

*Electric Mobility Challenge 2018*

# **SMART CHARGING AND MATCHING ELECTRIC MOBILITY TO LOCAL RENEWABLE ENERGY SUPPLY**

**ewi**

Institute of Energy Economics  
at the University of Cologne



**Erasmus Centre for  
Future Energy Business**

FOUNDED BY

ROTTERDAM SCHOOL OF MANAGEMENT  
ERASMUS UNIVERSITY



**SIEMENS**

*Ingenuity for life*



Ministerium für Wirtschaft, Innovation,  
Digitalisierung und Energie  
des Landes Nordrhein-Westfalen



Presenter: Ruud Noordijk

Moderators: Prof. Wolf Ketter & Volker Beckers



**DNHK**

Deutsch-Niederländische Handelskammer  
Duits-Nederlandse Handelskamer

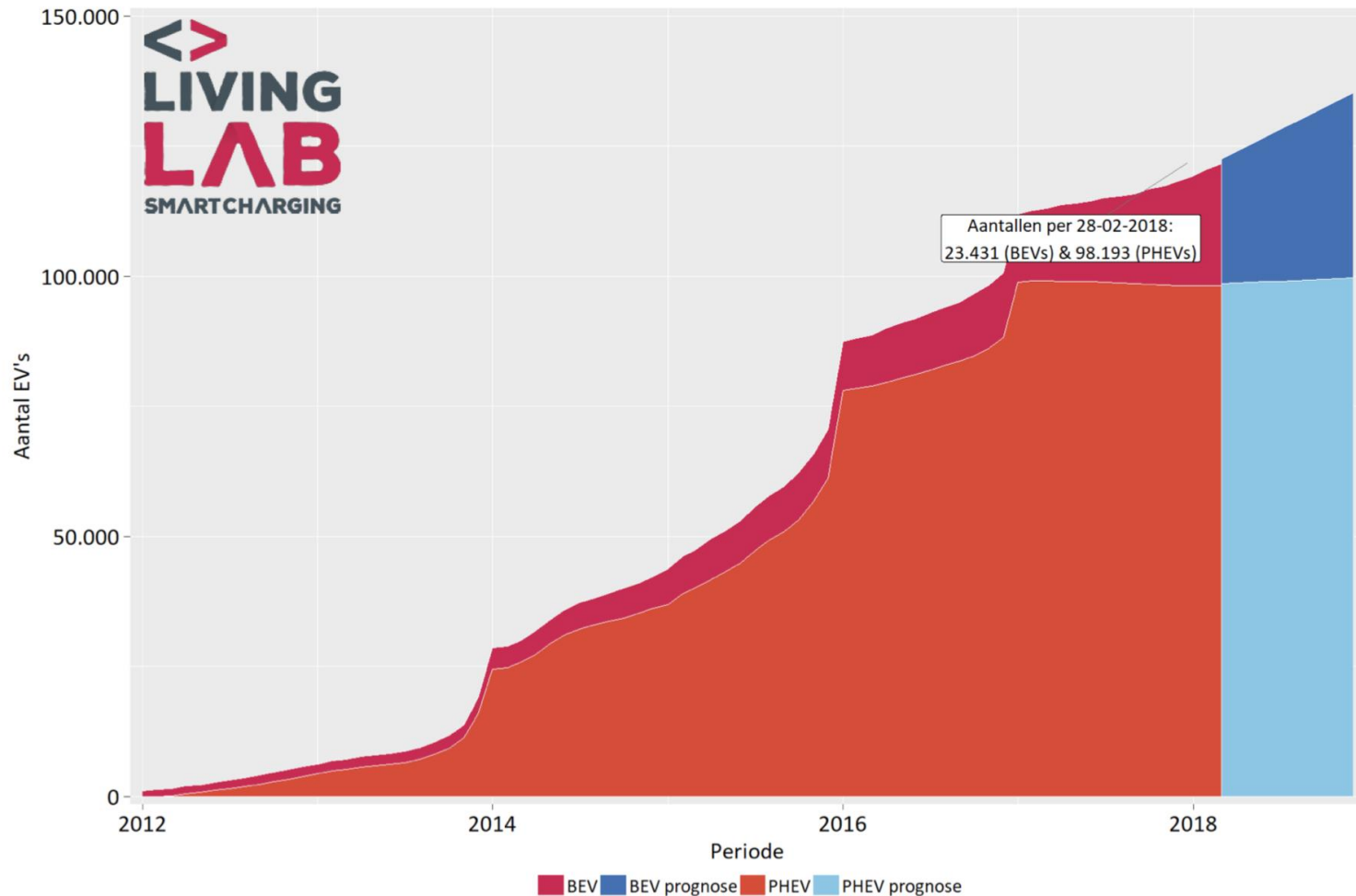
# Smart Charging challenges

Living Energy Conference  
Electric Mobility Challenge – 20th April 2018



Ruud Noordijk

# ~125,000 EV's in the Netherlands



# Charging Infrastructure

- 35.000 public and semi-public charging points
- Estimated 84.000 private charging points (based on 2012 research, estimated and extrapolated grow to 2018)
- 800 fast-charging points (>50kW)

## What is Smart Charging about?

Controlling the charging session, taking into account multiple interests:



