



Transatlantic Workshop on Electric Vehicles and Grid Connectivity

G4V – grid-for-vehicles Project

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Project coordinator

17 November 2010

Brussels

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007 – 2013) under grant agreement No. 241295.

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Overview – the G4V-project

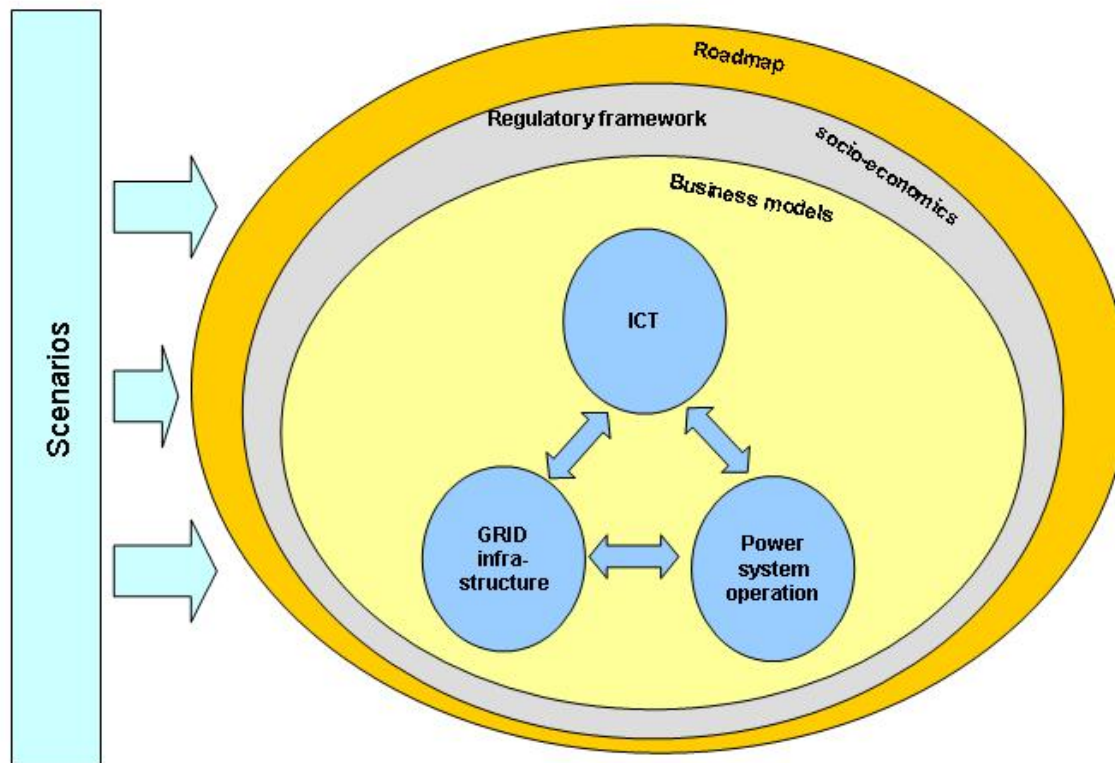
Project duration: Jan 2010 – June 2011



time-horizon: 2030

Key – Question:

What needs to be started **now** in order to enable a mass market of EV?



- technical issues
- legal framework
- business model
- customer convenience
- environmental aspects



