

User preferences for charging locations and charging schemes – a survey in eight EU countries

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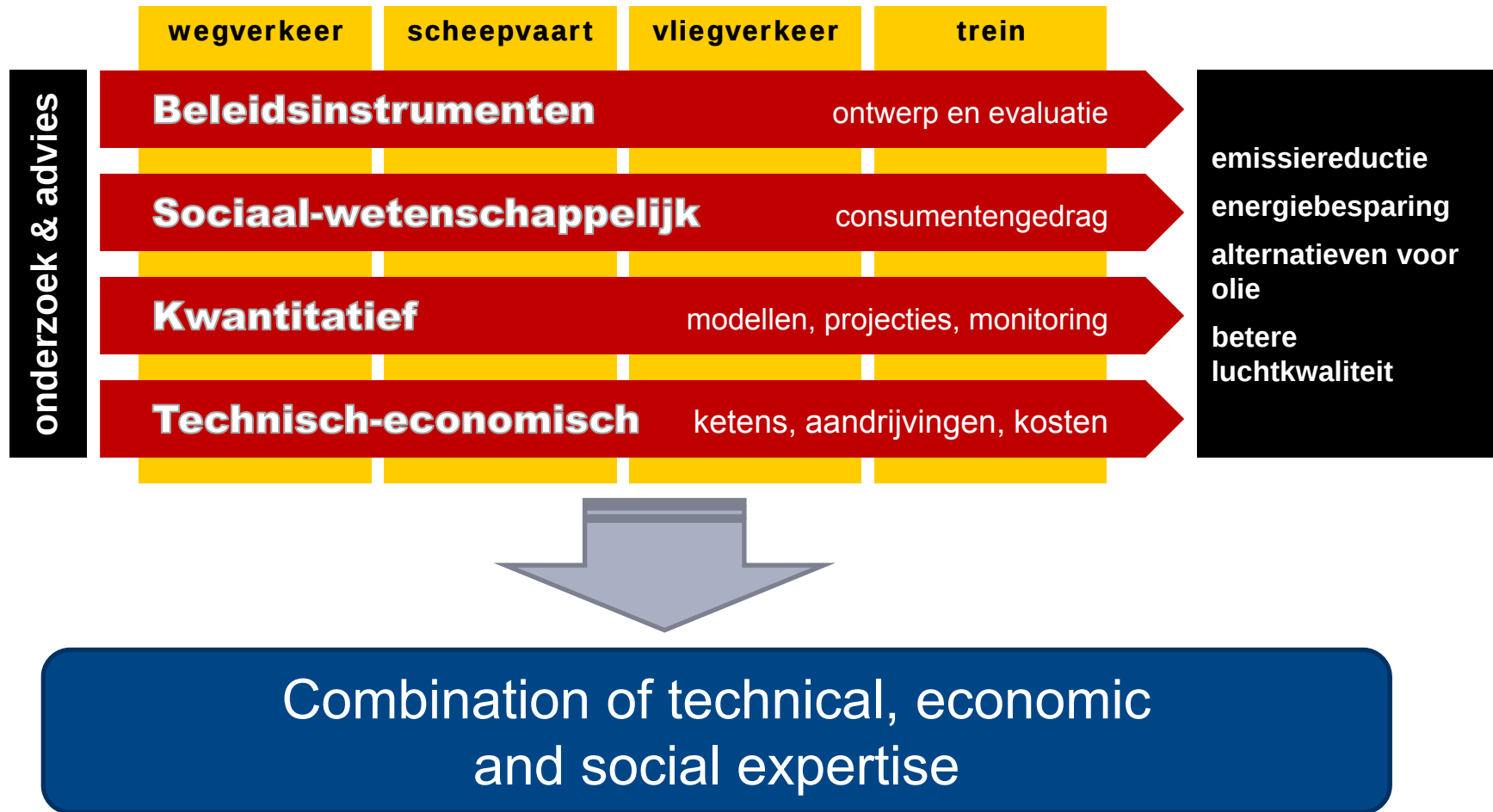
ECN – 2 major locations

Petten



Amsterdam





- Currently moderate interest of consumers to buy an EV
 - Not surprising because limited model portfolio & infrastructure available
 - People willing to buy an EV in 2 years: Live in smaller municipalities and have a private parking place
- Indicated EV driving range (120km) perceived as not sufficient → wish-list
 - Occasional long trip plus mistrust (lack of awareness) in battery performance
- Preferred charging location: whenever possible at home or work!
 - Not completely surprising: Safest and most convenient option
 - Even people that currently don't have a private parking place at home/work would prefer to charge at home
- High interest to participate in delayed (off-peak) charging scheme
 - Less interest to participate in V2G schemes → BUT €60 p.a. can make a difference
 - Leased battery does not solve all doubts of citizens: stand-by capacity for emergency situations

