evs 27
The 27th INTERNATIONAL ELECTRIC VEHICLE SYMPOSIUM & EXHIBITION
BARCELONA
17th-20th November 2013

MIT Portugal

FCT
Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR

Synergies between electric vehicles and solar electricity penetrations in Portugal

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U LISBOA | UNIVERSIDADE DE LISBOA

19 Nov 2013

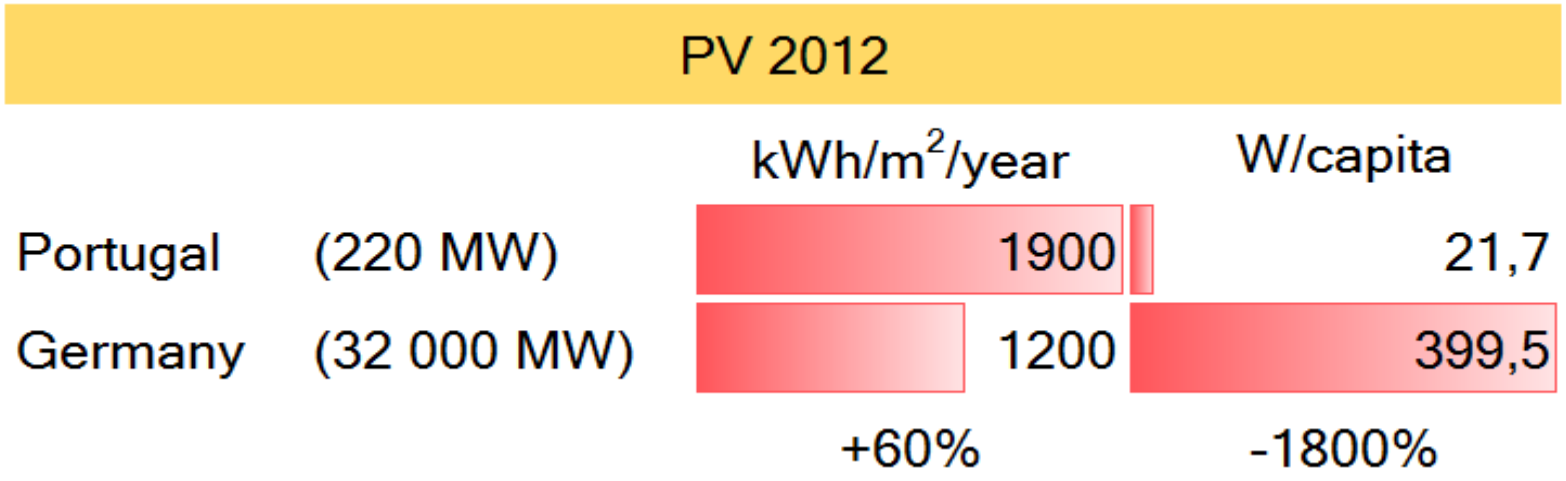
Organized by Fira Barcelona avele
Hosted by AVERE mea Ajuntament de Barcelona
In collaboration with EVAAP EDTA
Supported by European Commission

