

Utility Experience with Electric Vehicles

Preparing an Effective Electromobility System for Europe

Green eMotion Conference

Liepaja

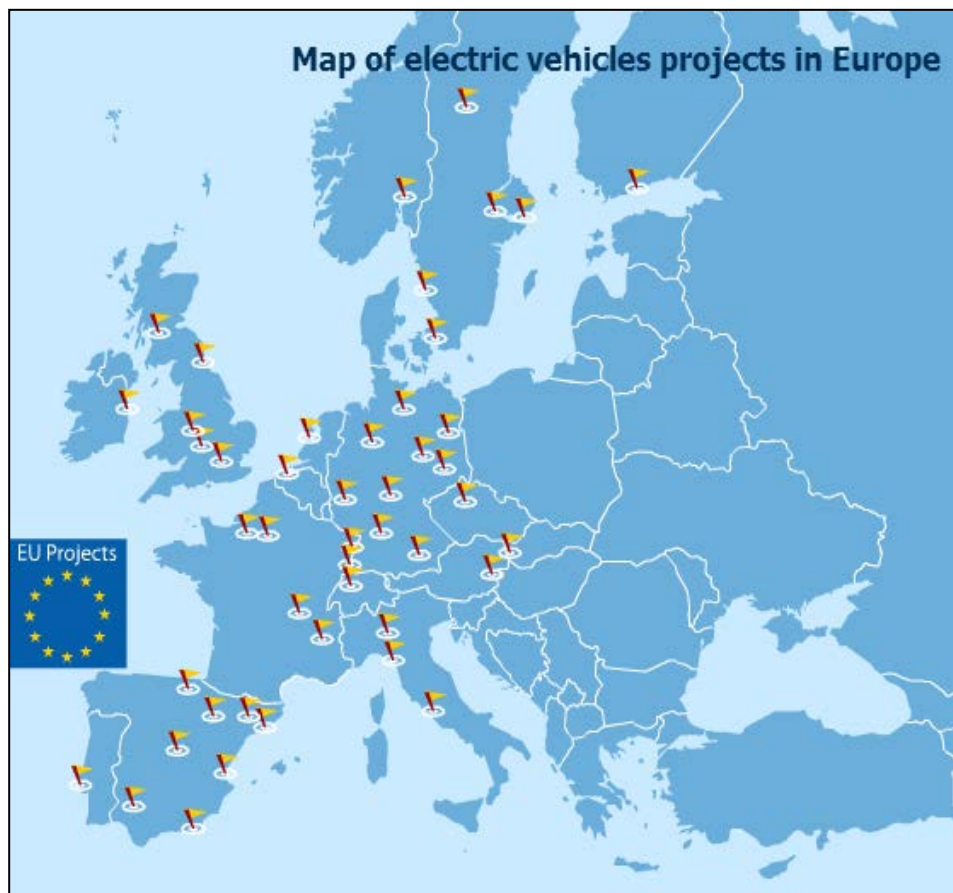
Feb 10th 2015

Senan McGrath

Chief Technology Officer, ESB eCars, Ireland
& Chair of Eurelectric Electric Vehicle Task Force

EURELECTRIC TF EV: bringing together over 30 electricity stakeholders from 19 European countries





**External Stakeholders
Forum: 25-26 February 2015**

www.eurelectric.org/Maps/InteractiveMapEV

Project Status - Infrastructure Update

Ireland

AC Public Charge Points

(Type 2 – 22kW)

820

Fast Chargers (Chademo with some Combo)

64

Northern Ireland

AC Public Charge Points

(Type 2 – 22kW)

