European global analysis on the electro-mobility performance – Data collection task results

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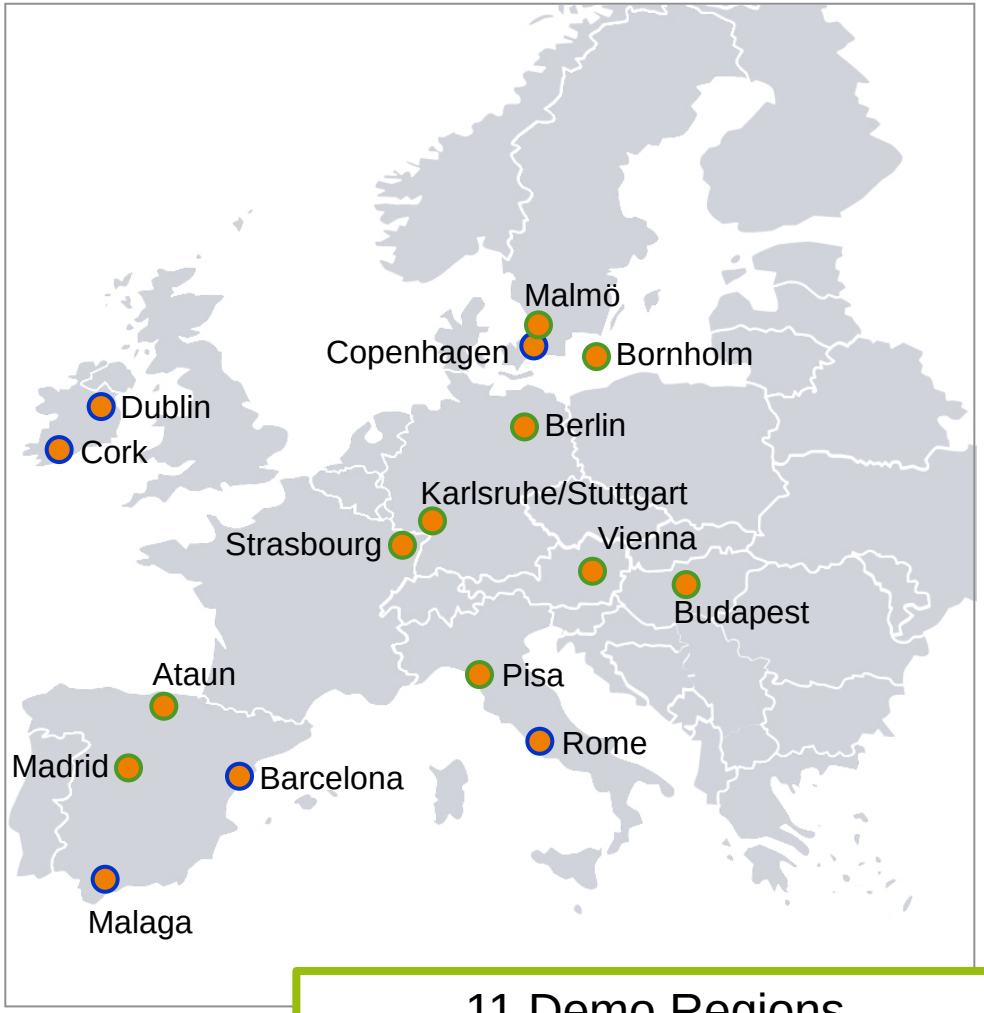
Green eMotion