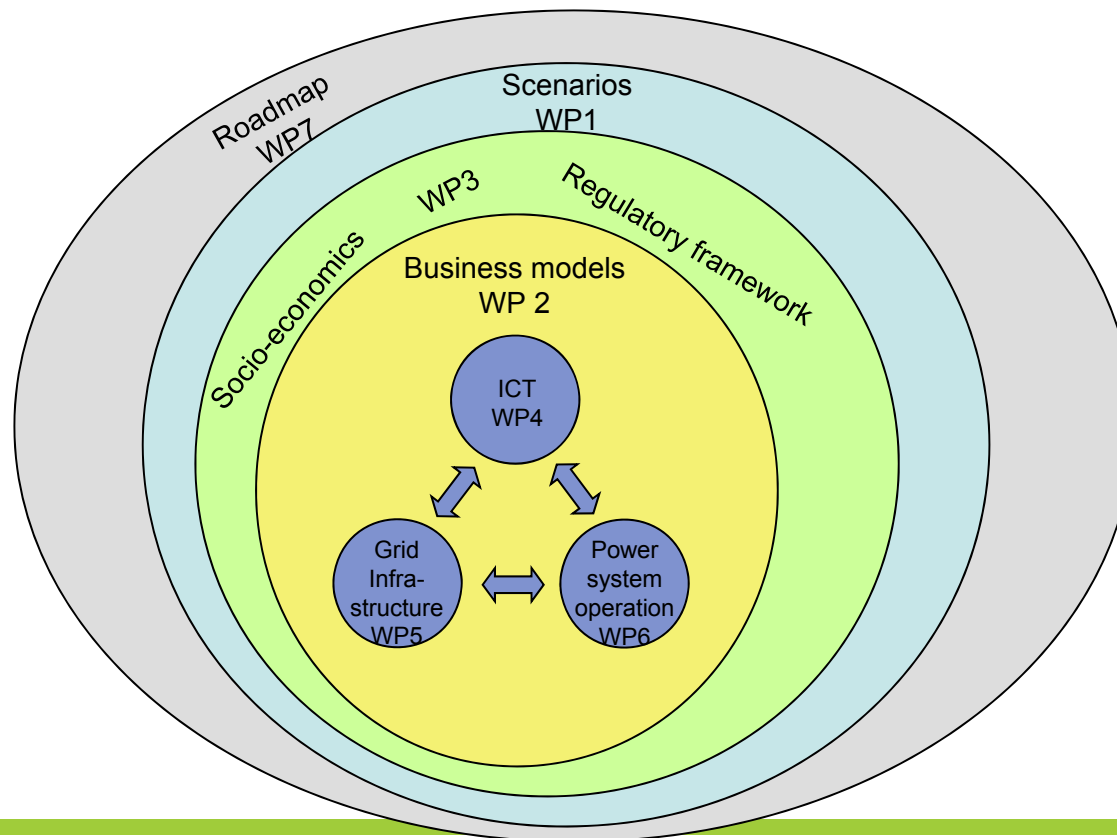
Overview: the G4V project

Project duration: Jan 2010 – June 2011

Key – Question:

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

time-horizon: 2030



- technical issues (grid)
- legal framework
- business model
- customer convenience
- environmental aspects



Recommendations

Focus and approach



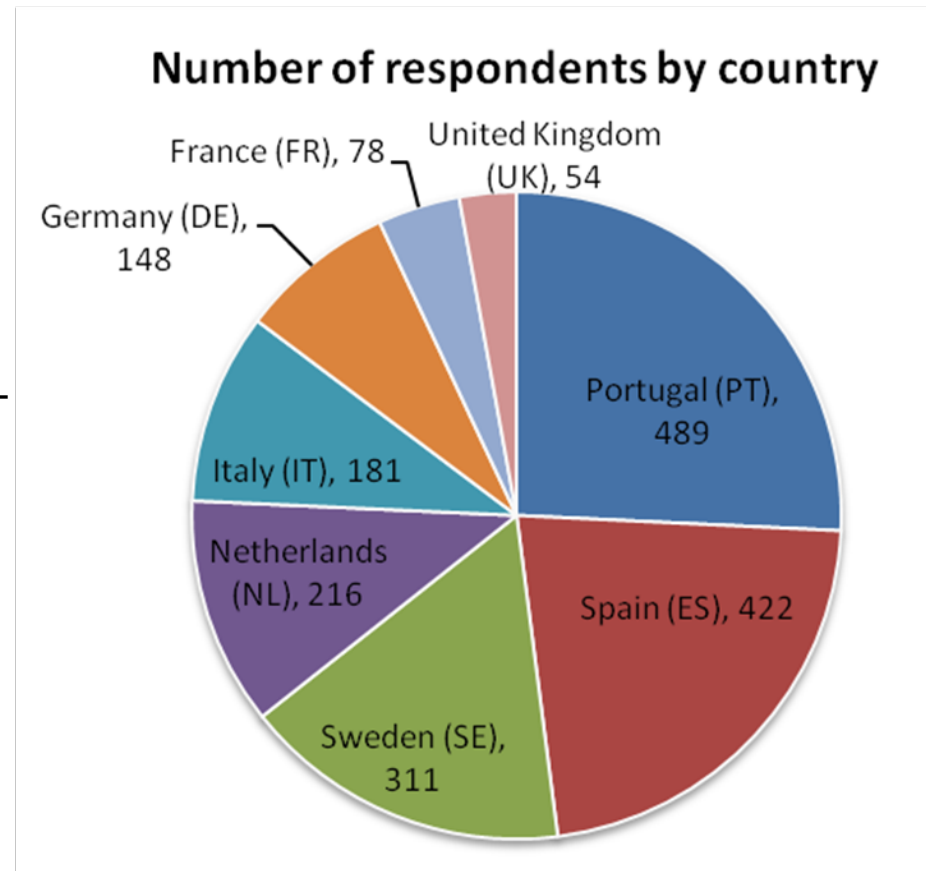
- G4V looks at EV roll-out from a grid perspective
 - Therefore NO detailed analysis on vehicle purchasing behaviour
- Focus on preferences and acceptance of:
 - Choice of charging location
 - Delayed charging (off-peak)
 - Vehicle-to-Grid (V2G) services
- Methodology
 - Web-based, small-scale survey (16 questions)
 - Countries: DE, FR, IT, NL, SE, ES, UK, PT
 - Each questionnaire available in the respective language