Outline

- Contextual framework
- Motivation
- Modelling
- Scenario
- Results
- Wrap-up

Contextual framework

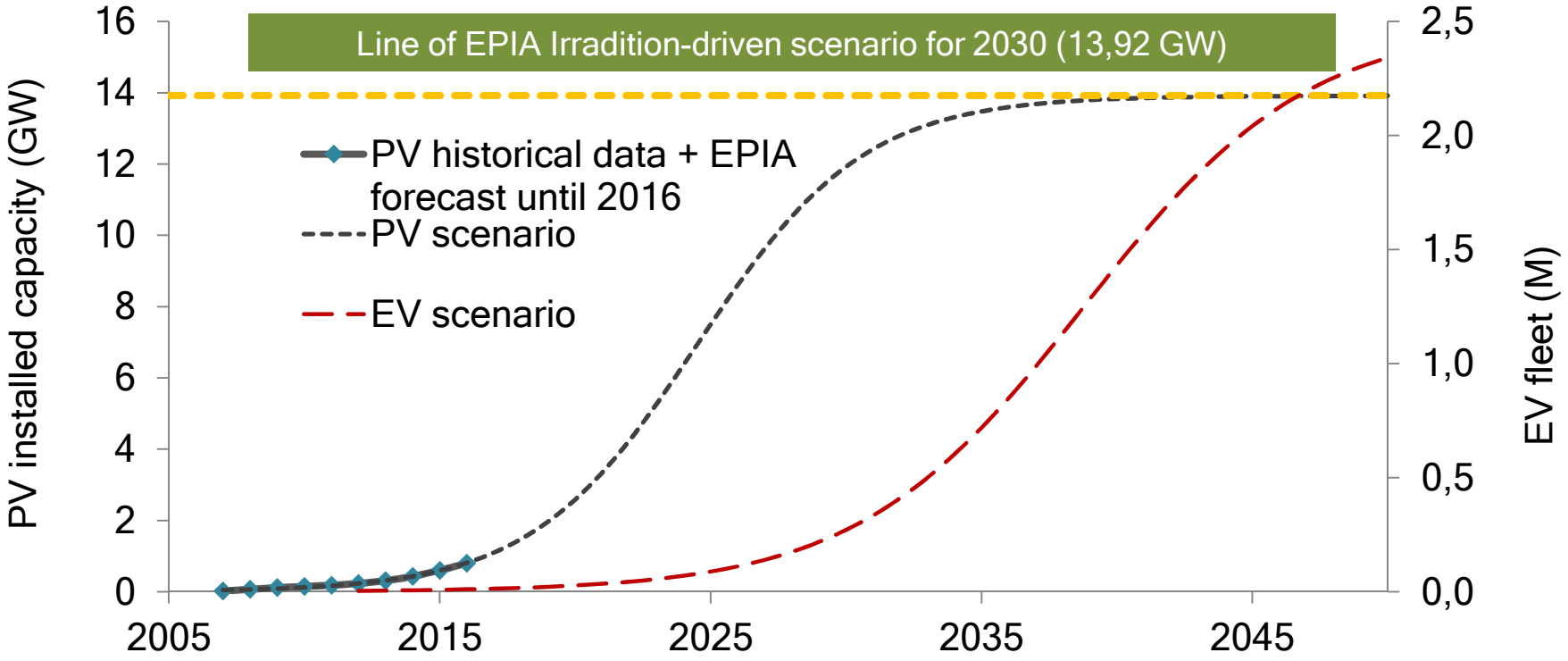
- Portugal is among the best places in Europe to produce solar electricity
- But that capacity is underused (penetration ≈1%)



Contextual framework

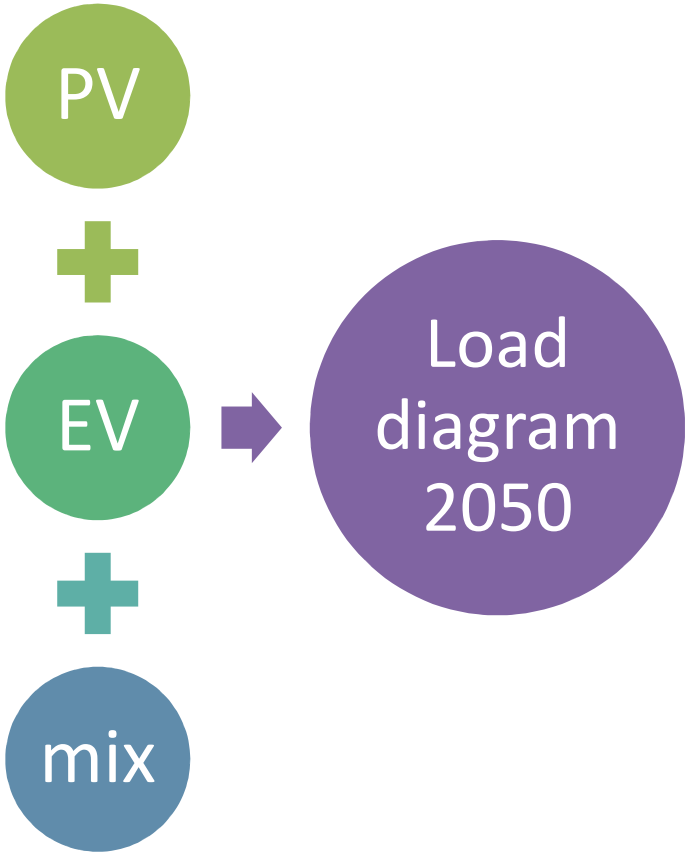
- Portugal is a world pioneer in the promotion of the EV
- 1 300 regular charging stations
- 50 fast charging stations

