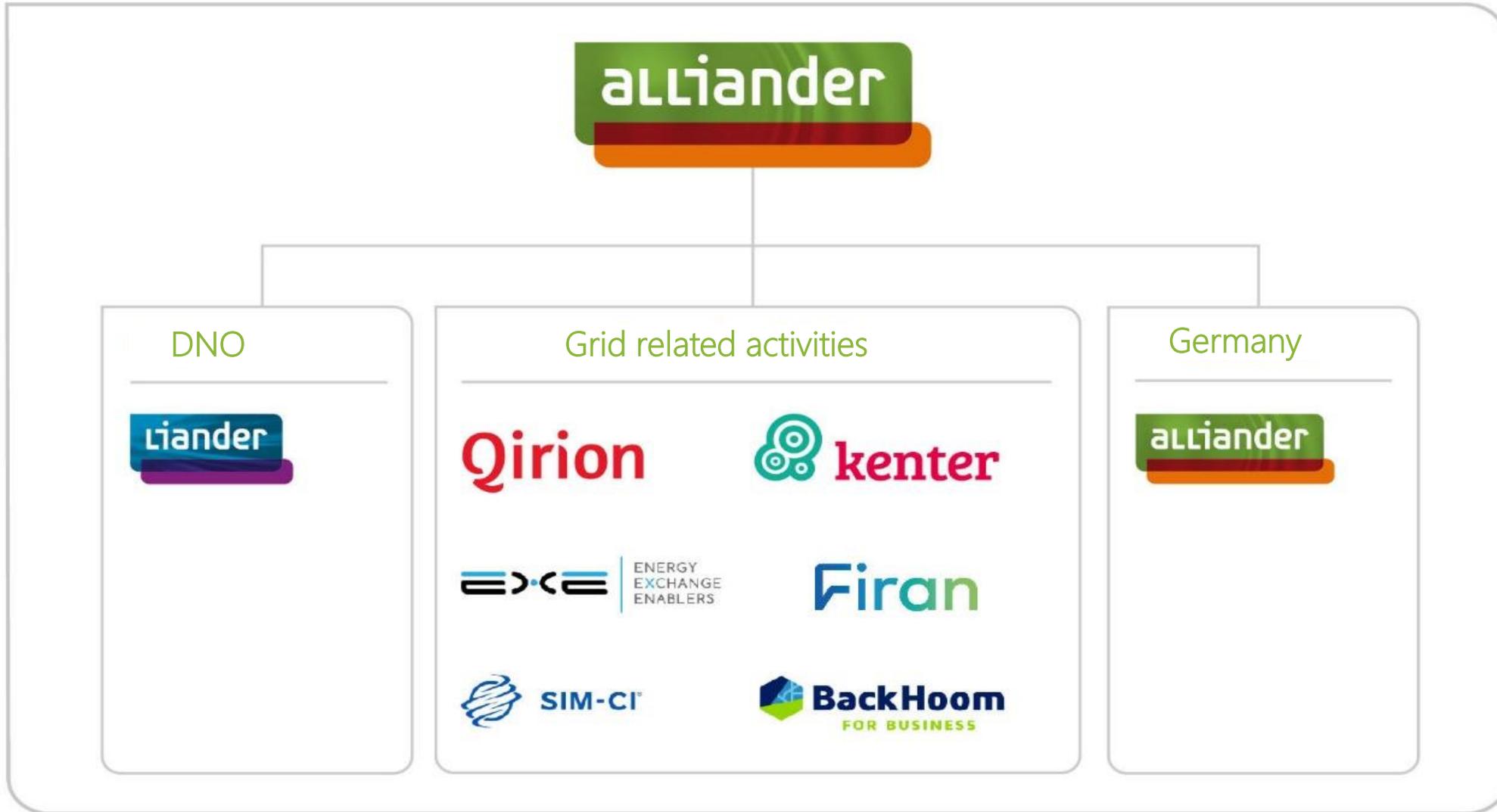
Financial

- Revenue: € 1.7 billion annually
- Investments: € 844 million in 2019

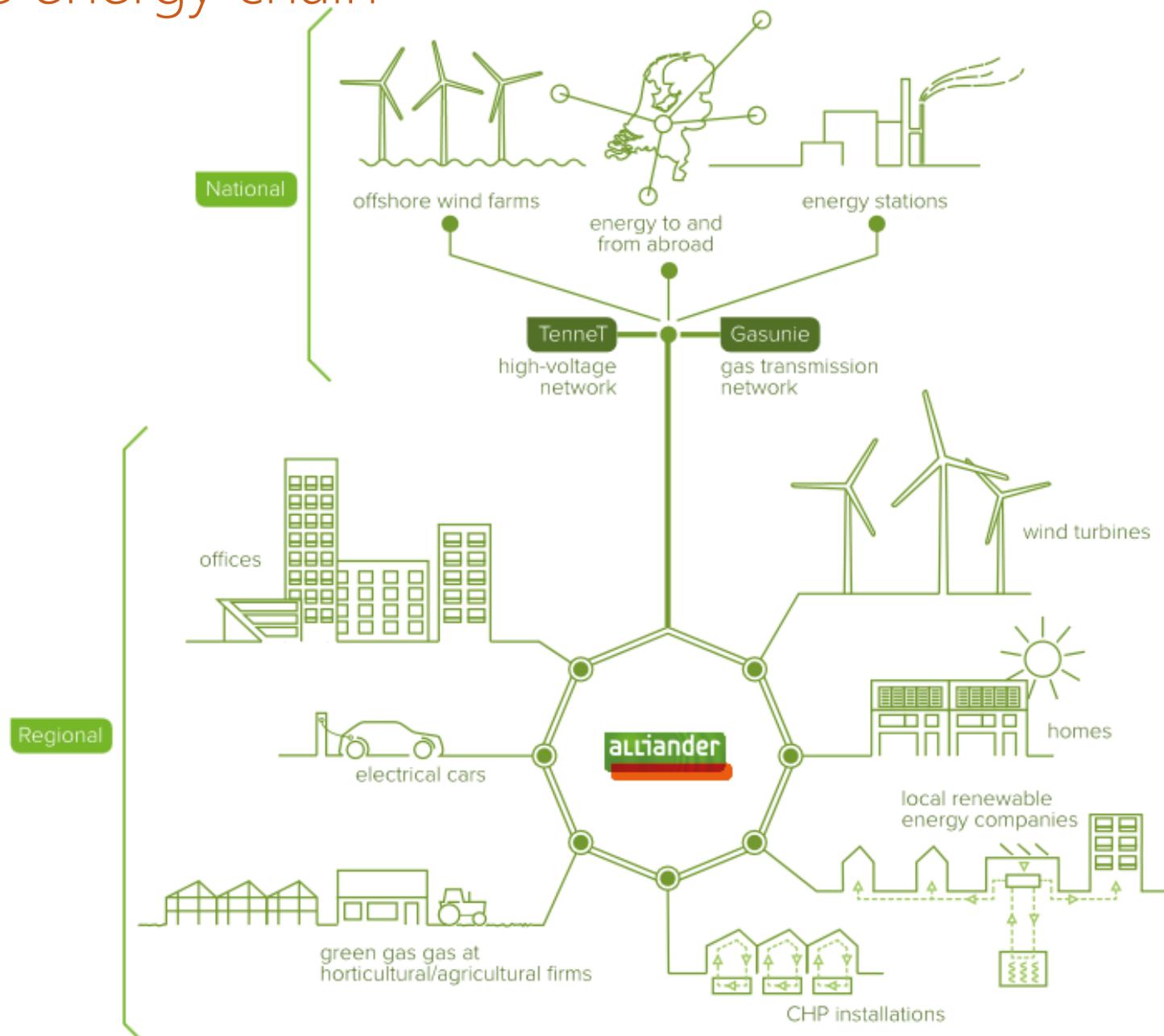
Gouvernance

- Publicly owned

Organigram



Alliander in the energy chain



