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Electrification of transport

New demand for wind and renewable power

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Electrification of transport

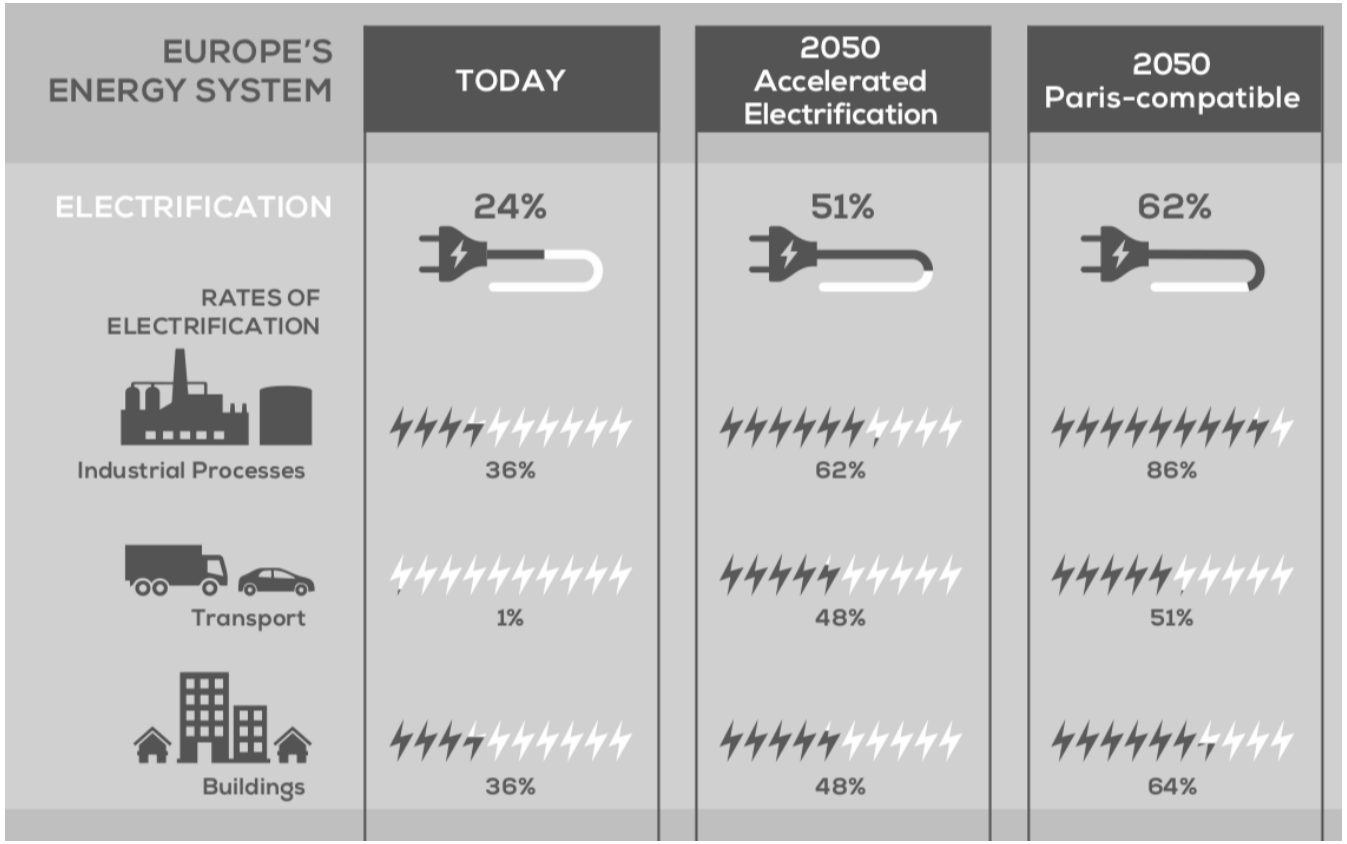
Wy does it matter and what does it mean?

Meeting our ambitions and targets on decarbonization

Electrification of industrial and transport sectors offer great opportunities to do just that

EU mandate for **33% renewable** energy calls for **changing the way** we use energy in our daily life.

51% of transport infrastructure could be electrified to help us **meet our ambitions**.



