Amsterdam University of Applied Sciences

EVEC MODEL FOR ENERGY FLOW ANALYSIS

June 5th, 2019

Jos Warmerdam
Lecturer / researcher

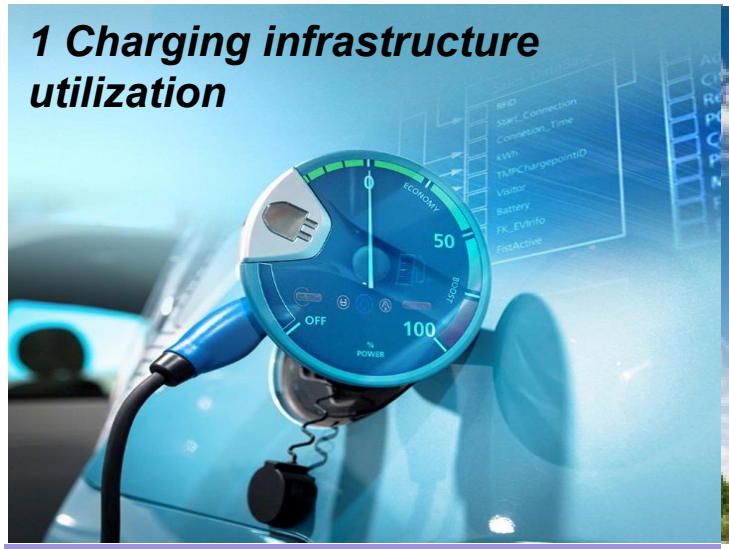
Amsterdam University of Applied Sciences
Urban Technology research program

