

Smart charging systems in Zero Emission Neighbourhoods

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About the research centre ZEN

- New research centre in Norway, 8 years from 2017 to 2024:
Zero Emission Neighbourhoods in Smart Cities (ZEN)
- Hosted by NTNU
- 10 public partners, 22 industry partners and 2 research partners
- Total budget: Ca. 380 MNOK (2017 – 2024)
- Funded by the partners and the Research Council of Norway
- Around 20 PhD candidates and 5 post docs will be educated

VISION:
**«Sustainable
neighbourhoods with
zero greenhouse gas
emissions»**

RESEARCH SCOPE



BUILDINGS



USERS



**ENERGY
SYSTEMS**



DEMONSTRATION

ZEN pilot areas



Ydalir, Elverum



Furuset, Oslo



NyBy, Bodø



Campus Evenstad



**Knowledge axis with
NTNU Campus, Trondheim**



NRK plot, Steinkjer



Zero Village Bergen

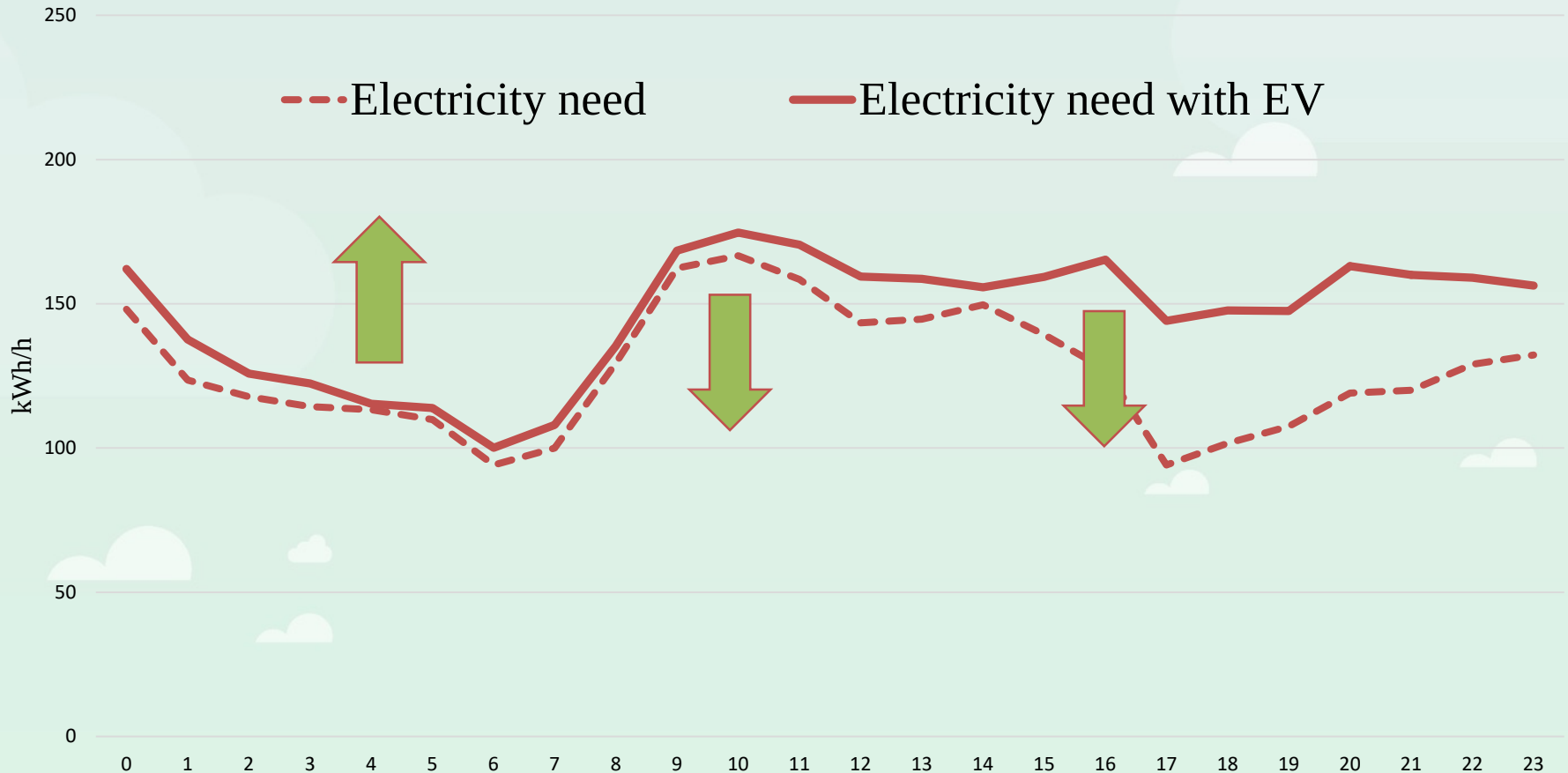
Energy use and production in ZEN

- Highly **energy efficient**
- Local **renewable energy sources** – Thermal and electric
- Managing energy flows in the built environment and with the surrounding energy system in a **flexible** way

