

DELTA-EE PUBLIC WEBINAR

WHAT CAN DSOS LEARN FROM THE PRACTICES USED TO INTEGRATE RENEWABLES IN THE UK AND THE NETHERLANDS?

Highlights from the Distribution Network Service

A DELTA-EE Service with support from 

29 APRIL 2021

Hello!

Today's team

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Housekeeping



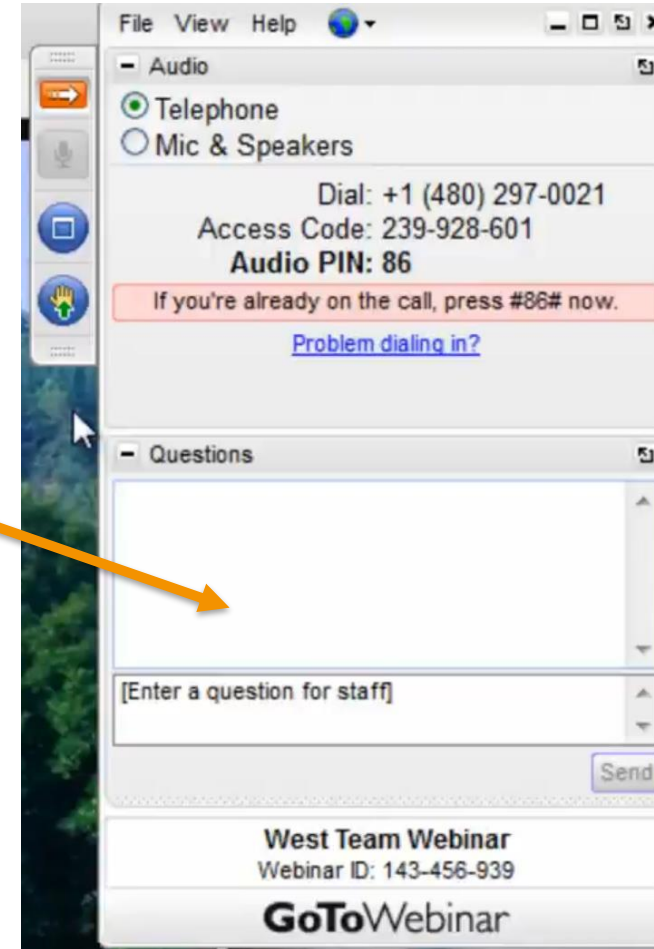
~30 minutes
+ 5-10 mins Q&A



You can write down a question which we will come to at the end of the webinar



Webinar is being recorded & slides will be sent out afterwards!



1st Poll:

How big of a challenge is the integration of renewable energy for DSOs?

- a) It's their biggest current challenge
- b) It is a challenge, but there are currently bigger challenges for DSOs
- c) DSOs are in control of the challenge, it is not a big concern anymore
- d) It is not a challenge yet in my country, as there isn't a significant amount of renewable generation

About Delta-EE and Alliander



We enable organisations to successfully navigate the energy transition.

- Subscription research services
- Consulting
- Training

Subscription research services

Connected Homes	Distribution Network Service*	Distributed Power
Electrification of Heat	Energy Insights +	Energy Storage
EV Charging	Flexibility	Gas Heating
Global Hydrogen Intelligence	Local Energy Systems	Heating Business
New Energy Business Models	New Energy France	

* This Service is delivered with support from Alliander



Alliander is a group of companies, incl.:

- Liander (Largest Dutch Distribution Network Operator for Electricity & Gas)
- Firan (Heat Networks, Microgrids and Hydrogen)
- Telecom (Wireless and Fibre connectivity)
- Qirion (engineering sustainable tech and infra)
- Kenter (metering & energy management)
- ENTRNCE (energy transaction services)

Alliander develops and operates energy networks in the Netherlands and Germany.

Through our cables and pipes, over six million households and companies are supplied with electricity, gas and heating. And we pursue innovative and sustainable solutions and services that contribute to the new energy system.

We are driven by keeping energy reliable, affordable and accessible for everyone in the transition to sustainable energy.

What can DSOs learn from the practices used to integrate renewables in the UK and the Netherlands?