Similar drives energy grid company and railway company

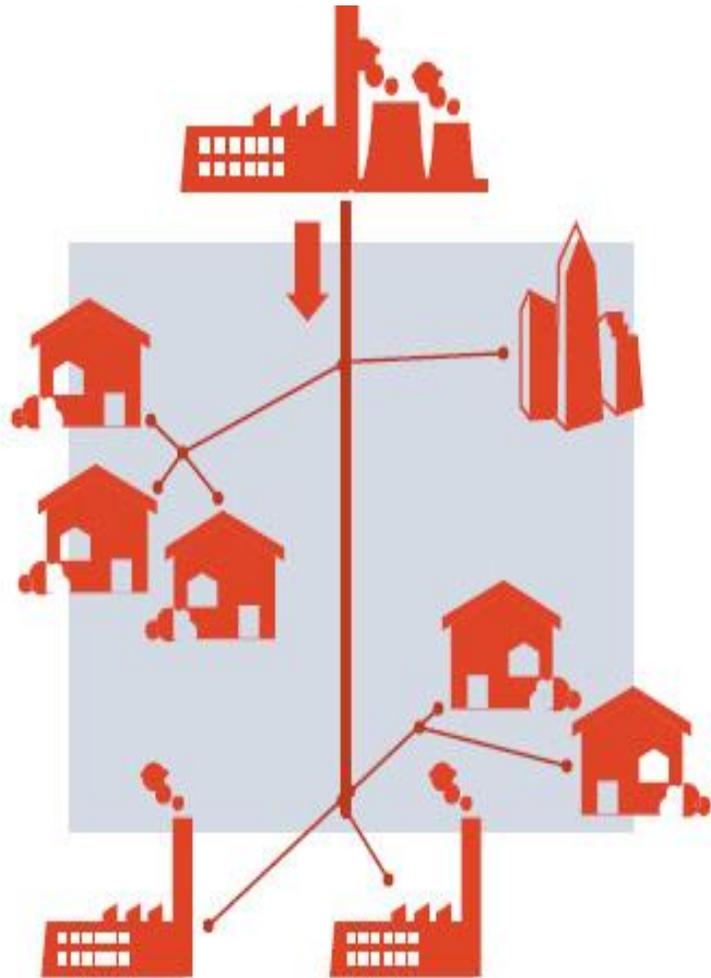
The logo for Alliander, featuring the word "alllander" in white lowercase letters on a green rectangular background with a dark green shadow effect.The logo for ProRail, featuring the word "ProRail" in a bold, dark red serif font.

- ↘ Both infrastructure managers
- ↘ Both ProRail and Alliander are *public parties* in the Netherlands
 - ↘ Alllanders shareholders are 100% local governments
- ↘ Safety is top priority
- ↘ Reliability crucial

