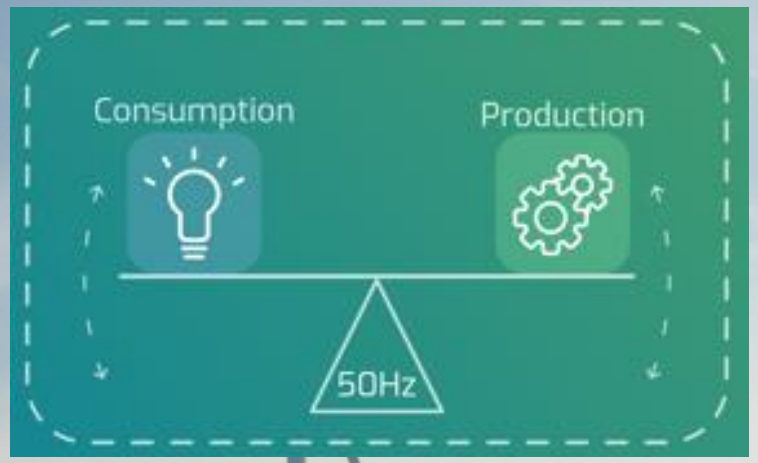
Grid impact

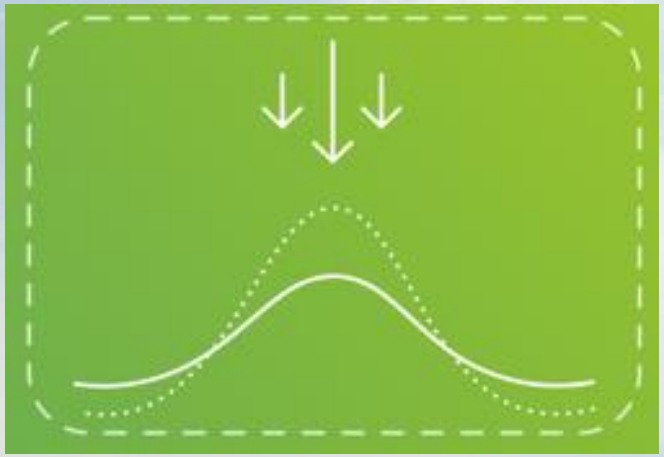
The importance of integration

The importance of integration

Grid impact of Emobility

- ElaadNL
- Context
- Balancing and congestion
- Developments on MV and HV
- Developments on LV