Agenda

1. Introduction
2. What are the main technical challenges?
3. What are some of the practices?
4. Summary and future direction

Scope

For this presentation and the underlying report

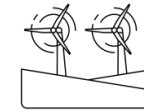
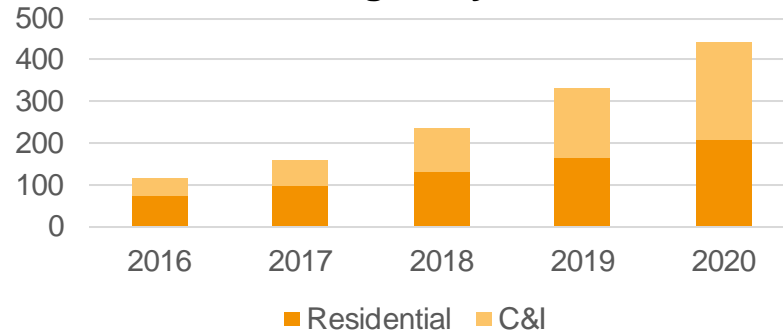
- The report is looking at the practises relating to the integration of **renewable power generation in distribution networks**.
- What is not included directly in the scope, but still part of the wider narrative :
 - **Integration of low-carbon heating & transport technologies** : not directly within scope but still part of the narrative, for example as a solution, due to their inherent flexibility or with regards to their implications for the complexity of the future system etc.
 - **Challenges at a TSO level or system level** : not discussed in the same detail as the challenges in a DSO level, but for example important to keep in mind that the solutions for these issues will often be derived from distribution network assets and/or distributed energy resources connected to the distribution networks (e.g. System Balancing, Frequency Response, Black start capabilities etc).
- Research focused on 2 countries NL and UK

Introduction

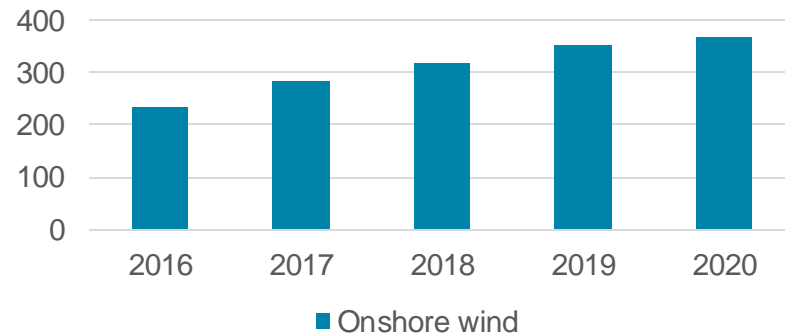
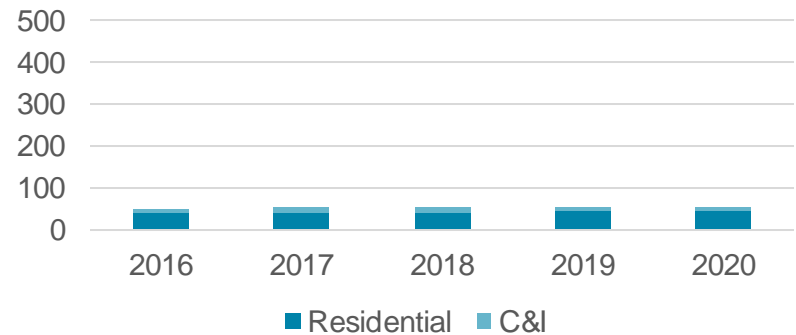
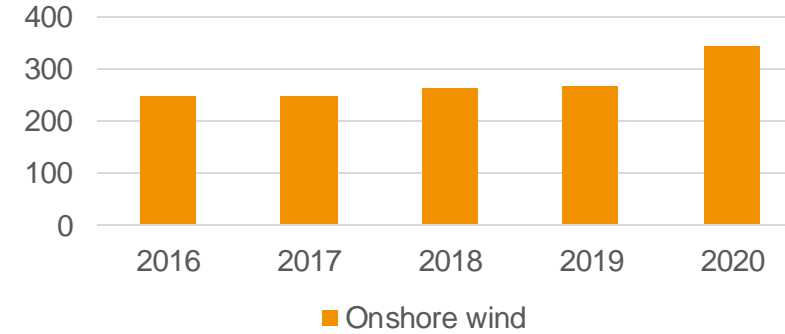
Netherlands & UK on the energy transition



Installed base of Solar PV normalized by total country population (MWp/million people), excluding utility-scale



Installed base of onshore wind normalized by total country population (MWp/million people)