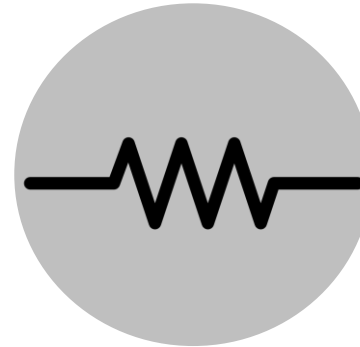
Preferences  
EV-drivers

Charging  
behavior



EV batteries for  
buffering and storage

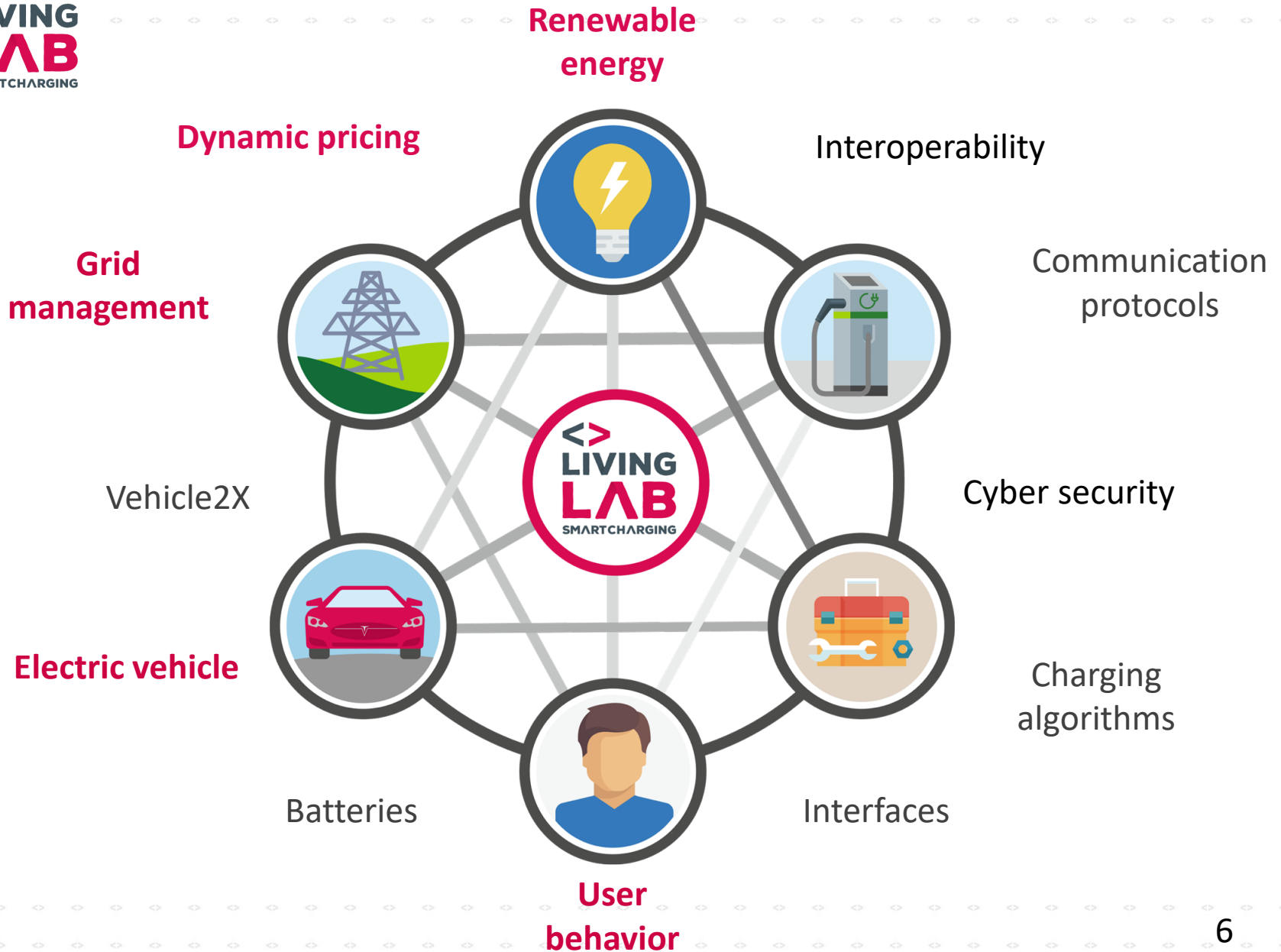