Source: Breaking new ground. Wind Energy and the Electrification of Europe's Energy System. WindEurope, September 2018

Electrification of transport

What are we talking about

Cars

11 – 350 kW

Buses

100 – 600+ kW

Trucks

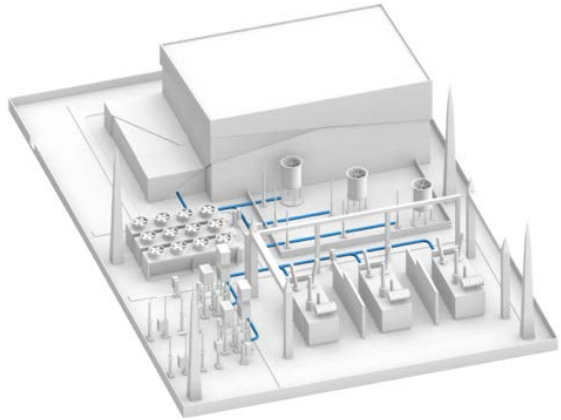
350 – 600+ kW

Ships

1 – 24 MVA

Railway

Scalable unlimited



Aviation

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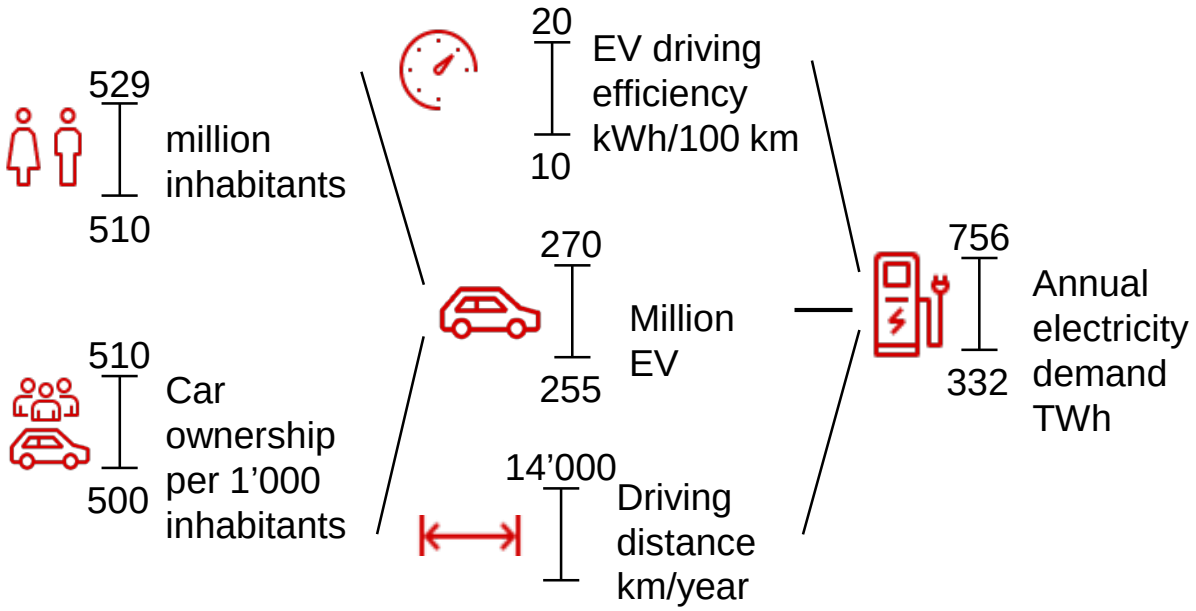
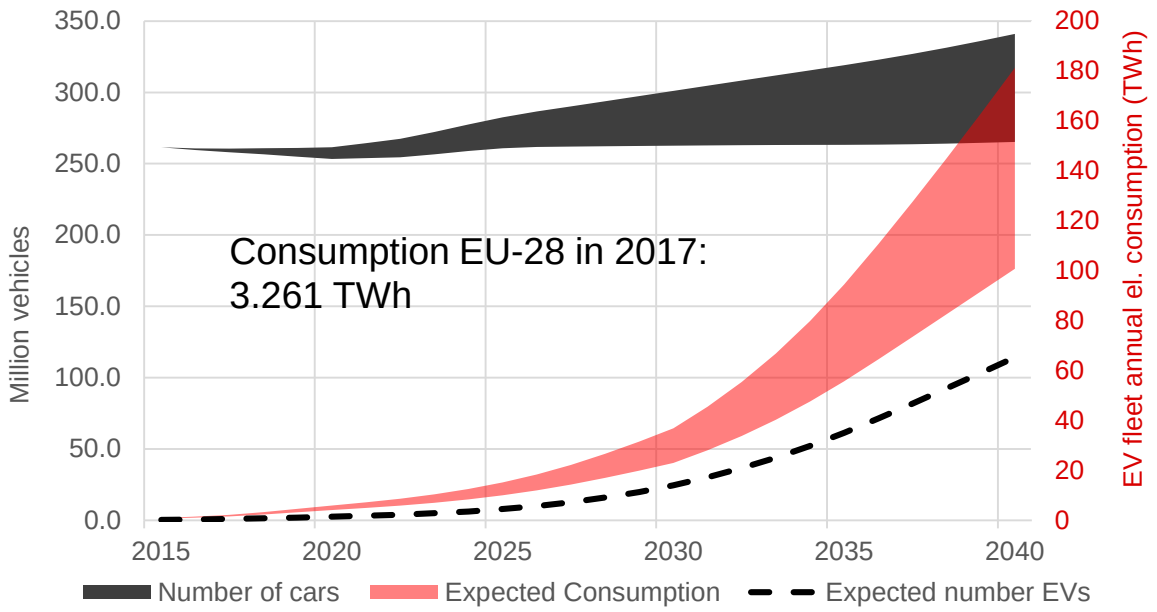
Why we discuss it here?