The image shows two overlapping screenshots of the G4V questionnaire. The top screenshot is in English, titled "Electric cars", and the bottom screenshot is in Portuguese, titled "Carros eléctricos". Both screenshots show the G4V logo and a welcome message. The English version says "Hello," and "Welcome to this questionnaire about electric cars. This anonymous questionnaire will give you the opportunity to indicate your preferences related to electric cars. It is open for everybody living in the European Union (above the age of 18) no matter how much you know about electric cars. Answering the questions will only take 10-15 minutes of...". The Portuguese version says "Olá" and "Bem-vindo a este questionário sobre carros eléctricos. Este questionário anónimo solicita a sua informação sobre preferências relacionadas com carros eléctricos. É um questionário para todas as pessoas a viver na União Europeia (com idade superior a 18 anos) independentemente do conhecimento prévio sobre carros eléctricos. Este questionário demorará apenas entre 10 a 15 minutos a preencher na sua totalidade e exigirá apenas alguns clicks." Both versions include a "Próximo" (Next) button at the bottom.

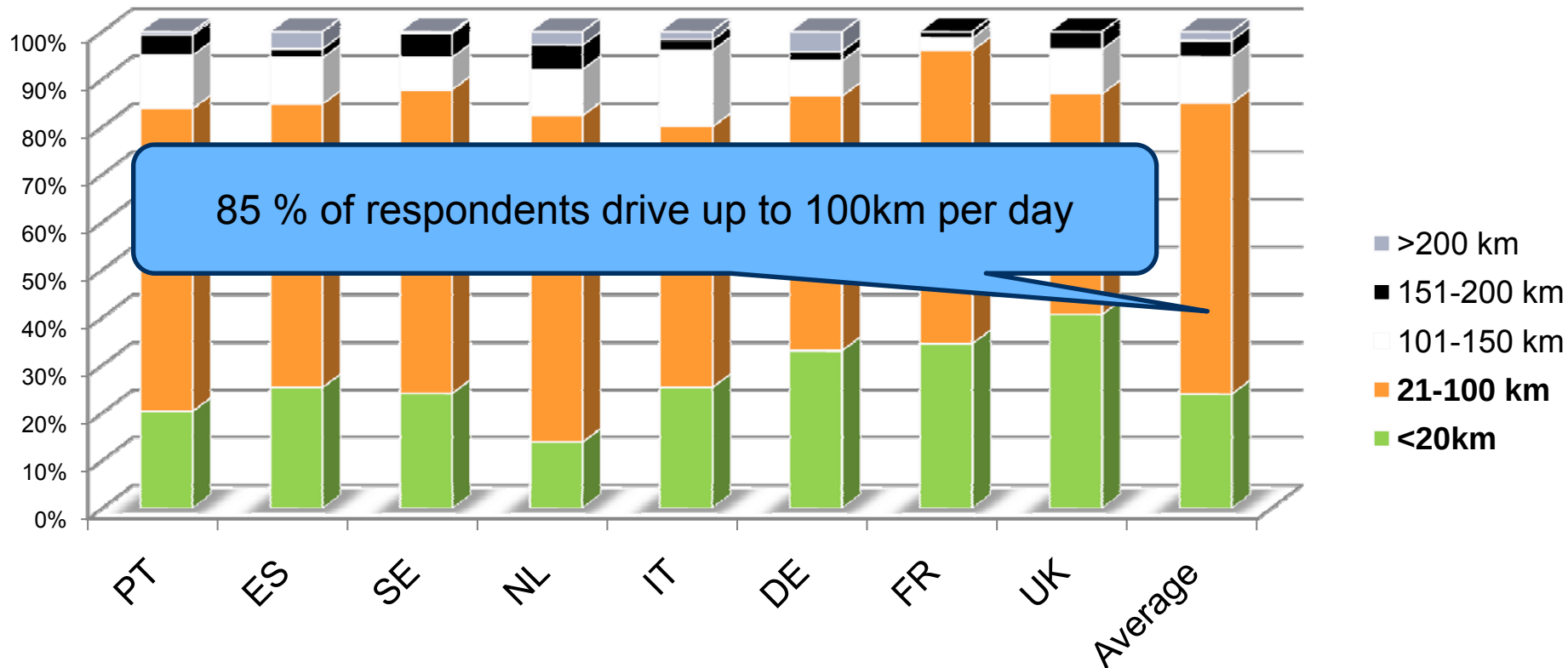
- Limited knowledge among respondents about characteristics of EVs and charging issues
 - Information (in lay language) provided within survey
 - Agree technical data: 120 km range, 4h standard charging, charging costs € 3 (home) vs € 5 (public)
- Intended user behaviour
 - *Imagine you would have an EV, how would you use/charge it?*
 - Possibly more socially accepted answers (intention/behaviour gap)
- Survey distribution
 - via G4V website and project partners in respective countries
 - Questionnaire access via hyperlink (one per language)

- Results

- Questionnaire active from December 10' – February 11'
- **1900** replies in total
- But number of responses among countries differ
- Perfect statistical sample not possible within G4V (small task) – but outcomes already provide useful directions



