

INCIT-EV

LARGE DEMONSTRATION OF USER CENTRIC URBAN AND LONG-RANGE CHARGING
SOLUTIONS TO BOOST AN ENGAGING DEPLOYMENT OF ELECTRIC VEHICLES IN EUROPE

POLIS conference The last steps towards large scale public smart charging

Brussels, 30 November 2022

Pieter Looijestijn
p.Looijestijn@mrae.nl

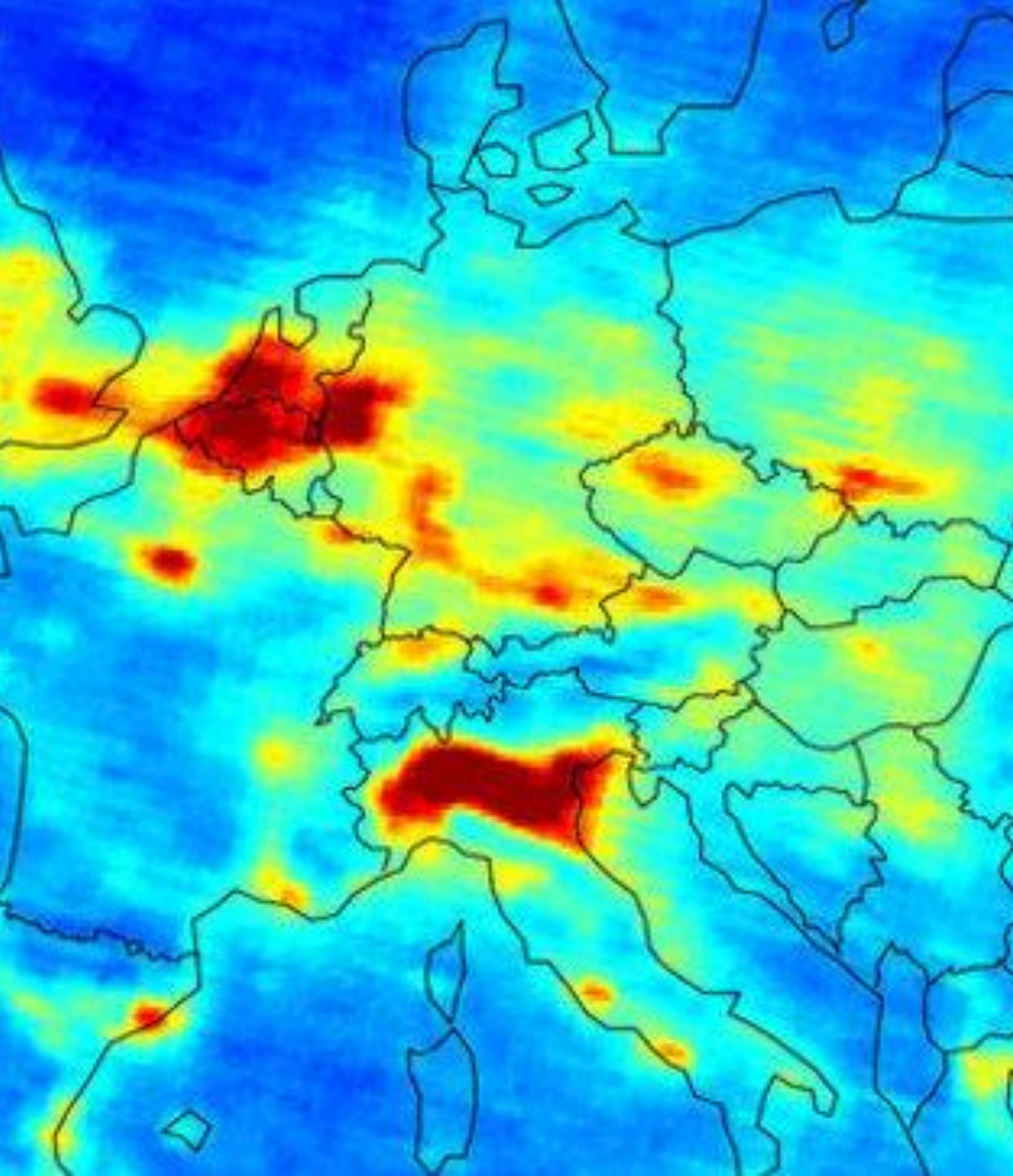
Follow us on: <https://www.incit-ev.eu/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875683.



- 1. MRA-E and INCIT-EV introduction**
- 2. Challenges**
- 3. Smart charging**
- 4. INCIT-EV use case 1a**
- 5. Final steps and wish list**



1. MRA-E introduction

Cooperation of local and regional governments

- Including 3 provinces and 70+ local governments

Clean air, prevent climate change,
energy transition

Stimulate electromobility

Accessible and affordable
charging, competitive market

Network of public charging
stations



1. MRA-E introduction: public charging

Numbers

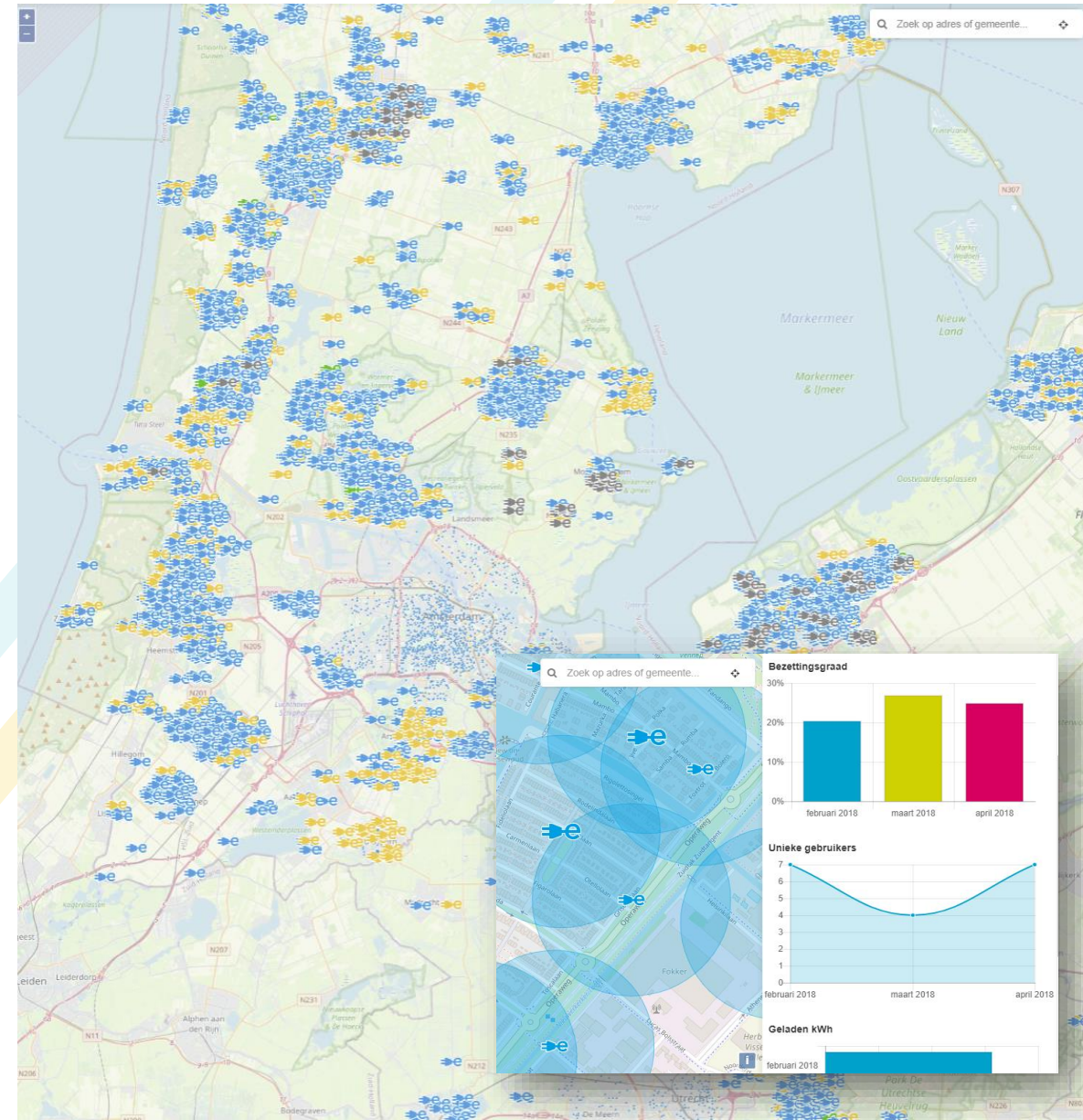
- 10.000+ public charge points
- 9 active concessions
- ~200 charge points installed per month