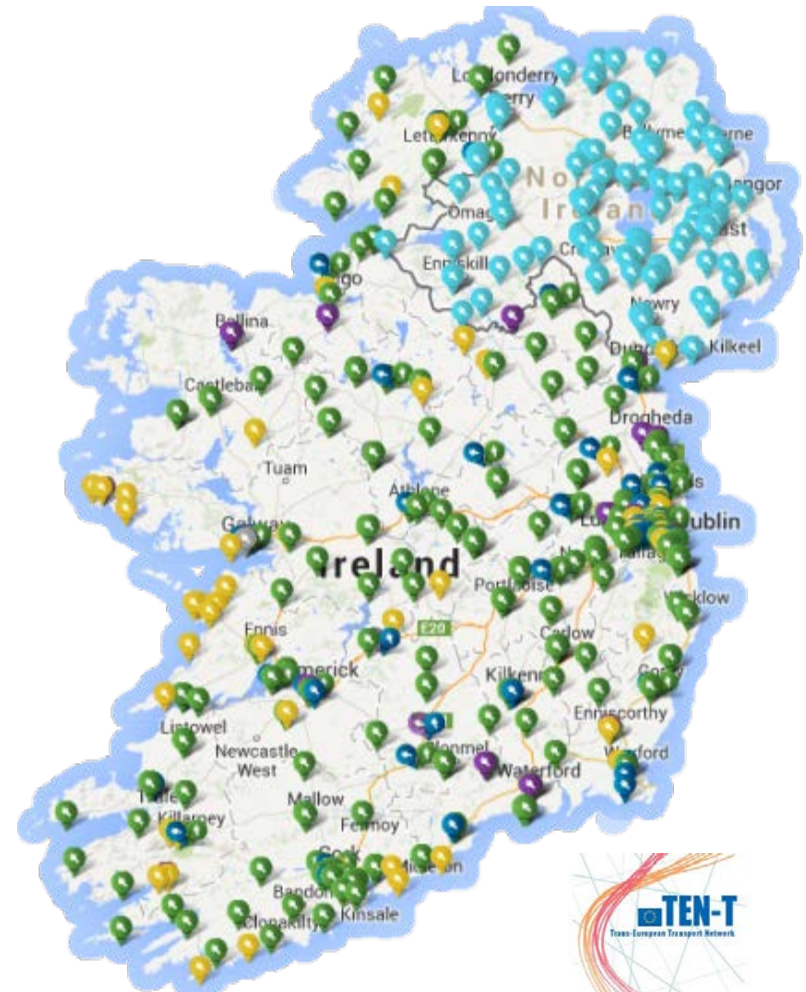
320

Fast Chargers (Chademo)

14

EU TEN-T (First EU Country)

50% Funding for Chargers on main interurban routes & modal hubs



December 2014



TEN-T UK & Ireland (RCN) – 2013/2014



2012 TEN-T Ireland –Northern Ireland

- 46 Fast Chargers on island

Rapid Charge Network Consortium

- Nissan, VW, BMW, Renault
- ESB, (Ireland)
- Newcastle, UK Gov Dept for Transport