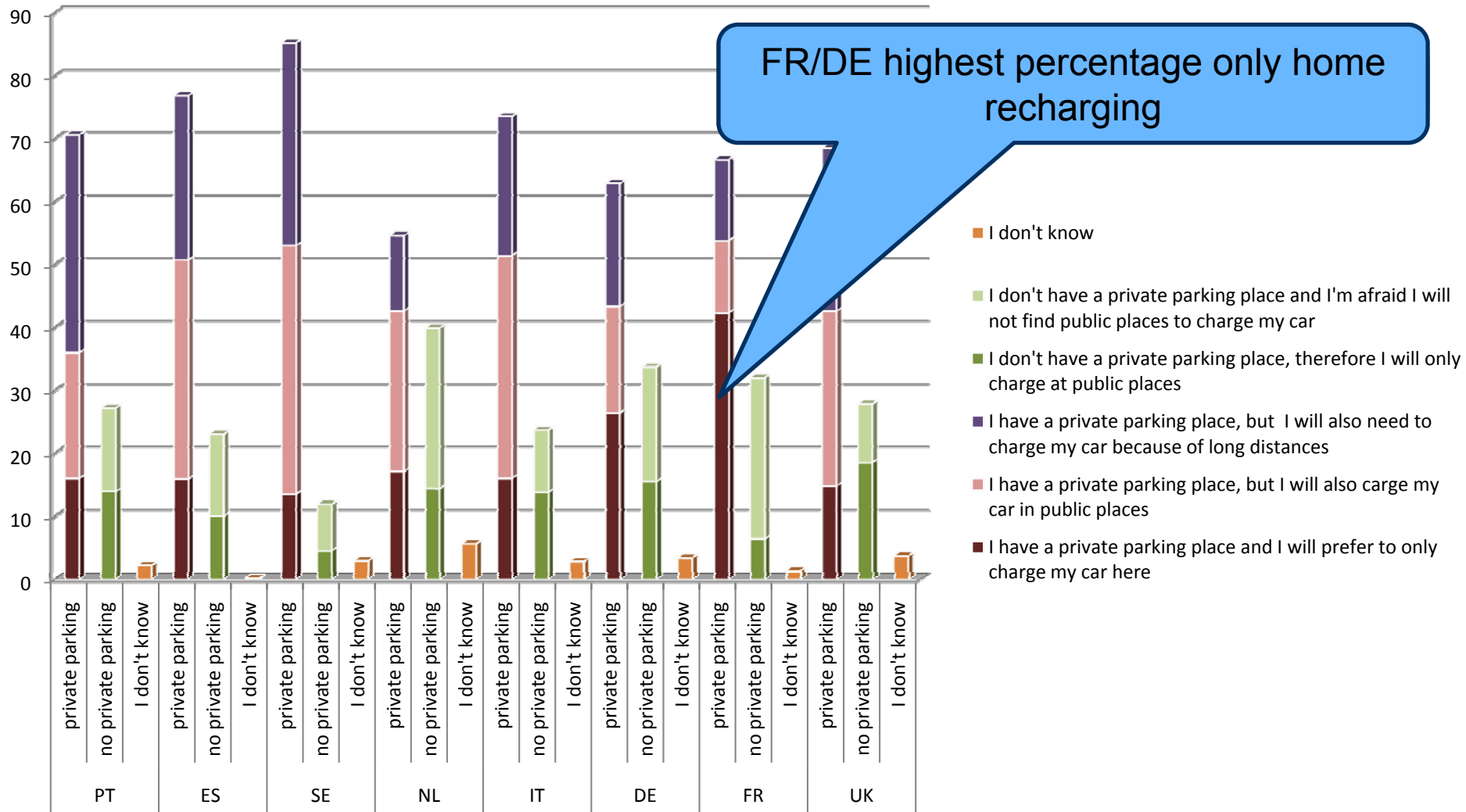
Survey results: current daily kilometers



BUT: required battery capacity to be interested in buying EV: 308km (NL 389km)!

People take into account the occasional longer trip

Preferred charging location



Survey results: preferred charging location

- 70% respondents has private parking place
 - 1/3 prefers to only charge at home/work
 - 1/3 also wants to charge at public places
 - 1/3 also needs to charge at public places because of long distances

30% without private parking place
Of these: 12% is afraid they will not find a place to charge

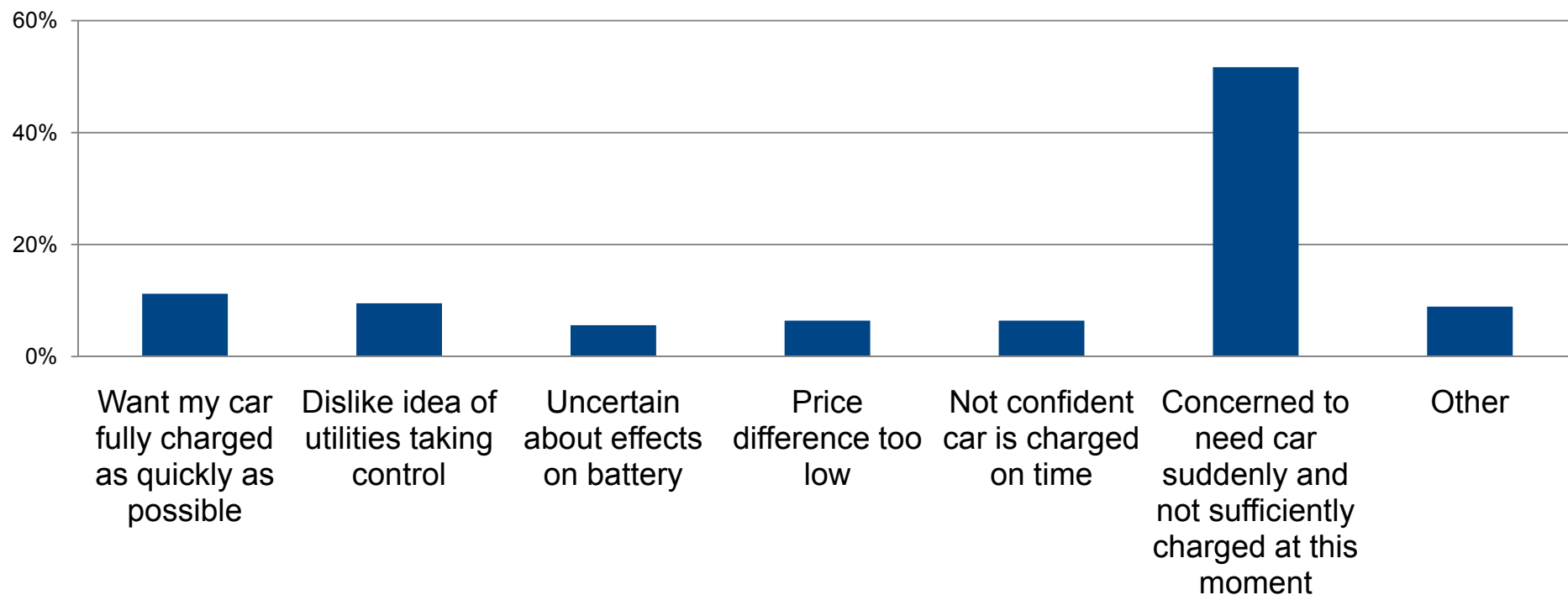
25% of these only want to charge at home with price incentive (!)