Approach

- Demand and data-driven realisation
- Prognosis guides predetermined locations and licensing

Quality

- Roaming since 2012
- Charging tariff maximised

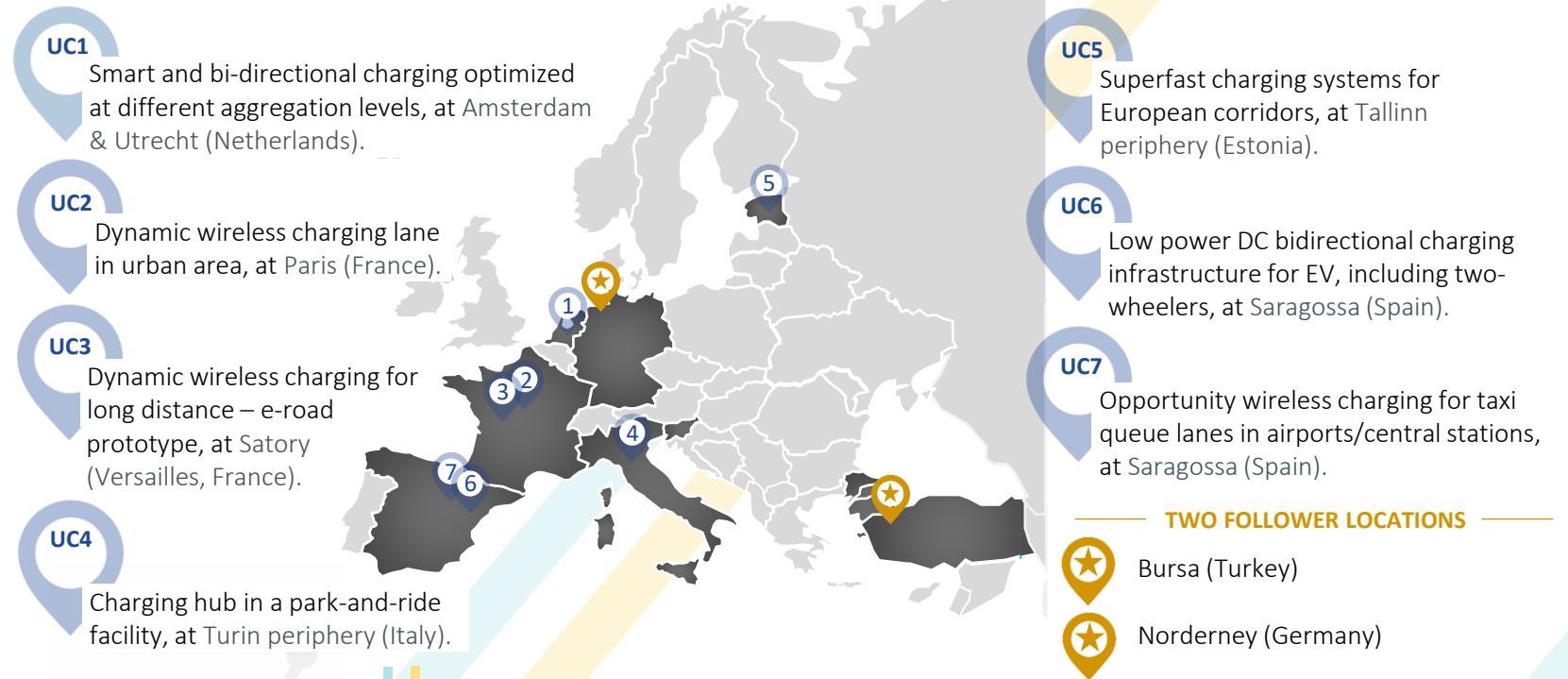


INCIT-EV is a European project led by CIRCE in which electric vehicle charging technologies will be developed and validated in five European countries, thus improving the user's perception of electric mobility.