Contextual framework

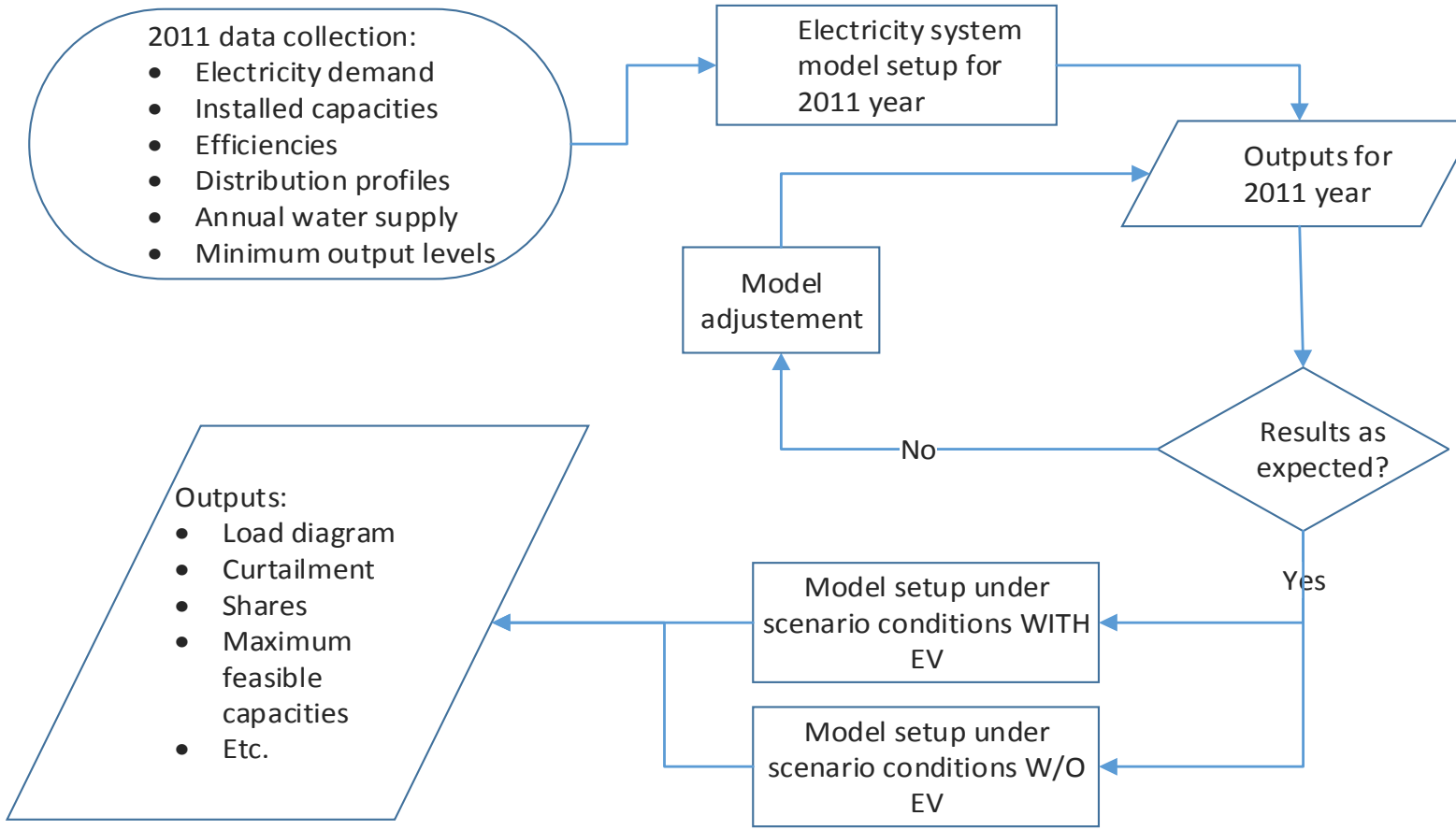


Motivation

- To study the synergies/interactions between PV and EV deployments and the existing electricity mix in the Portuguese 2050 load diagram