Estimated annual electricity demand from 100% EV in EU



Projected number of EVs in EU and their energy demand



Wind power will play a significant role in Europe to fuel a clean electrical transport.

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Can we actually deliver it?

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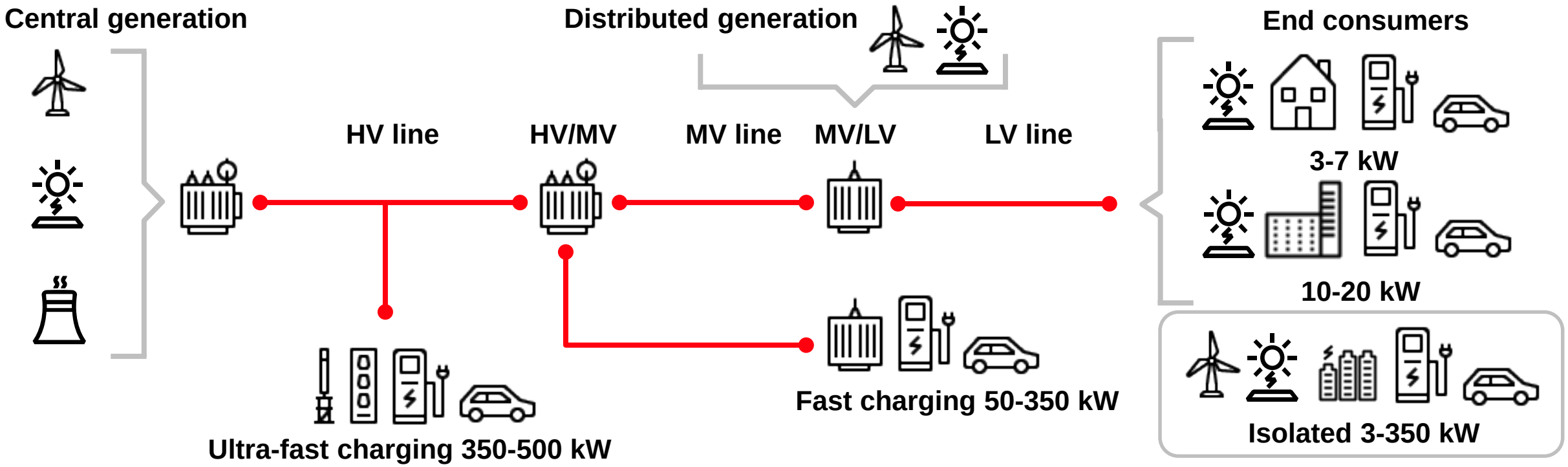
Charging use cases and solutions



Building blocks for delivery are available.

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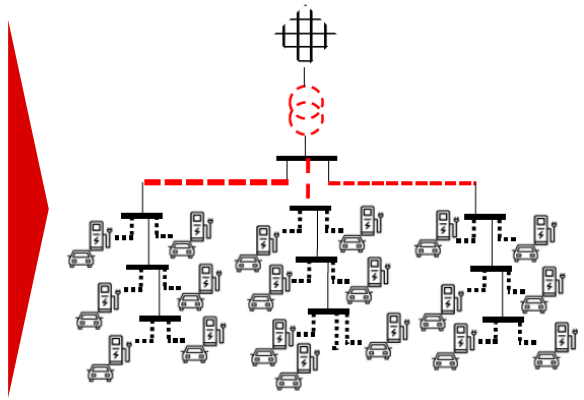
Will distribution networks become the bottleneck?

today

tomorrow



Building blocks for grid integration of EV charging

Passive	Active
Transformer overloading[1]	OLTC[2]
Transformer upgrade	VAR control
Limit charger rating	Energy storage
	Smart charging

Measure to increase EV hosting capacity of distribution networks

- Temporary overloading of assets
- More precise monitoring and control
- Smart (controlled) charging

Digitalization of distribution networks is the key for electrification of indiviual transport.