REFERENCE
CITIES IN
EUROPE

INCIT-EV
PROJECT

SEVEN USES CASES



INCIT-EV in figures

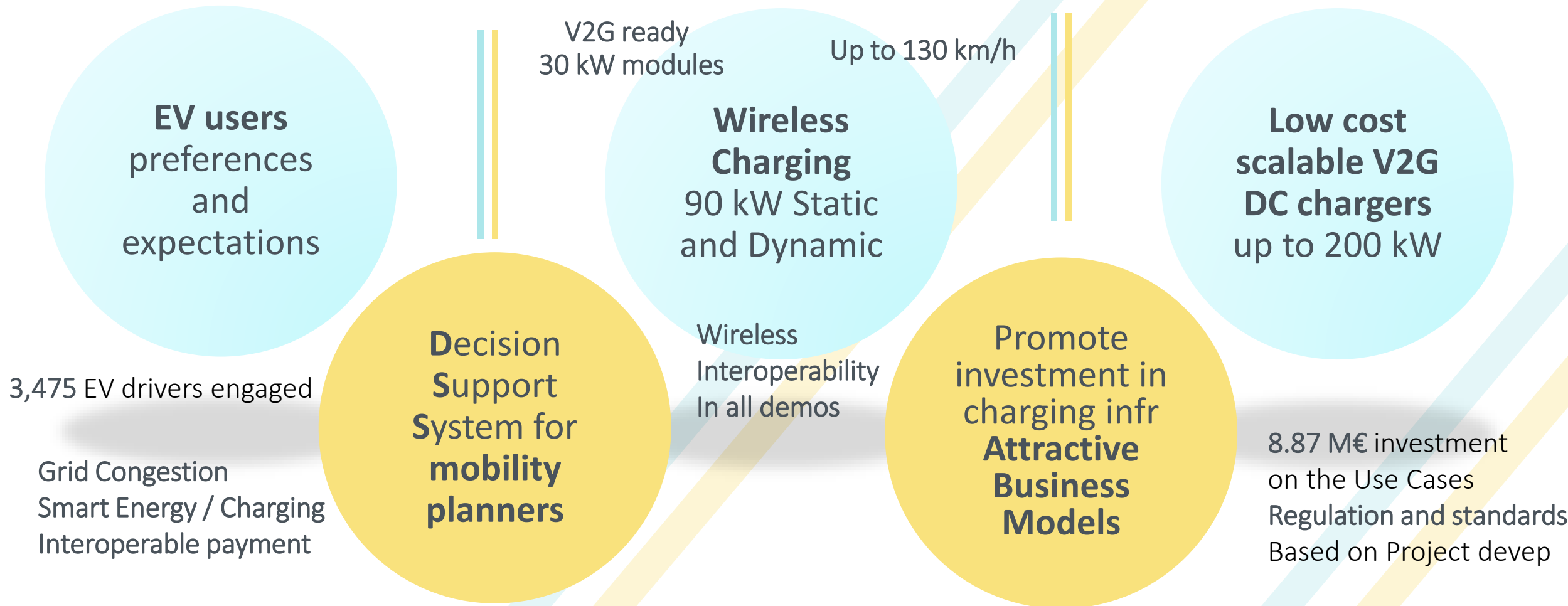
18,6M€ budget
15M€ funded by the European Commission
32 partners are directly involved in the project
52 months long. January 2020 - June 2024
More than 7 innovative solutions

INCIT-EV Consortium

CIIRCE coordinates the INCIT-EV project, to improve the experience of electric vehicle (EV) driving with a consortium of 33 partners from eight countries




INCIT-EV aims to demonstrate, at five demonstration environments, an innovative set of **charging infrastructures, technologies and its associated business models**, ready to improve the EV users experience with the ultimate goal of **fostering the EV market share** in the EU.



2. Challenges: network growth and usage



evdata.nl


 Total kWh charged, **monthly**

Filter period from Jan | 2018 to May | 2022

Source: www.evdata.nl

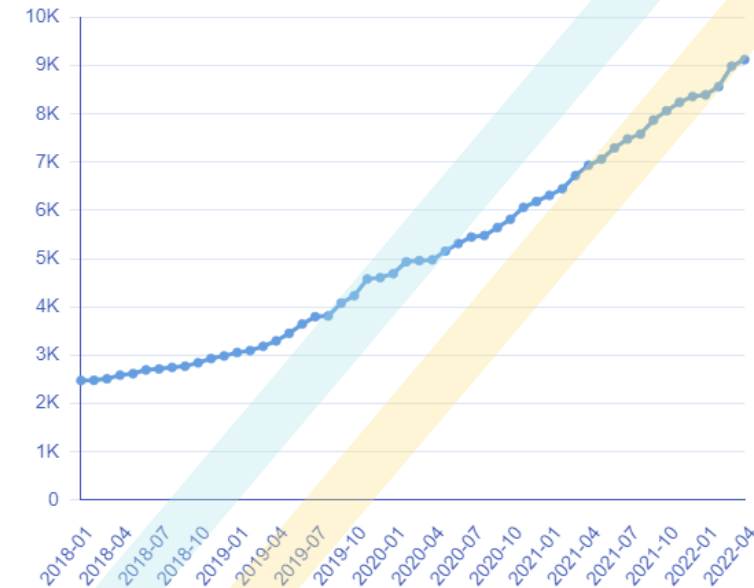


[Download data](#)


 Number of used charging points, **monthly**

Filter period from Jan | 2018 to May | 2022

Source: www.evdata.nl



[Download data](#)