European Commission

Introduction

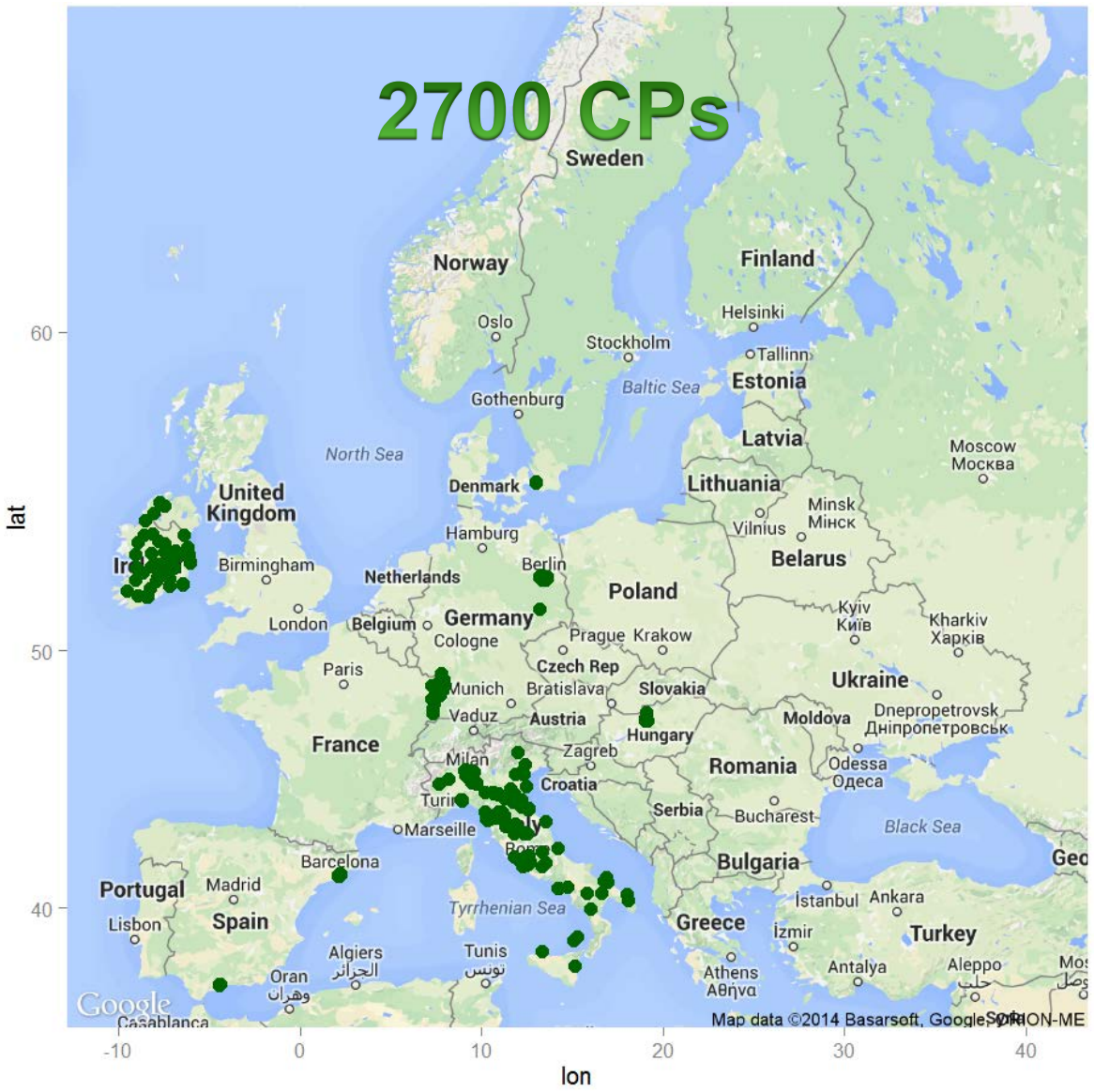


11 Demo Regions
8 European countries

During **three years** a fleet of **electric vehicles** and a set of **charging points** have been monitored.


Verbund
RSE
Ricerca
Sistema
Energetico
Green
eMotion
The Green eMotion
Electric Rally
Driving Electric
from
Milan to Brussels!