1 cointrolled
2 OLTC: on-load tap changer

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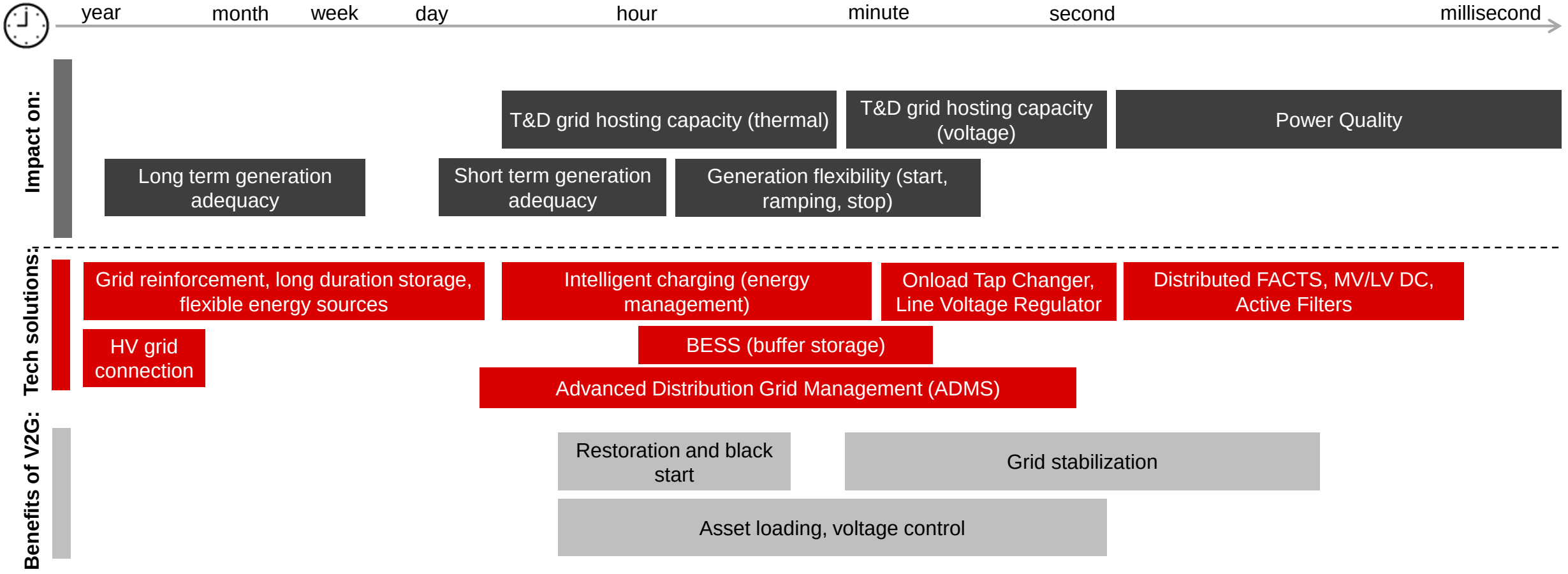
Key solutions to enable the proper development of it



Uncontrollable EV charging challenges
Impact mitigation alternatives
Vehicle to grid (V2G) applications

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Examples where wind and transport come together

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Fast charging network in a country with high wind potential

Netherlands deploy country wide charging infrastructure

The need:

- Deployment of country wide charging infrastructure in NL
- Promote green charging – Fastned runs a network of charging infrastructure which uses **100% renewable power**

The solution:

- Fastned selected ABB to provide 200+ fast DC chargers
  - 15 – 30 minutes charge time
  - All fast charging with standard plugs
  - All charges connected and monitored in the cloud
- Similar projects in:
  - Estonia, Hungary
  - Denmark, Norway
  - Germany, UK

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(Internally) electrified ships – a first step for more?

Wind of Change – Wind farm operations service vessel

State-of-the-art Wind Farm Service Operation Vessel including the newest ABB technology achieving greater efficiency and precision.

DC grid inside the vessel

Energy Storage: 2 x 203,5 kWh

NKT Victoria – Cable layer vessel

Custom built according to NKT's specifications, it will enhance the capacity of NKT submersible cable operations while delivering optimum efficiency and accuracy.

DC grid inside the vessel

Energy Storage: 1 x 156 kWh

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Summary

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Summary

Enable a market for electric transport

- One of our opportunities to advance the decarbonization of the energy sector
- Policy efforts in place, more should be added
- Industry started to prepare the value chain (batteries, EV models, charging infrastructure, etc.)

Powering it up

- Wind will play a significant role to power the electric transport
- Technologies have been developed, to kickstart the adoption of electrical transport
- More solutions and infrastructure is necessary to reach our goals

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We are key

- As drivers and passengers, we have great power to select the ways we move around
- Go for a clean transportation path
- Support our goals and ambitions


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