 Charged kWh per charging point, **monthly**

Filter period from Jan | 2018 to May | 2022

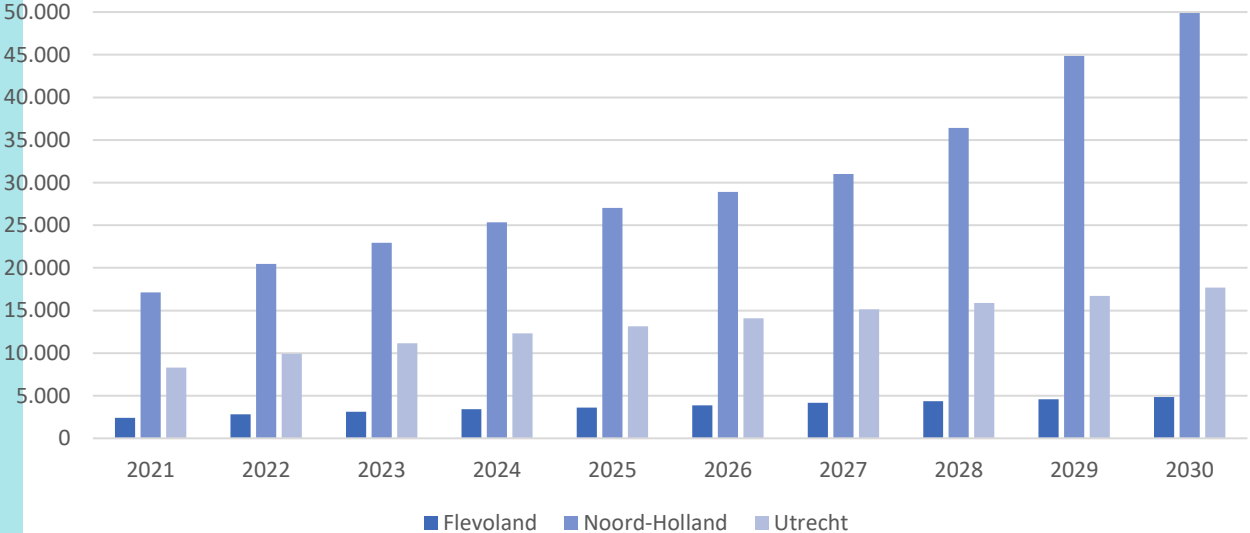
Source: www.evdata.nl



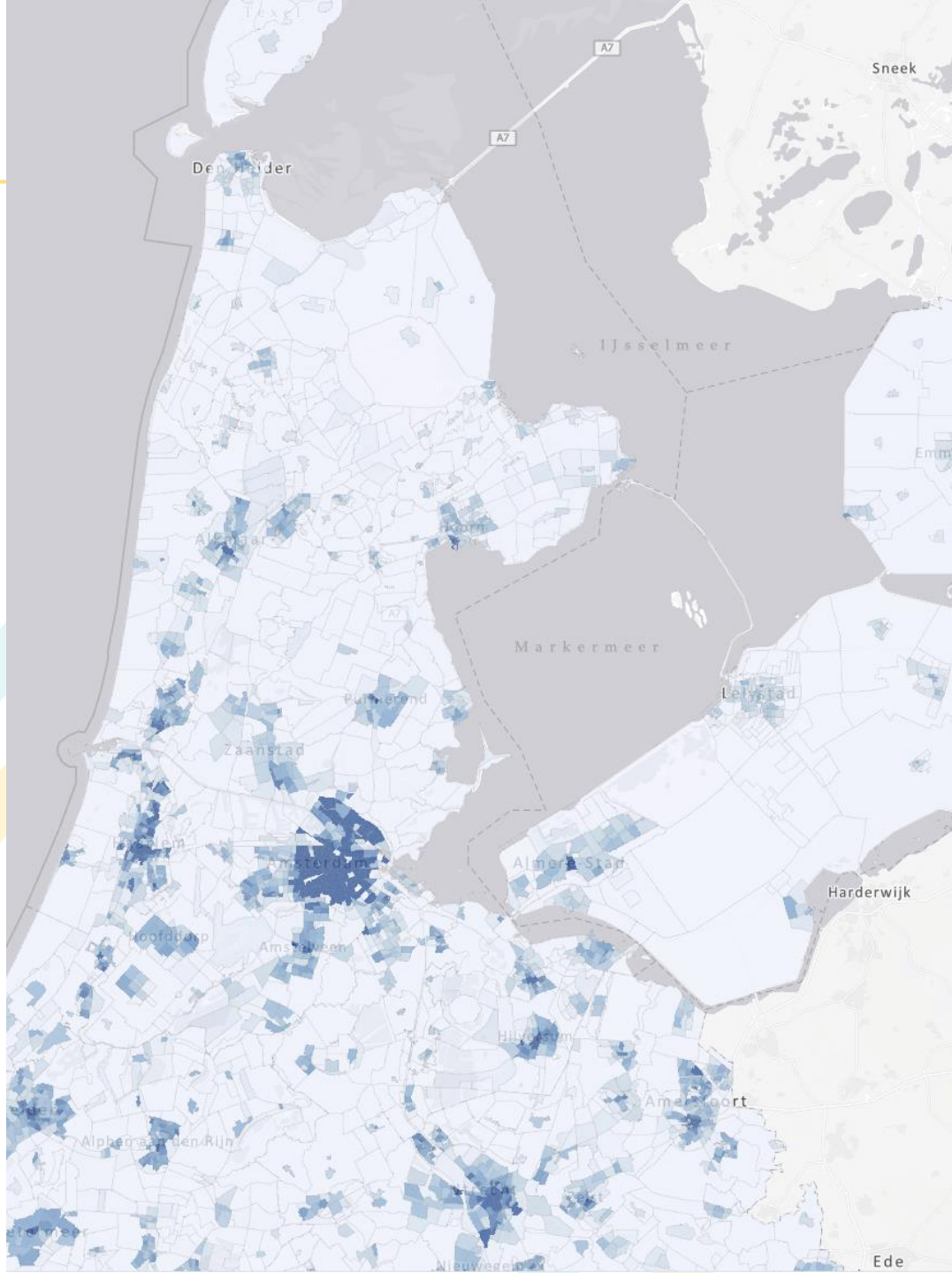
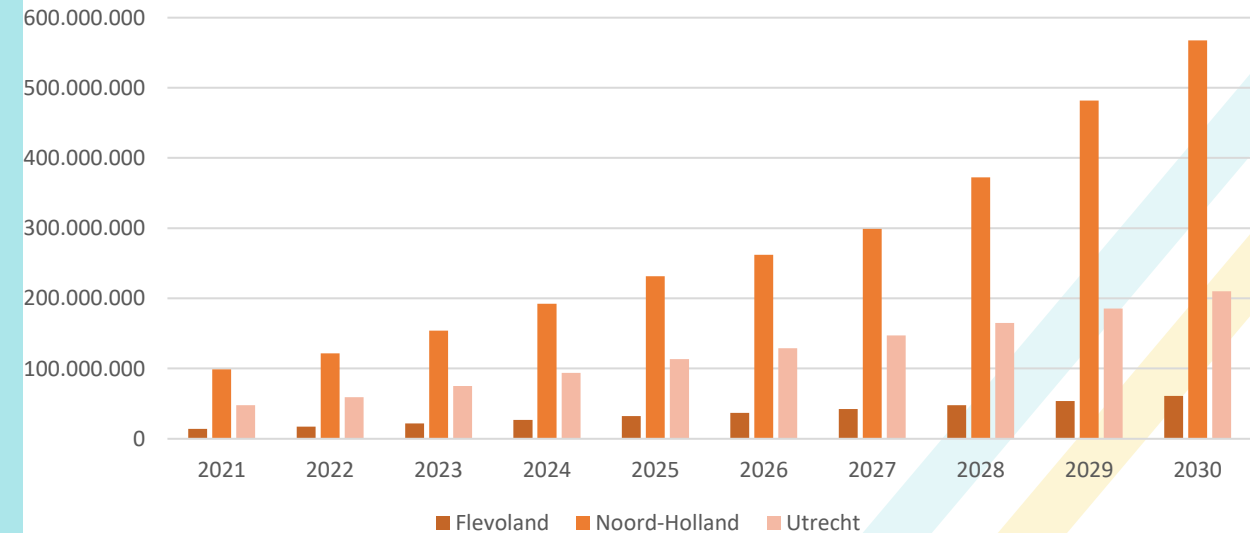
[Download data](#)