Charging points



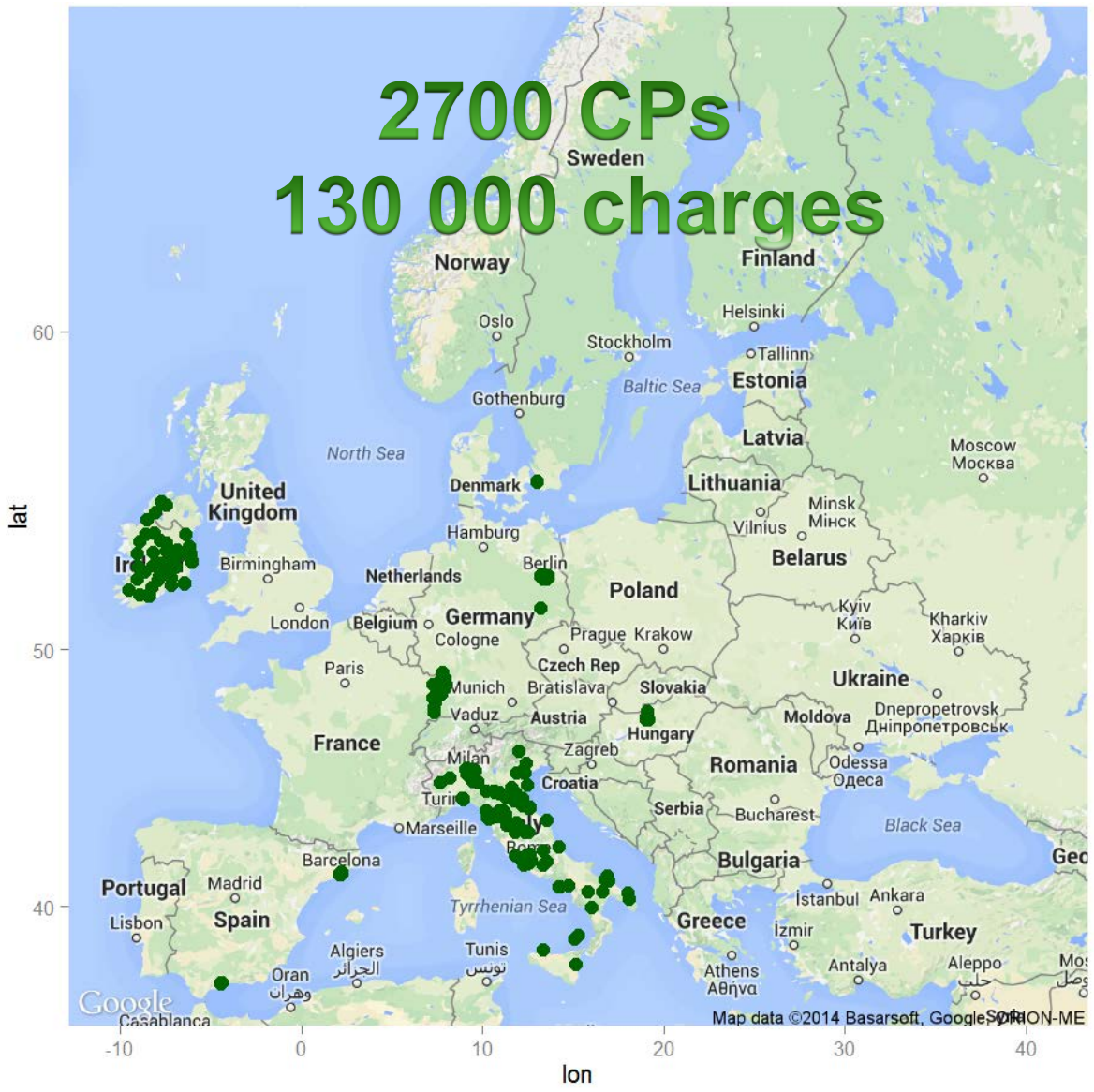
STREET

OFFICE PARKING

HOUSEHOLD

PUBLIC ACCESS PARKING

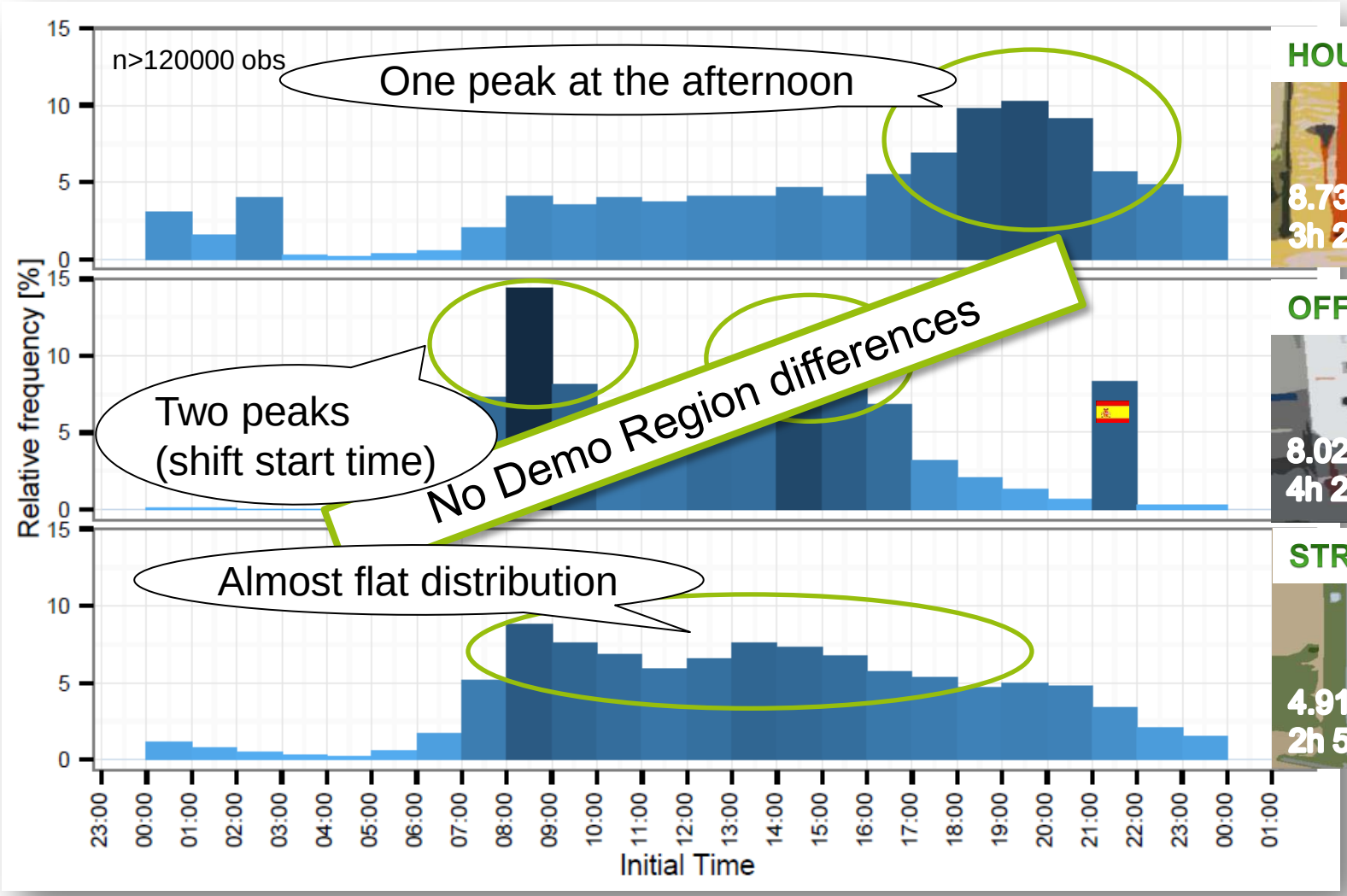
Charging points



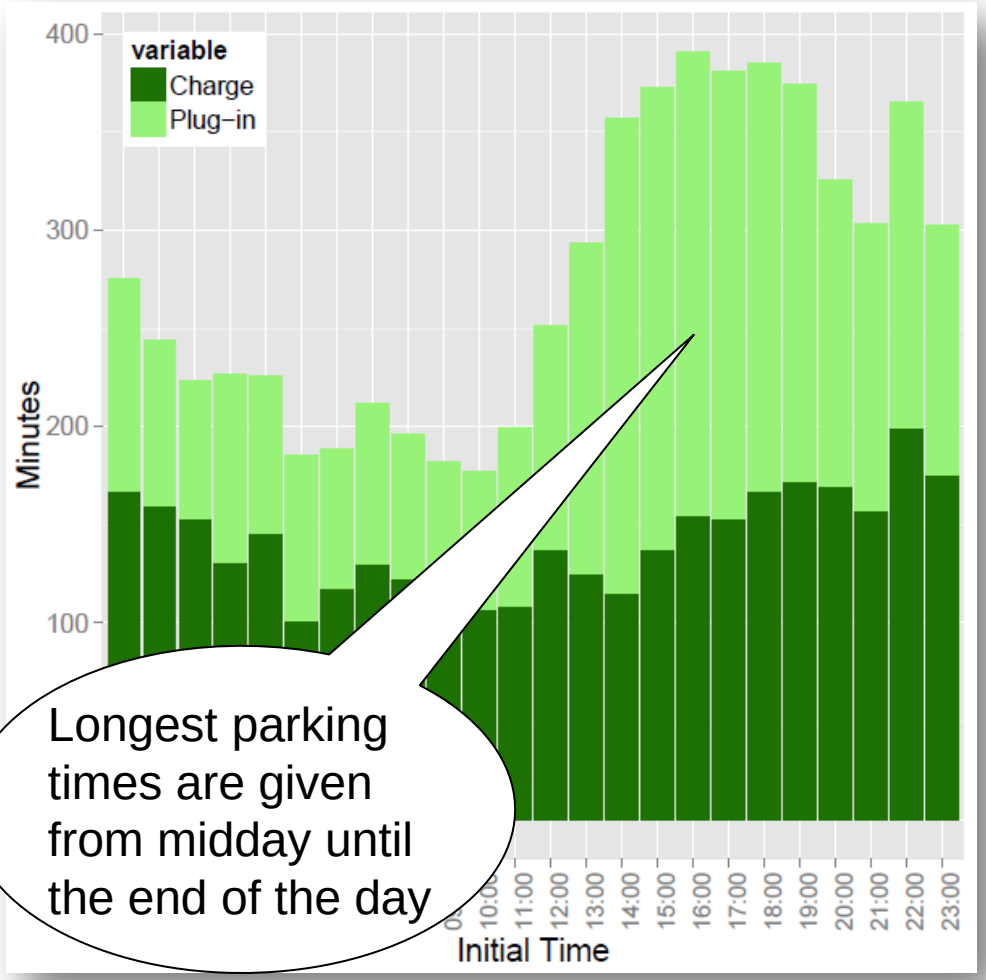
66% private

33% private

Charging behaviour



Charging behaviour



Longest parking times are given from midday until the end of the day

Daily plug-in time is approximately **4h and 30min** from which the EV is actually being charged an average of **2h 23 min**