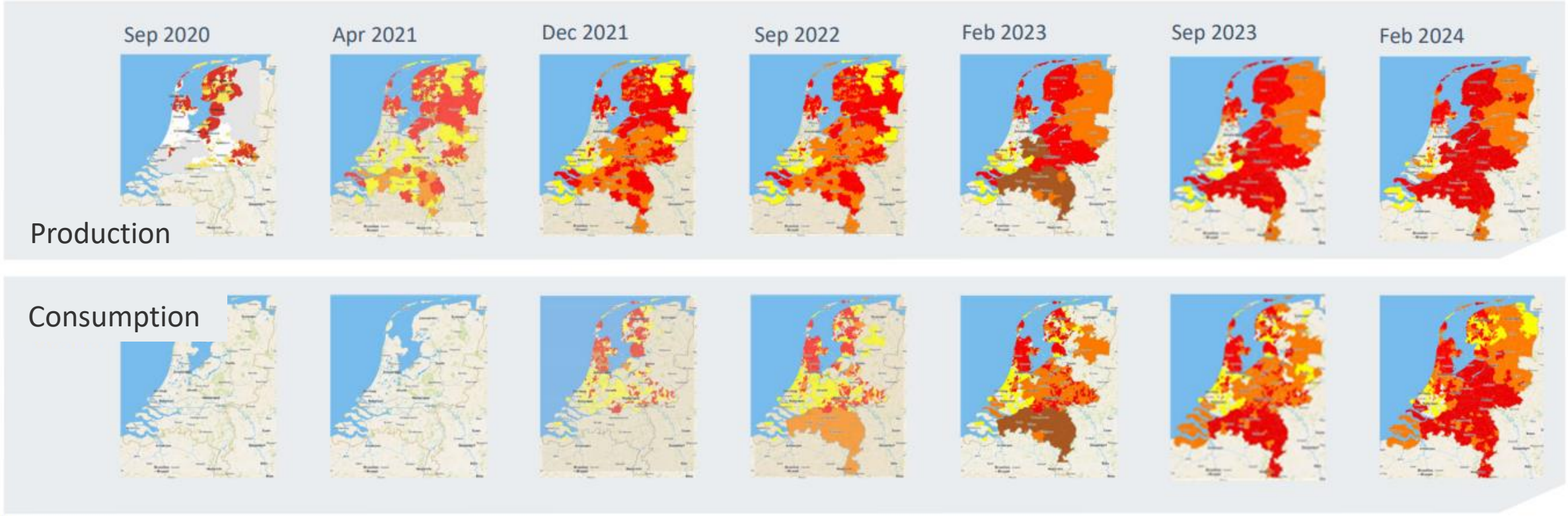


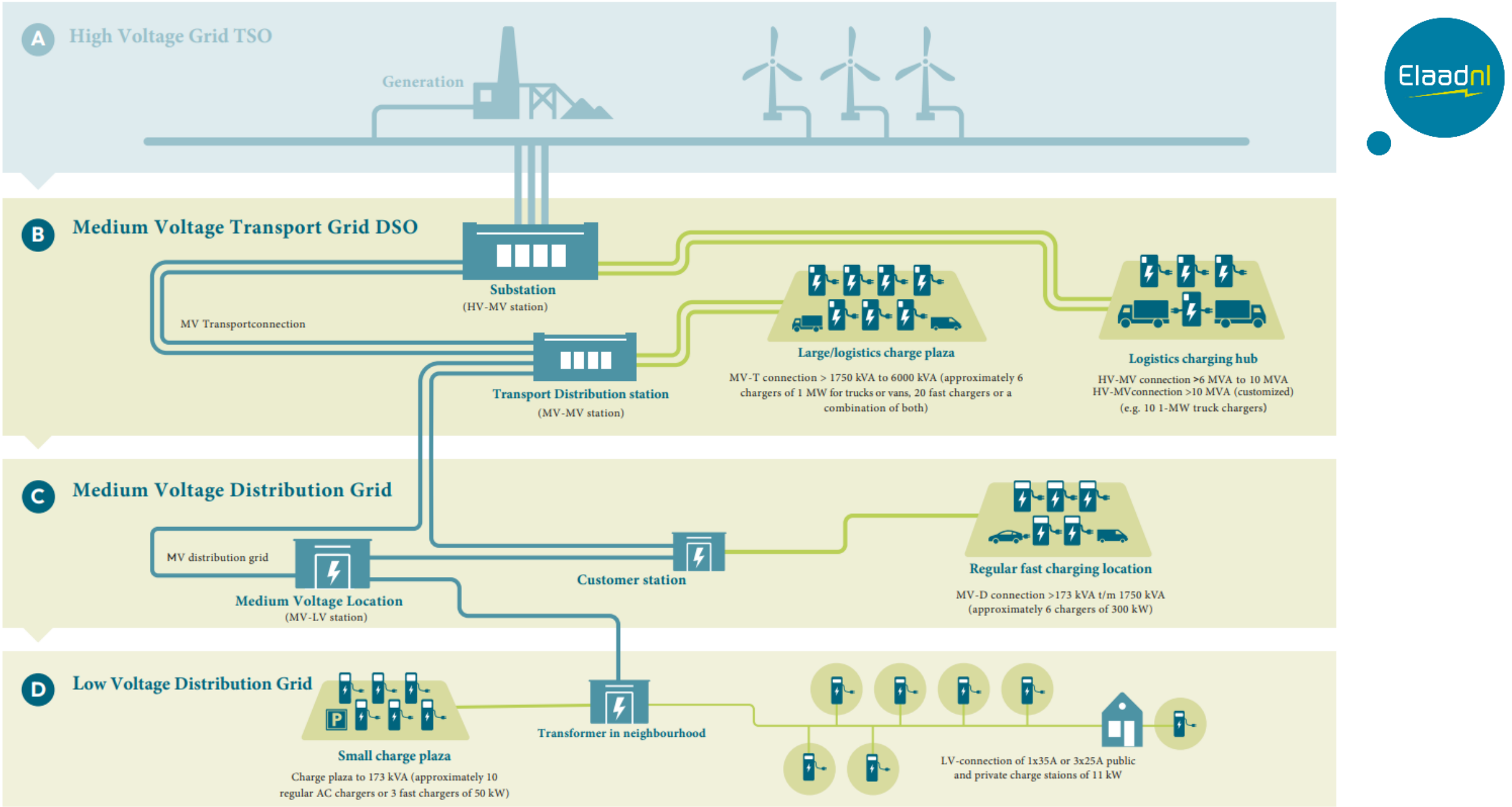


Balancing and Congestion

Difference

Development of congestion

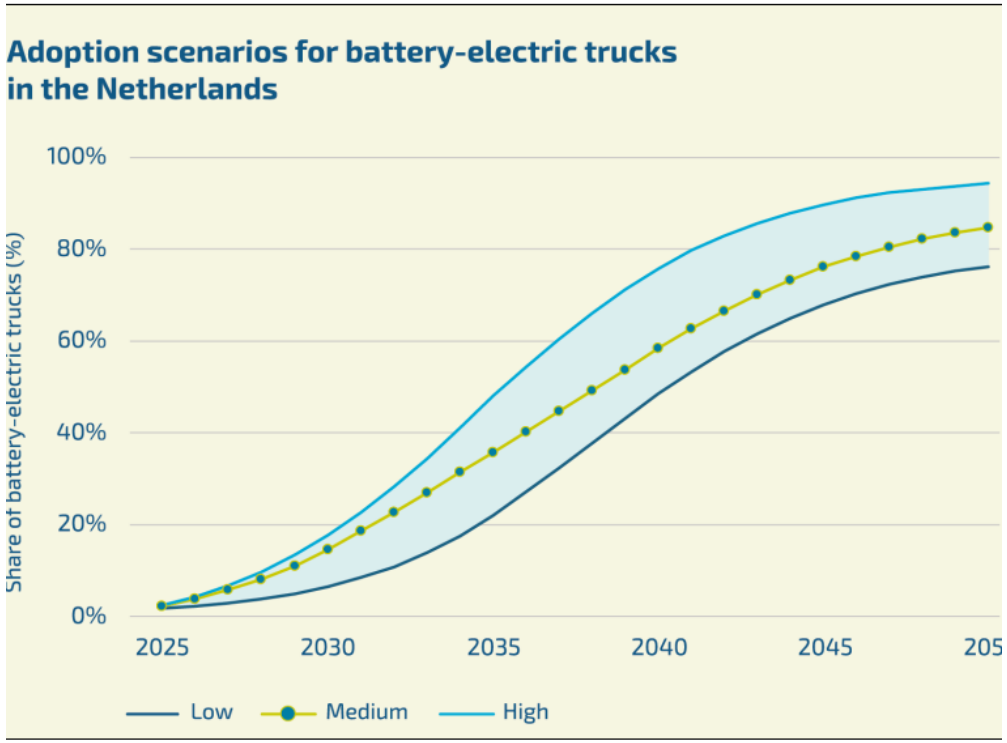



A
High Voltage Grid TSO
Generation
B
Medium Voltage Transport Grid DSO
Substation
(HV-MV station)
MV Transportconnection
Transport Distribution station
(MV-MV station)
Large/logistics charge plaza
MV-T connection > 1750 kVA to 6000 kVA (approximately 6 chargers of 1 MW for trucks or vans, 20 fast chargers or a combination of both)
Logistics charging hub
HV-MV connection >6 MVA to 10 MVA
HV-MVconnection >10 MVA (customized)
(e.g. 10 1-MW truck chargers)
C
Medium Voltage Distribution Grid
MV distribution grid
Medium Voltage Location
(MV-LV station)
Customer station
Regular fast charging location
MV-D connection >173 kVA t/m 1750 kVA
(approximately 6 chargers of 300 kW)
D
Low Voltage Distribution Grid
P
Small charge plaza
Charge plaza to 173 kVA (approximately 10 regular AC chargers or 3 fast chargers of 50 kW)
Transformer in neighbourhood
LV-connection of 1x35A or 3x25A public and private charge staions of 11 kW