Prognosis (public) charging demand 2030

Required public AC charging points



Energy demand public AC charging per year in kWh

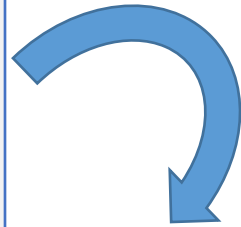


2. Challenges: vast numbers

Prognosis public AC
charging demand in
region (excl. G4 cities)
for **2030**

72.419

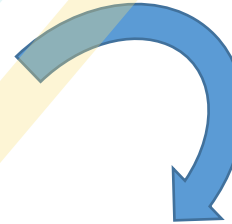
charge points



In operation **2022**

10.000+

charge points



To be installed

7.800

charge points **per year**

2. Challenges: grid capacity

Capaciteitskaart afname elektriciteitsnet

Bijgewerkt: 09-06-2022 16:01

Limits of electricity grid

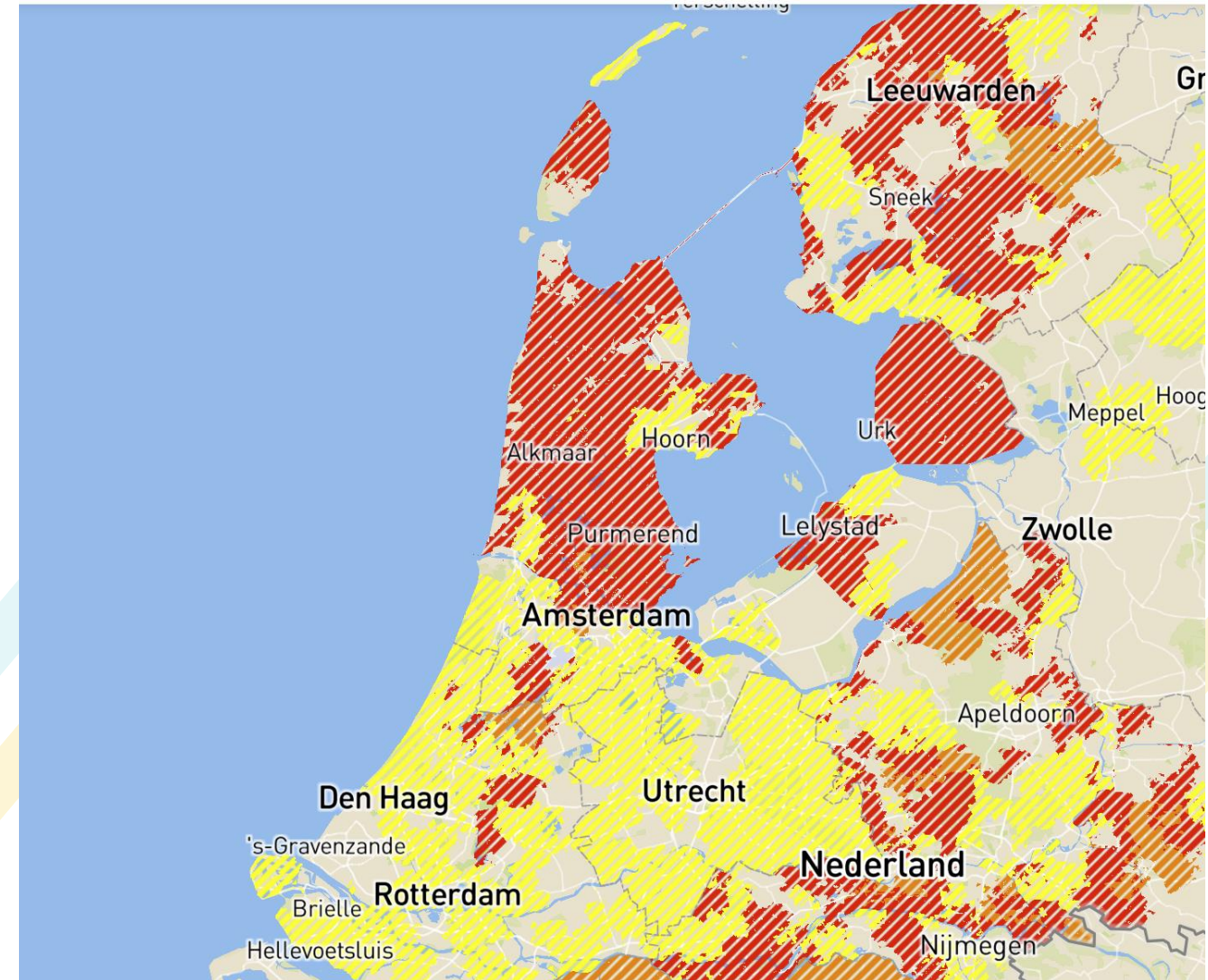
- All large Dutch grid operators have warned that capacity is being reached

Impacts on roll out

- AC low power charging points can now still be installed
- Specific areas already have mayor delays for new AC public charging grid connections
- This will increase with uptake of EV, electric heating, etc. etc.

Unique role possible for electromobility

- Electromobility and specifically 'destination charging' can be effective to reduce grid impact of energy transition



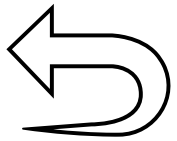
3. What is smart charging?



Delaying,



changing power output,



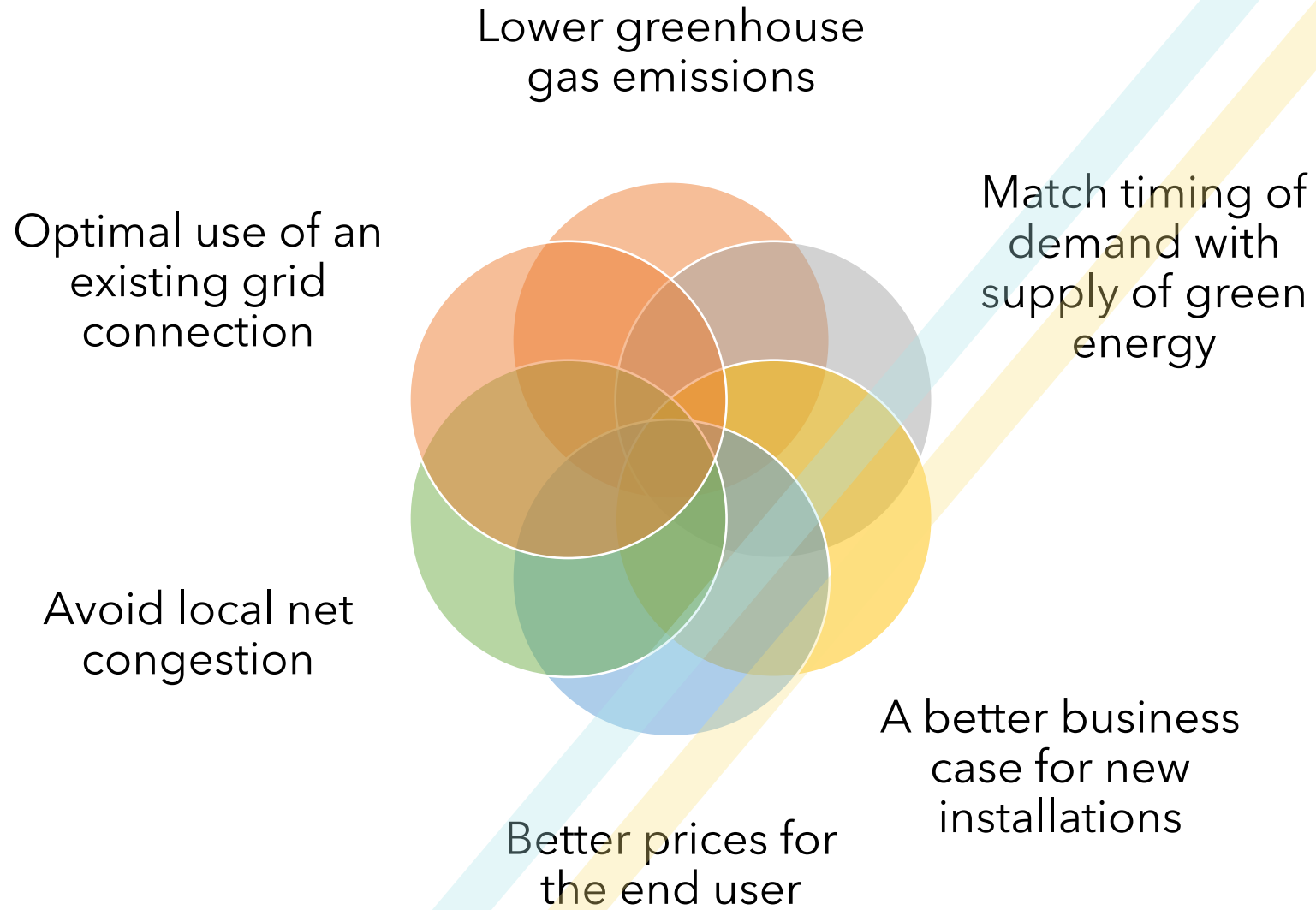
or changing the direction of charging.