On average, EVs charge 52% of the time they are plugged-in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September 2014
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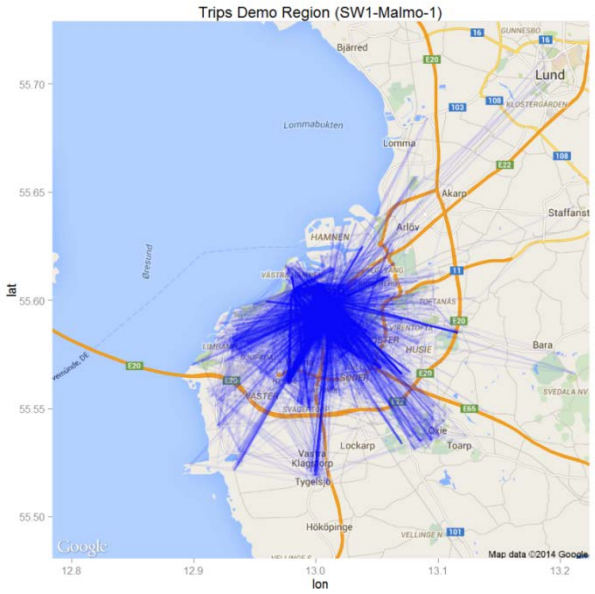
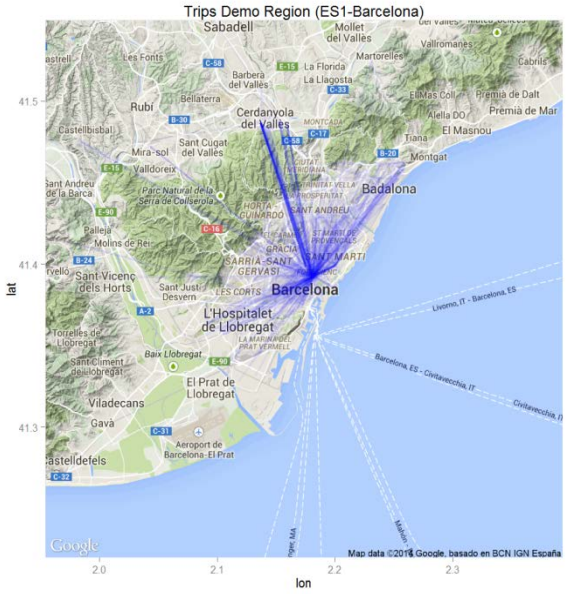
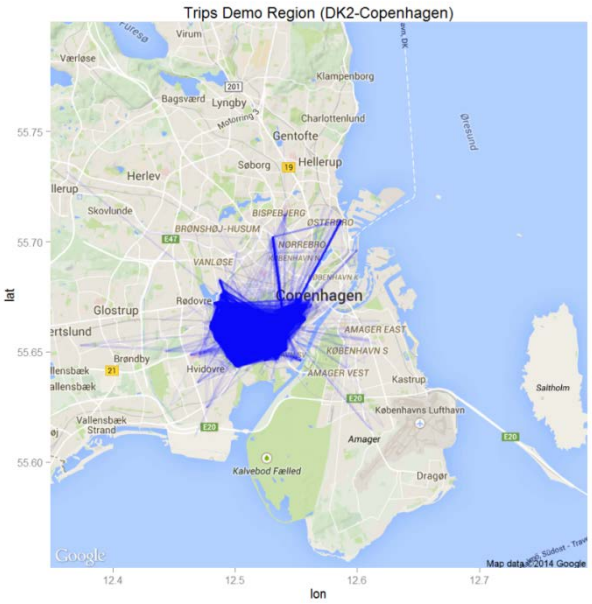
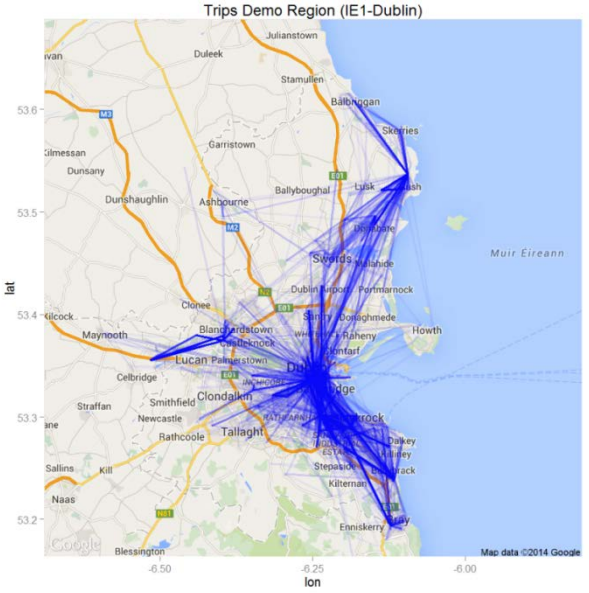
Electric vehicle data