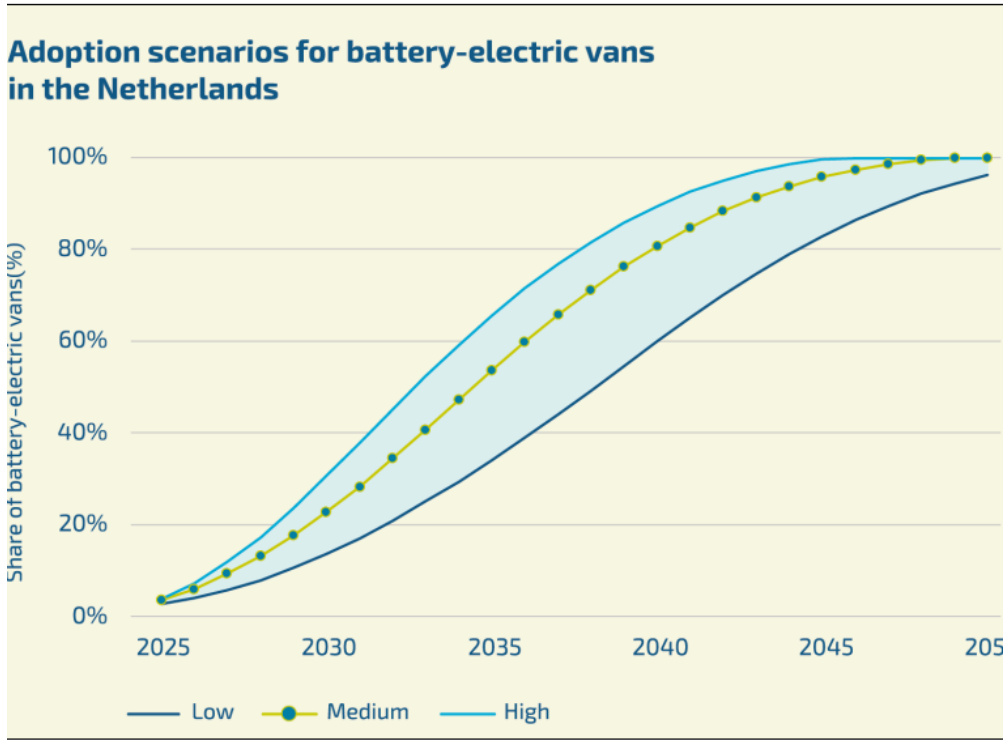
Growth of e-Logistics

Increase in capacity demand

Adoption scenarios logistics



Electric trucks



Electric vans

New grid contracts

Solutions for higher grid levels

Photo: Alliander

New grid contracts

Non-firm Connection and transport agreement	Only right on transport capacity if it is available on the grid.	Lower tariff than usual. ***The discount can be up to 50%.***
Alternative transport right based on duration	Agree to use less than a maximum of 15% transport capacity during peak times. HV level.	***50% discount on the regular rate.***
Alternative transport right based on time blocks	Agree to use the grid only at pre-agreed times. MV level.	The discount on the tariff depends on the actual capacity you have purchased and the associated tariff category. ***The discount can be up to 50%.***
Group- transport agreement	In a Group Transport Agreement, a group of companies jointly requests a specific amount of power from the grid operator. They coordinate among themselves how that power is distributed. ***Companies and grid operators experiment with this under the collective name 'Energy Hubs'.***	The more optimal the distribution, the greater the chance of a rate advantage.