Amsterdam
The Netherlands

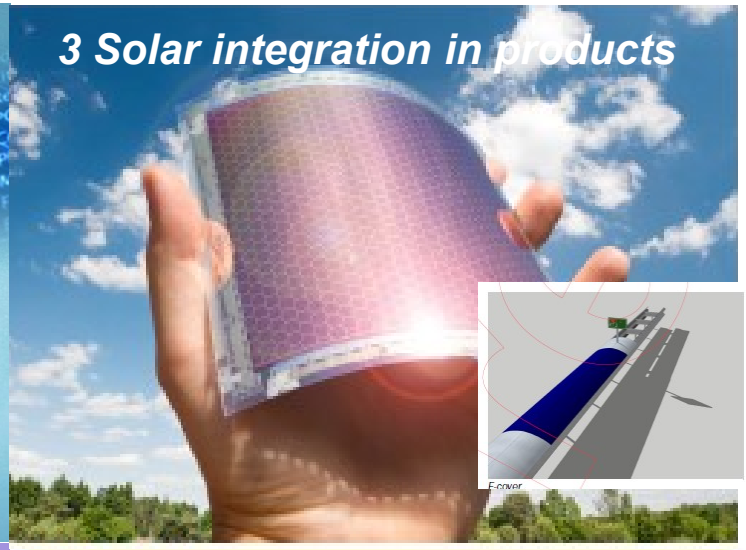
CREATING TOMORROW

URBAN TECHNOLOGY RESEARCH PROGRAMME
SMART ENERGY SYSTEMS

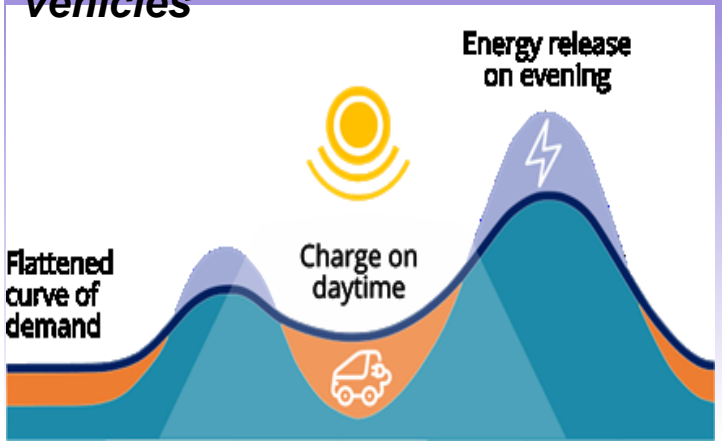
1 Charging infrastructure utilization



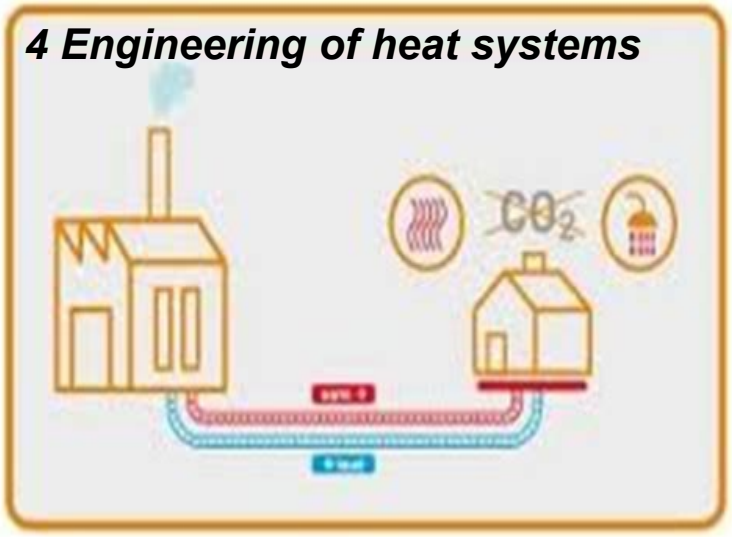
3 Solar integration in products



2 Grid integration of electric vehicles



4 Engineering of heat systems



Key figures:

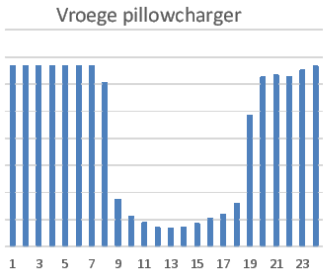
- 15 researchers
- 3 PhD
- 8-10 projects
- Budget 650kEuro
- 20+ publications
- 20+ students / year

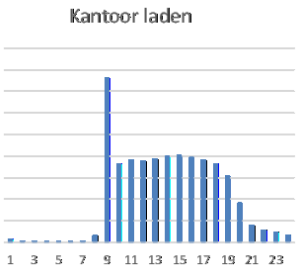
Amsterdam University of Applied Sciences

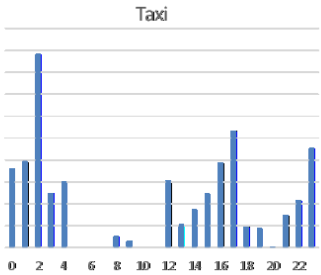
CHARGING INFRASTRUCTURE UTILIZATION

- Performance
  - Datawarehouse & datamanagement
  - How do you measure performance? → KPIs
  - How are charging points used? → dashboard & monitoring

- Rollout planning of charging infrastructures
  - Occupancy rate of charging points differ (usually between 20-40%)
  - Charging profiles per charging station



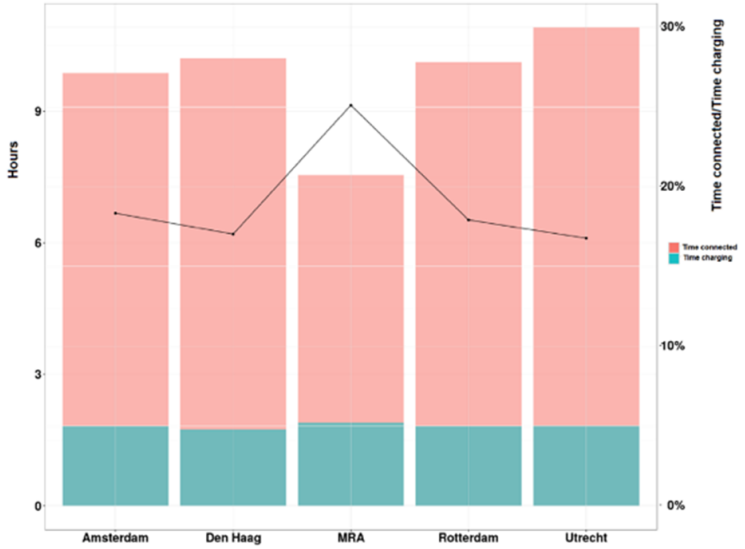




Amsterdam University of Applied Sciences

CHARGING INFRASTRUCTURE UTILIZATION

- Effect studies
  - What are effects of policies to improve efficiency of charging point utlization?
  - On average 20% of the connection time is used for charging