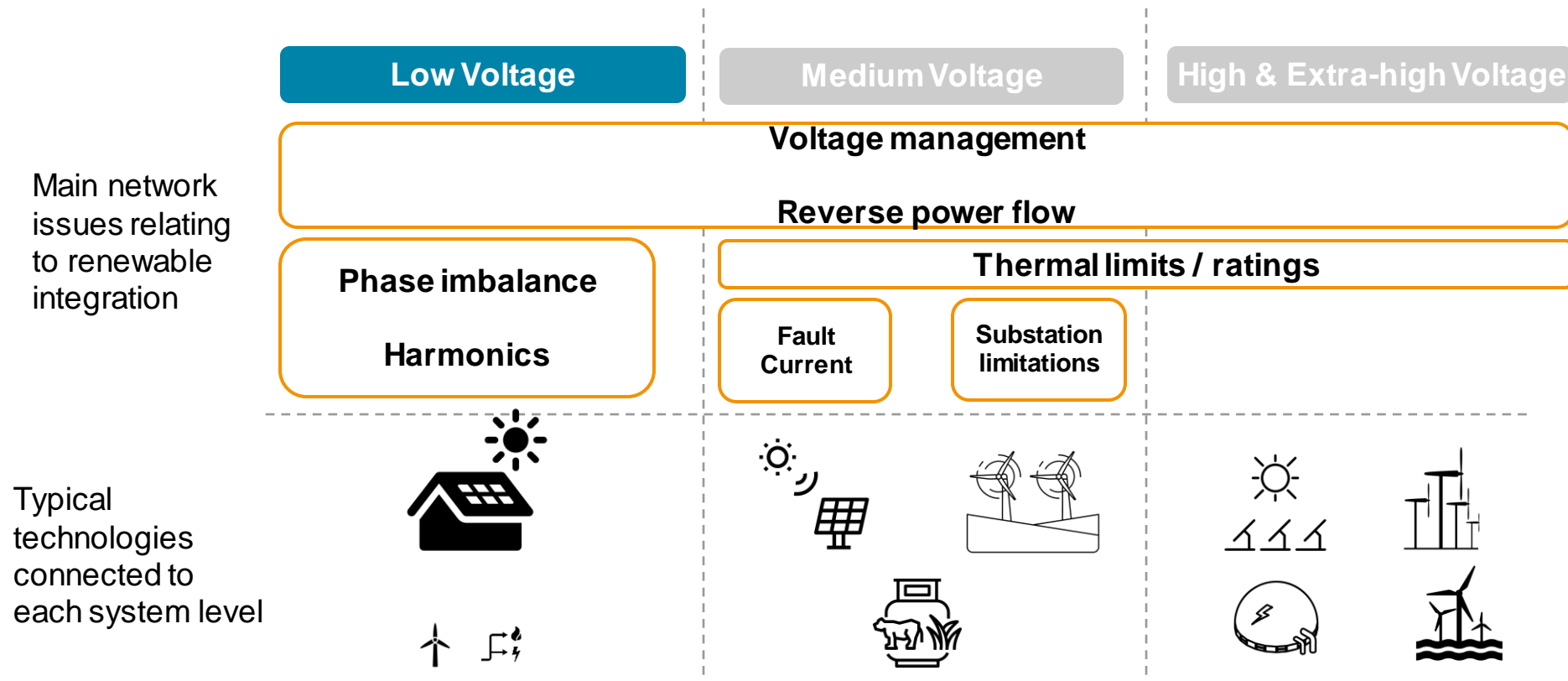
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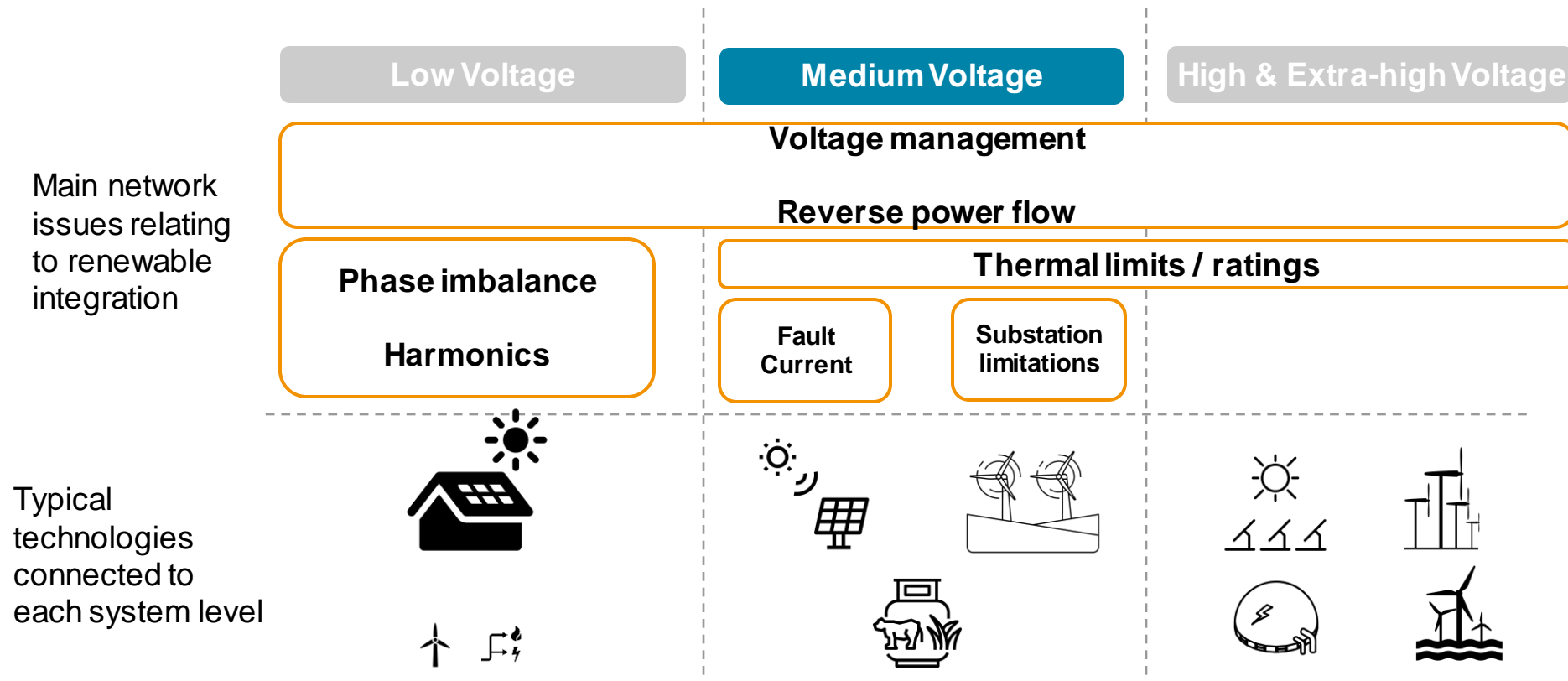
What are the main challenges?