With price incentive (€ 5 vs 3)
53% will only charge at home or work

These people are also more interested in buying EV in coming 2 years

Survey results: interest in delayed charging (with price incentive)

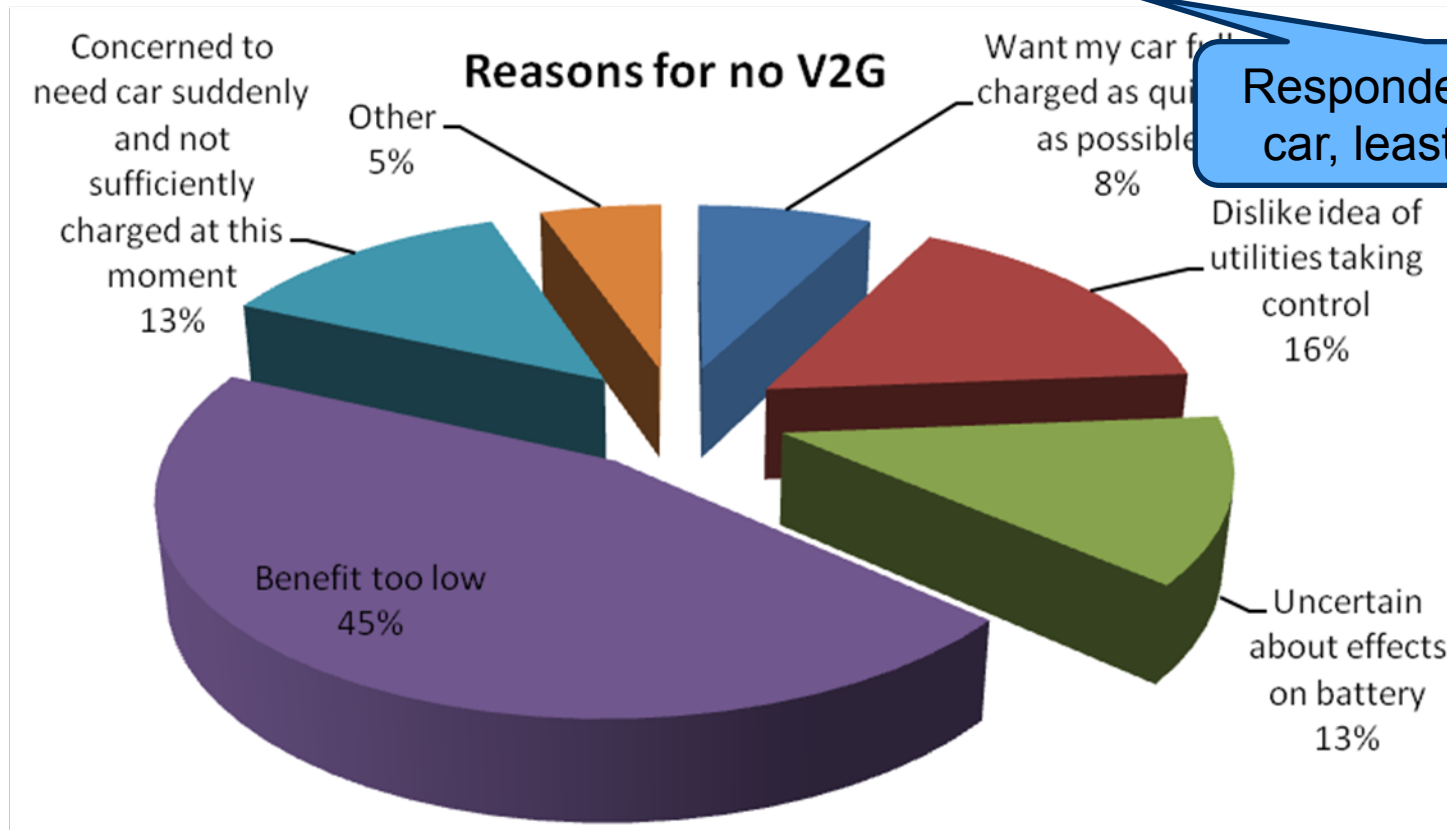
- Charging would not start right away after connecting the EV to the grid
- Delayed charging (22:00-06:00, battery full in the morning, €2 vs €3)
- Average high interest in delayed charging (5.74 on 1-7 scale)
- Reasons for not being interested: (everyone ticking 4 and lower on scale):