Vehicle to X



Optimizing use of TSO  
and DSO grids



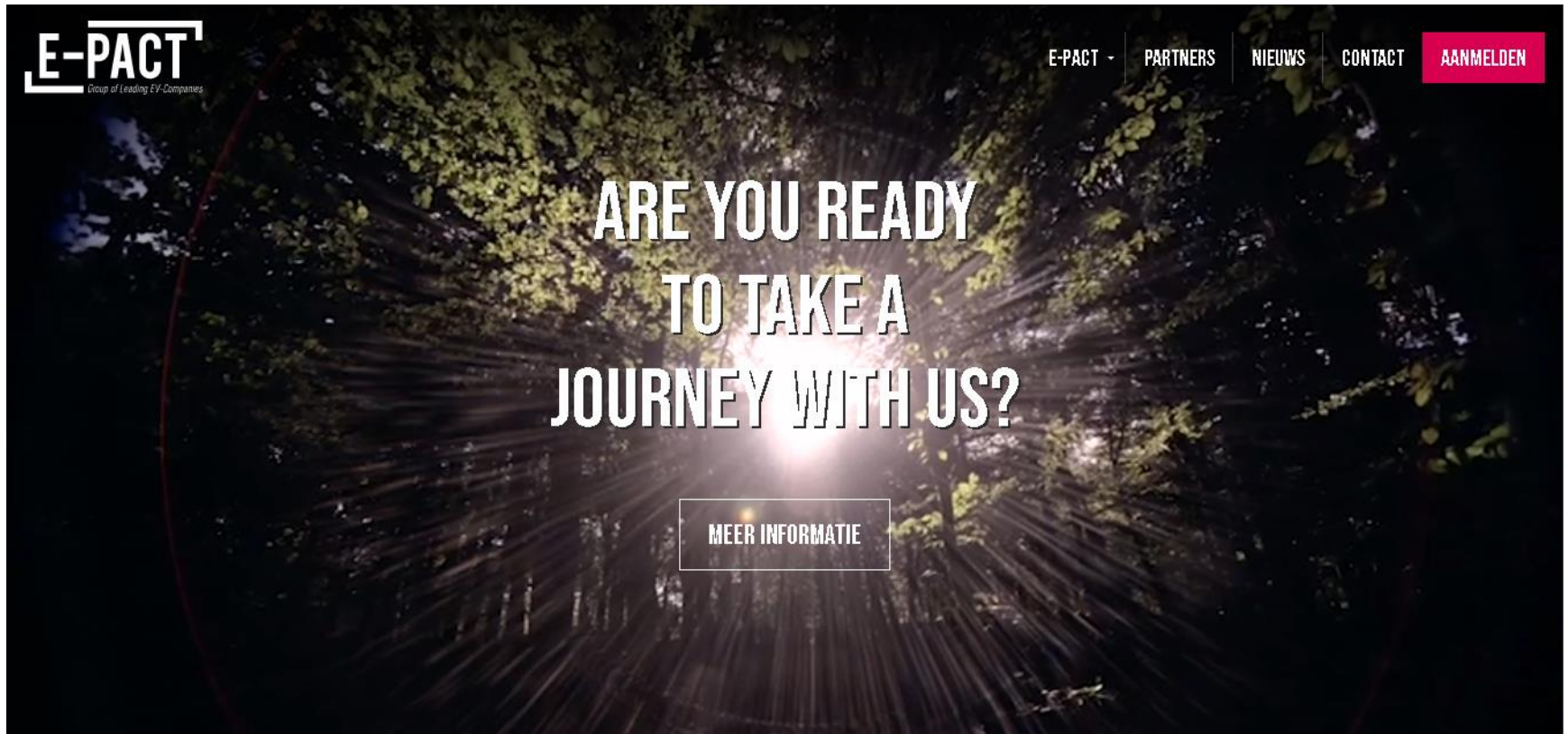
Optimizing the use of  
renewables and enabling  
low energy prices