Low voltage



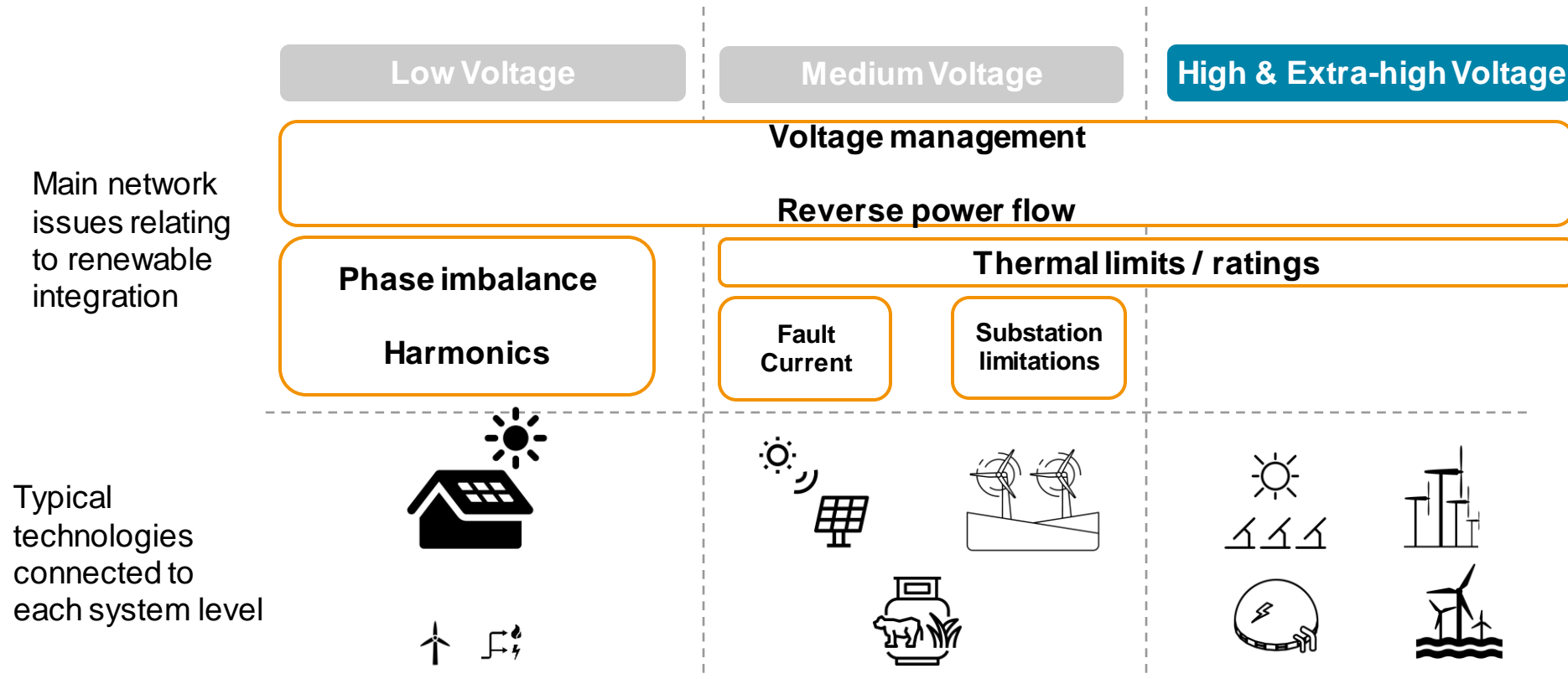
What are the main challenges?