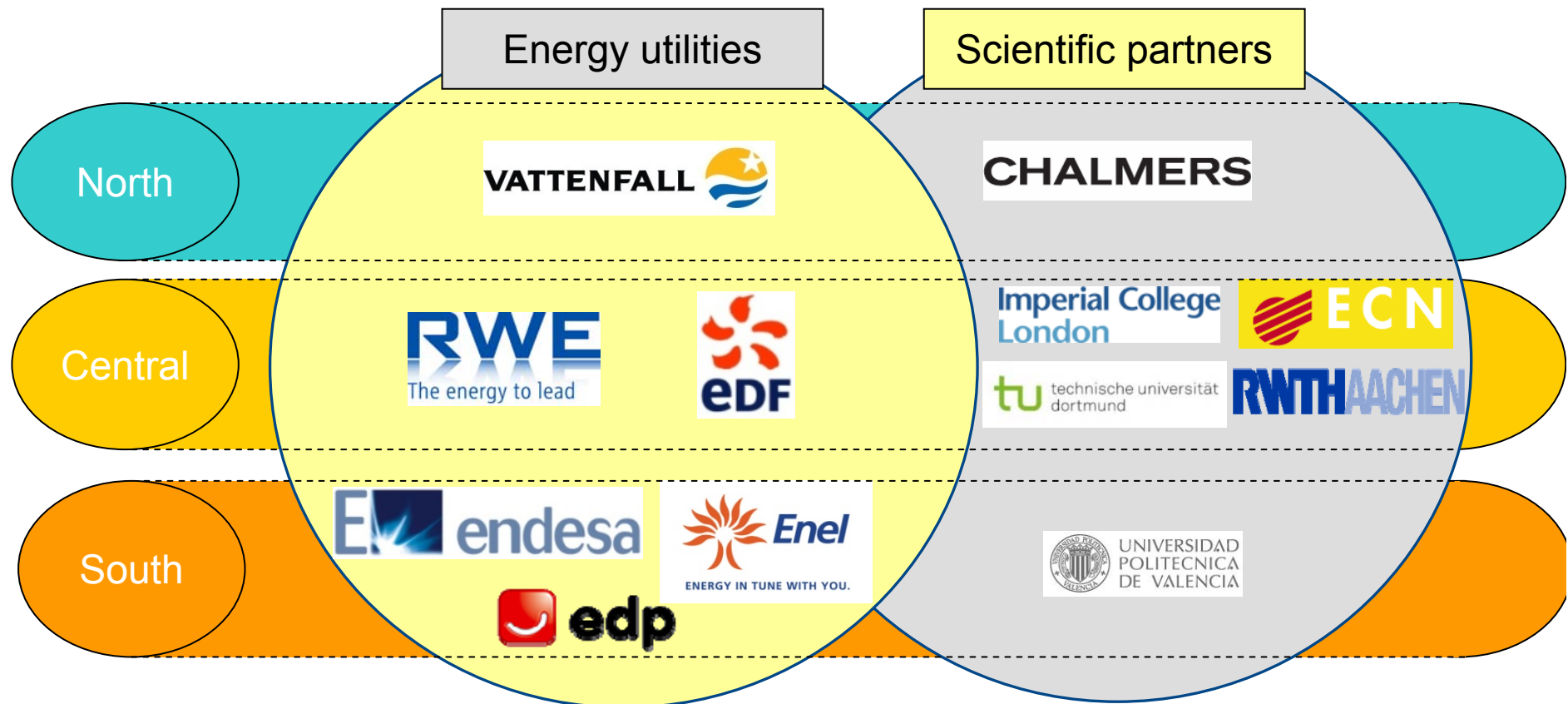
Recommendations



The G4V consortium



12 partners from eight countries



Influencing Parameters

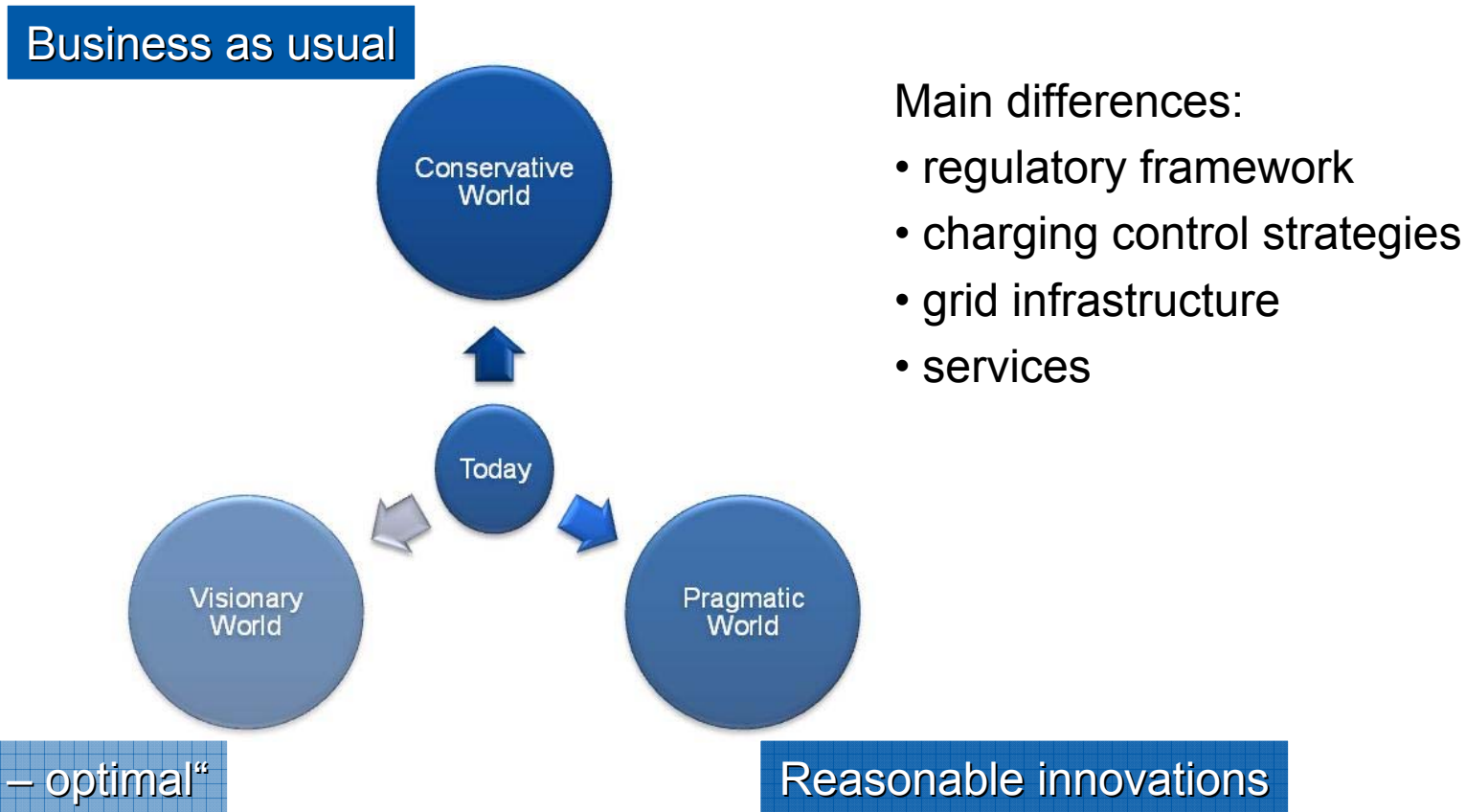


- market penetration (subsidies ?)
- regional distribution
- temporal distribution
- directionality (uni/bi)
- kind of vehicle (BEV/PHEV)
- kind of battery (Li-Ion?)
- battery capacity (1kWh - 35kWh, usable percentage ?)
- battery exchangeability (yes/no)
- energy demand (approx. 6kWh/d, log-normal distribution)
- connection power (3.7kW - 40kW)
- market access regulation
- ...

