Discover TenneT

Jeroen Drewes – Emma Pellizzari

22 May 2019

Stay tuned. Safety first!

For your safety as well as our own we would like to draw your attention to the following safety measures.

In case of an emergency, the following instructions also apply:

- Follow the escape route as indicated.
- Use the stairs instead of the lift.
- Go the assembly point.
- Follow the instructions of the in-company emergency worker who is present at that moment.

Welcome & Agenda

- About TenneT
- Tasks of a Grid Operator
- Challenges in a evolving Energy Market
- Breakout session
- Wrap-up and conclusions

Your hosts for today

Emma Pellizzari
Balancing Specialist

Jeroen Drewes
Balancing Specialist

Gineke van Dijk
Stakeholders Management

Janine Spaan
Campus Recruiter

TenneT…who?

TenneT at a glance

4,538
Employees

EBIT
806
(EUR million)

Assets
21.8
(EUR billion)

Investments (2019-2029)
35
(EUR billion)

Connected offshore wind farms
17

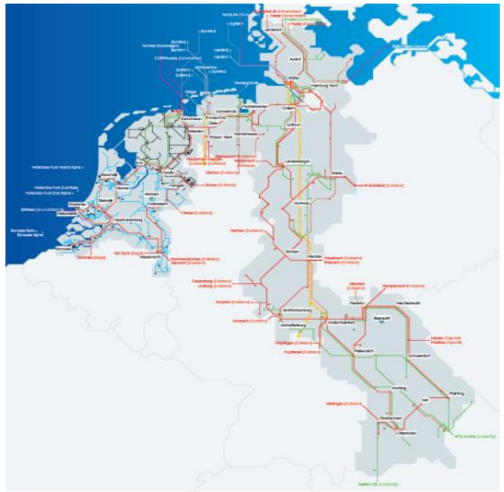
Number of transformer substations
462

Total grid length
23,000 km

Number of end-users
41
million

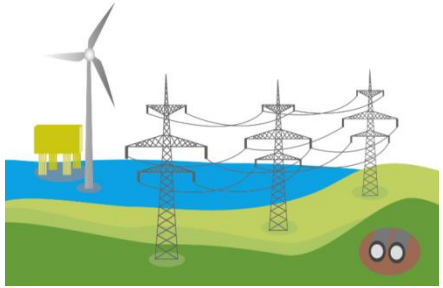
Total HVDC stations
18

Grid availability
99.99%

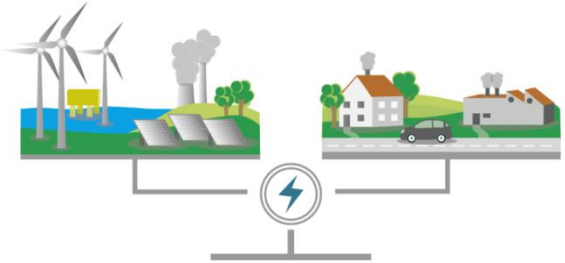


First European cross-border Transmission System Operator

Tasks for a Grid Operator



Transmission services



System services

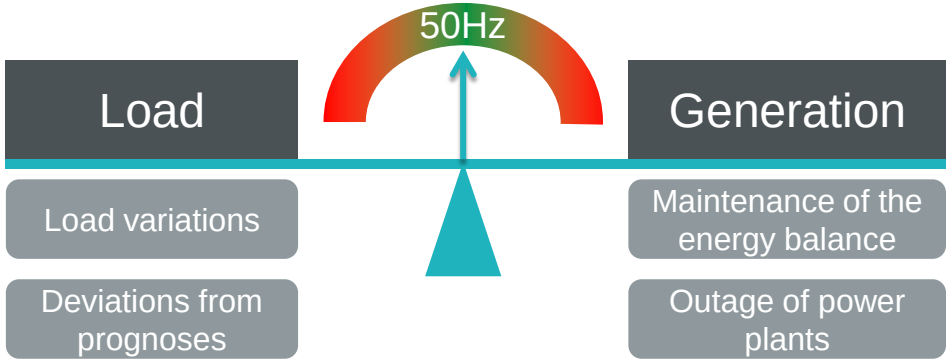
Market facilitation

Transmission Services

TenneT is a **grid operator** (110 kV and higher voltage levels)

- Maintaining the grid
- Grid investments
- Connections
- Safety and robustness of the grid (N-1)
- Etc.