Medium Voltage



What are the main challenges?

High & Extra-high Voltage



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What are the solutions to the challenges?

Examples of deployed solutions

Network-facing solutions		
LV solutions	MV solutions	HV/EHV solutions
Distribution transformer with automatic voltage control	Dynamic line ratings	
Soft Meshing		Upgrade to novel protection systems
In-line voltage regulators	Fault current limiters	Collocation of battery storage
Enhanced monitoring and aggregation of smart meter data	Advanced Automatic Voltage Control (AVC) systems	

Customer-facing (flexibility) solutions	
Flexible curtailment	Demand-side flexibility

What are the solutions to the challenges?

Example: Enhanced monitoring

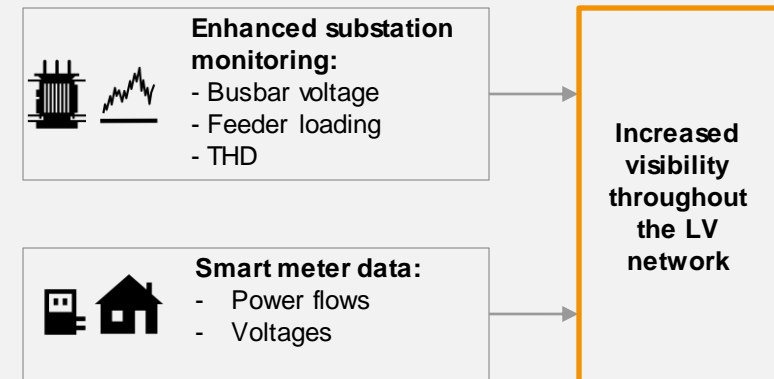
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Customer-facing (flexibility) solutions	
Flexible curtailment	Demand-side flexibility

Examples of deployed solutions

Increasing the visibility of LV networks parameters is becoming very important, with the expected increase at the levels of penetration of EV charging and heating.

Data points taken at MV/LV substations and at consumers can increase the visibility of the state of the network



What are the solutions to the challenges?

Example: Dynamic line ratings

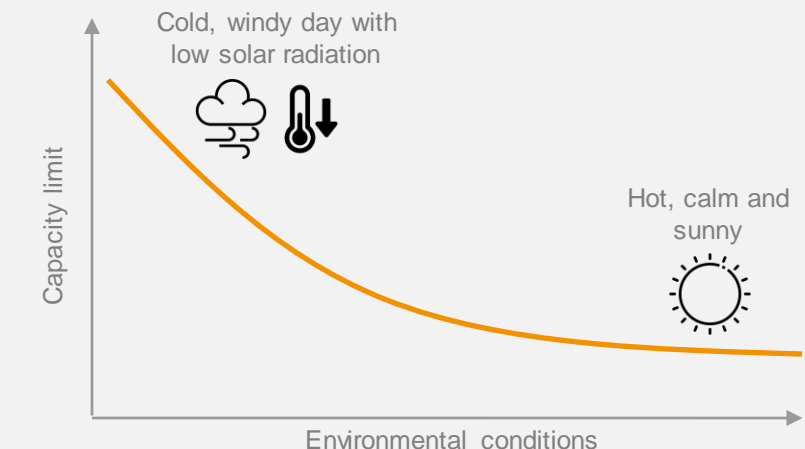
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Customer-facing (flexibility) solutions	
Flexible curtailment	Demand-side flexibility

More accurate real-time estimation of the capacity limits in overhead lines, can reduce the risk of curtailment of renewable energy generators due to congestion.

Indicative effect of environmental conditions on line capacity limits



What are the solutions to the challenges?