Results V2G

- V2G: unload & recharge whenever plugged in
- Least interest compared to delayed charging (4.4 on 1-7 scale)

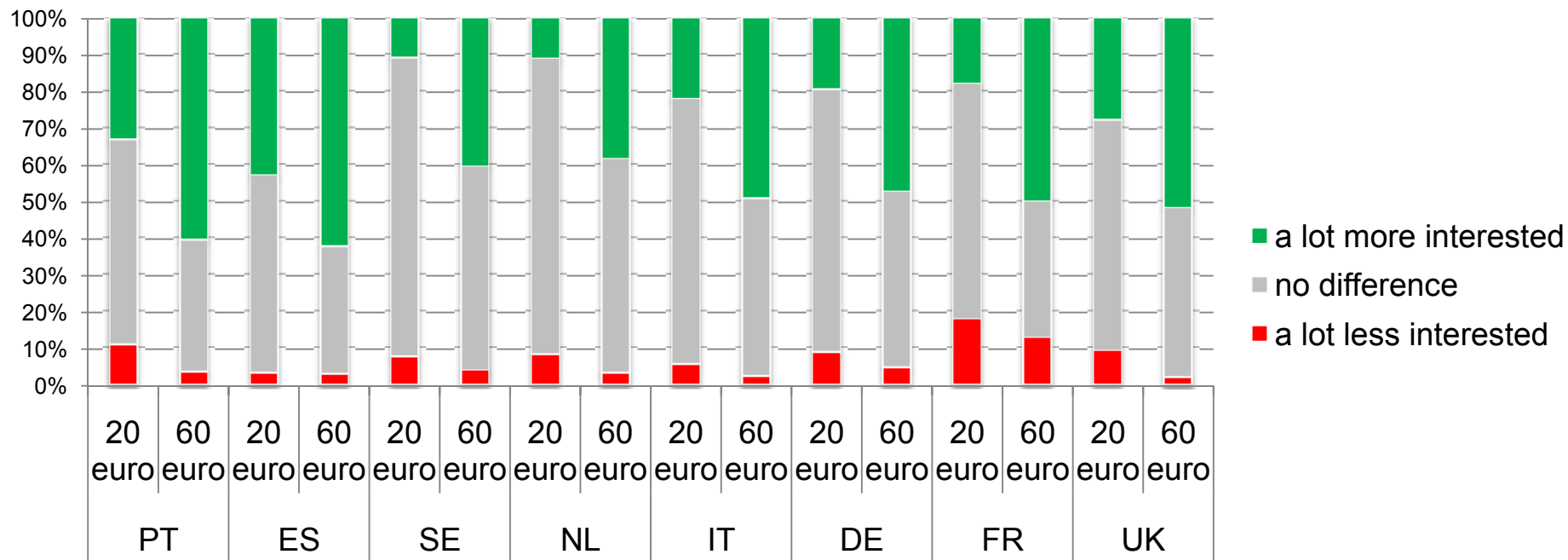
Young people & respondents (currently) without car, most interested



Respondents with big car, least interested

Interest in V2G – Impact of price incentives

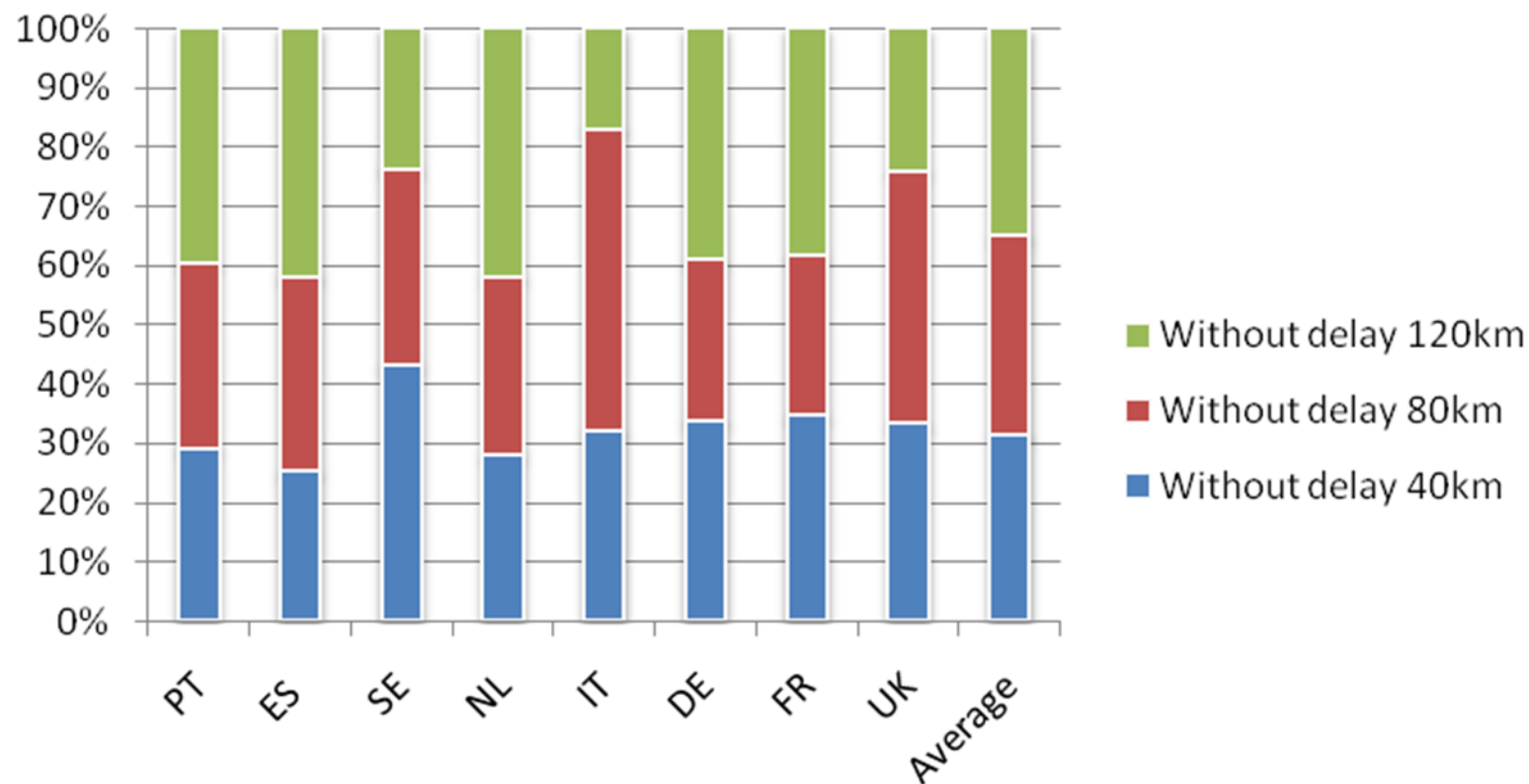
- Interest to participate in V2G services with price incentive of € 20 and € 60 / year:



Impact of incentives clearly vary depending on economic circumstances (e.g. GDP/capita)

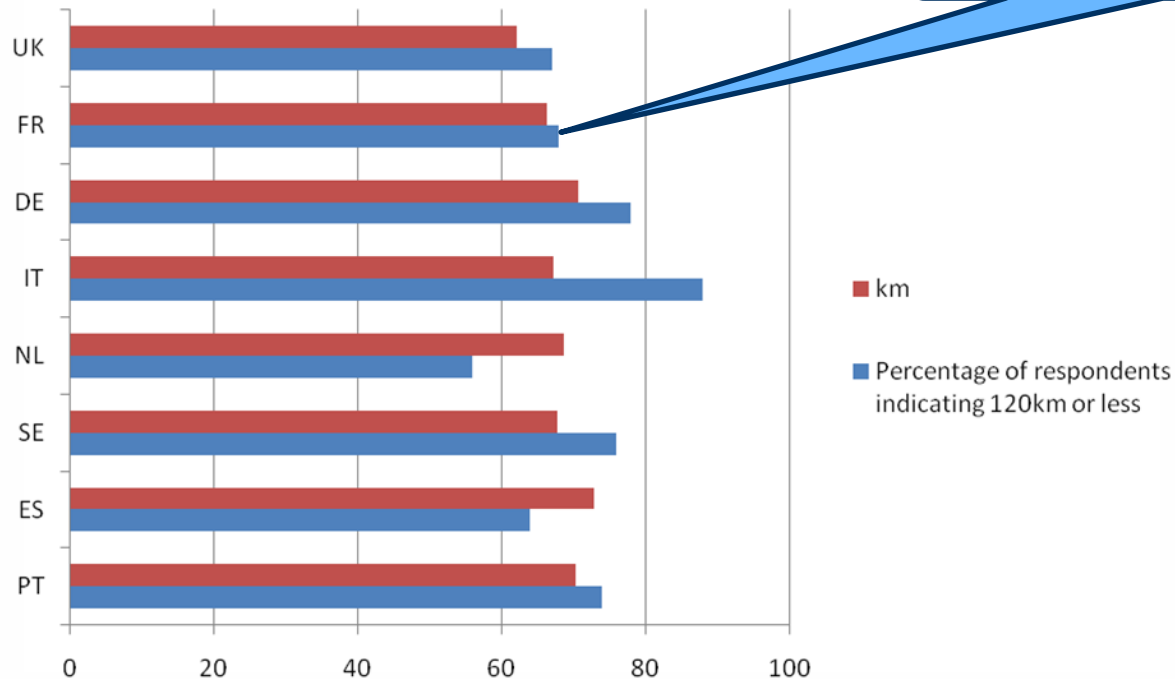
- Options: Recharge battery up to 40km:€2 80km:€2.5 120km: €3

Recharging with specified battery capacity



V2G – remaining battery capacity

Stand-by battery capacity



On average 70km
considered sufficient

- Includes only people that indicated 120km battery capacity or less
- 70km = provides indication which remaining capacity could be used for services

Survey results: Impact of leased battery

Impact of leased battery



- People indicate preference for mixture of home/work recharging and public recharging spots
 - With price incentives, it is possible to influence behaviour towards charging at home/work → Users in the next 2 years
- Urban/suburban infrastructure
 - People living in smaller communities (<100,000) will charge at home/work
 - People living in large cities → most afraid of being 'stranded'
 - Cities: Recharging at points of interest (large office parks, shopping centres)
 - Fast charging, inductive charging? → help to reduce fears of city dwellers
- Initial user group willing to participate in delayed charging schemes as they have mostly private parking → home recharging
 - Price incentives positive effect to influence consumer behaviour
- V2G schemes generally lower acceptance levels
 - On average 70km should remain in the battery → provides indication which battery capacity could be used for services
 - Leased battery improves situation