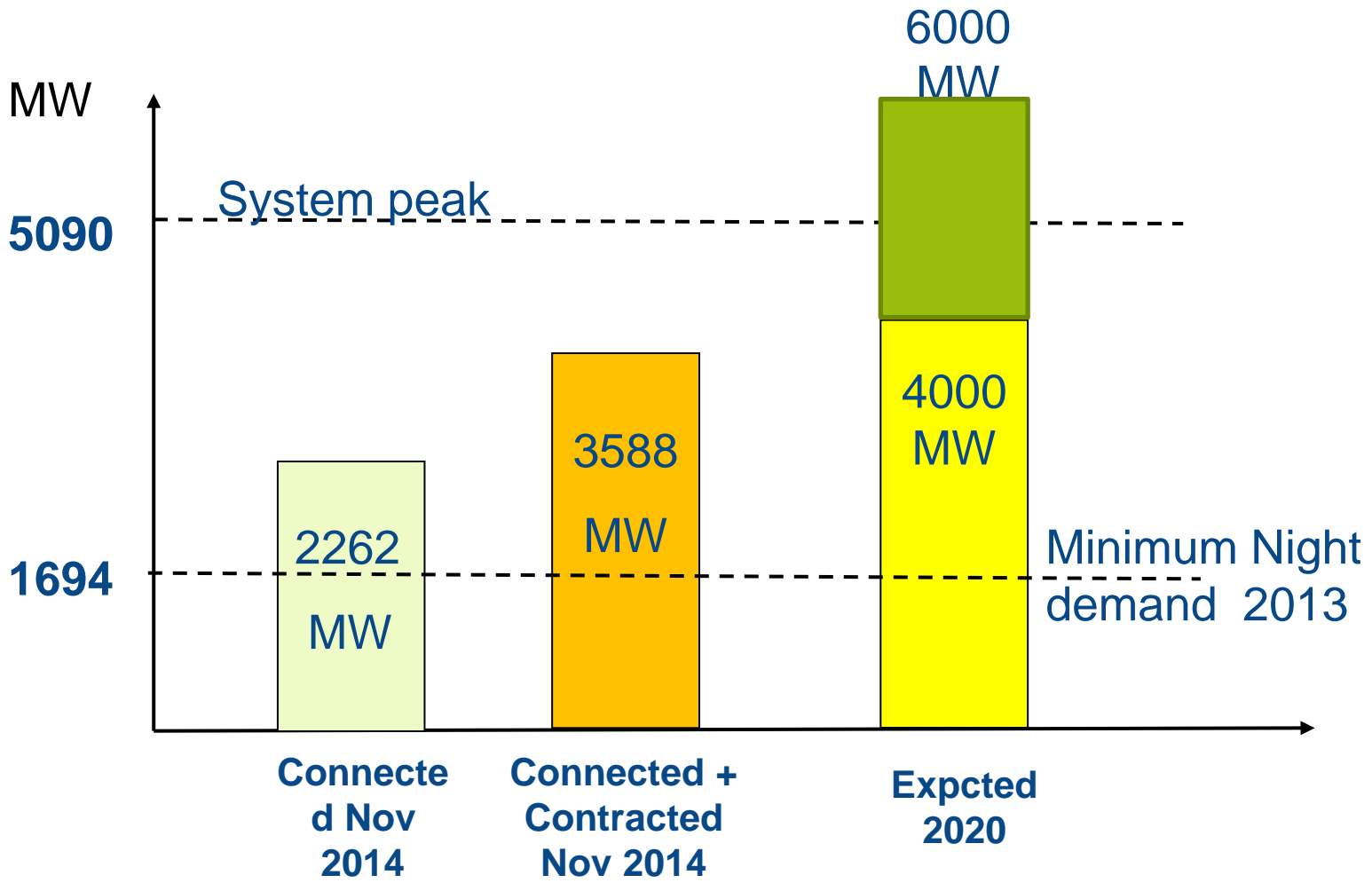
74 Fast Chargers

- 2 routes North-South (M6) and East-West (M62)