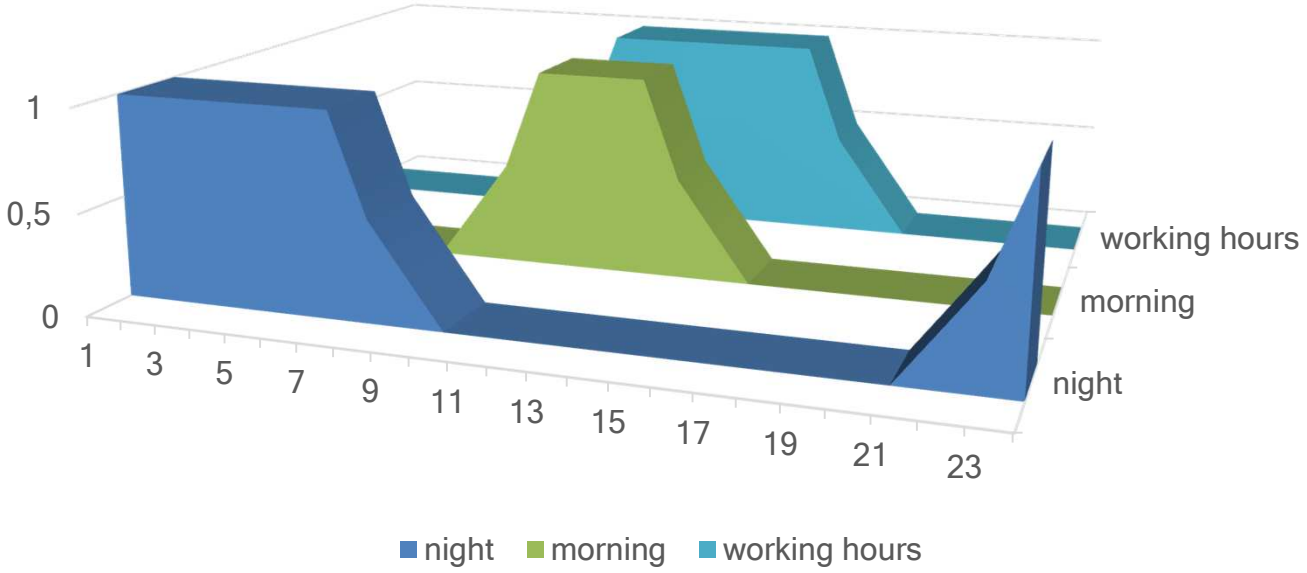


Modelling


2011 data collection:
Electricity demand
Installed capacities
Efficiencies
Distribution profiles
Annual water supply
Minimum output levels
Electricity system model setup for 2011 year
Outputs for 2011 year
Model adjustement
Results as expected?
No
Yes
Outputs:
Load diagram
Curtailment
Shares
Maximum feasible capacities
Etc.
Model setup under scenario conditions WITH EV
Model setup under scenario conditions W/O EV

