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Session 4

**BUSINESS MODELS
FOR EV'S**

**MOVING
TOWARDS SUSTAINABLE
GROWTH**



MOVING
TOWARDS SUSTAINABLE
GROWTH

Robert Evans

CHAIRMAN'S OPENING REMARKS

ARUP



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**MOVING
TOWARDS SUSTAINABLE
GROWTH**

Peter Young

WHAT DOES CABLED TELL US ABOUT THE FUTURE?

LCV2011
8th September 2011

**What does CABLED tell us about the
future?**

Peter Young– Project Director, Arup

www.cabled.org.uk

Arup and Low Carbon Transport

BERR Department for Business Enterprise & Regulatory Reform

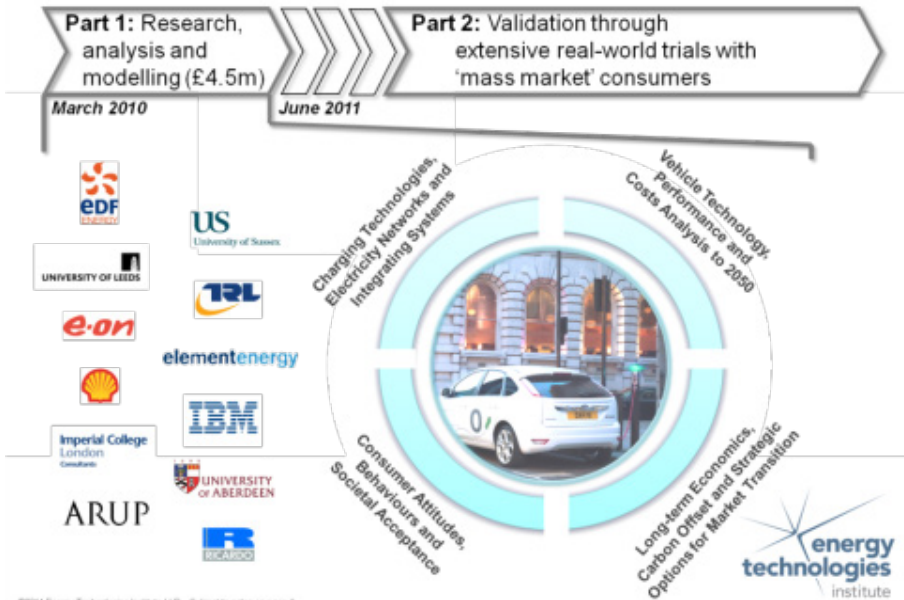
Department for
Transport

Investigation into the Scope for the Transport Sector to Switch to Electric Vehicles and Plug-in Hybrid Vehicles