Linking Belfast & Dublin thru UK to North Sea Ports



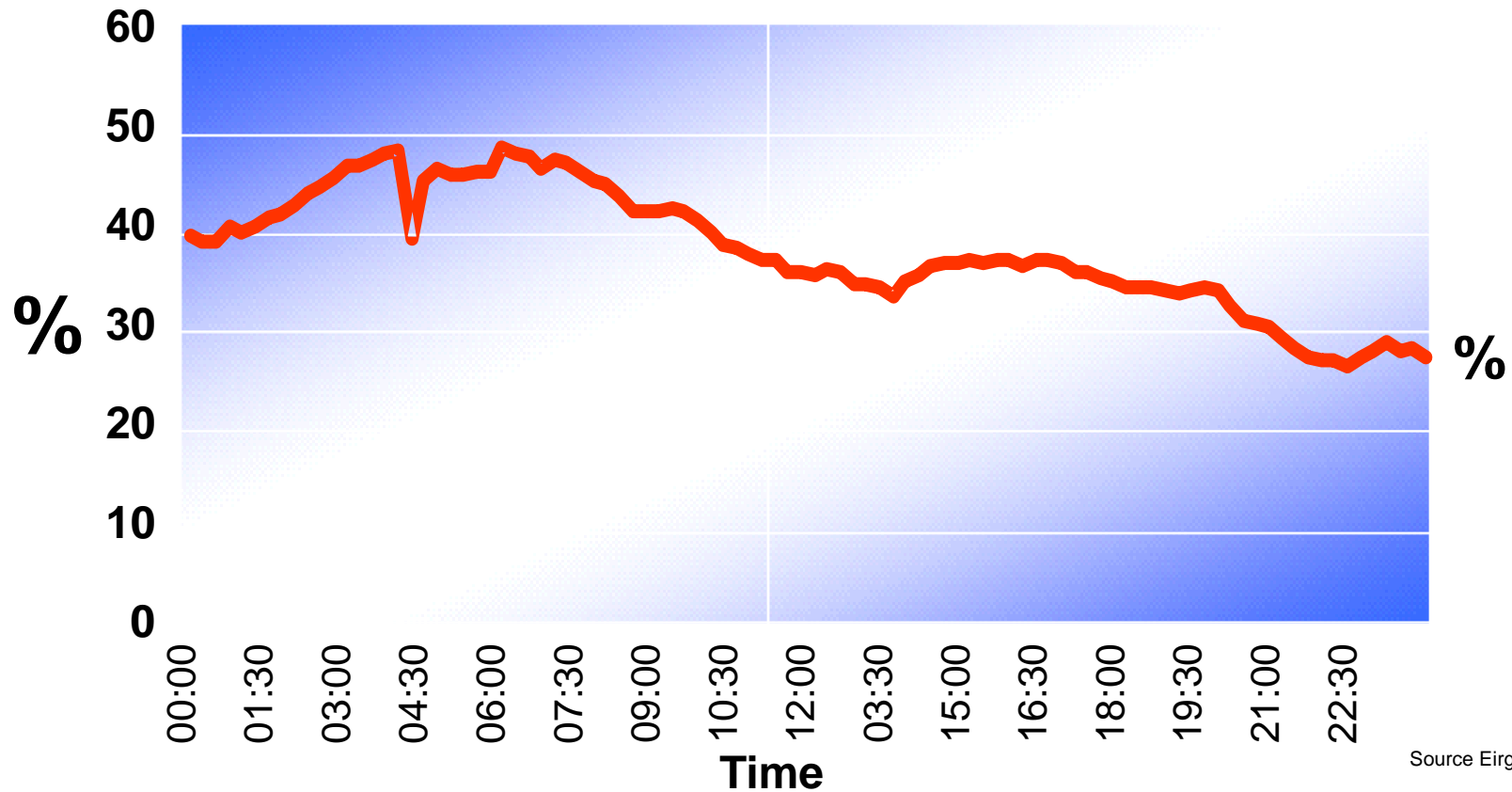
Ireland's Investment in Wind Generation



50% Wind Connected to Distribution System



Wind Generation as % of System Demand Monday 5th April 2010



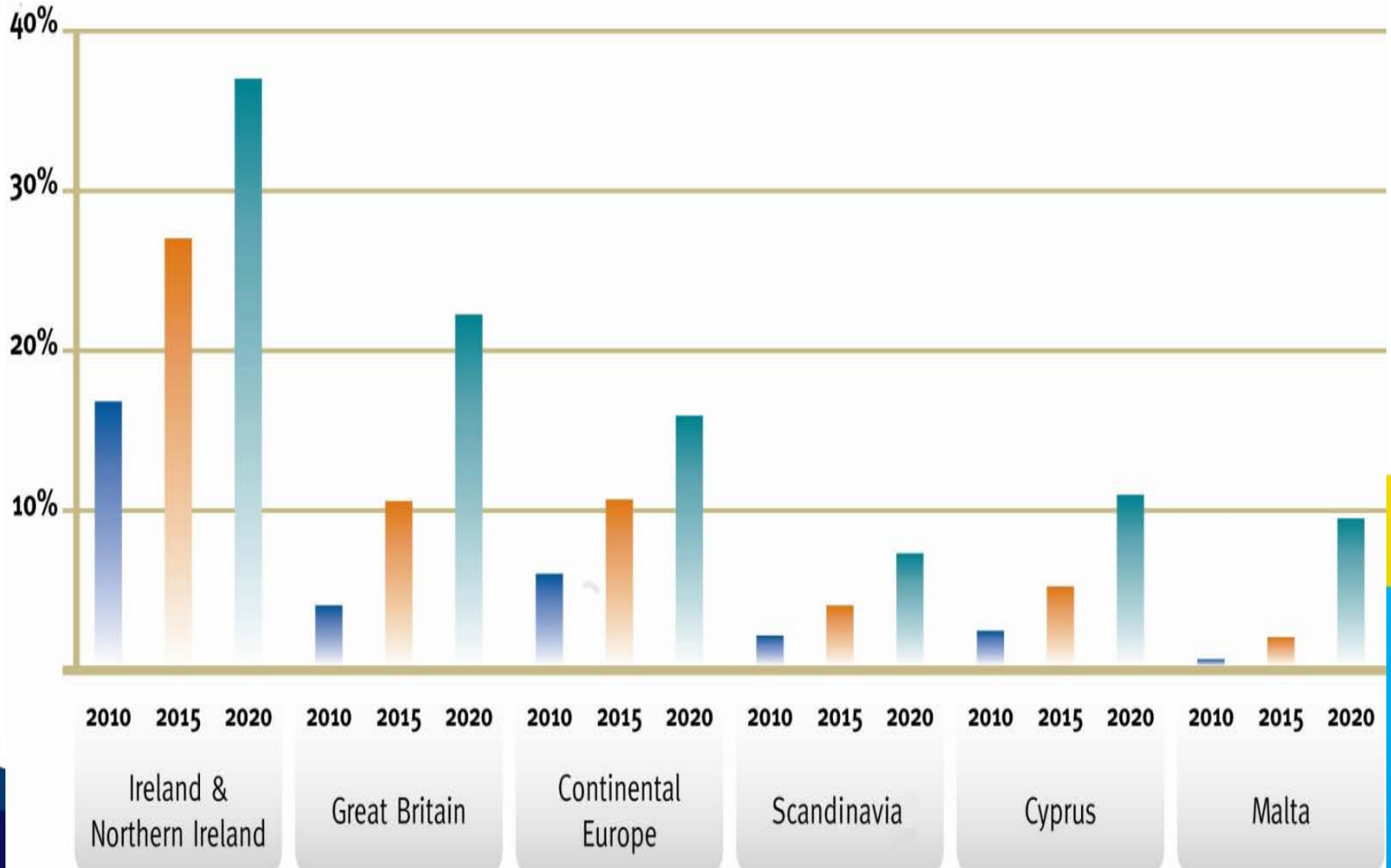
Source Eirgrid

European Targets

Variable Non-Synchronous Renewable Generation



Energy for generations



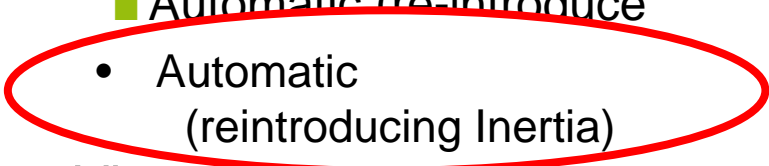