# Hackaton: developing Smart Charging solutions

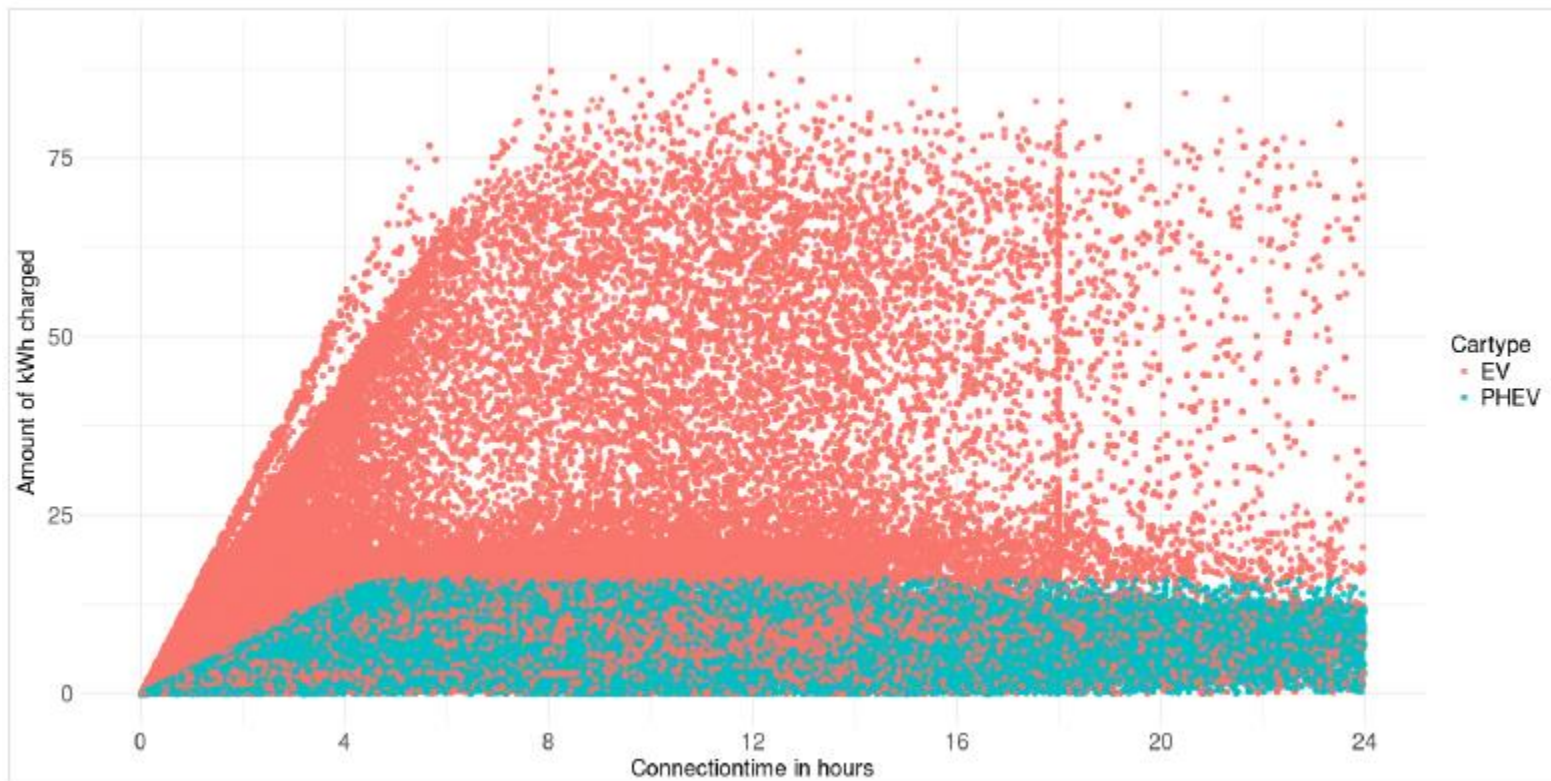


# E-PACT: accelerating smart charging in fleets

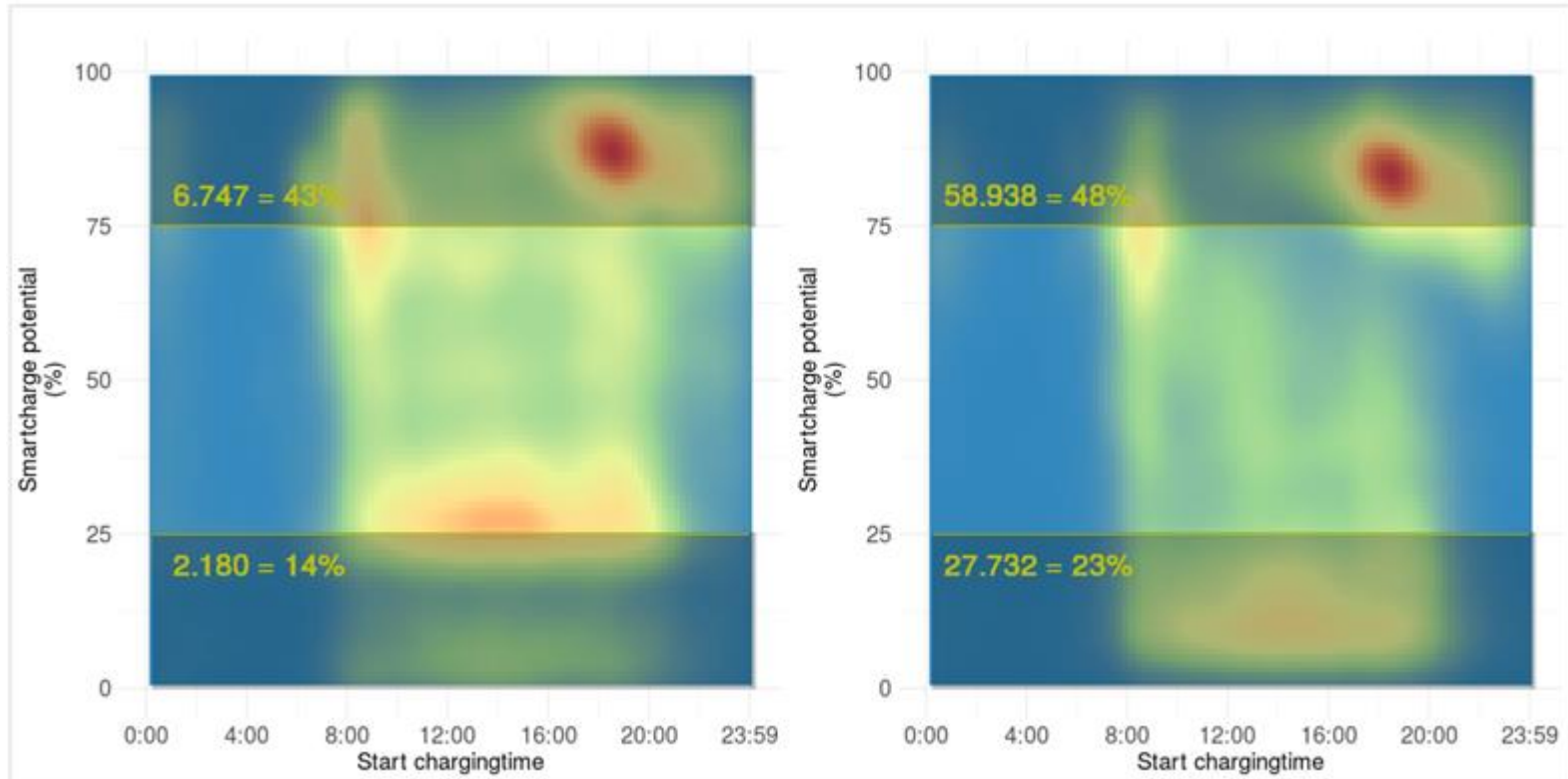




# Data-analytics on national level



# Data-analytics on national level



Smartcharge potential= (1-charging time/connection time)\*100%