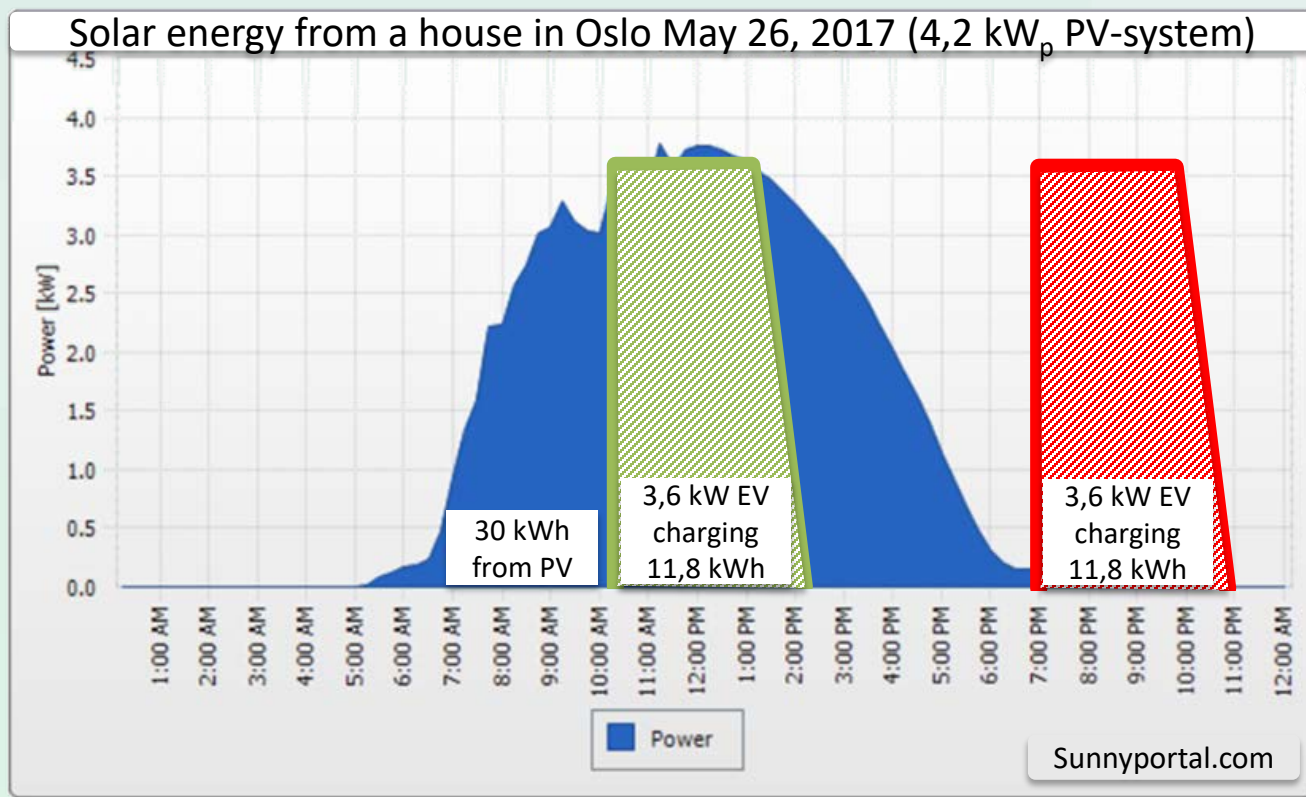
CAN SMART EV CHARGING STATIONS BECOME A HUB IN NEIGHBOURHOOD ENERGY MANAGEMENT?