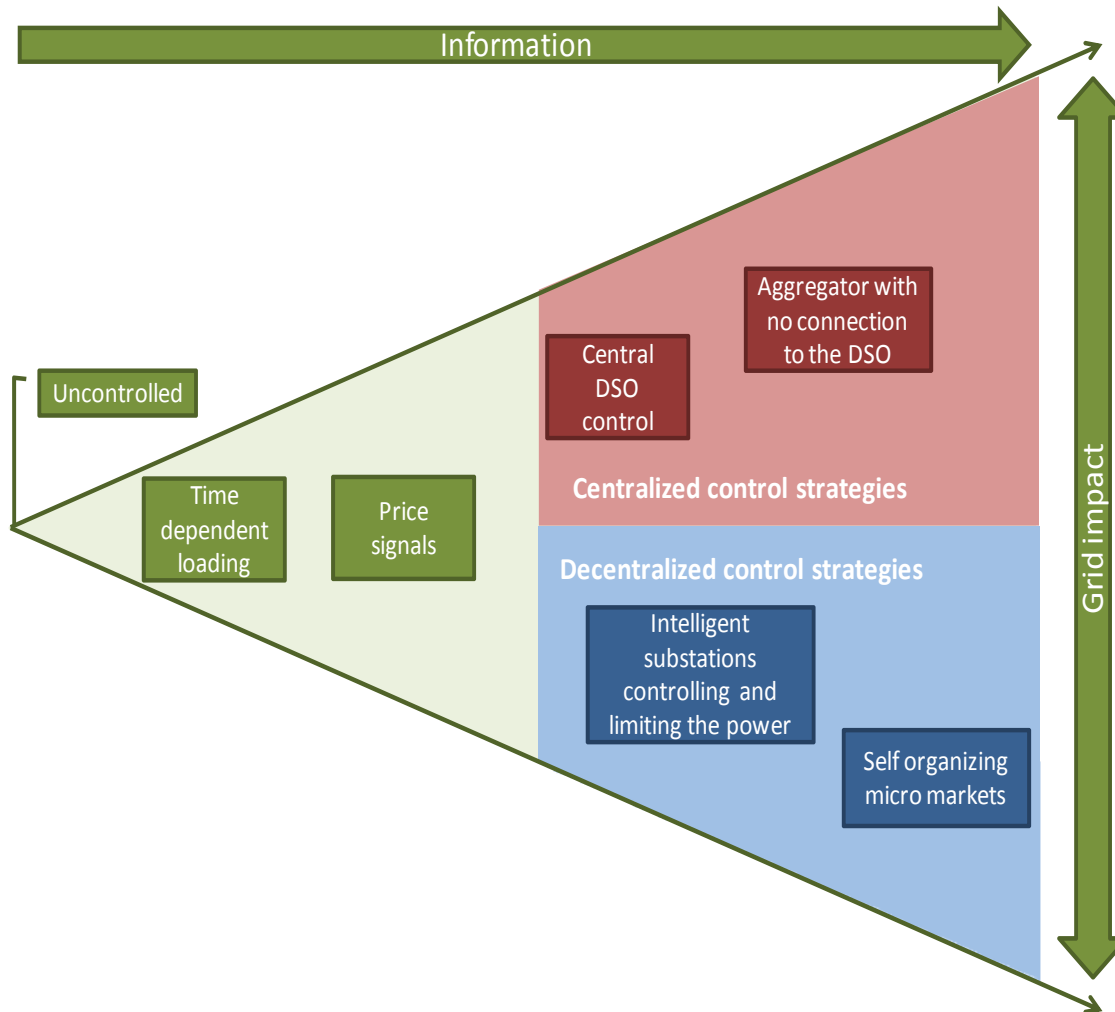


Definition of Szenario-worlds

How could the development in the European electricity sector look like?