Congestion management

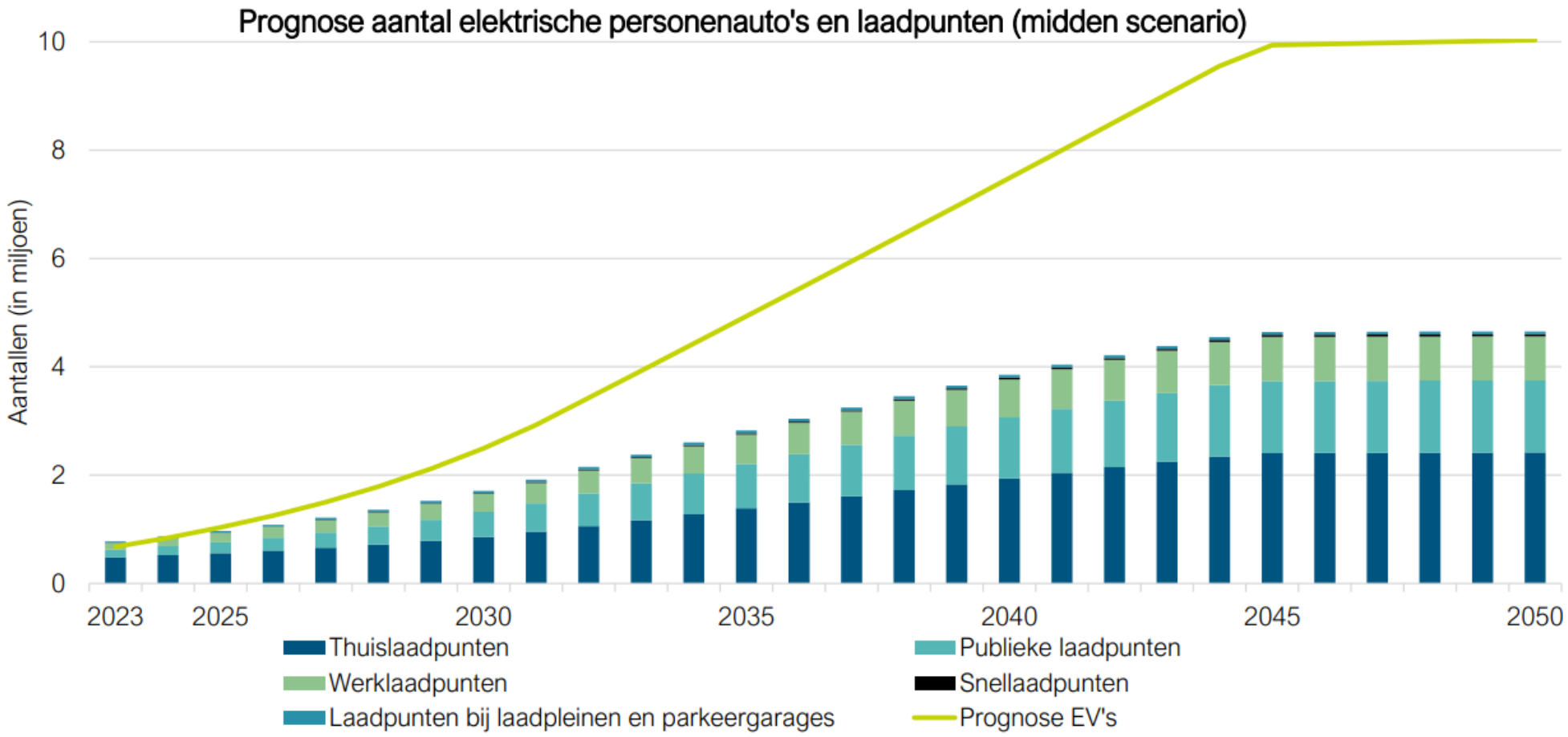
Smart charging and site integration

Precondition

LV Developments