With the aim achieving societal
and/or financial benefits



Aims



Steering

Static

Dynamic

Interaction

Passive

Active

System

Private -
open

Private -
closed

Public -
open

Public -
closed

Aims

Local
netcongestion

Imbalance

CO₂

Energy costs

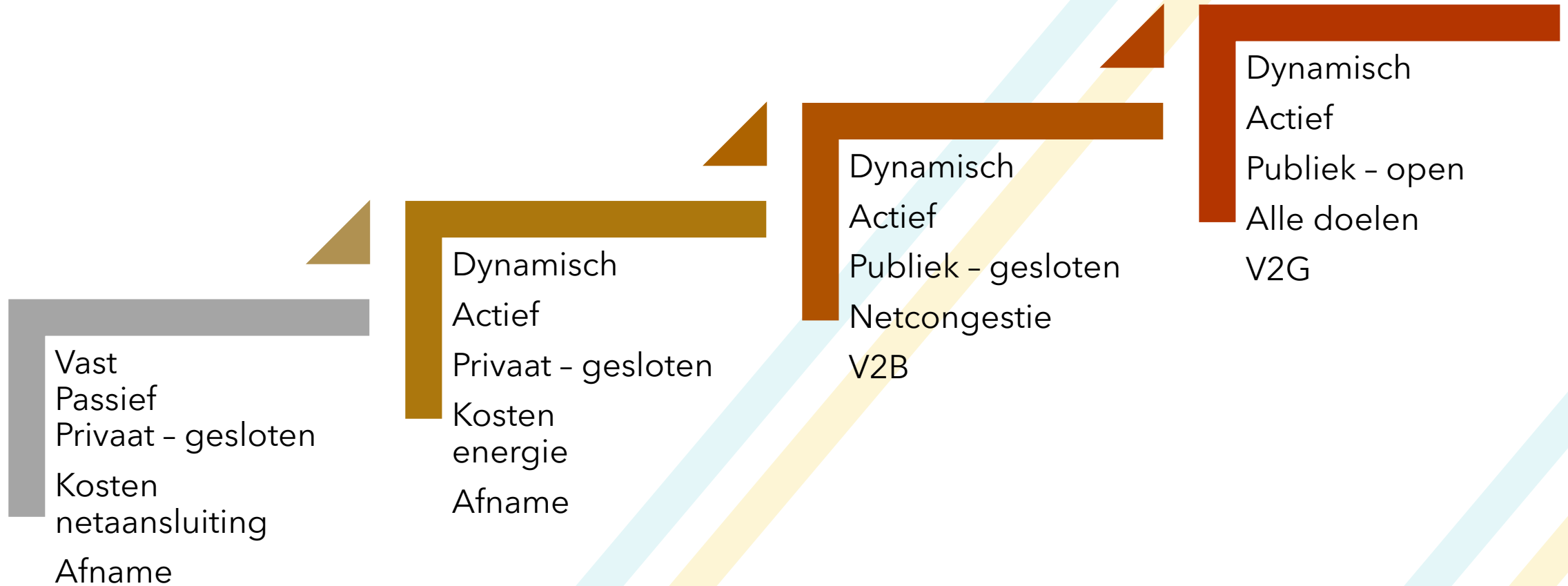
Optimise grid
connection

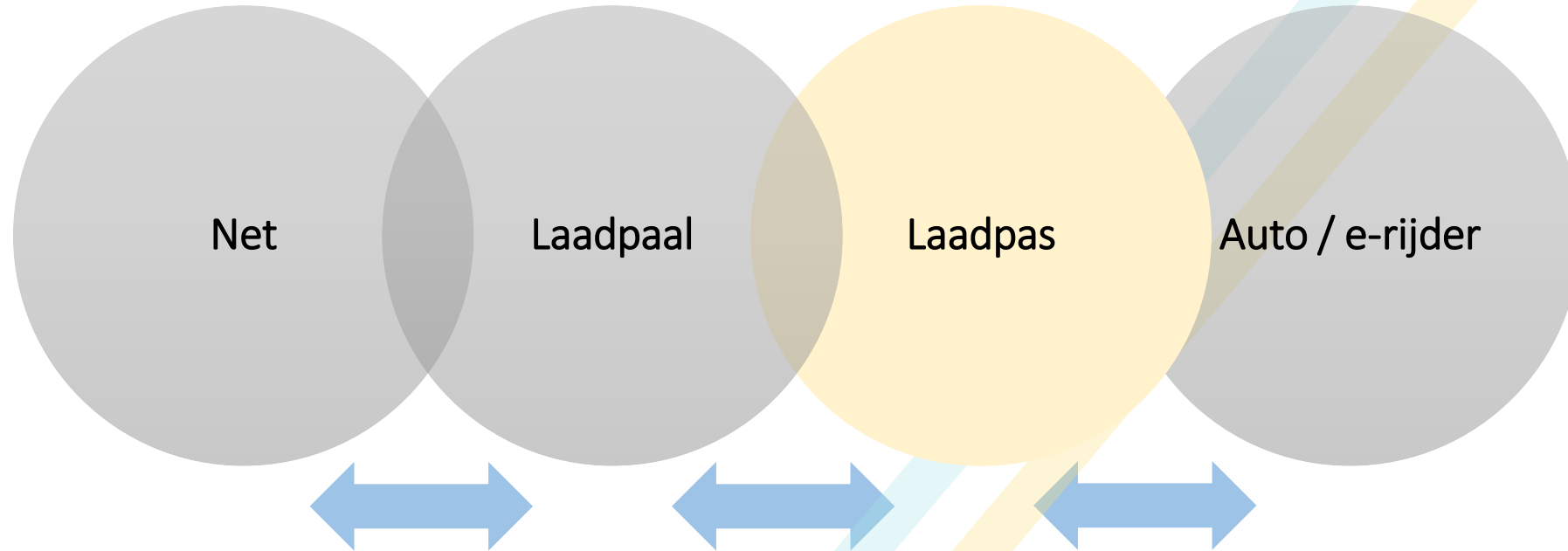
Direction

Recharging

Recharging
and
Discharging

Increasing complexity





- Roaming: uniforme data-uitwisseling en contracten
- Adhoc-laden: CPO-apps en spaarsystemen

3. Smart charging: public framework (1)



1. Government selects smart charging goals

- CPO implements and optimises

Net congestion

- CPO offers flexibility on the market
- DSO requests flexibility
- In case of emergency CPO can be ordered to address net congestion needs

2. National standard required on what to expect as end user

- Minimum amount energy delivered / time.