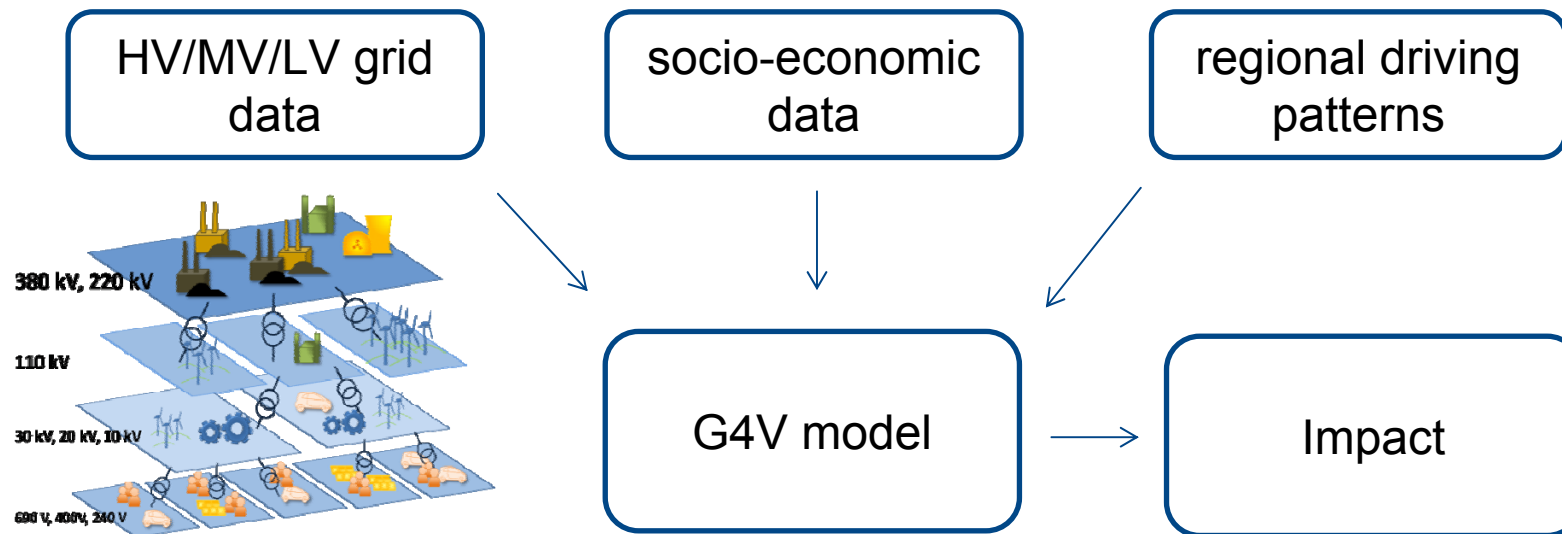
Overview about Control strategies



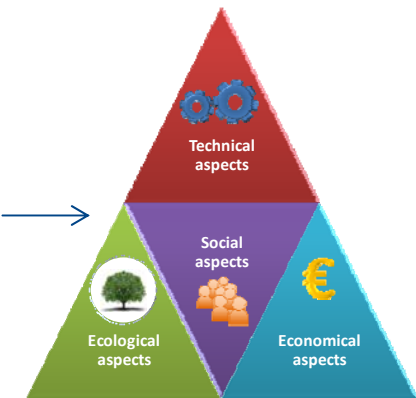
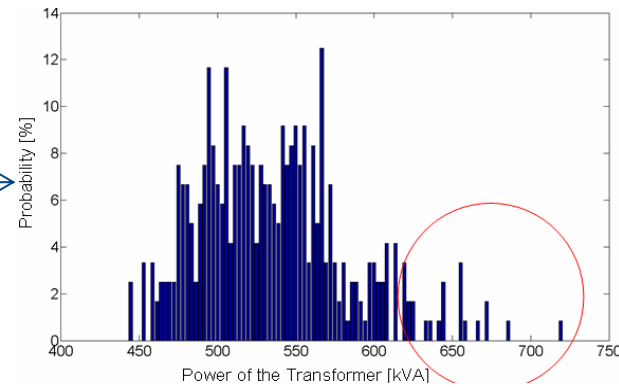
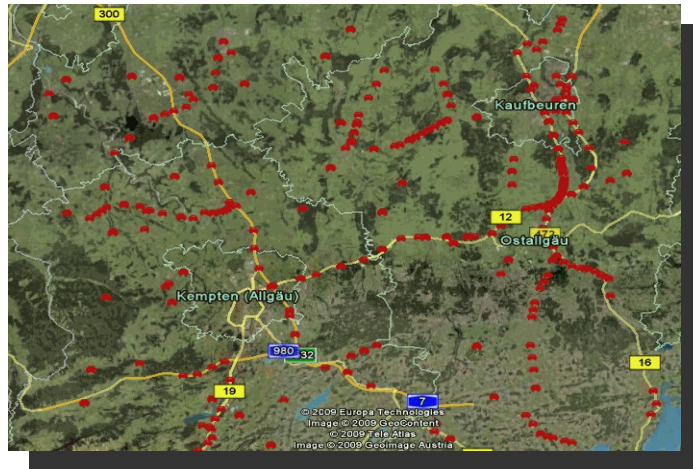