Challenge due to the energy transition

Present grid

alliander



Power generation



Transport



Distribution



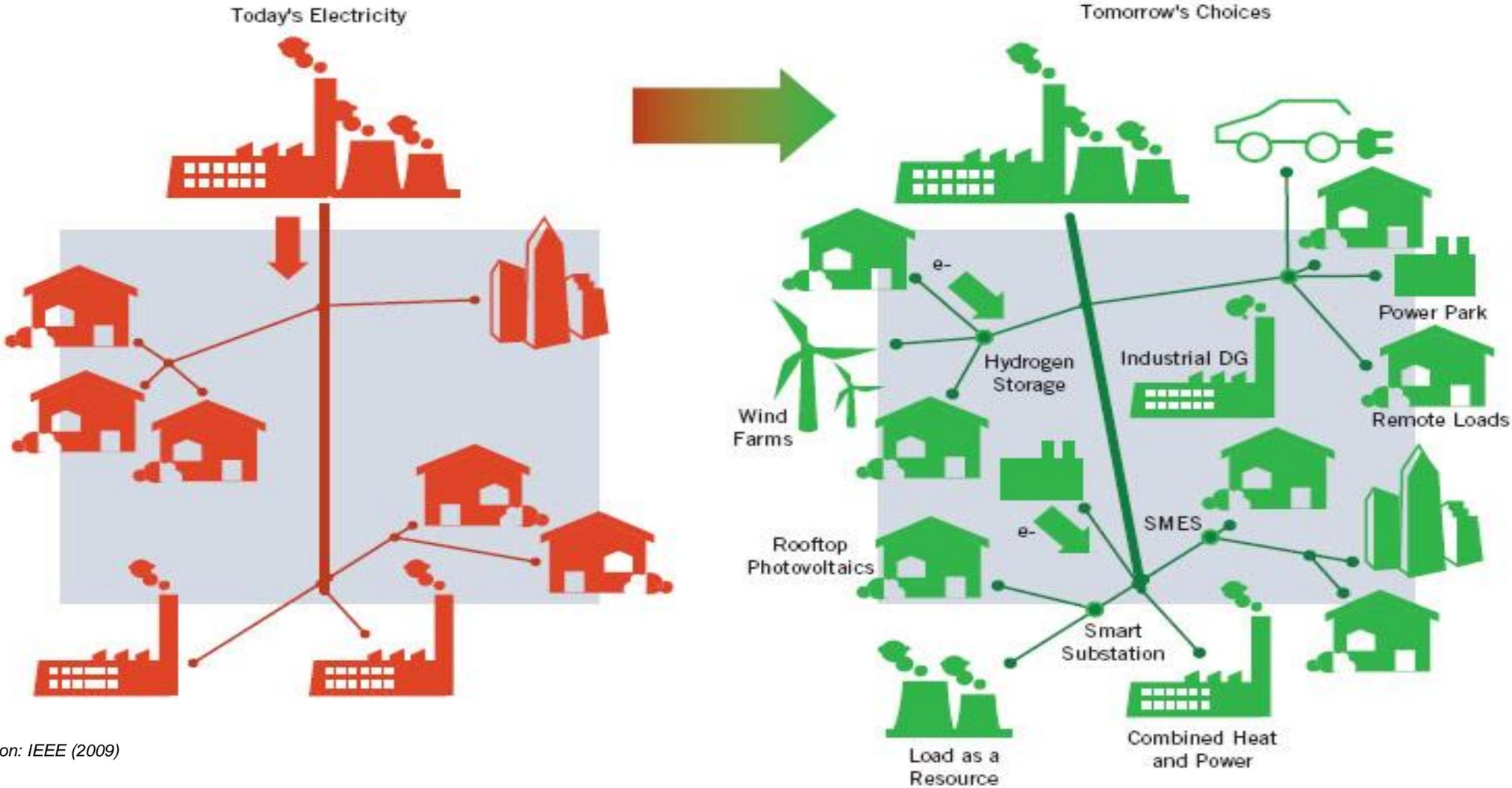
Use

Challenge due to the energy transition

From present grid to tomorrow's grid



Grid Modernization



Bron: IEEE (2009)

Some cases

- All the cases mentioned are ment to inspire
- So: imagine that there are no legal or technical barriers