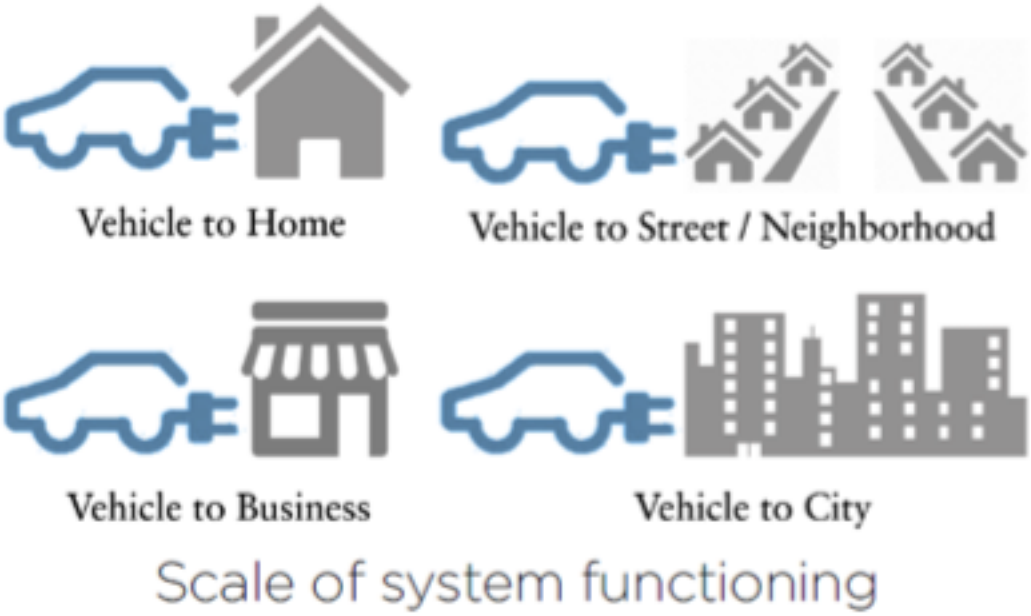


- Grid integration
  - How does charging contribute to current energy peaks?
  - Can smart charging reduce peaks? (without transactions being affected?)
  - Opportunities of Vehicle2grid solutions?

Amsterdam University of Applied Sciences

GRID INTEGRATION OF EV: SEEV4-CITY PROJECT

- Consumer research: open to providing
- Energy modelling; increasing autonomy
- Degradation battery: different results



Hogeschool van Amsterdam
Vehicle to Neighborhood, Vehicle to Business

energy.
Vehicle to Street

cenex
Vehicle to Home
Vehicle to City

Gemeente Amsterdam
Vehicle to Neighborhood

Leicester City Council
Vehicle to Home
Vehicle to City

KATHOLIEKE UNIVERSITEIT LEUVEN
Vehicle to Business

AMSTERDAM ArenA
Vehicle to Business

City Partners

POLIS EUROPEAN CITIES AND REGIONS NETWORKING FOR INNOVATIVE TRANSPORT SOLUTIONS
AVERE
northumbria UNIVERSITY NEWCASTLE

SEEV - 4 City Broad Operating Partners

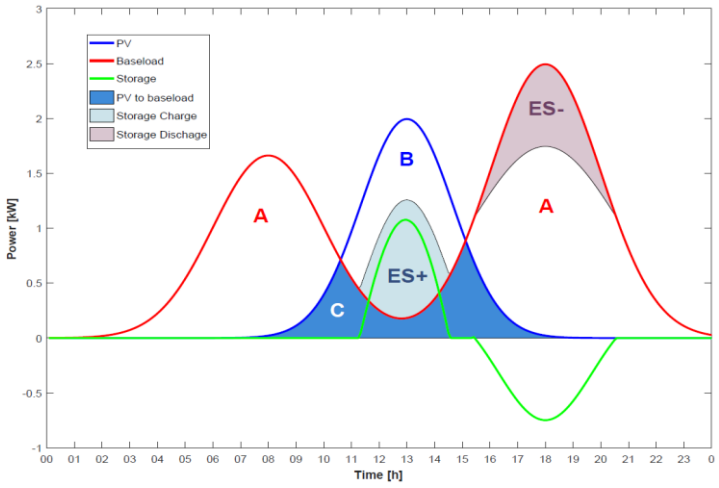
iea International Energy Agency
The Capital Region of Denmark
DTU
NORDHAVNEN