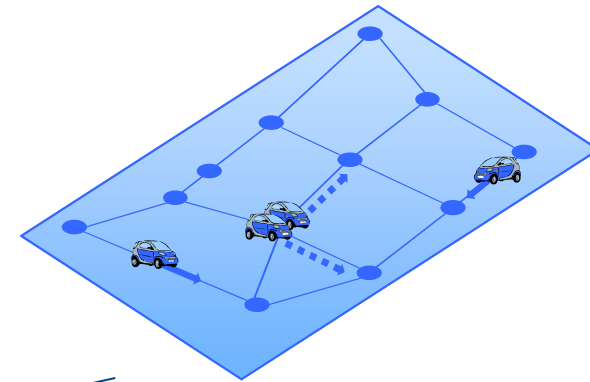
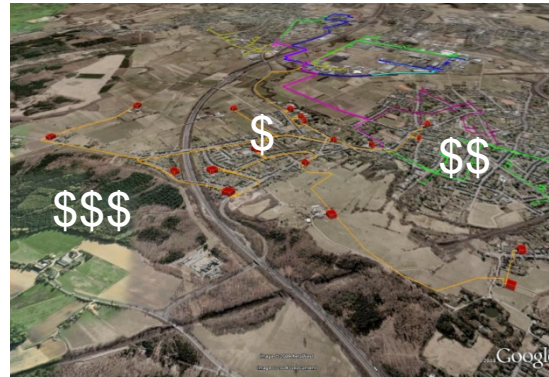
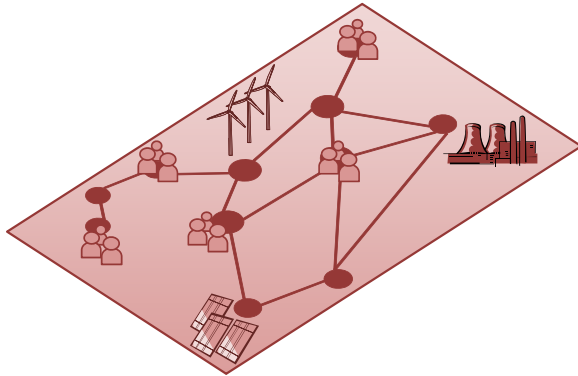
- Main objectives:
 - Integration Renewables
 - LV-grid – congestion management
 - Exploitation of EV's flexibilities