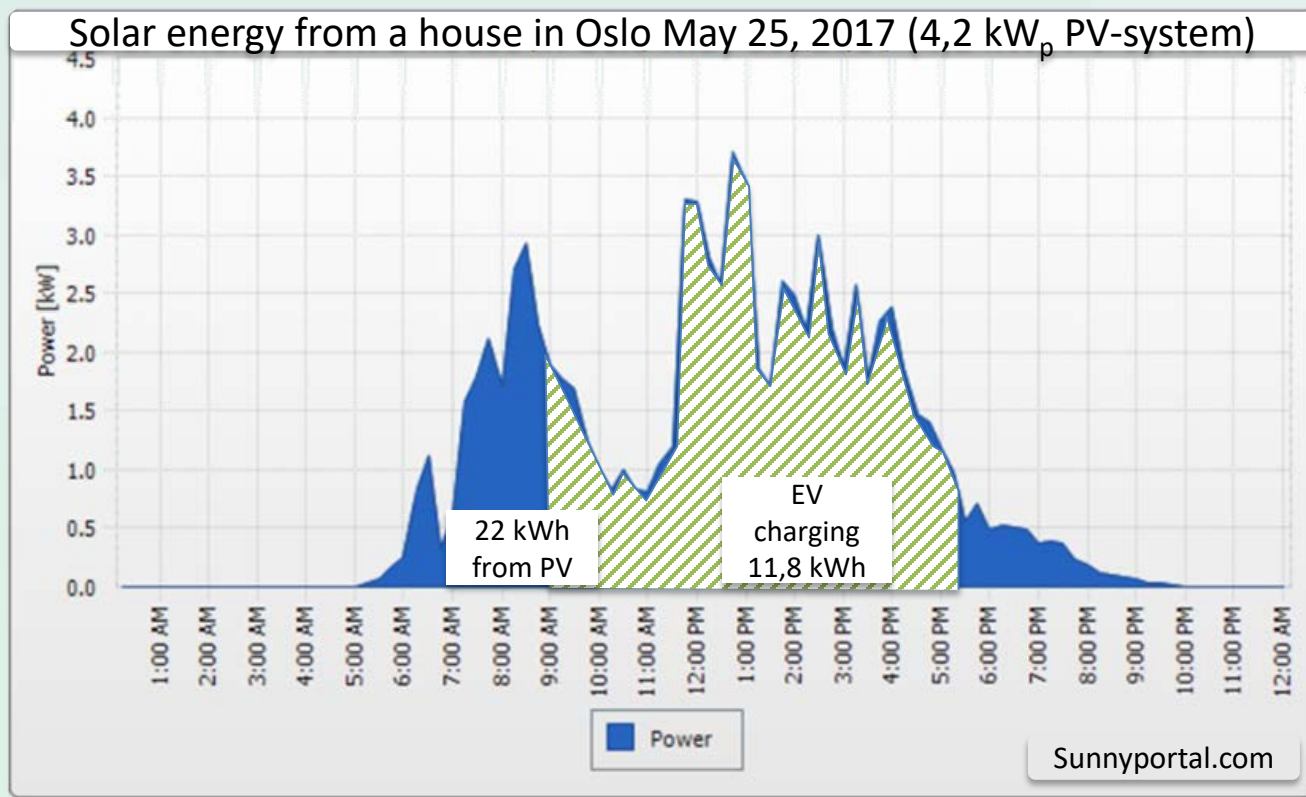
Example of smart charging benefits in ZEN: Shift charging to reduce peak loads