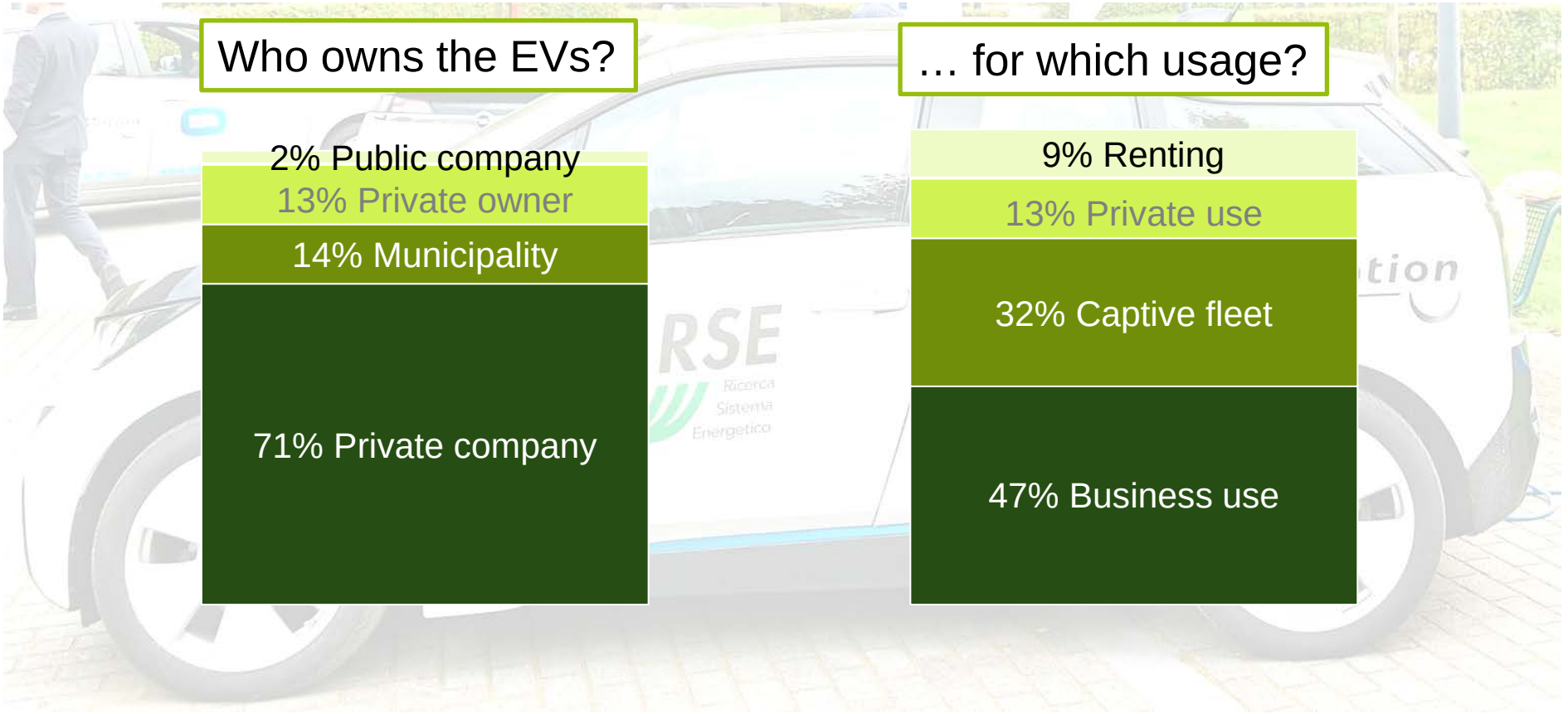


700 EVs

95 000 trips

80 000 charge events

Electric vehicle data



Who owns the EVs?

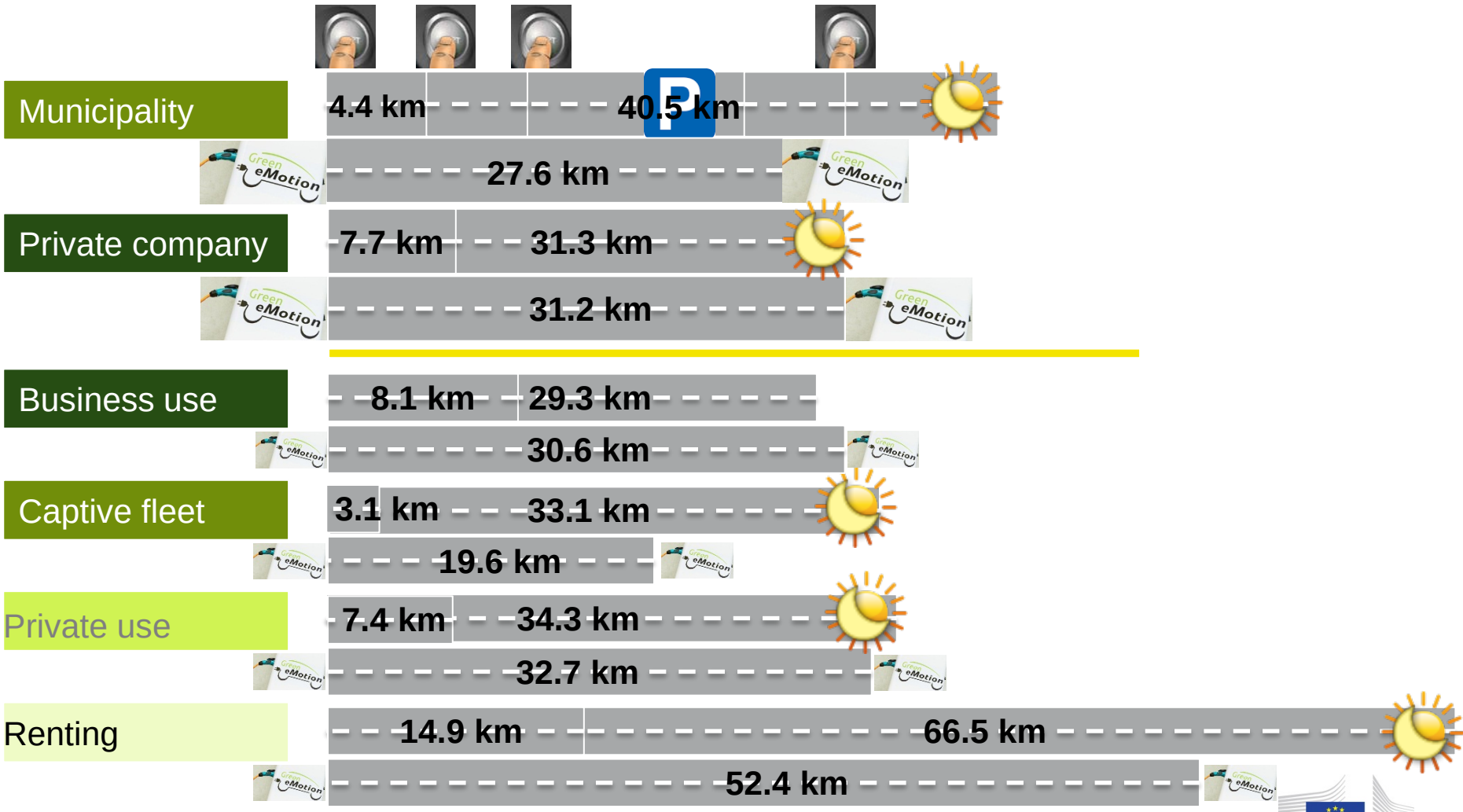
- 2% Public company
- 13% Private owner
- 14% Municipality
- 71% Private company