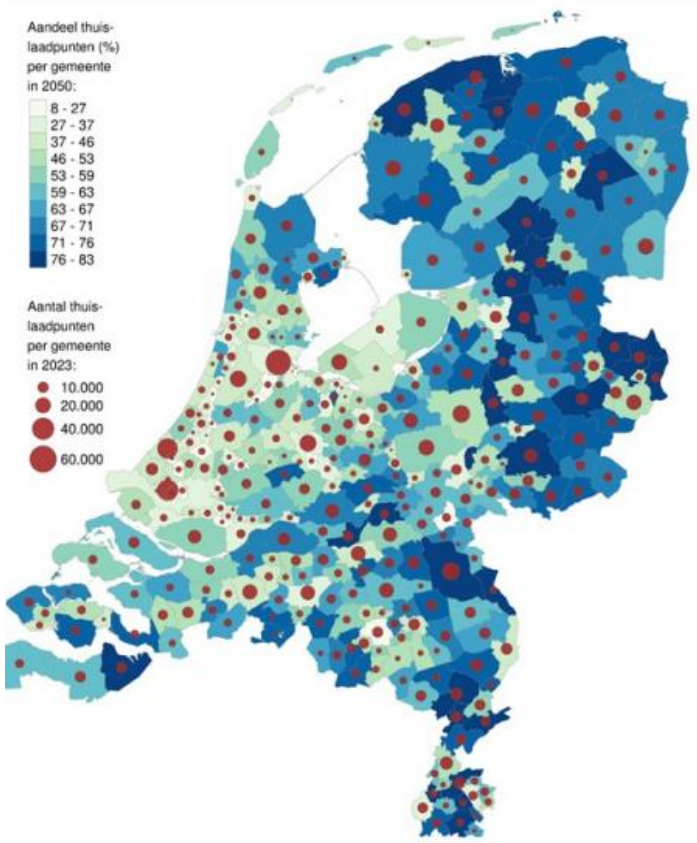
Growth scenarios

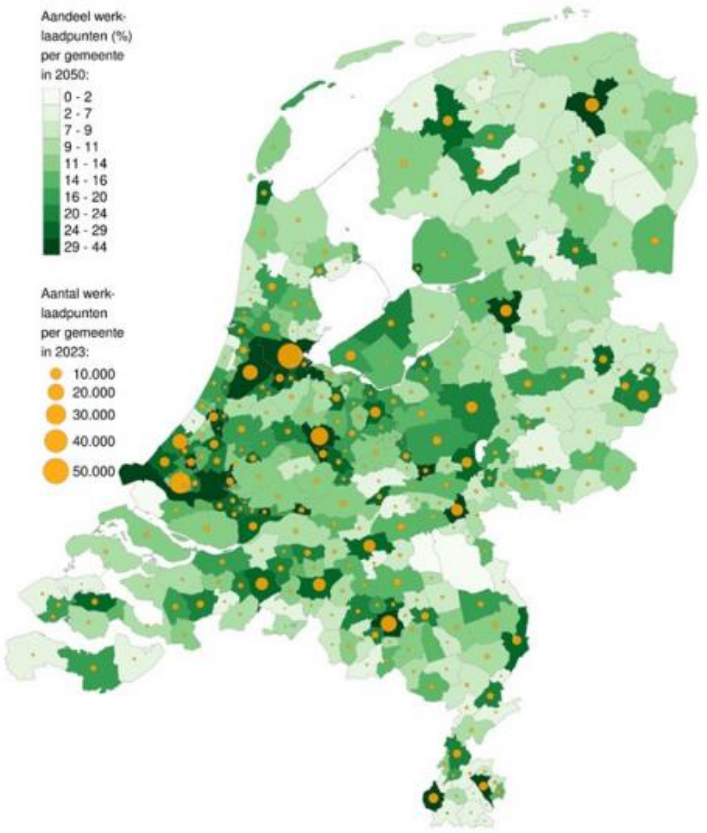
Adoption scenario EV(SE)