Maintaining the Balance



Maintenance of the energy balance: the amount of electricity produced must always match the amount of electricity consumed.

TenneT has no production or consumption units, we contract **ancillary services** from market parties: Balancing Service Providers (BSPs).

It is a responsibility of the market participants to respect their forecast on a 15 min. level

Facilitating the Market

- TenneT actively contributes to the **further integration of the European energy market** and the development of a North-West European electricity market (NWE region)

- TenneT is an active member of international organizations in order to help **shape the integration of the European electricity market**
- TenneT has an interest in **EPEX SPOT** – a power exchange for spot market trading of day-ahead and intraday transactions

Challenges in a evolving Energy Market

Energy Now – TenneT

Renewables and grid balance

Integrating renewables in the grid and maintaining the 50 Hz

NL makes way for large-scale sun and wind

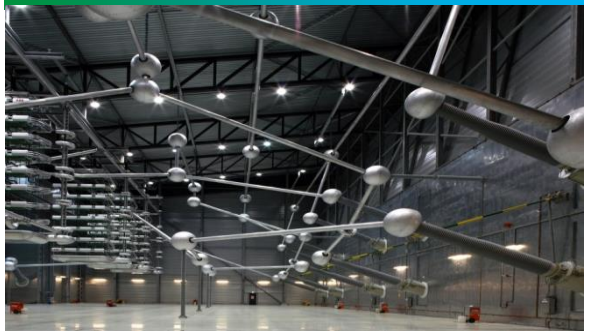
More weather dependency and therefore instant fluctuating energy generation

More players and assets in the electricity markets

Digitalization will play an important role

Security of supply must be maintained

Ensuring security of supply, even during long periods without wind and sun



RES and conventional generation

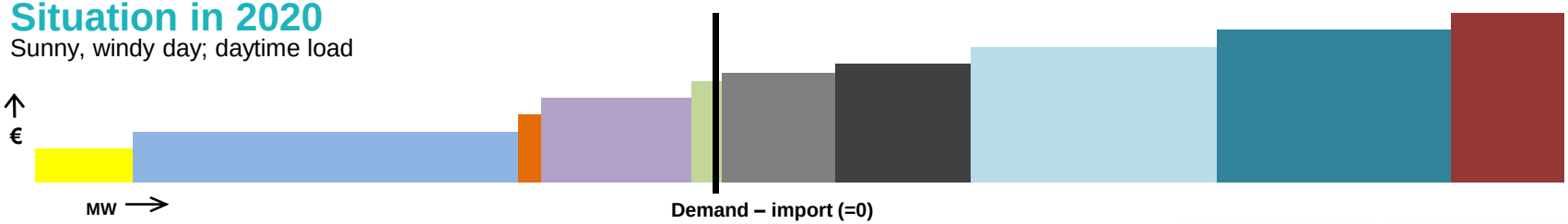
- Conventional plants will sell lower volume against (on average) lower prices
- Prices will rise at times without wind or sun
- Because of market coupling, prioritizing wind or solar production capacity can have impacts not only at national level