Strategic Support Partners

Amsterdam University of Applied Sciences

SEEV4-CITY KPI'S

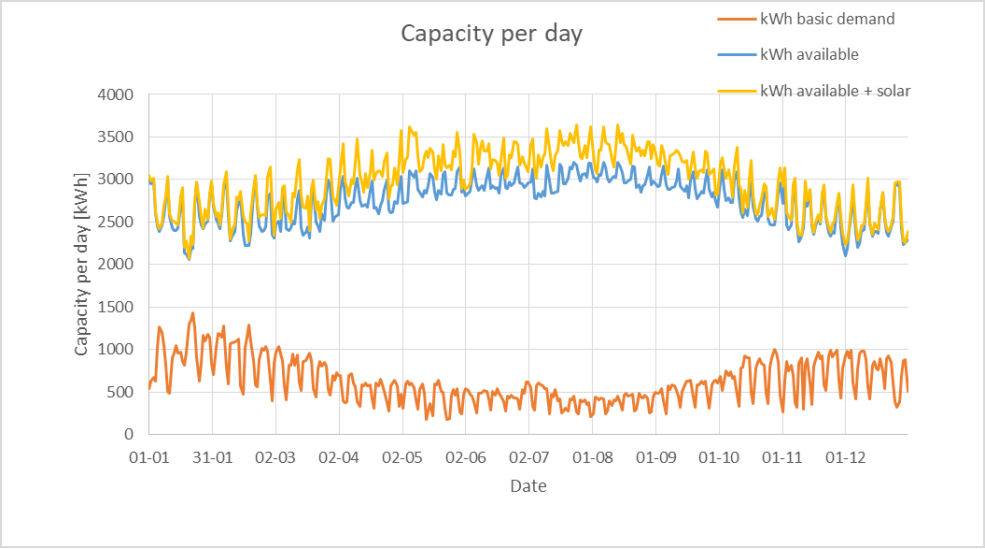
- CO_2-emission reduction
  - PV generation
  - EV replaces ICE
- Increased Energy Autonomy
  - More PV locally used
  - Smart energy management
  - V2X
- Avoided grid investments
  - Smart energy management
  - V2X / Static battery



Amsterdam University of Applied Sciences

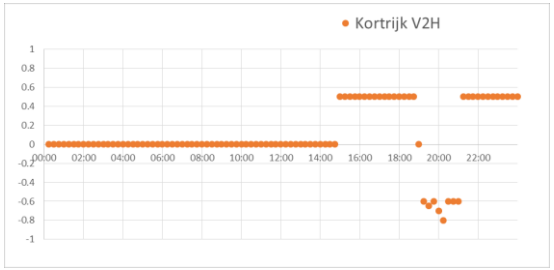
EVEC MODEL

- EVEC: Electric Vehicle Expansion Calculator
- Excel based
- 1st:
  - Charging capacity per day
  - Smart meter data for basic power consumption
  - Effect smart charging
- 2nd:
  - PV generation
  - Static battery
  - Charging profiles