Examples of deployed solutions

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Customer-facing (flexibility) solutions	
Flexible curtailment	Demand-side flexibility



Demand side flexibility involves agreeing demand turn-down contracts to manage network constraints enabling avoidance or deferral of network reinforcement



Typical commercial and industrial loads

Example of flexibility for congestion management in the Netherlands

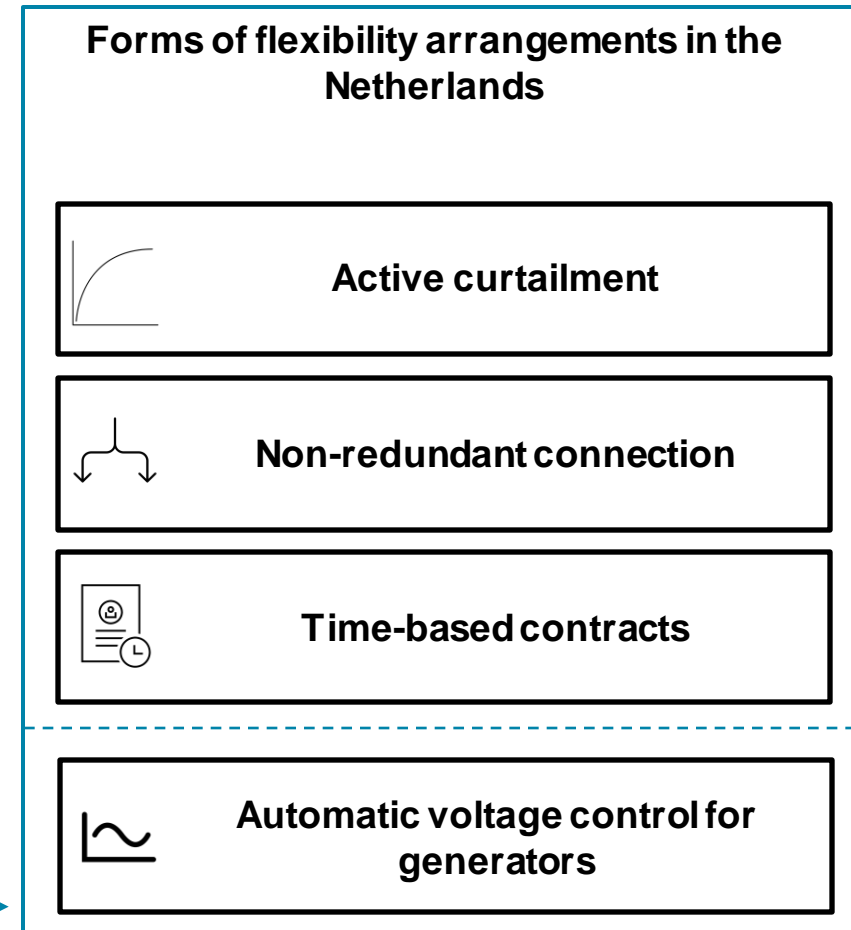


What are the solutions to the challenges?

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Examples of deployed solutions



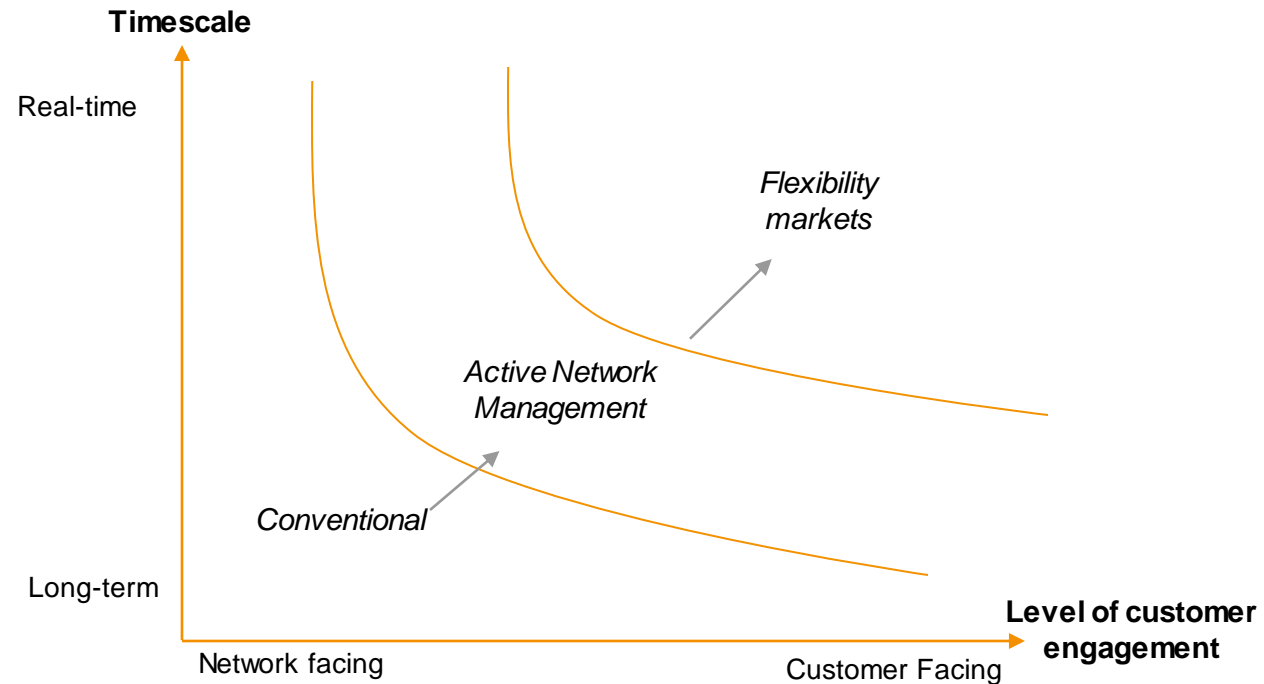
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4. Future direction and key outtakes