Situation in 2012

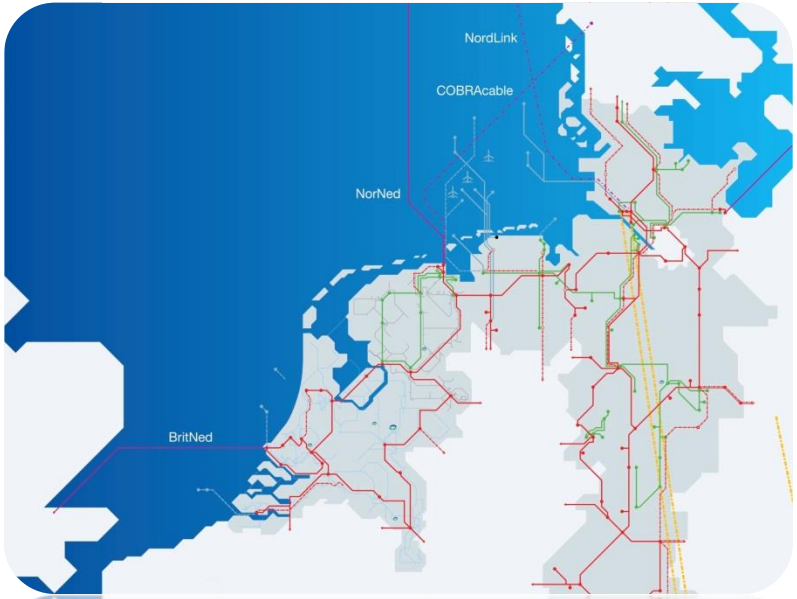
Sunny, windy day; daytime load

Situation in 2020

Sunny, windy day; daytime load

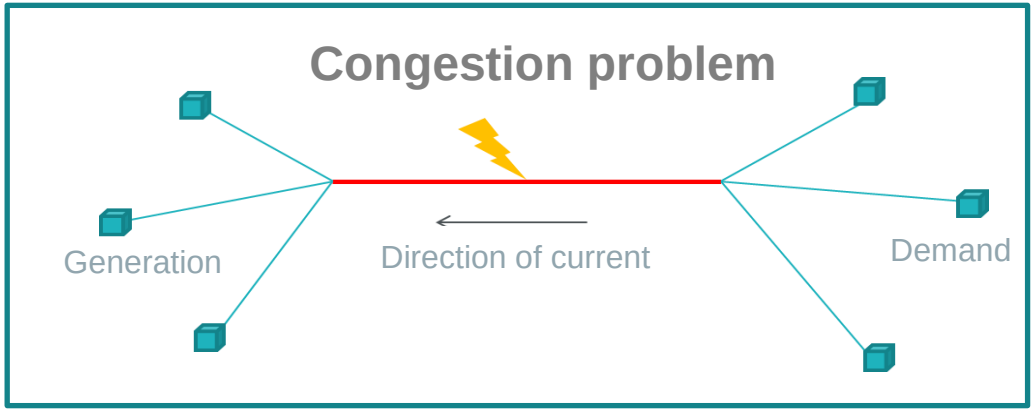


The grid has capacity limits



It's not possible to extend indefinitely the transmission grid.

An optimum should be found between investment and grid management.