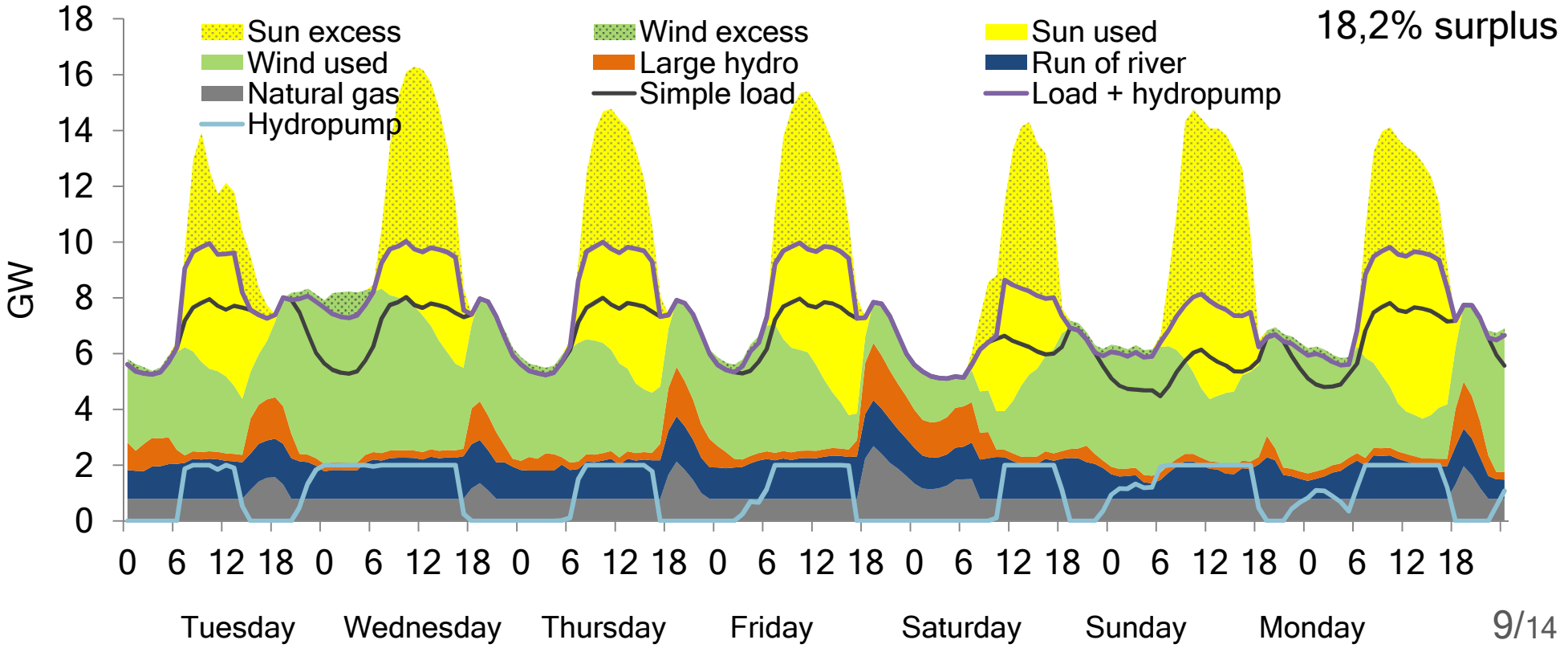
2050 Scenario

- Assumptions based on literature, e.g., EU, EPIA, IEA, PNAER
- Charging profiles considered:



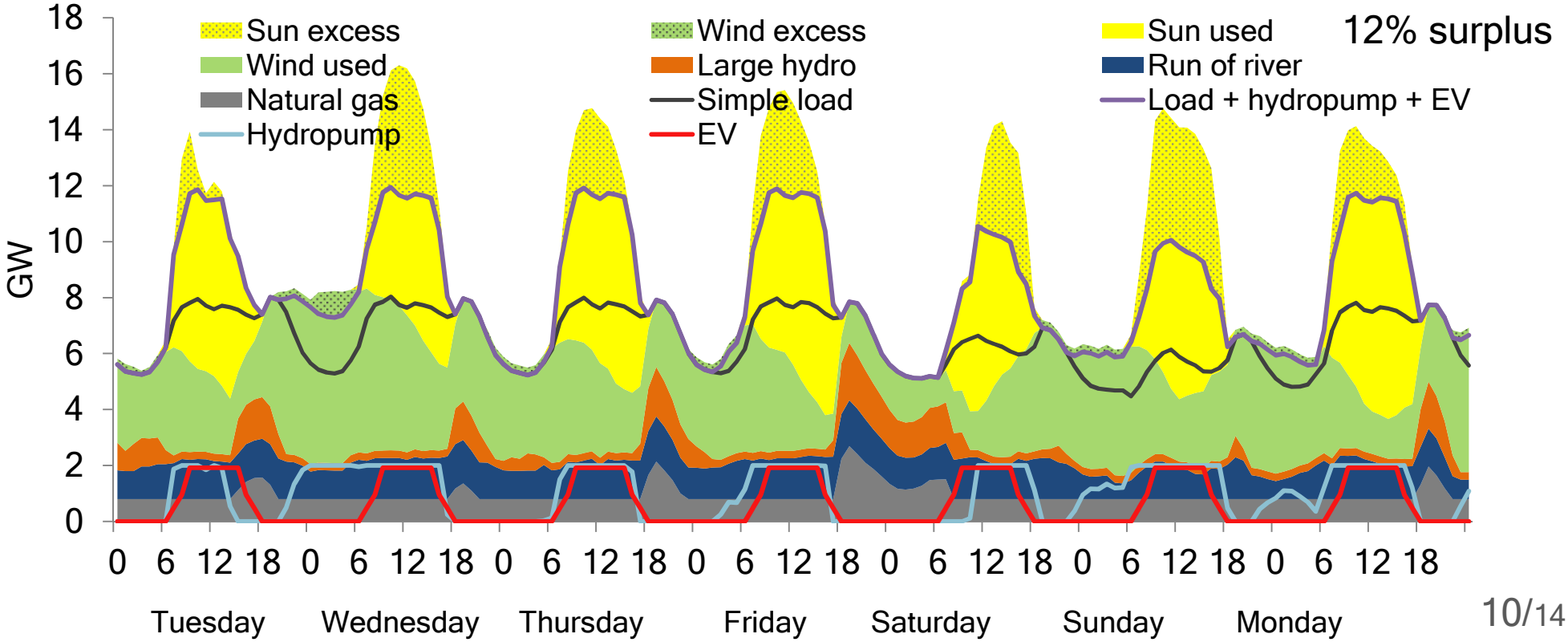
Results

> 2050 late April week load diagram, no EV



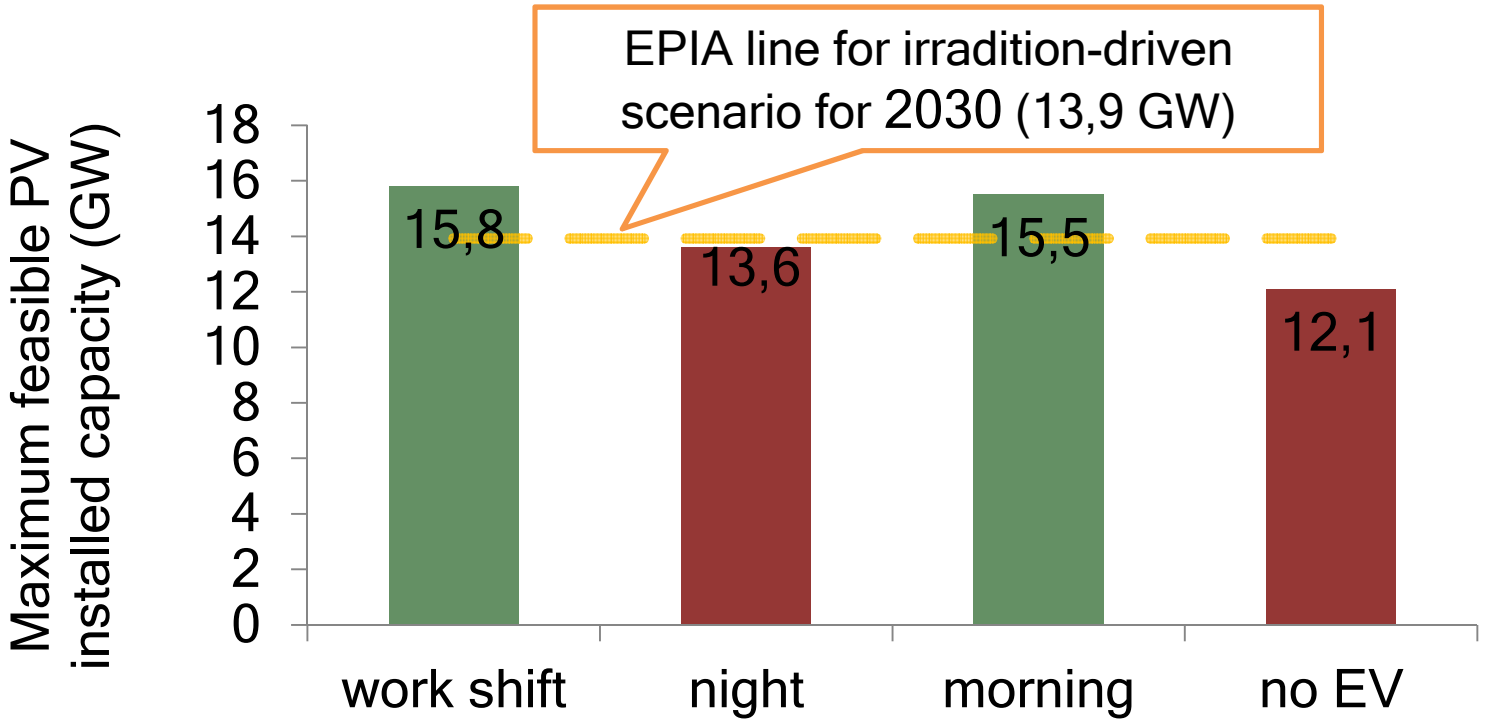
Results

> Same week, with EV work shift charging profile



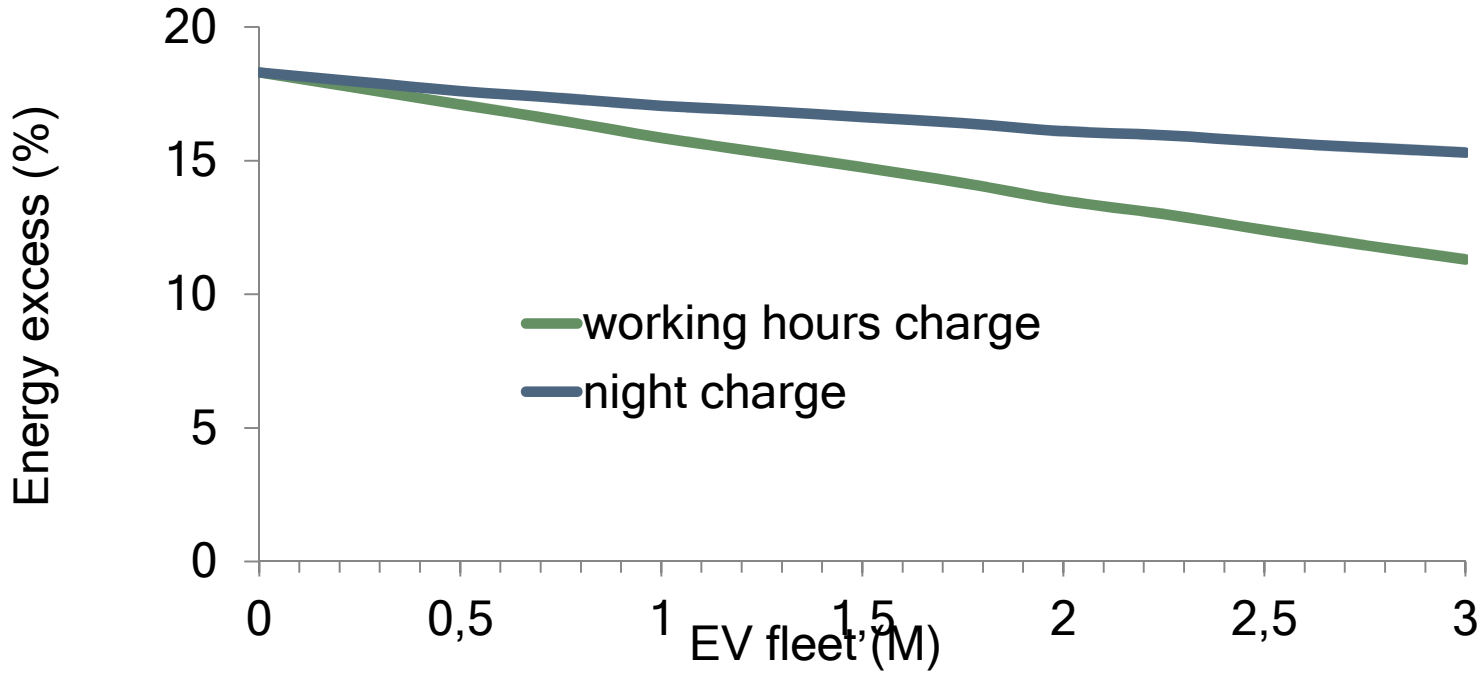
Results

> PV maximum feasible installable capacity as function of different EV charging time-profiles



Results

> Excess of electricity in the grid as function of the size of the EV fleet



Wrap-up

- EV storage capacity allows for the penetration of solar PV
- Working shift charging profile allows more solar electricity penetration than other profiles
- Even in a scenario of high penetration of EV in the national LD vehicles fleet (40%), it was clear that not all the electricity generation can be absorbed internally

Thank you

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