„G4V Impact Assessment Approach“

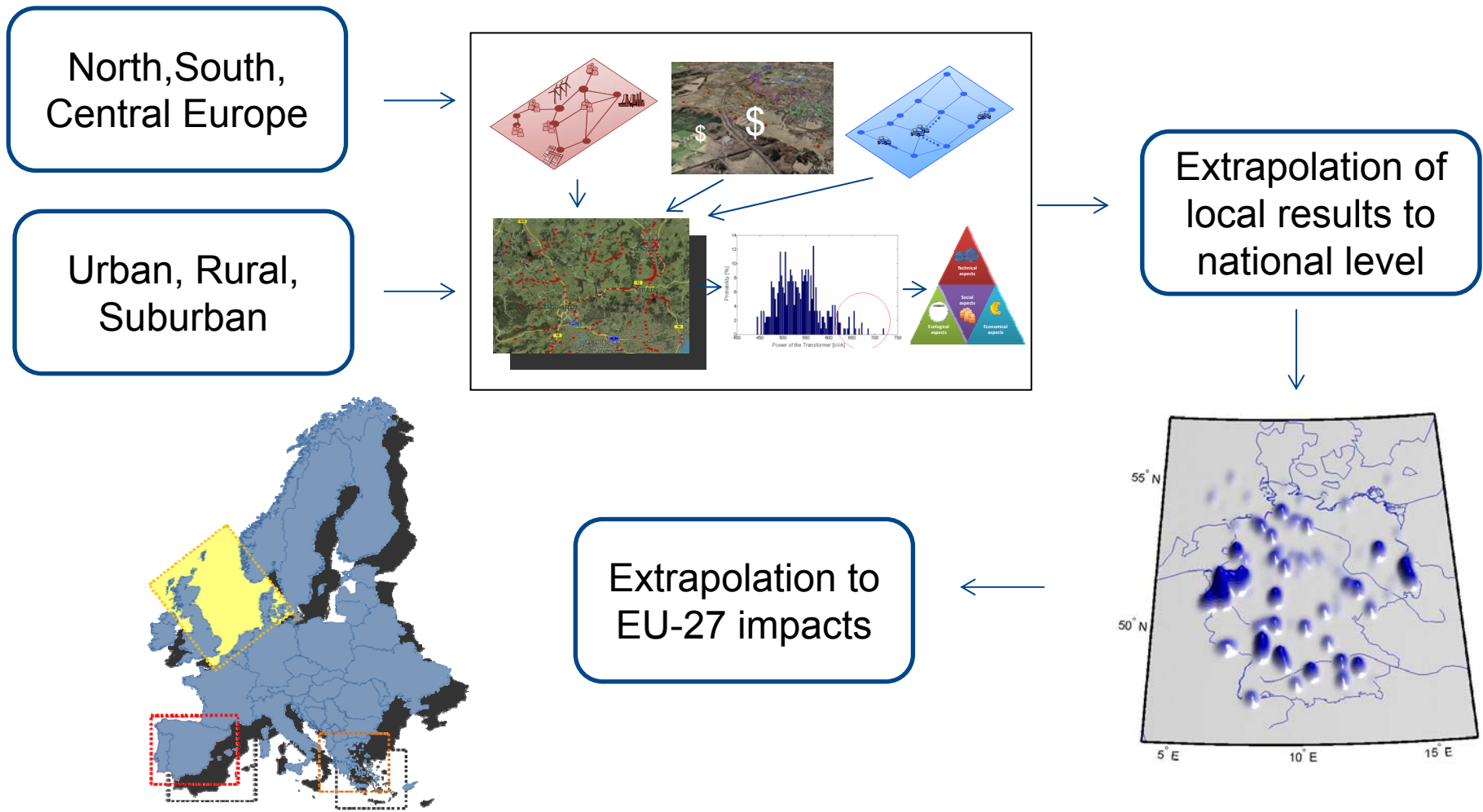
- agent based
- geographically referenced
- high time resolution (15min)
- long duration (2010-2030+)