… for which usage?

- 9% Renting
- 13% Private use
- 32% Captive fleet
- 47% Business use

Electric vehicle data

How much do they drive?



Battery usage analysis

Do users drain their battery storage limits?

The **average state of charge** when starting a charge event is **60.5%**

Less than 2% of the trips end with a **battery state of charge lower than 20%.**

7% of the renting trips end with a battery state of charge lower than 20%.

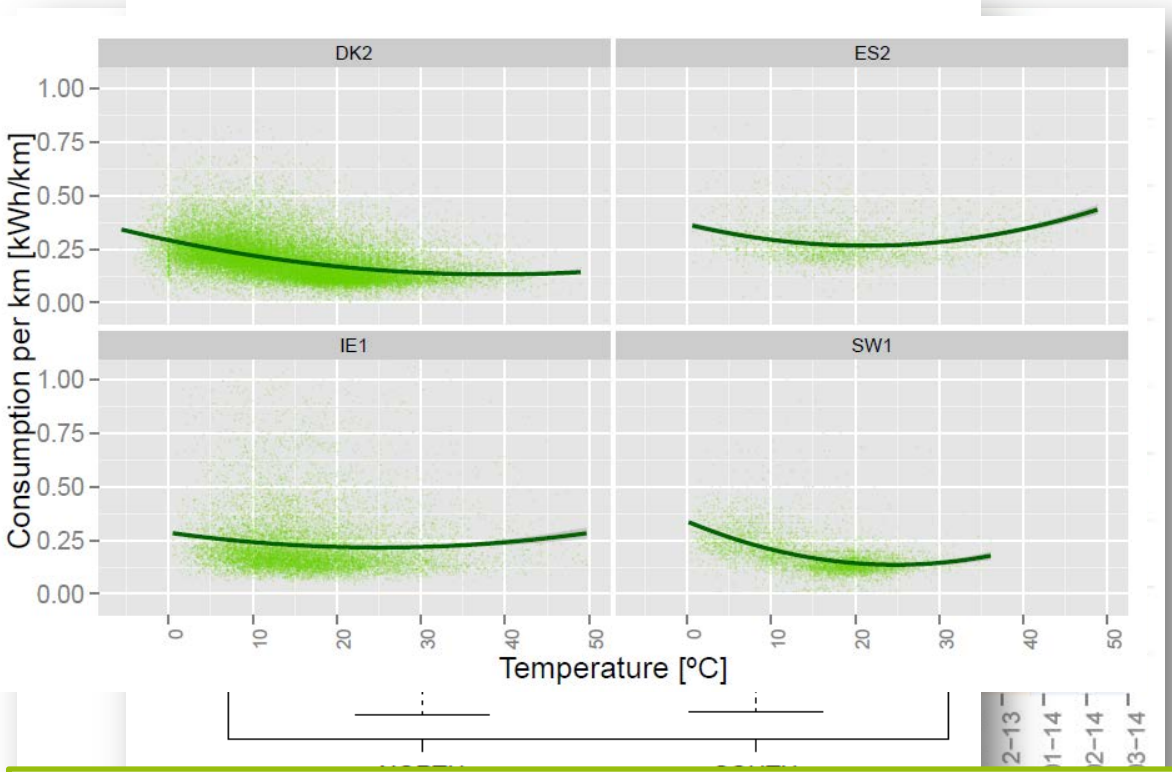
0.5% of the captive fleet vehicles end a trip with a battery state of charge lower than 20%.

The lowest average state of charge corresponds to private use (58%)

The highest average state of charge corresponds to captive fleet (64%)

Energy consumption

How much do I consume for driving a km?



Seasonality: the average energy **consumption** per km in summer **decreases up to 50%** with respect to colder months.

Do users learn to reduce their trip consumption?

- Probably some, but we have no evidence.

Geographic location would influence the consumption.