Based on analysis of National Renewable Action Plans (NREAPs) as submitted by member states

Planned Smart Grid Features



Frequency Response

- Via TSO Command
- Automatic (re-introduce



- Automatic (reintroducing Inertia)

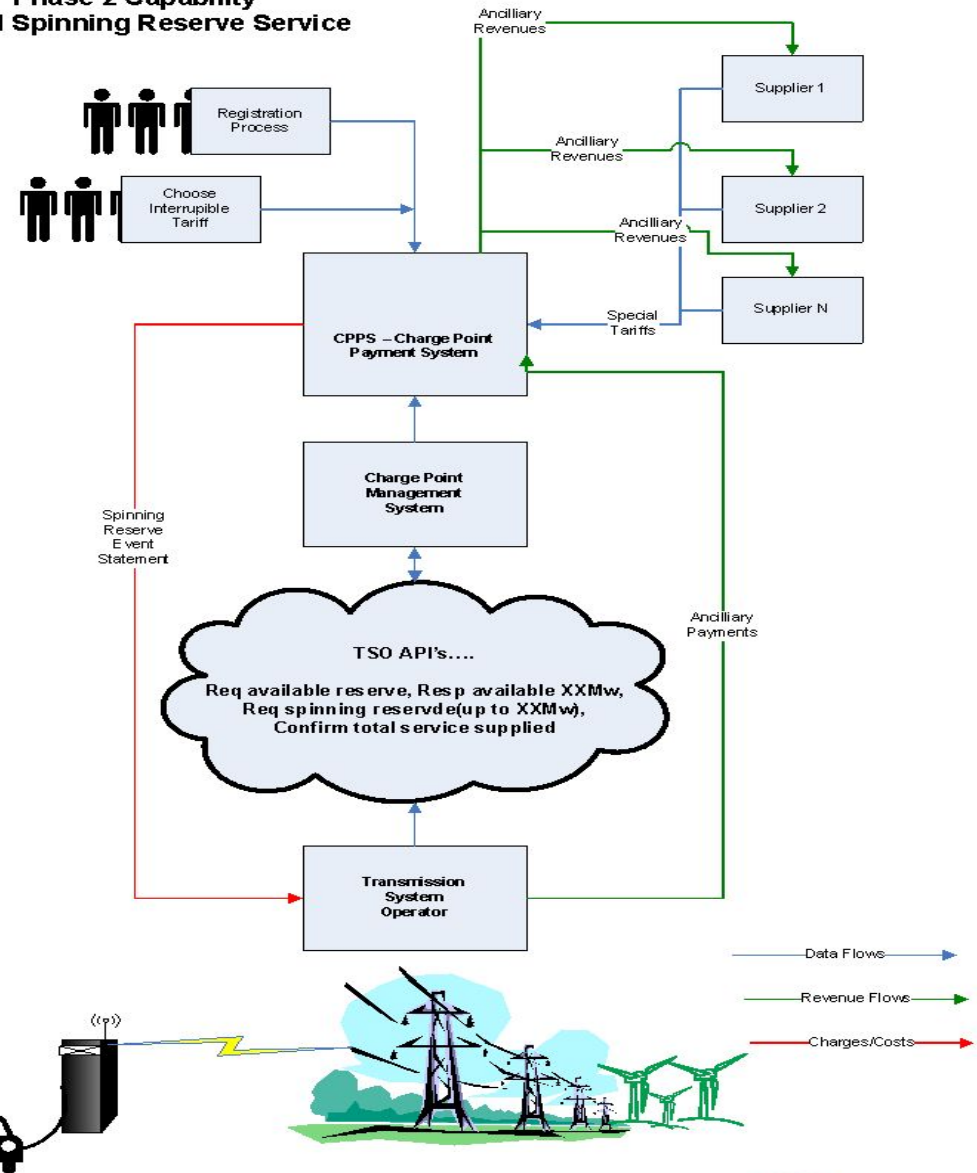
Virtual Spinning Reserve

- Request
- Tracking
- Settlement

DSO/Scada integration

- CP Grouping by Transformer
- Integration with OMS System

Phase 2 Capability Virtual Spinning Reserve Service



Electricity as a fuel leads to more sustainable transport:

- Reducing CO2 emissions
- Increasing energy efficiency
- Reducing oil dependence

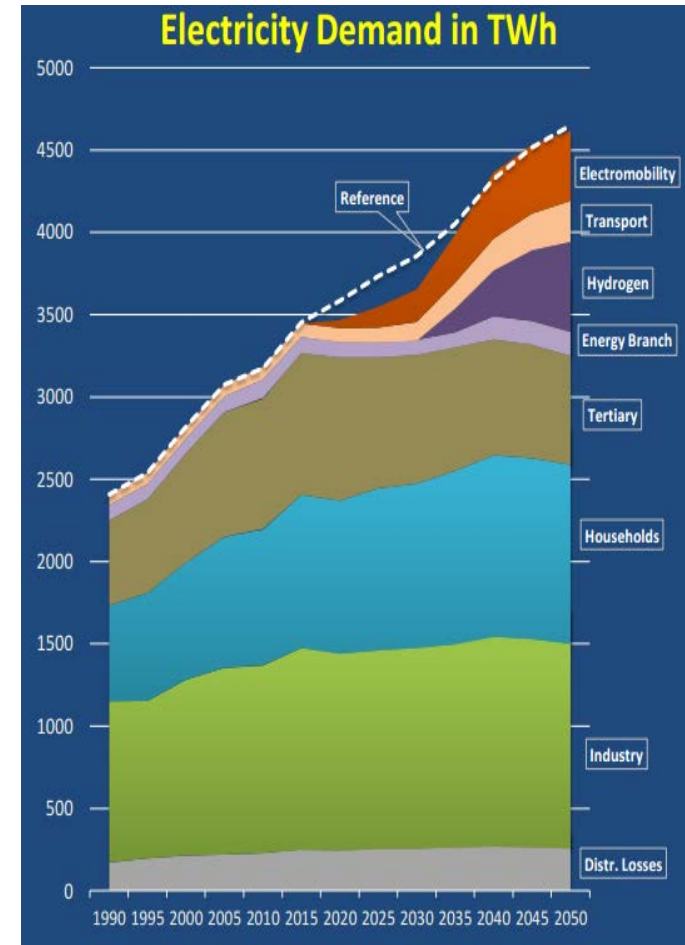
Environmental performance of EVs will further improve due to commitment to carbon-neutral electricity by 2050

Increased shift towards electrification – *EURELECTRIC 2014 “Manifesto”*



- EV has the potential of providing flexibility as mobile load and source of energy storage
- Renewables complementary to electric vehicle charging
- Mass-market EV electrification requires an intelligent connection between the vehicle and the grid

Smart charging is a cornerstone in the smart grid development benefiting the power system, customers & society