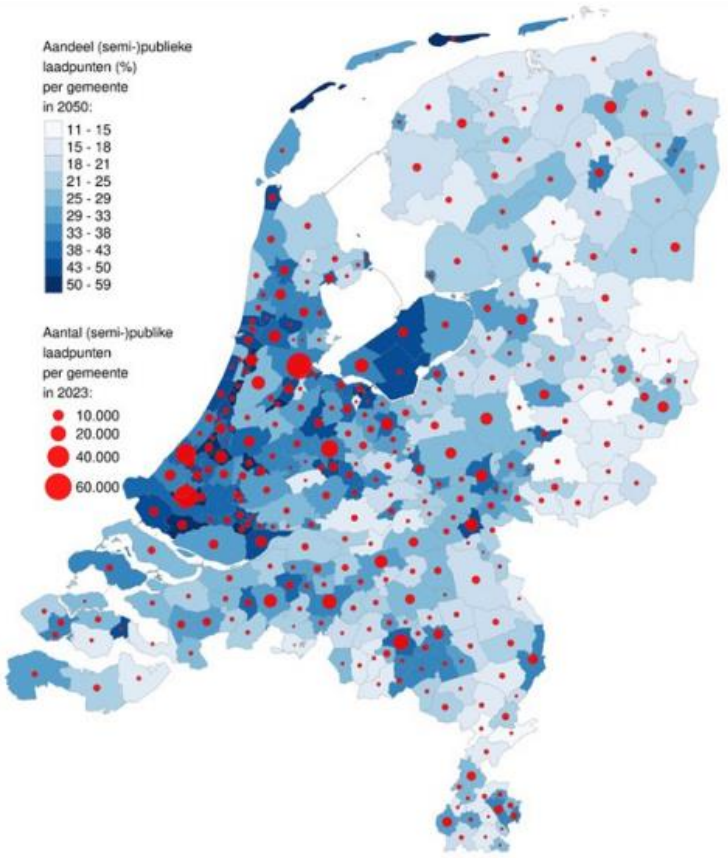


Source: ElaadNL outlook: Elektrificatie van personenauto's tot 2050

EV Hotspots


Aandeel thuis-
laadpunten (%)
per gemeente
in 2050:
8 - 27
27 - 37
37 - 46
46 - 53
53 - 59
59 - 63
63 - 67
67 - 71
71 - 76
76 - 83
Aantal thuis-
laadpunten
per gemeente
in 2023:
10.000
20.000
40.000
60.000


Aandeel werk-
laadpunten (%)
per gemeente
in 2050:
0 - 2
2 - 7
7 - 9
9 - 11
11 - 14
14 - 16
16 - 20
20 - 24
24 - 29
29 - 44
Aantal werk-
laadpunten
per gemeente
in 2023:
10.000
20.000
30.000
40.000
50.000

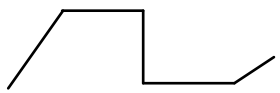

Aandeel (semi-)publieke
laadpunten (%)
per gemeente
in 2050:
11 - 15
15 - 18
18 - 21
21 - 25
25 - 29
29 - 33
33 - 38
38 - 43
43 - 50
50 - 59
Aantal (semi-)publike
laadpunten
per gemeente
in 2023:
10.000
20.000
40.000
60.000

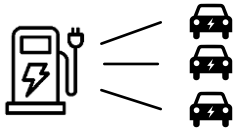
Solutions for LV grid aware charging

Public charging infrastructure

Elaadnl

Grid aware charging


Reduced power during peak


Distribute capacity over active charging sessions


New and existing charging points


Automatic messaging DSO-CPO


Considering the user experience of the EV driver

Based on the 'Grid-aware Charging Guidelines' (May 2024):

- Reduce available capacity where needed
- If multiple charging stations of a CPO are installed in the same congestion area, the available power of charging stations in this area may be distributed among these charging stations.
- Minimum available power of 2kW per CP and 30 kWh per 6 hrs.
- The power limits indicated by the grid operator are absolute.

Grid aware charging

In phases towards increasing automation and accuracy

Static profile (MVP)

Via grantor

- Capacity profile and application area determined based on raw measurement data.
- Capacity profile and application area is sent manually without linking systems.
- Update frequency is maximum 2x per year.

Automated static profile (1.0)

From DSO to CPO

- Capacity profile and application area determined where possible based on actual data (Dali boxes in combination with algorithm)
- Capacity profile and application area is sent automatically via an automated interface (via OpenADR)
- Frequency of update is on a weekly/monthly basis.