The **external temperature** is clearly the main effect on the consumption per km (that is on the EV range). The optimal consumption is reached with mild temperatures approaching 20 degrees.

Charging, driving and parking daily patterns

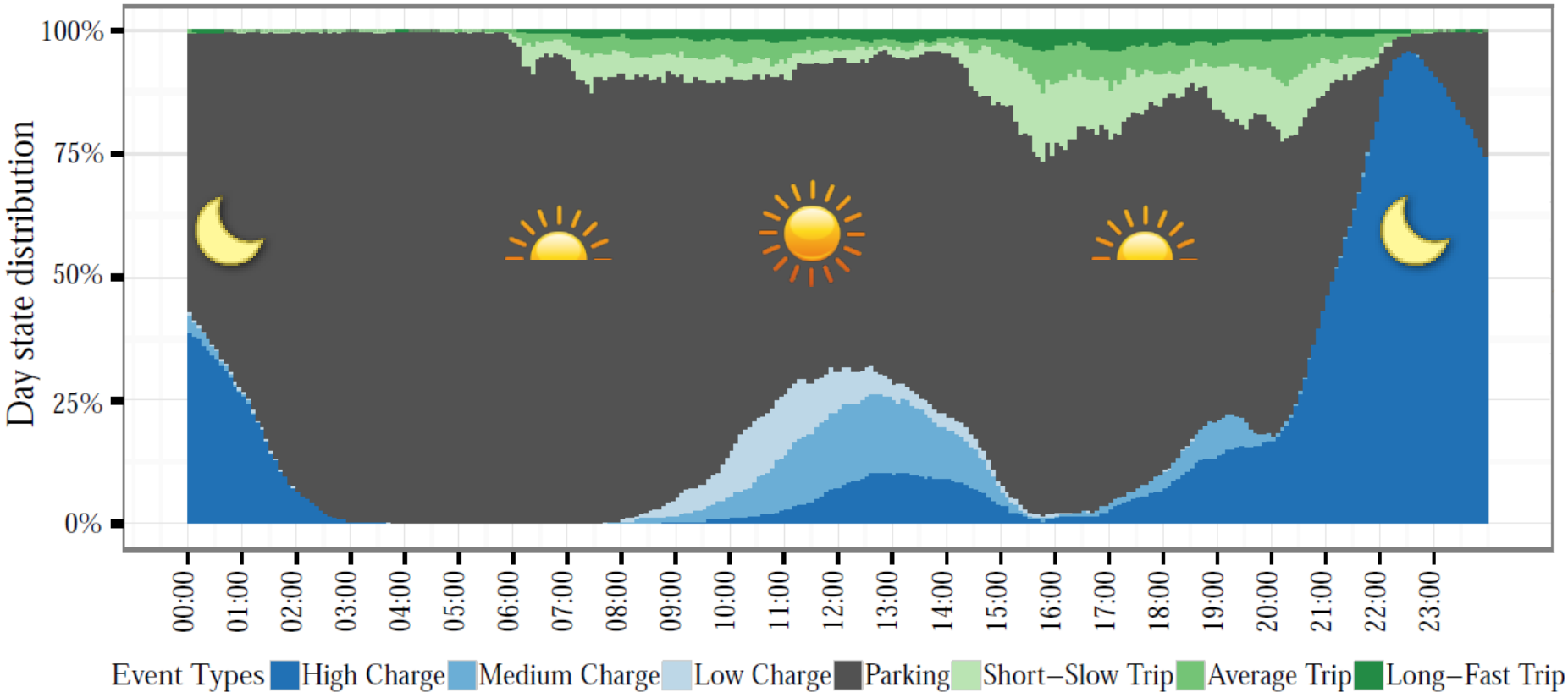
- The aim is to identify patterns taking into account car life trajectories
- A clustering analysis suggests the classification of trip and charge events into three groups

	Initial SoC	SoC increment
Low	83%	15%
Medium	55%	26%
High	35%	51%

	Trip speed	Trip distance
Short-slow	16.7 km/h	3.85 km
Average	30.5 km/h	5.49 km
Long-fast	52.1 km/h	22.72 km

Charging, driving and parking daily patterns

Domestic users pattern



- Charge events at lunch time and at night.
- Trips during the day, more during the afternoon.

Data collection applications

Business

- To identify **client segmentation** for car manufacturers, utilitites and e-mobility service providers.

Technical

- To provide accurate **information about the charge cycles** in order to estimate the EV battery life span.
- To **simulate the user car behavior** required to optimize grid integration.

Policy

- To **help policy makers** to regulate and promote the use of EV with objective data.
- To **better understand the deployment of EV**: user‘s behaviour, charging/driving patterns, differentiation by type of use (fleet, private,etc)

Some references

Comparison with other European projects.

THANKS

to all Stakeholders Forum members that have shared their information

publications.jrc.ec.europa.eu/repository/hand[illegible]92972

Deliverable D1.10

European global analysis on the electro-mobility performance

(Available soon at www.greenemotion-project.eu/ - end of February)

After four years of work…

We don’t know how electric vehicles will be in the near future…

But…
We know we must monitor them and we know how!!

Thank You

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