How are distribution networks evolving?

Evolution from centralized control and conventional network facing solutions to autonomous distributed energy resource management systems and customer facing market solutions



What are some key outtakes from the report?



Increasing monitoring and control capabilities is key for the evolution of networks



Flexibility (especially on the generator side) plays an important role for the integration of renewables



Most issues (and solutions) focusing on MV networks currently, but in the future LV networks will feel increasing pressure from the decarbonisation of heat and transport

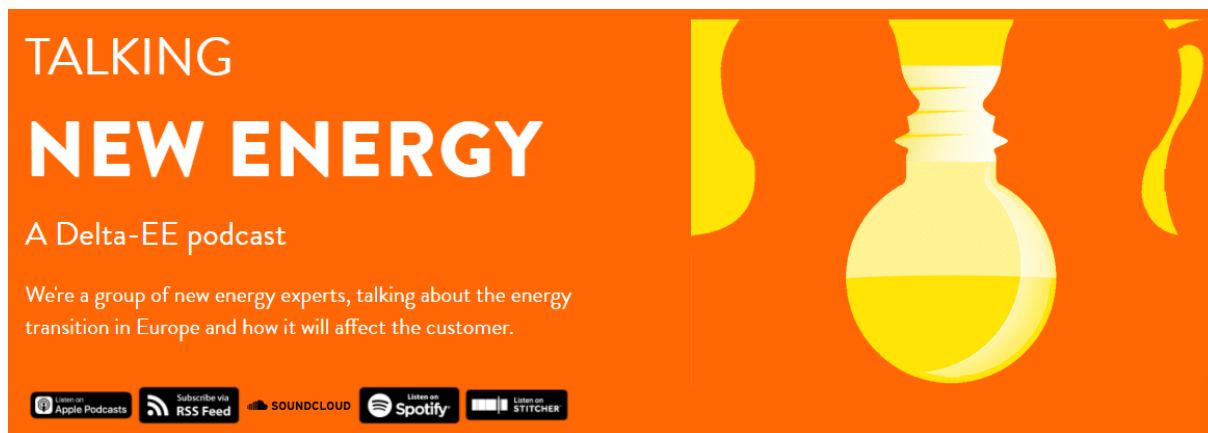


There are some differences in the practises of DSOs in the Netherlands and the UK, but these are not fundamental.

How ready are DSOs to facilitate the energy transition?

- a) There is a huge amount to do, so they may act as a brake for the energy transition.
- b) Despite the challenges, it is very unlikely that they will act as a brake for the energy transition.


A bit about us





TALKING
NEW ENERGY


A Delta-EE podcast


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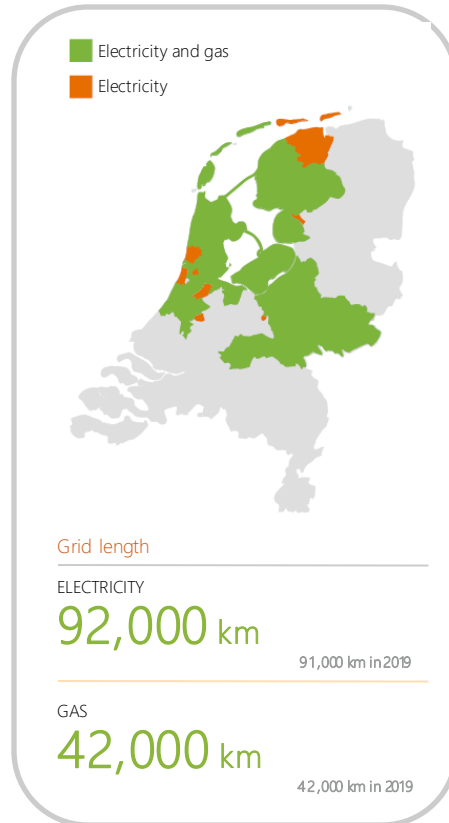
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The largest distribution network company in the Netherlands