# TestLab ElaadNL

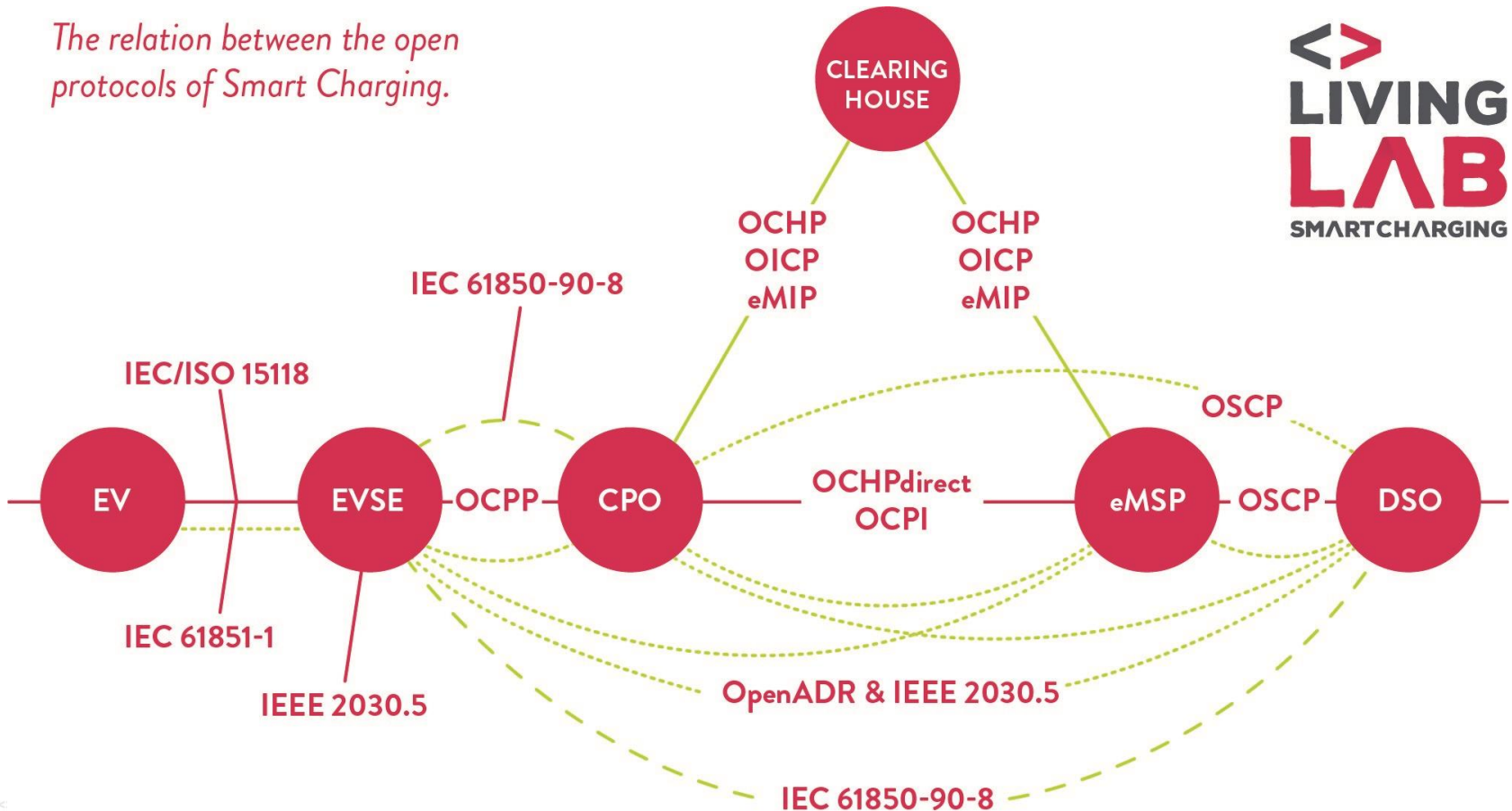


# Challenge 1

## Open market and level playing field

# Open communication standards between actors

*The relation between the open protocols of Smart Charging.*



# Smart Charging ready infrastructure

Publiek

Semi-publiek



aantal

- 10
- 50
- 100
- 250
- 500
- 750
- 1000

toegangsvorm

- Publiek
- Semi-publiek

## Challenges

- Which hardware and software requirements do we need?
- How to achieve that public and private location owners use the same standards?
- How to optimize for consumers (e.g. price transparency, charging services etc.)?
- How to handle the national and international regulations?