Dynamic profile (2.0)

From DSO to CPO

- Data is read in real time and the capacity profile and application area are controlled day ahead on available grid capacity.
- Capacity profile and application area are sent day ahead via an automated interface (via OpenADR)

Capacity limitation contract

In a CBC you agree with the DSO to limit your capacity demand.

CLC - Call-off
Agreement to limit the capacity demand if the grid operator requests this.

CLC - Time Block
A time-bound contract specifies when and to what extent to reduce the capacity demand.

Grid aware charging

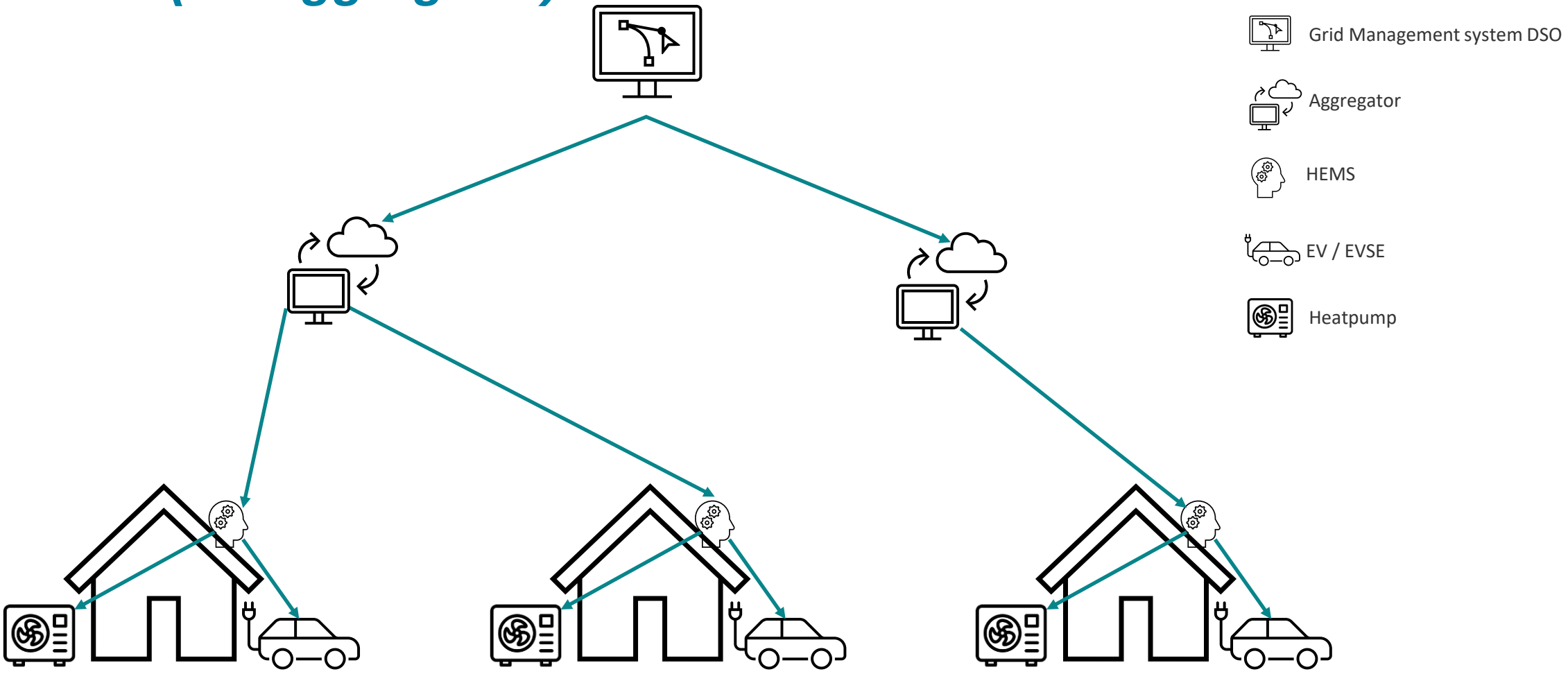
Regulation / Proposition

Grid aware charging at home

In development

Integrated and cloud based

to HEMS (via aggregator)



Questions?

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