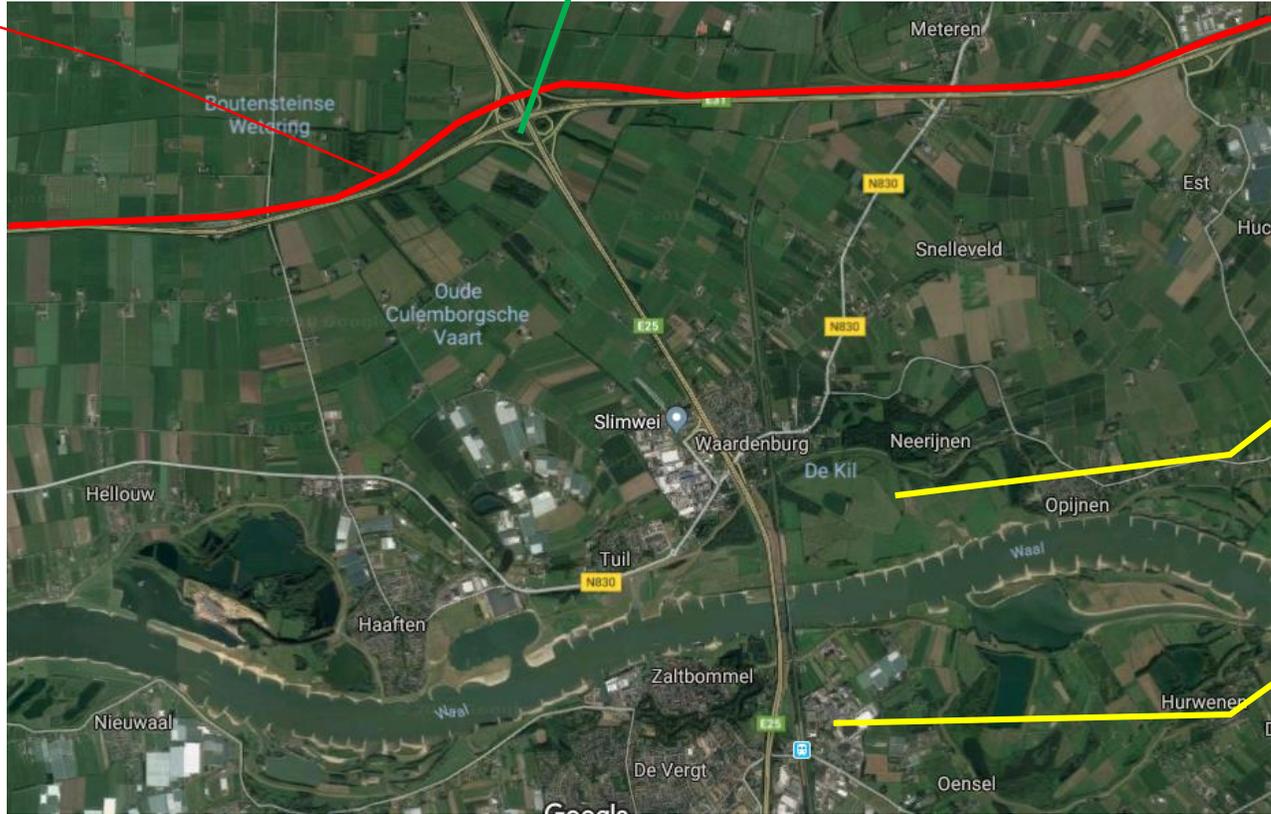
- Cases:
 - Wind
 - Solar
 - Storage

Windturbines in Deil



Betuweroote

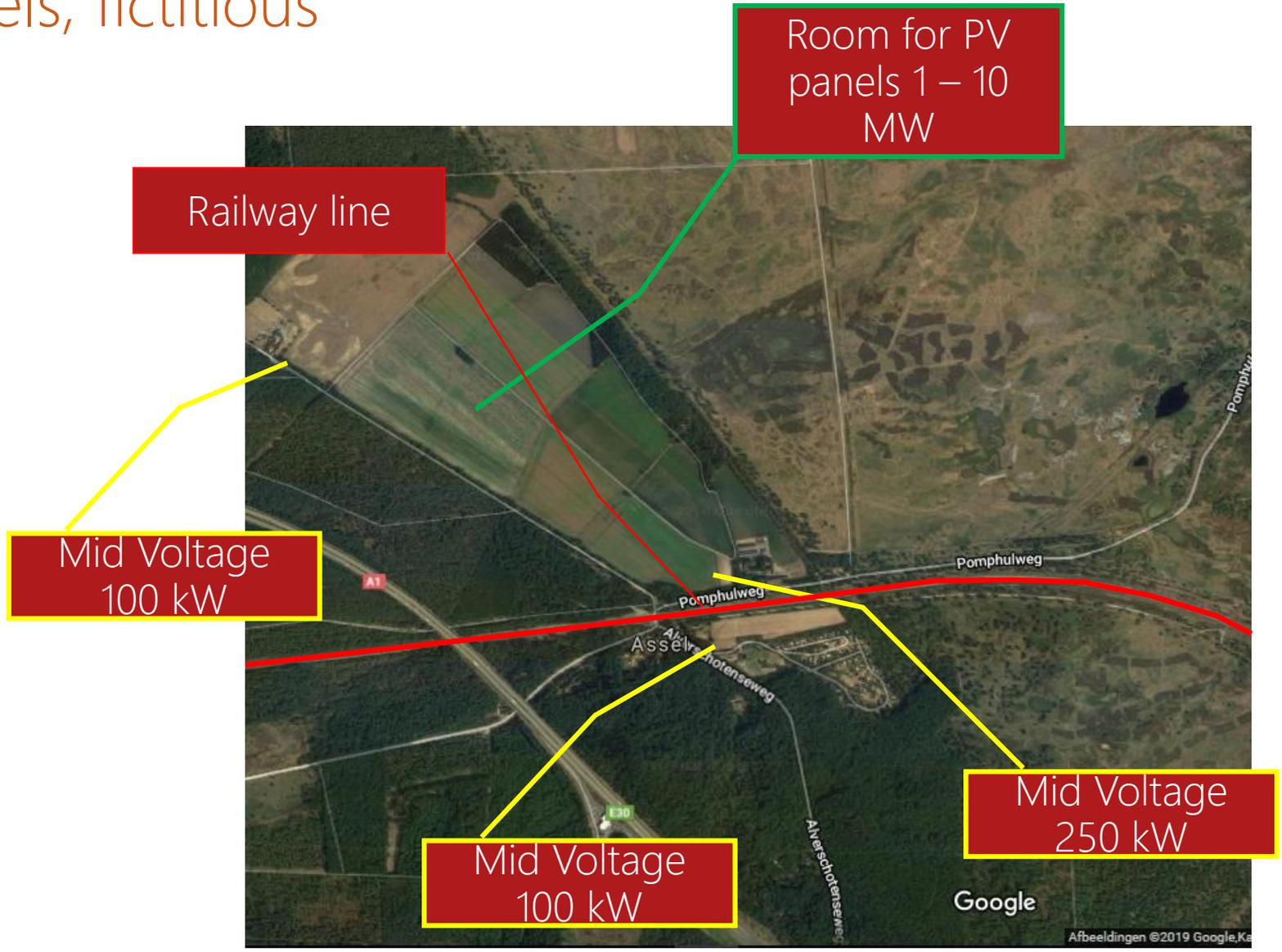
4 windturbines



Nearest Substation but limited capacity

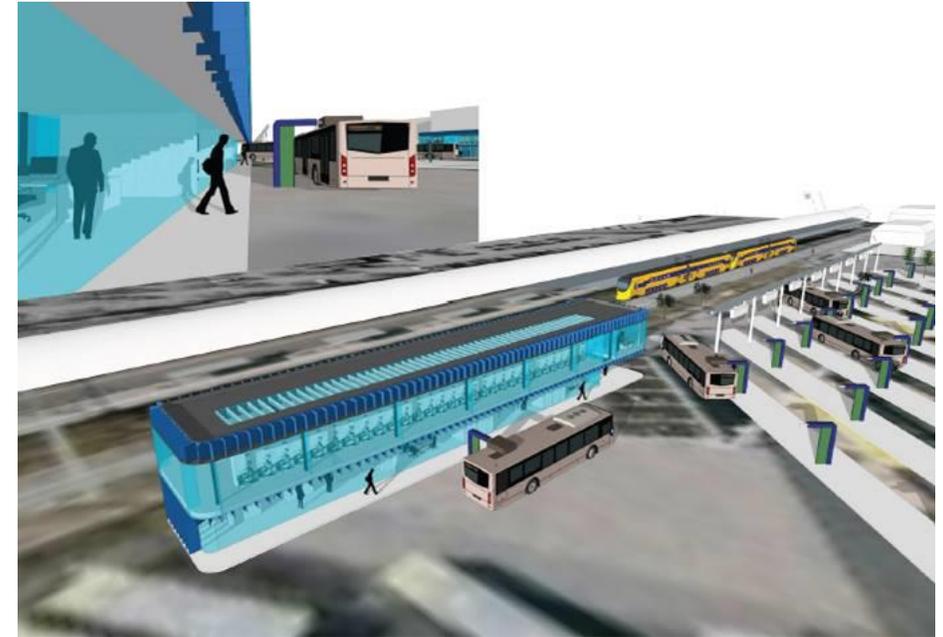
Nearest Substation with capacity

Solar panels, fictitious



Charging electric busses through a battery pack

- Busstations are often located near railway stations
- To improve the air quality in city centres electric busses are introduced.
- Other transport modalities also tend to electrification (cars, scooters, bicycles)
- Large electric capacity is required
- Charging busses through batteries spreads the required grid capacity
- Battery packs as a storing interface create new opportunity's:
 - Storing regenerated braking energy
 - Charging via the overhead contact lines
- ProRail is studying the concept .



Artist impression bus platform with electric charging facility

Finally

- Rail companies and a DSO have similar backgrounds and social and environmental goals
- Our electrical infrastructures will have to improve and innovate
- There are chances for synergy
- A further exploration is usefull
- We *might* face some legal and technical challanges

For further questions or exchange of ideas please contact:

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