Example of smart charging benefits in ZEN: Maximise self-consumption from PV

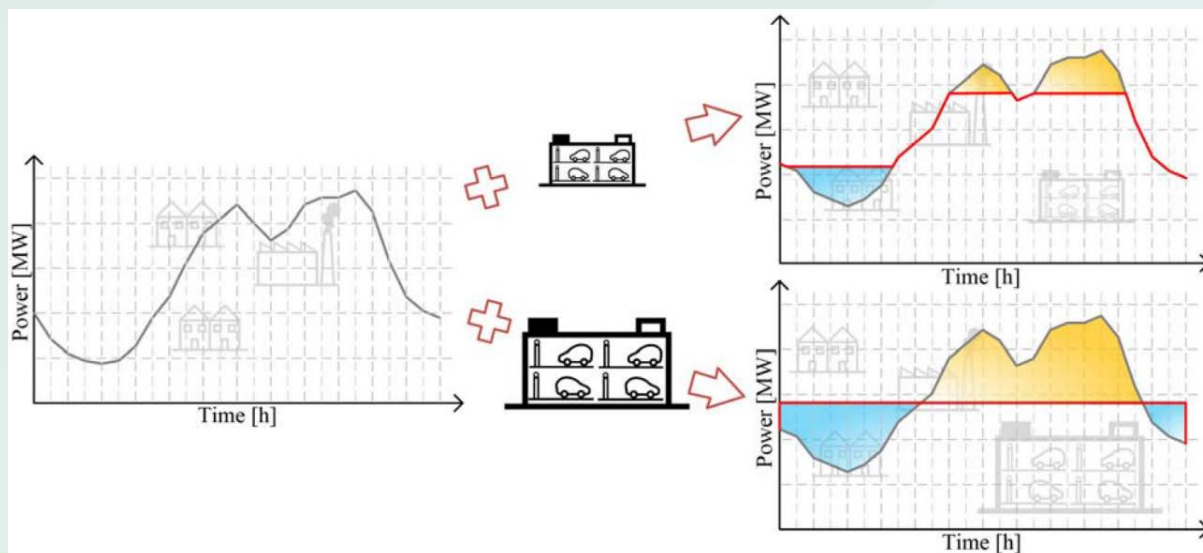


Example of smart charging benefits in ZEN: Maximise self-consumption from PV

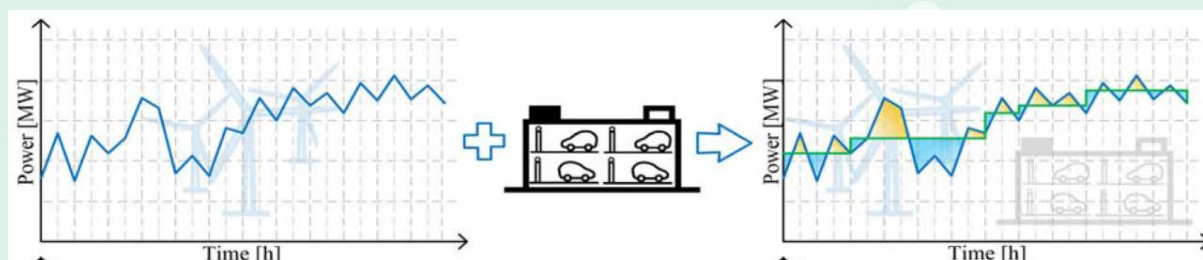


Example of smart charging benefits in ZEN: Power delivery from parked cars – V2G

1. **Peak shaving** in buildings/areas



2. Maximise **self-consumption**



3. **Flexibility**
service to grid

(Damiano et al., 2014)