3. Passive smart charging is the basis

- Allows large scale, major benefits, less complex
- Passive =
 - Without involvement of the end-user
 - Minor effect on individual charging sessions
 - Easy opt-out function for end-user
 - No bi-directional charging

4. Active smart charging is additional

- Fewer sessions, more complex.
End user benefits.
- Active =
 - End user interaction and rewards
 - Higher impact per session
 - Includes bi-directional



Grow towards smart charging on all public charging stations

- New charge points have the right technology

Select goals with the highest urgency and impact, combine when possible

- Currently, support DSOs
- CO2 and lowering costs are also crucial

Drafting plan for 1.000 cp smart charging 2023

Pilot multiple smart charging goals and methods



	1	2	3	4	5
Aim	Reduce emissions	Reduce net impact	Reduce emissions	Reduce net impact	Reduce net impact
Reliable recharging	Time restrictions Amperage resitrictions	Amperage resitrictions Opt-out	Amperage resitrictions Opt-out	tbd (closed user group)	tbd (closed user group)
Direction(s)	1	1	1	2	2
Steering input	Imbalance market	GOPACS net congestion market	EPEX Day ahead market	Building energy production & netcongestion	Netcongestion profiles
CPO	Vattenfall Incharge	TotalEnergies	TotalEnergies	Hilversum energy cooperation	We Drive Solar
Other partners	Various cities	INCIT-EV partners City of Haarlem	Cities of Zeist and Dijk&Waard Greenflux	City of Hilversum Venema TU Delft	Province Utrecht Various cities

Smart charging pilot INCIT-EV use case 1a



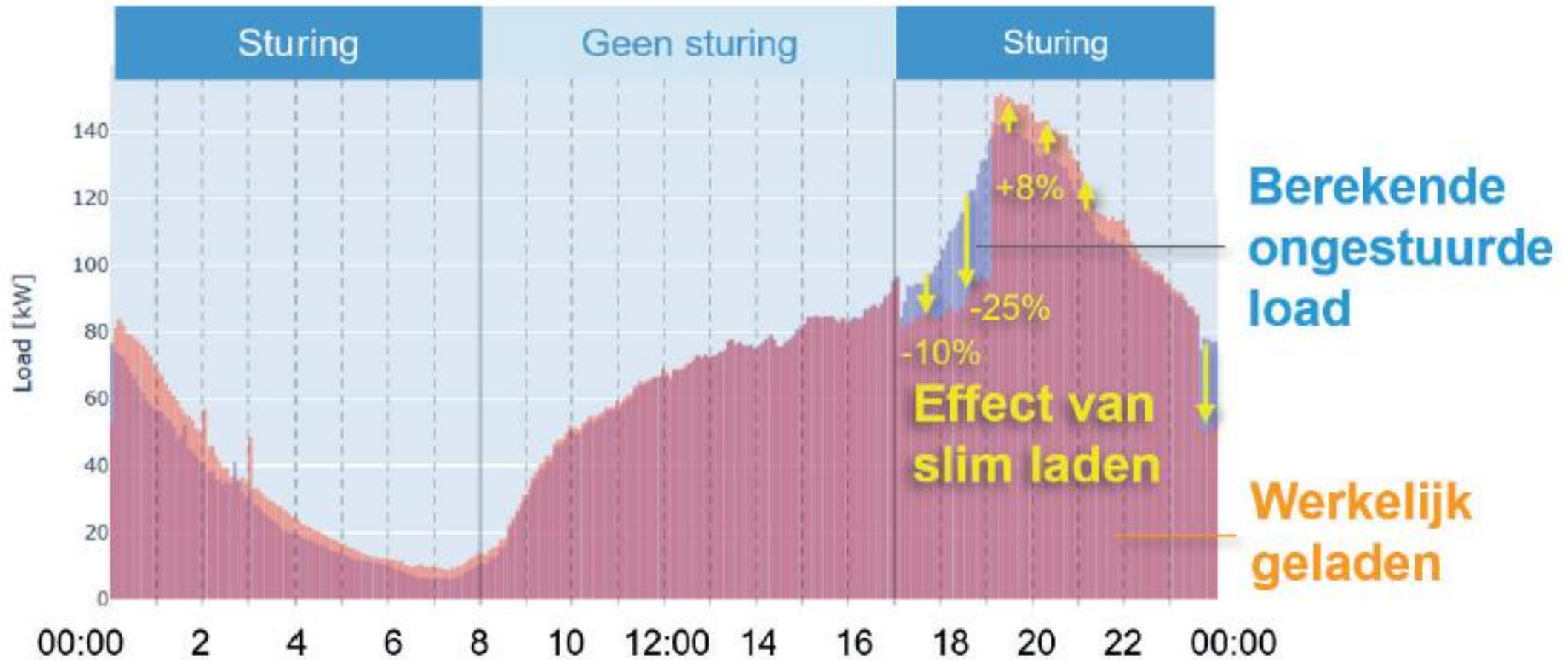
- Pilot in the city of Haarlem with 80 charge points
- Avoid local net congestion
- Simulated net congestion profiles
- Steering at cluster level
 - Minor negative effects per sessions
 - Combining effects to have impact