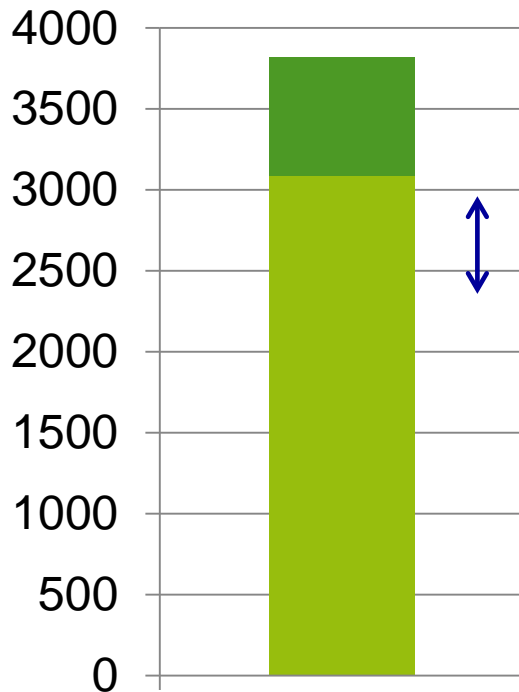
EURELECTRIC Power Choices Reloaded

Smart charging benefits for the power system



Additional electricity demand from 100% EVs is feasible

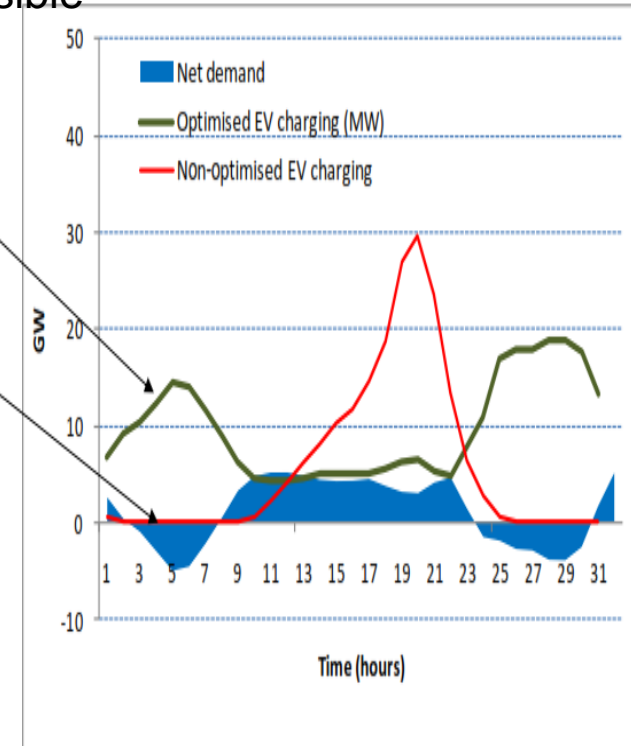
TWh



- Additional EV electricity
- Electricity generation

Optimal charging enhances demand during high wind to avoid curtailment

Non-optimized charging will lead to wind curtailment



Integrating wind power ; Source: G4V

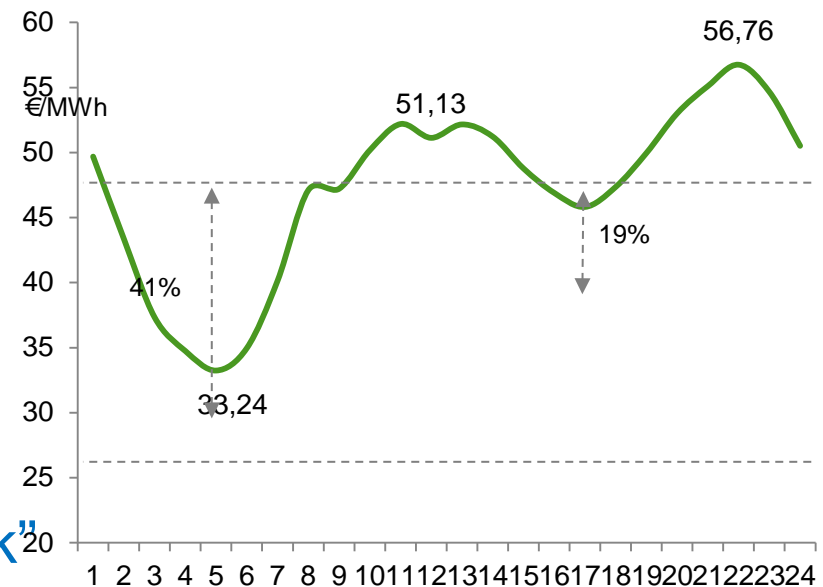
There is enough capacity in the grid to meet a fully electrified fleet at 100% if they charge outside peak hours. The issue is the peak demand.



Smart charging benefits for the EV Drivers

- Reduction of energy bill
 - Cost saved on energy due to EV consumption
 - No need to increase subscription and connection power

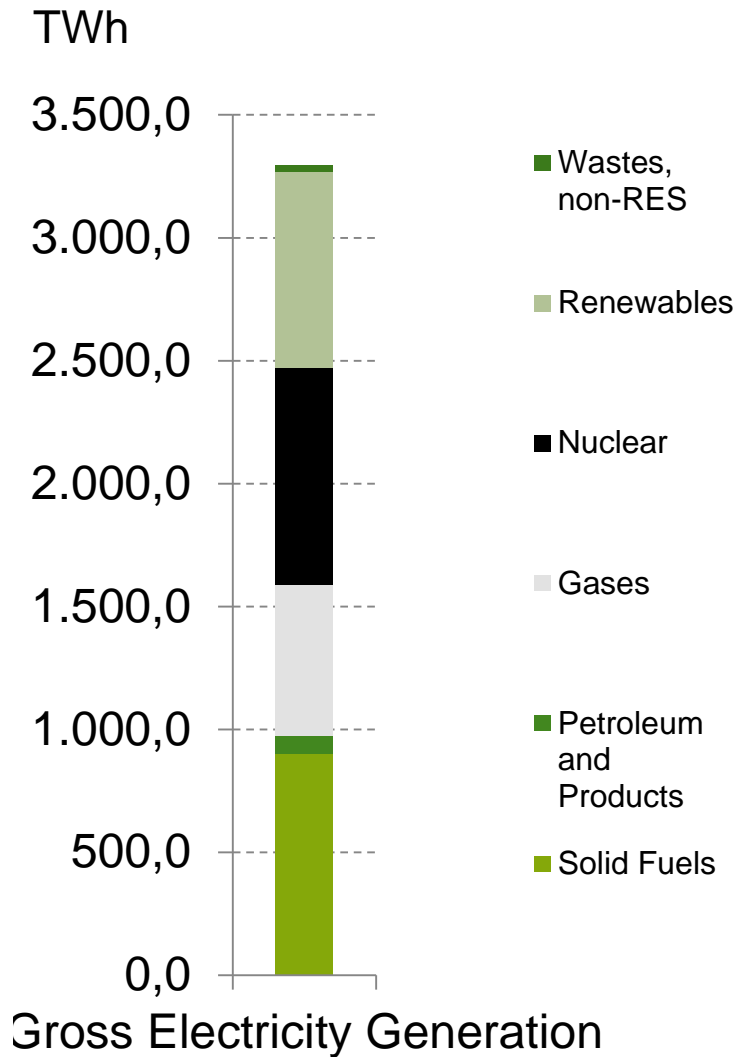
- Better TCO based on “off peak” cheaper tariffs