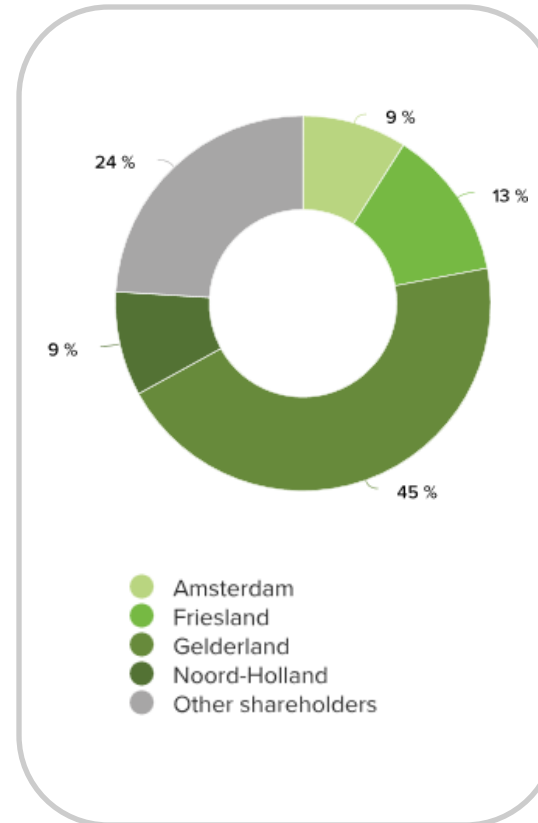
2020 in figures



Our service area



Our shareholders



Contact person for the Alliander contribution to this service:

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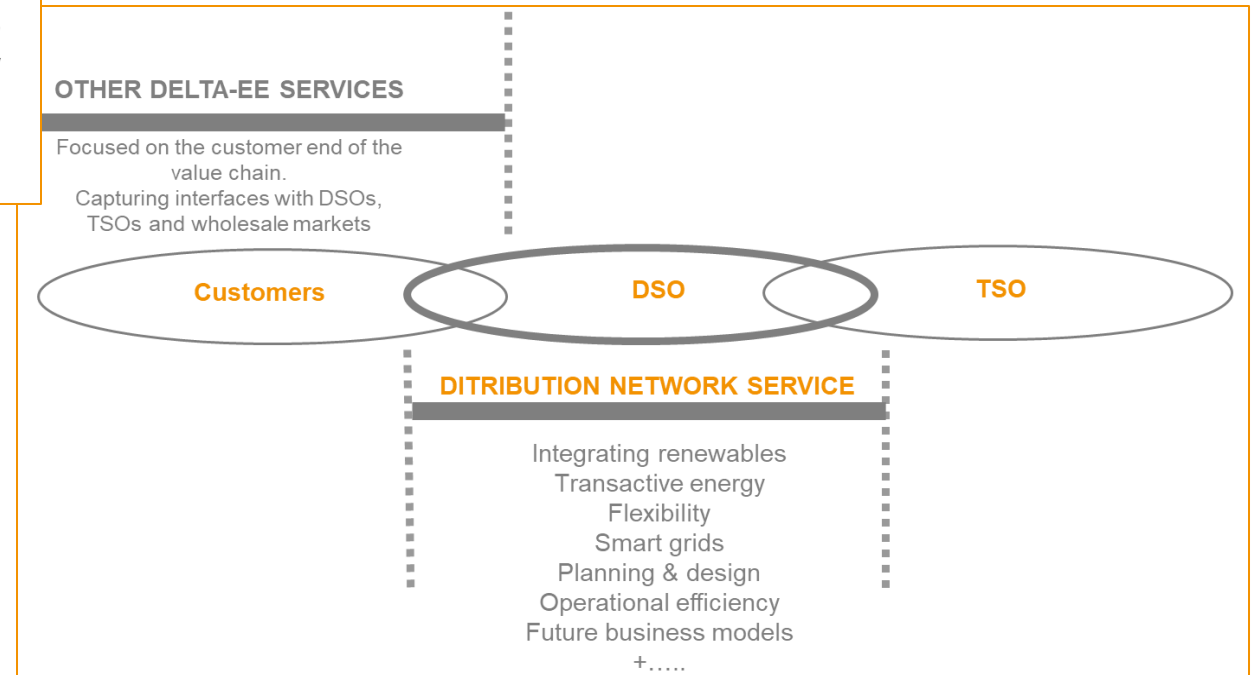
New: Distribution Network Service

Enabling DSOs, regulators and electricity OEMs to make better decisions in the energy transition



With support from 

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Thank you for joining the webinar

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