Planned in ZEN pilot Campus Evenstad (Statsbygg): Demonstration of V2G

Nytt fra Statsbygg

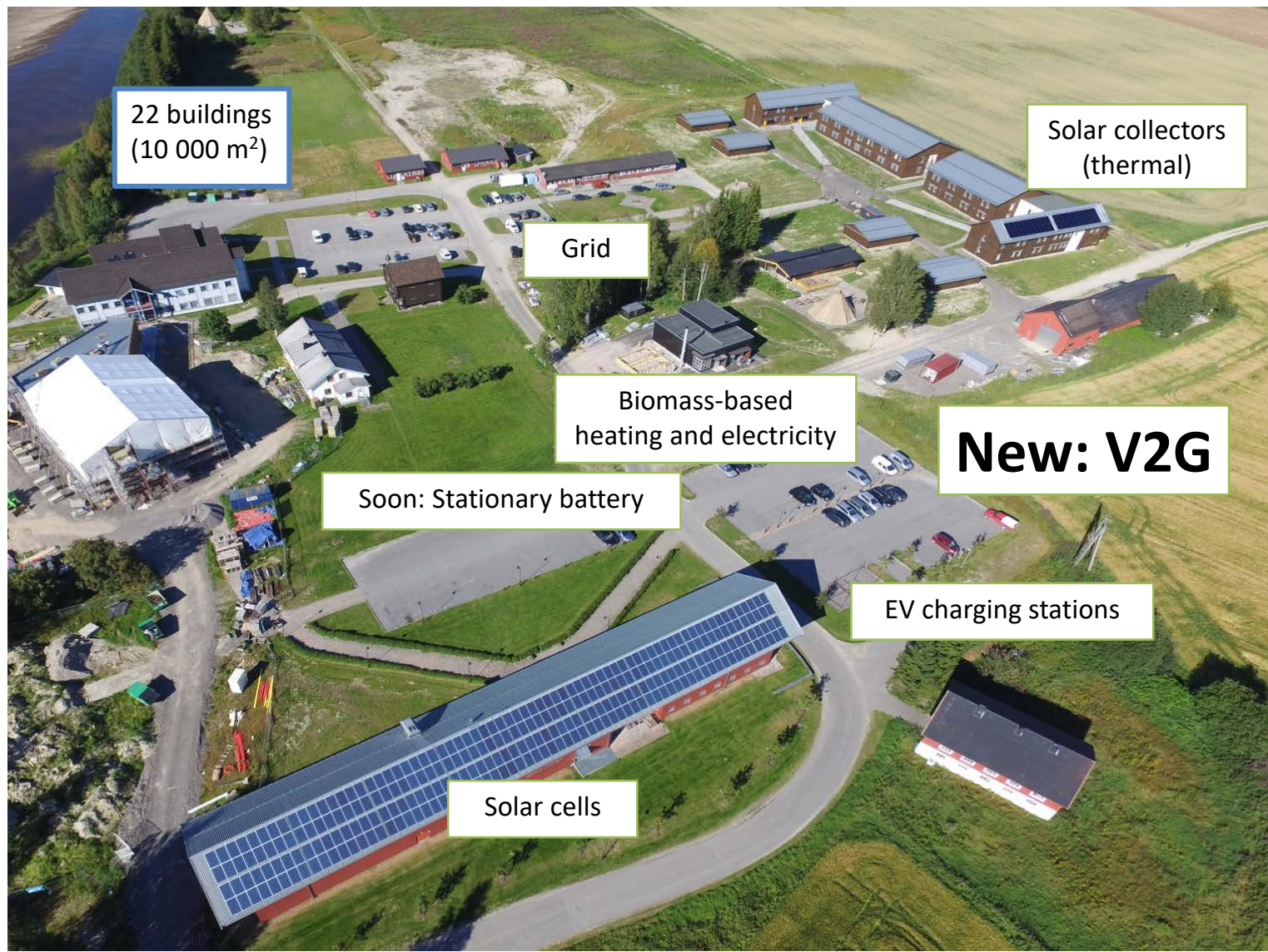
Elbilene blir en del av strømmettet



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På Campus Evenstad i Hedmark tester Statsbygg en rekke teknologiske løsninger som er nye i norsk sammenheng. Konseptet Vehicle-to-Grid (V2G) gjør elbilene til en aktiv del strømsystemet, og har et stort potensial i Norge.

Planned in ZEN pilot Campus Evenstad (Statsbygg): Demonstration of V2G

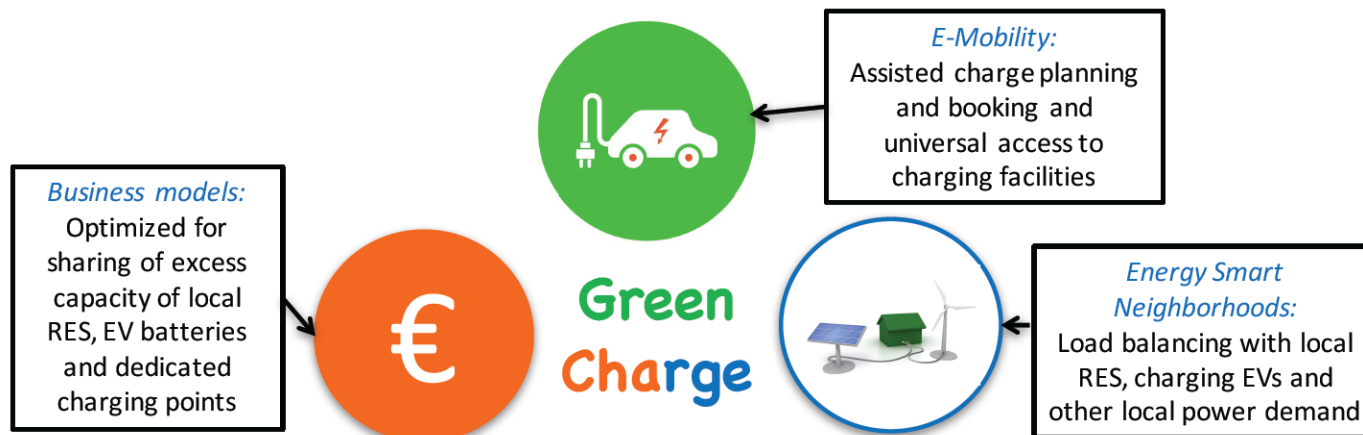


New Horizon2020 project: GreenCharge



Funded by the Horizon 2020
Framework Programme of the
European Union

- New project, with official start-up later in 2018
- Topic MG-4.2-2017 "Supporting 'smart electric mobility' in cities"
- Norwegian partners:
 - SINTEF (coordinator), Oslo, Fortum, eSmartSystems, University of Oslo
- Pilots in Norway (Oslo), Germany (Bremen) and Spain (Barcelona)
- Oslo-pilot: Smart and cost-efficient home-charging in housing associations with limited grid capacity



THANK YOU!