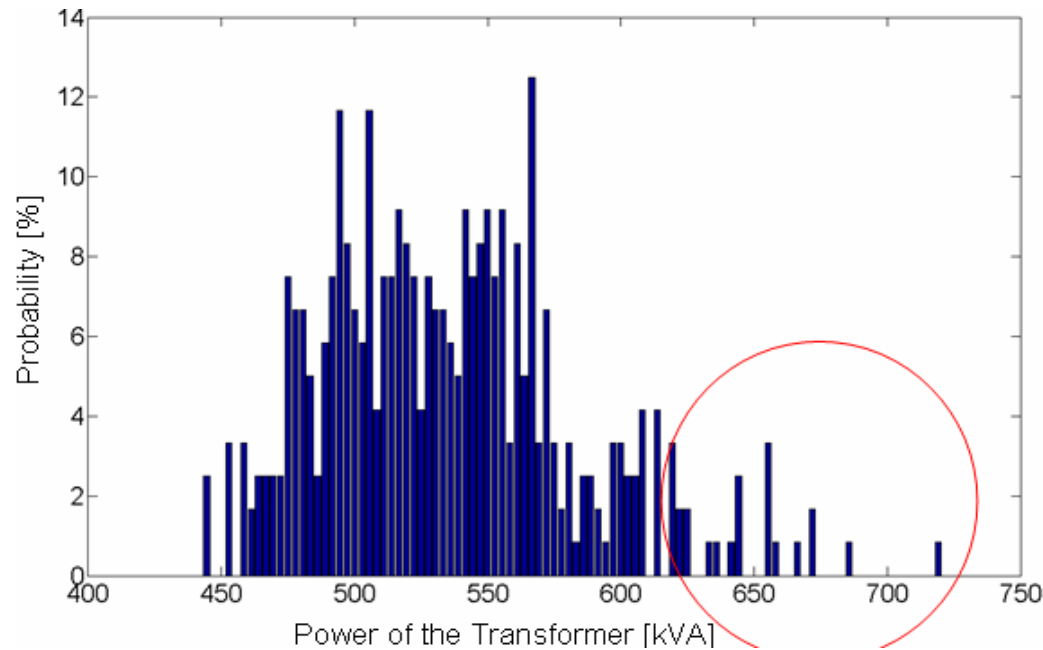
„G4V Impact Assessment Approach“



„EU-27 Impact Assessment“



Exemplary results - Probabilistic load flow



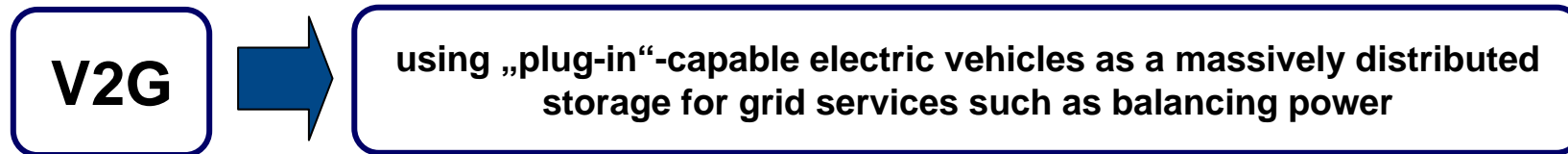
Specs:

- suburban grid: 630kVA transformer
- 250 households
- Energy consumption 2000-4000kWh/a
- Radial distribution grid
- Battery capacity 35 kWh
- Penetration rate: 12,5%

- only a few transformer overloads
- Necessary to include a safety margin (probability of occurrence) into grid assessment

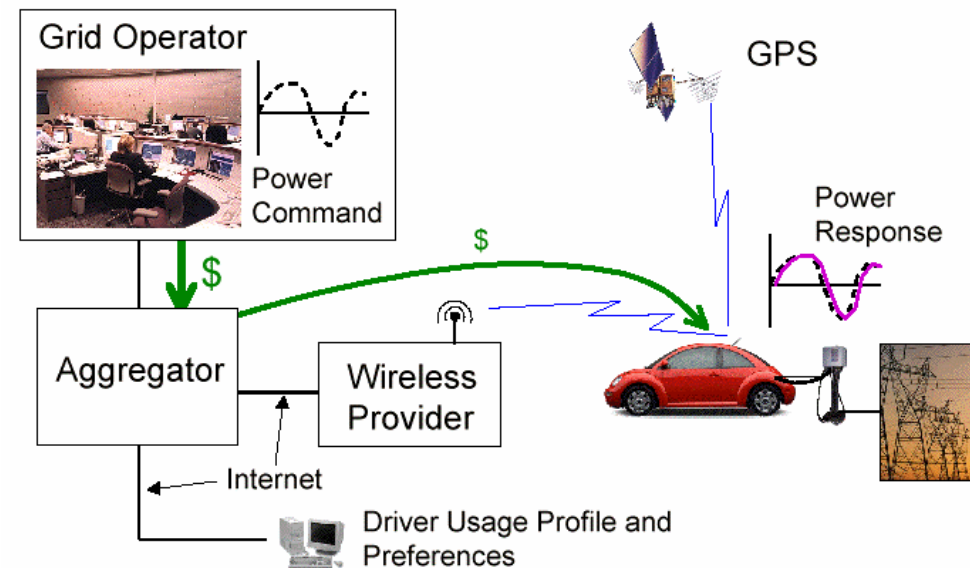


V2G for Aggregation



Aggregation

- technical requirements (ICT, Charger, ...)
- load flow calculations and impact on grid-levels (LV, MV, HV) → interdependencies!
- business case (reserve power market)



Frequency control: V2G vs generators?
→ **Comparison needs to be elaborated!**



Thank you!

also please visit: www.g4v.eu

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New Technologies

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