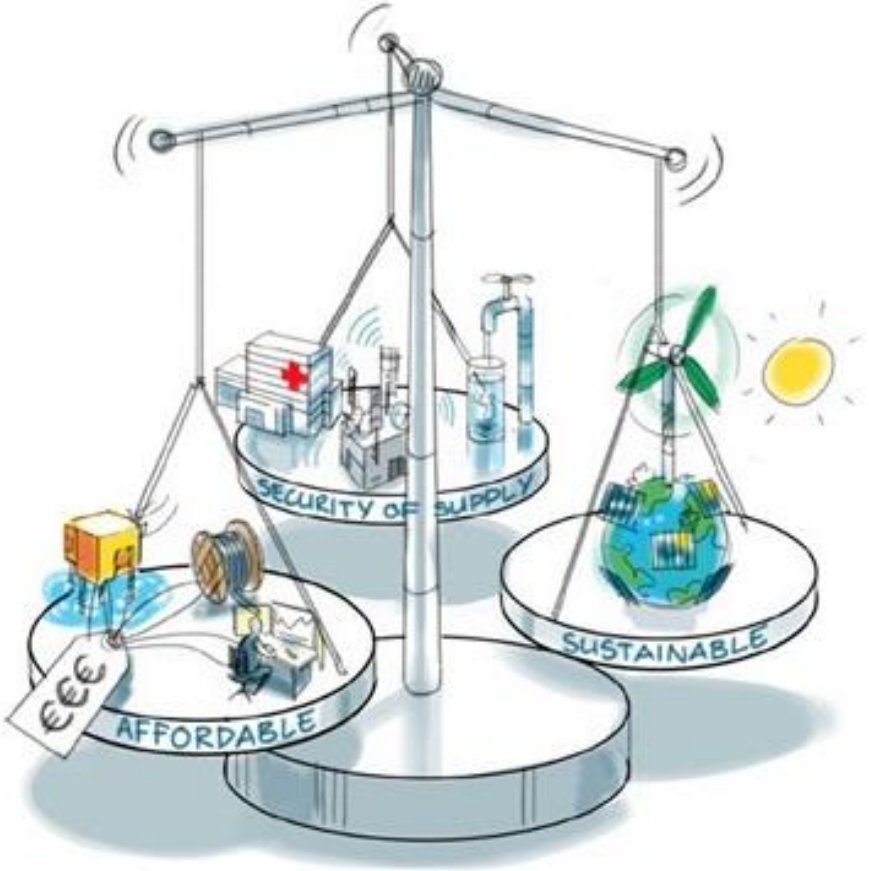
Developments in the market

Operation of HVDC cables, also within the synchronous area, to connect different european countries.

Resolution of products on cross border trading is increasing, more possibilities for market parties, increase the difficulty in managing.

Energy consumers are becoming also **“prosumers”.** The market needs to be facilitated also for these new players

Recap



Now it’s your turn!

Case

How can the electricity grid be operated as the smartest grid (also from EU perspective) when:

SCENARIO 1

- Increase of central RES by 70%
- Mobility (transport) is all electric

SCENARIO 2

- Increase of decentral RES by 70% (without the ‘salderingsregeling’)
- No natural gas for heating anymore

Your assignment

Develop a vision and plan of approach on how you would pick up this challenge.

Your plan must at least contain:

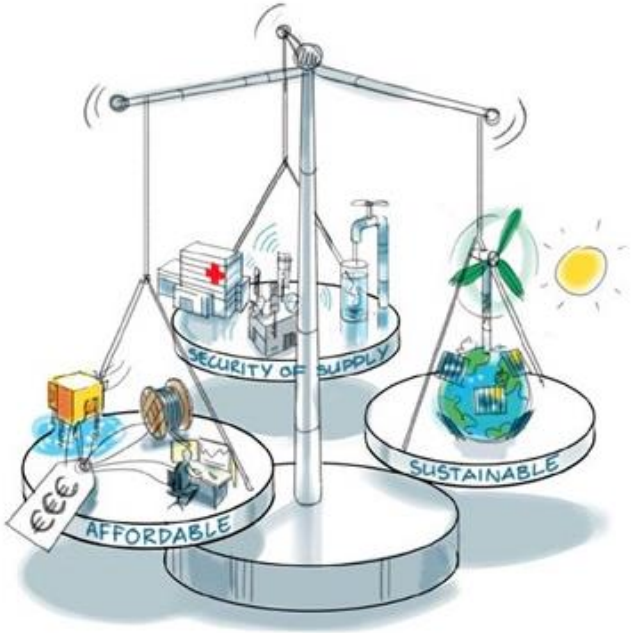
- Stakeholder analysis (who are stakeholders in your opinion?)
- Impact on information provisioning
- High-level solution design/minimum viable product (MVP)

Tips

- Assign roles in your team (e.g. project lead, solution designer)
- Use the Internet to find more background information
- Use your innovative skills, technology knowledge and think out of the box
- You can deliver your plan in any given format you prefer (e.g. Prezi, PowerPoint, flip-over, story-telling)

The Game

- You **create** a plan (*45 min*)
- You have the opportunity to consult **energy sector specialists** (*max 4 times*)
- **Pitch** your plan (*3 min*)
- Team and plan will be judged on:
  - Innovation and Vision
  - Completeness
  - Suitability for the Problem
  - Team Work



Wrap up

- What are we as TenneT doing
- How can you contribute to it already
- All stakeholders

Questions?

Thank you!

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www.tennet.eu

TenneT is a leading European electricity transmission system operator (TSO) with its main activities in the Netherlands and Germany. With approximately 22,000 kilometres of high-voltage connections we ensure a secure supply of electricity to 41 million end-users.

Taking power further