INVITATION TO THE FINAL GRID FOR VEHICLES (G4V) WORKSHOP

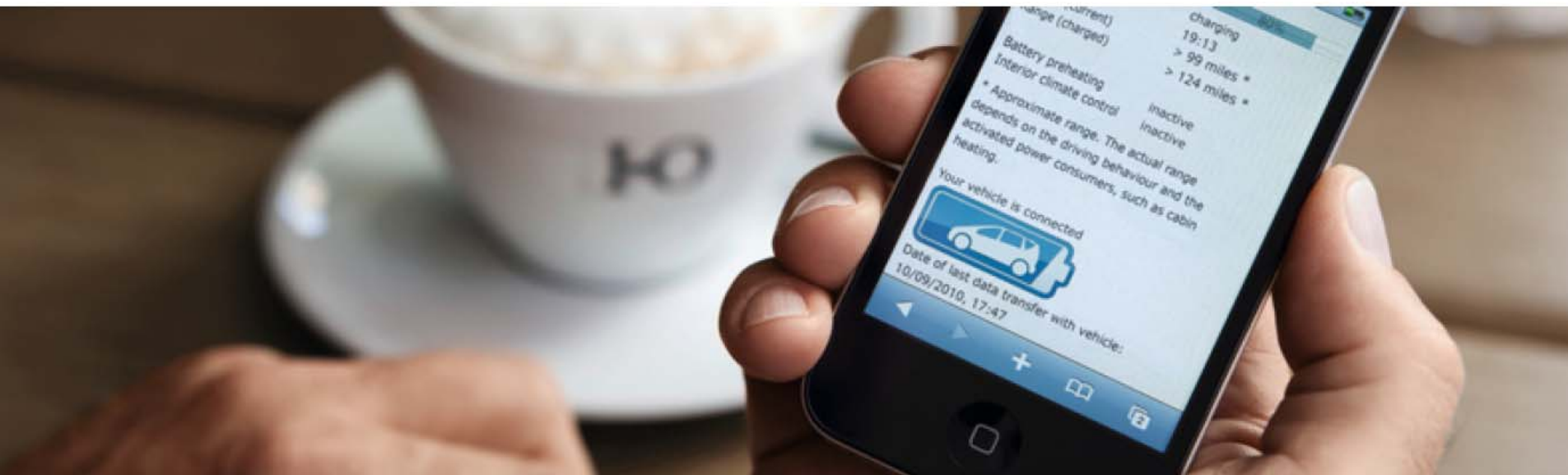
30 June 2011

Renaissance Hotel, BRUSSELS

08.30 – 17.00

Further information and registration: www.G4V.eu

Participation is free of charge



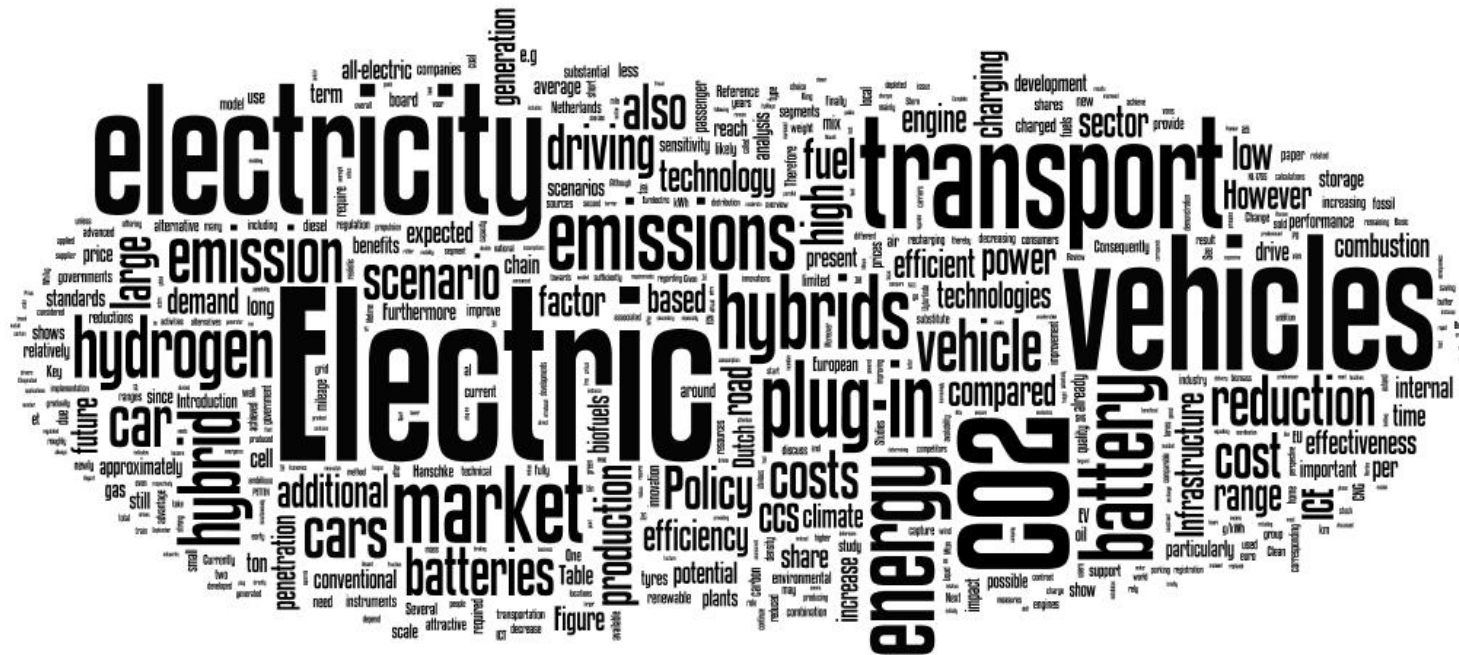
Green eMotion –

Development of a European framework for electromobility



→ **Lead partner for EU roadmapping**

Thanks!



Download the full report here:

<http://www.ecn.nl/docs/library/report/2011/o11030.pdf>