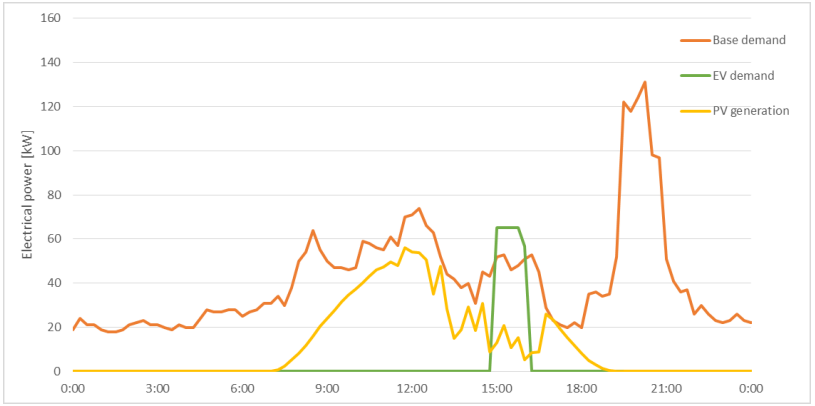


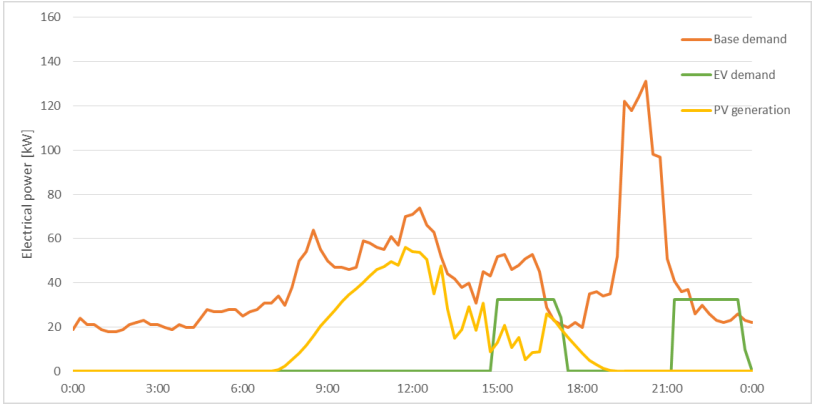
Amsterdam University of Applied Sciences

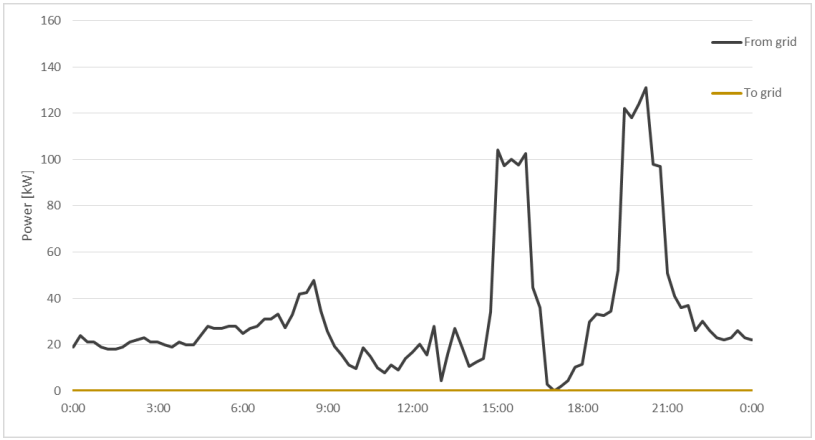
- Example Kortrijk, March 23
- 10 EV connecting at 15:00

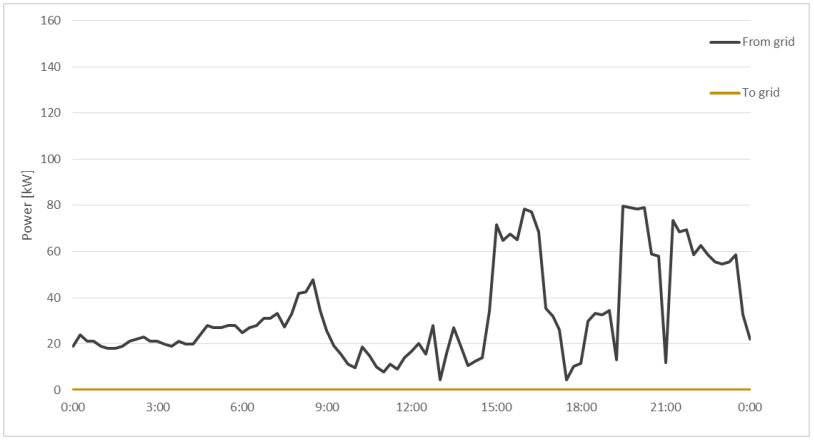


10 EV with V2H









QUESTIONS