CPO



Government





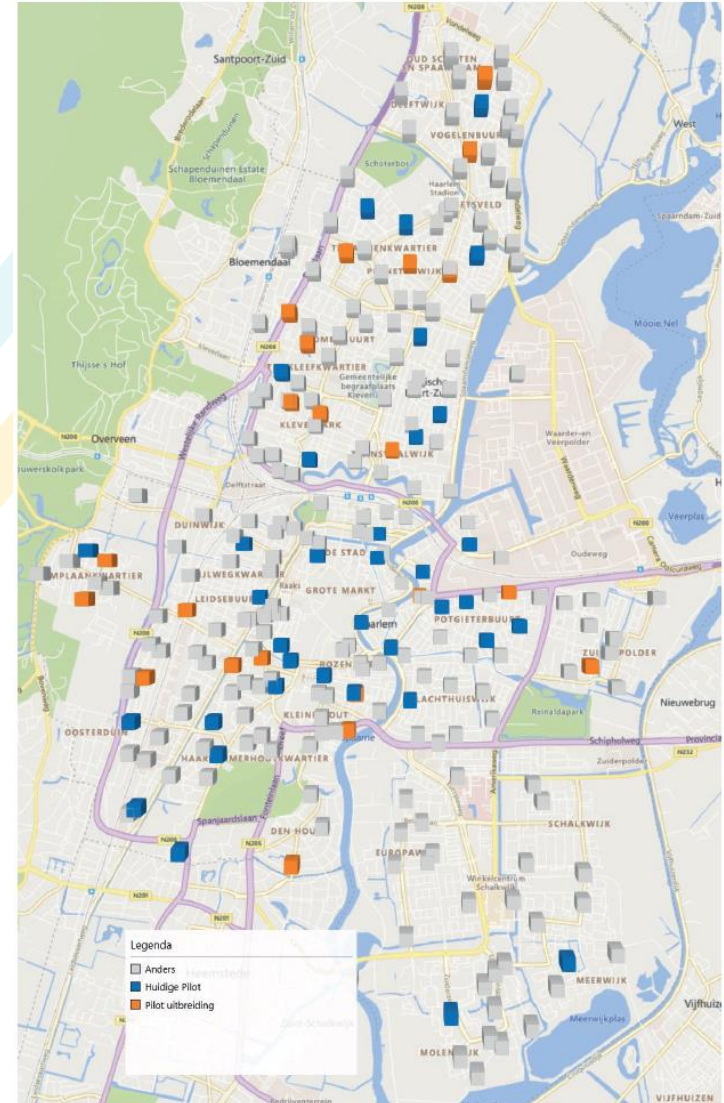
11% hot unplugs, equal to unsteered charging

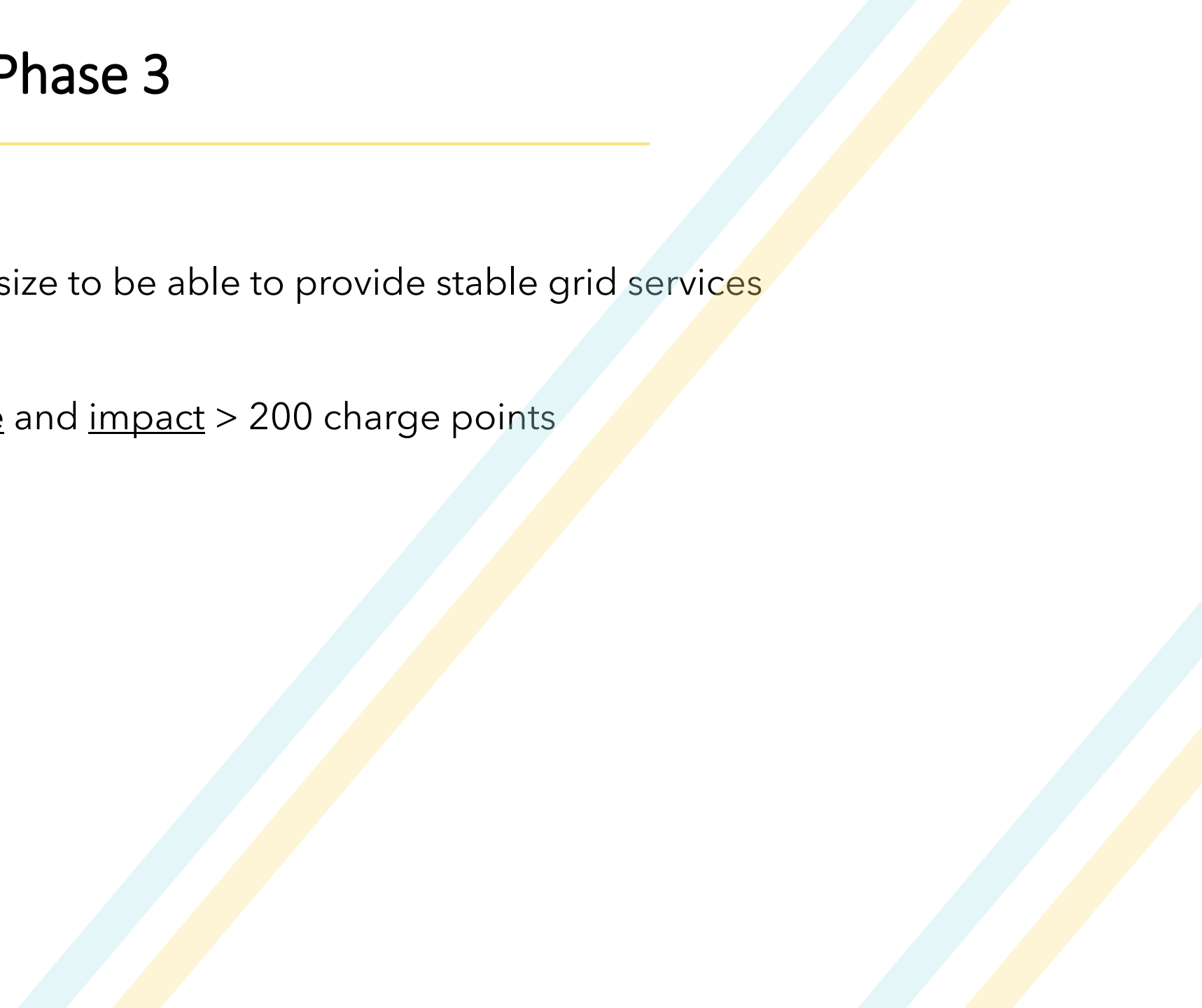
- 5.906 charging sessions
- 3 complaints
 - 1 x Vehicle app shows confusing messages
 - 2 x Charging session cancelled
- 'Waterbed effect'



- **Insert Amperage minimum**
and/or
- **Less often steering to 0 A**
- **Longer steering**

- Follow-up lessons from phase 1
+
- Increase exposure and impact > 116 charge points
- Respond to real demand flexibility requests from DSO: Liander



- Phase 2: insufficient pilot size to be able to provide stable grid services
 - Further increase exposure and impact > 200 charge points
 - Activate user group
- 
- The bottom right portion of the slide is decorated with two parallel diagonal lines. The upper line is light blue and the lower line is yellow, both extending from the bottom left towards the top right.

- **1.000 charge points smart charging**
- **Integrated in regular service**
 - Helpdesk
 - Information provision
 - Proactive and reactive maintenance
 - Collecting flexibility demand and offering flexibility services

- 1. Financial rewards for the most urgent objective: avoiding net congestion**
- 2. Detailed maps on net congestion (low voltage grid) that guide AC smart charging**
- 3. National norm for user friendly smart charging**
- 4. International standardisation**
 - on how vehicle & MSP apps respond to smart charging
 - on data flows that facilitate user involvement

Thanks for your attention!



Pieter Looijestijn/ p.looijestijn@mrae.nl

The logo for INCIT-EV features the text "INCIT-EV" in a bold, dark grey sans-serif font. The "I" and "C" are partially overlaid by a light blue triangle pointing to the right. To the right of the "V", there is a small, stylized light blue car icon. The entire logo is accented with several small yellow squares and horizontal lines.

INCIT-EV

<https://www.incit-ev.eu/>

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875683.