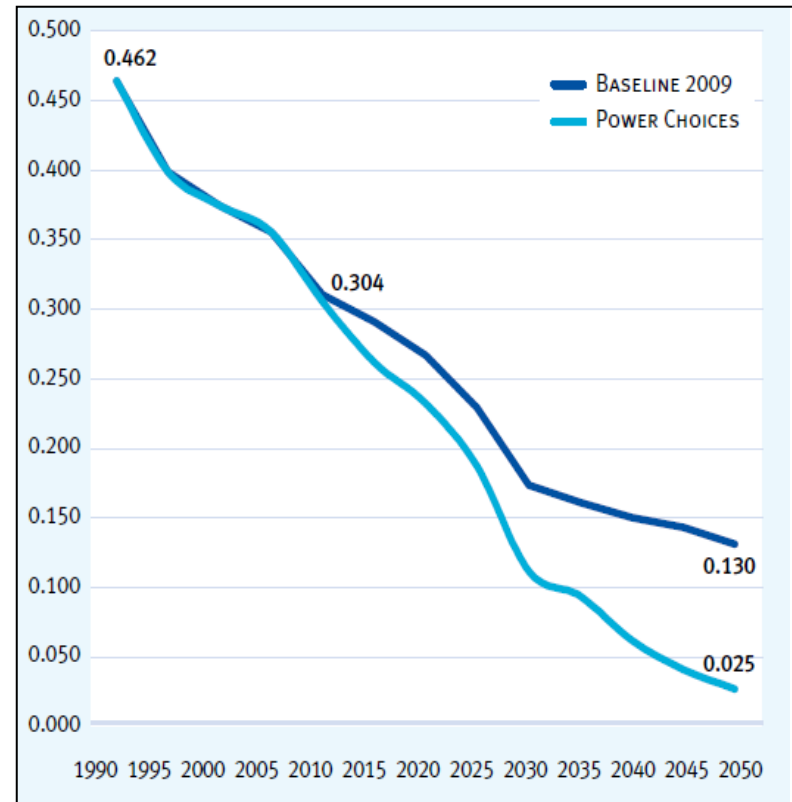
Source: Endesa

Optimising the EV user needs: smart charging is cheap, comfortable and easy -> need to incentivise consumers

Smart charging benefits for society



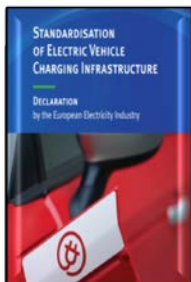
CO2 intensity of power generation (tCO2/MWh)



EURELECTRIC Power Choices Study



EURELECTRIC's TF EV publications



**Declaration on standardisation
of electric vehicle charging infrastructure**
October 2009



**Emerging market models for
public infrastructure**
September 2010



Charging needs for EVs
April 2011



**Views on Charging
Infrastructure**
March 2012



**Organising market for public
infrastructure**
July 2013

Available at www.eurelectric.org/publications



- Set up supportive policies for e-mobility
- Regulatory regimes should incentivise smart charging
- Prioritise demonstration and commercialisation
- Ensure interoperability and efficient exchange of data
- Electricity industry should build synergies with car manufacturers
- Develop smart charging technologies as part of the future smart grids

- European Electricity system can cope with 100% EVs with no additional Gen or Trans capacity
- Investment in Distribution grids can be minimised with Smart Charging
- Average electricity prices can be reduced to the benefit of the EV driver AND the electricity customer
- Society benefits from reduced CO2 emissions, better Air Quality and more Renewable Energy