## Challenge 2

# Controlling Smart Charging sessions



## Market actors

EV-driver

Electric vehicles

Energy producers

Energy suppliers

Transmission System Operator

Distribution System Operators

ChargePoint operators

E-mobility service providers

National and local governments

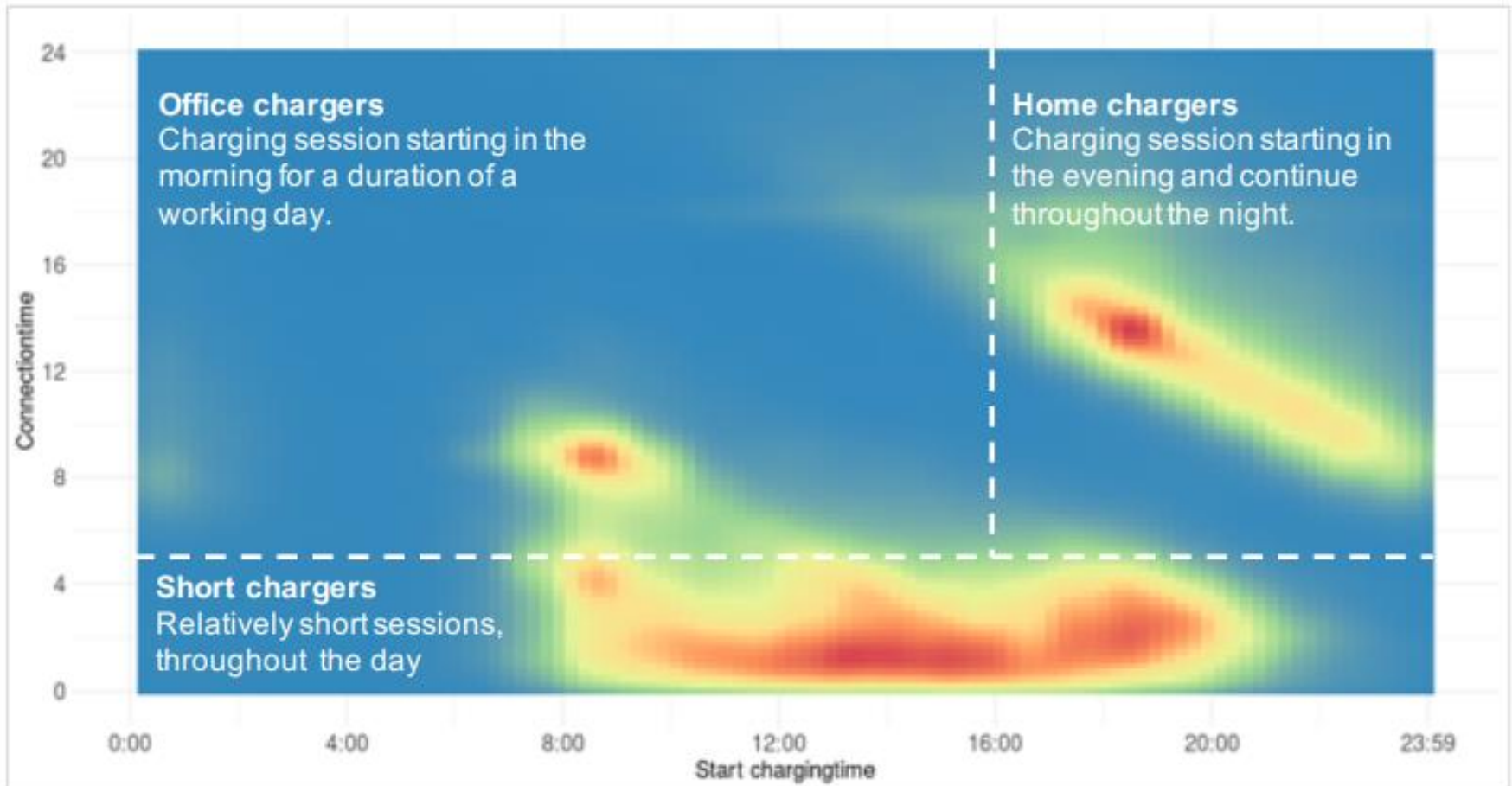
# Challenges

- Who is in the lead to make charging decisions?
- Which services are needed to develop valuable and user-centric propositions?
- How might the changing role for market players (e.g. OEMs, lease companies, energy suppliers) affect today's market organization?

## Challenge 3

# Involving consumers

# Current charging behavior



## SMART CHARGING STRATEGIES



### Postpone strategy

A charging session is shifted in time. The shift is a percentage of the Smart Charging Potential



### Cut and divide strategy

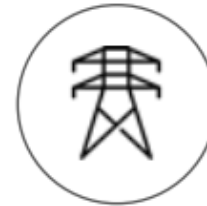
A charging session is split in smaller sessions. These sessions are scheduled in the connection time window.



### Power reduction

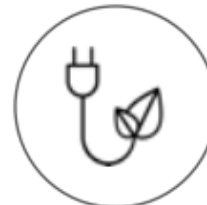
Reduce power, and hence the charging speed, at a charging point.

## PERFORMANCE INDICATORS



### Demand load

How can Smart Charging reduce the demand peaks?



### Sustainable charging

How can Smart Charging be used to utilise the available renewable energy?



### Cost reduction

How can Smart Charging be used to optimize for APX prices?

# EV as a powerstorage: free energy?



# Challenges

- What is the role of EV-drivers in Smart Charging? Just do it or the leading stakeholder?
- How do EV-drivers preferences match grid capacity and energy supply?
- When is Smart Charging valuable for EV drivers?

## Challenges overview

1. How to achieve a level playing field for all players involved?
2. Who is in charge of Smart Charging?
3. How to engage EV-drivers / consumers?



## Contact us



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