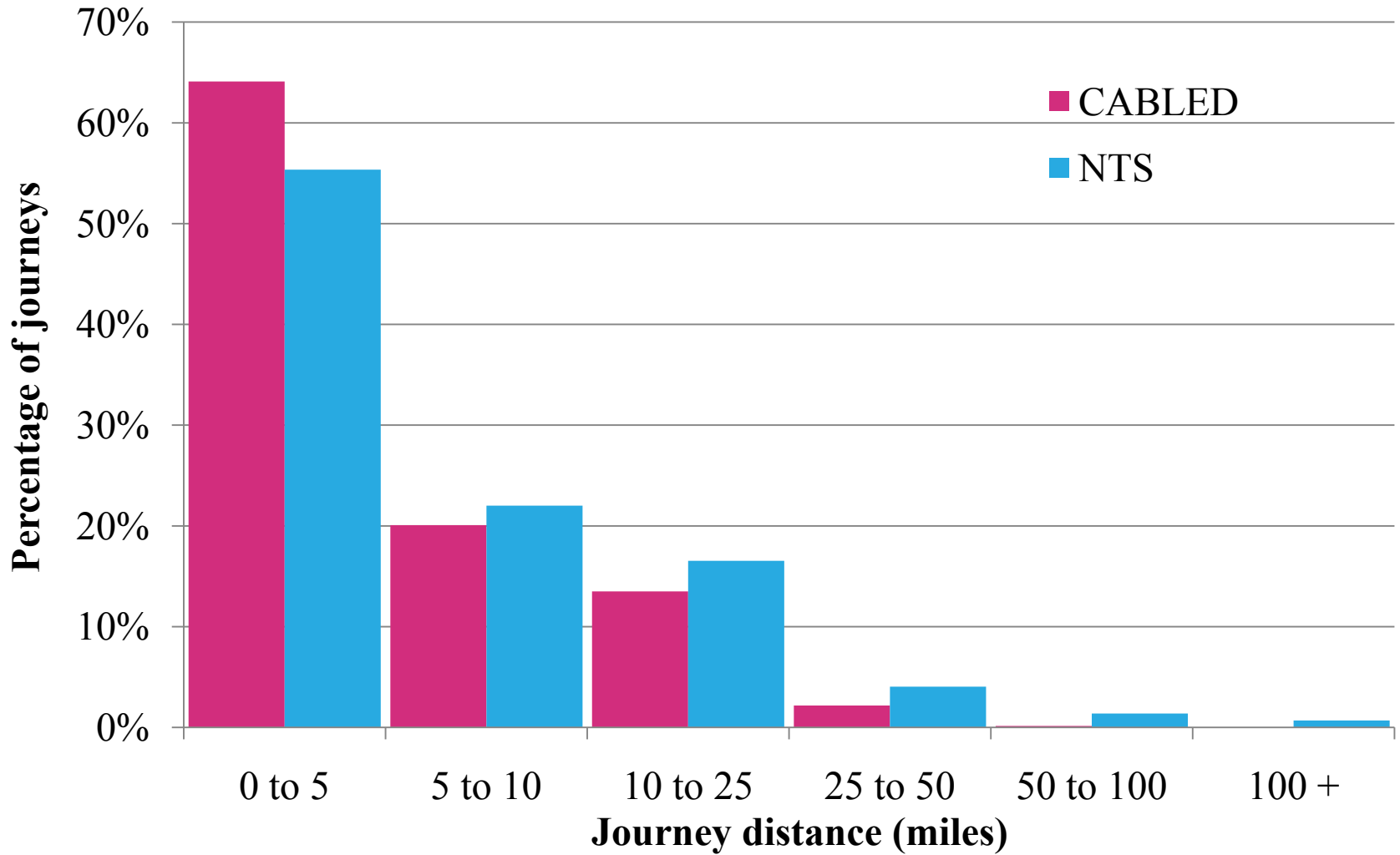
October 2008



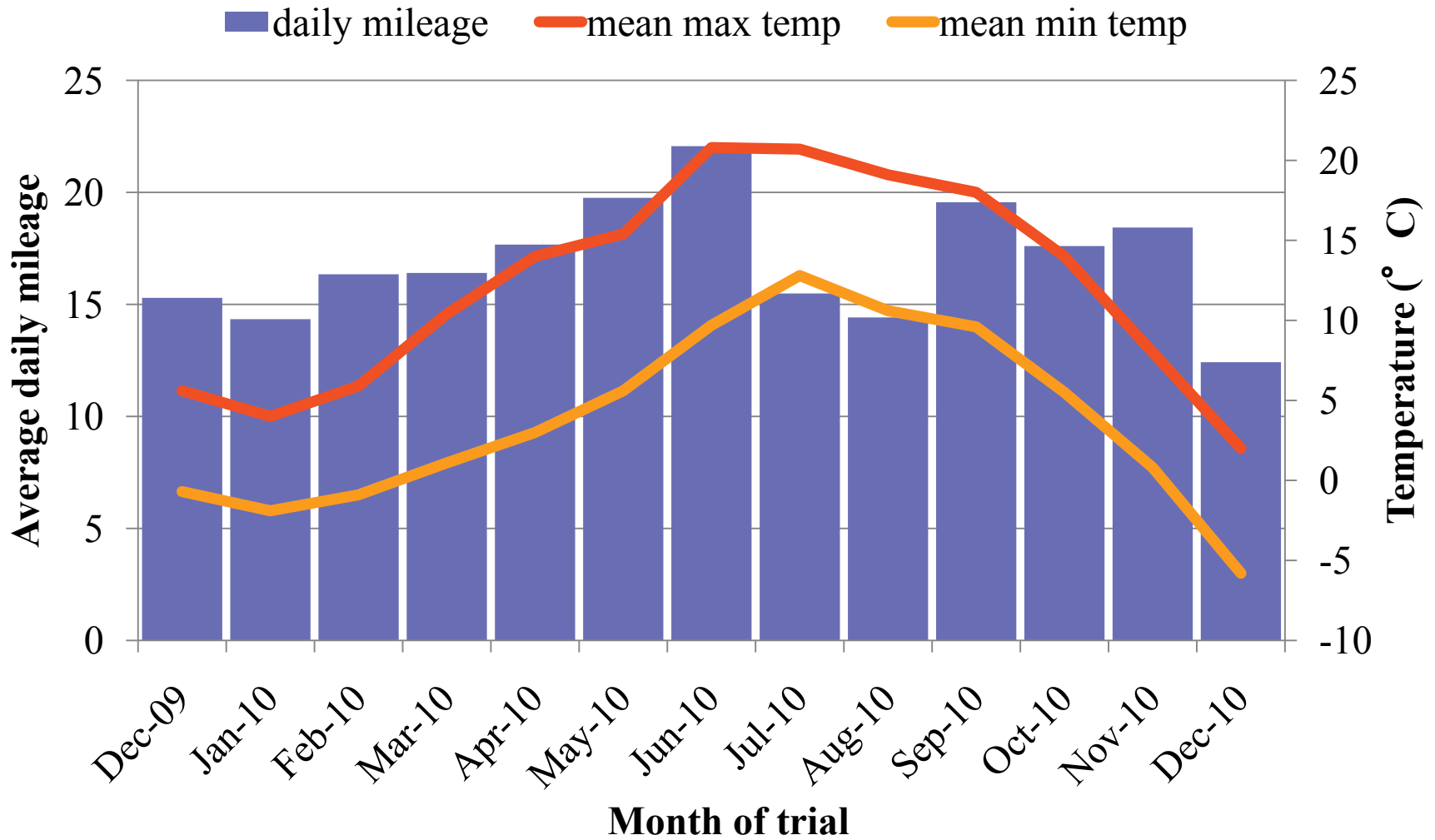
ETI's World-class Plug-in Vehicle Programme



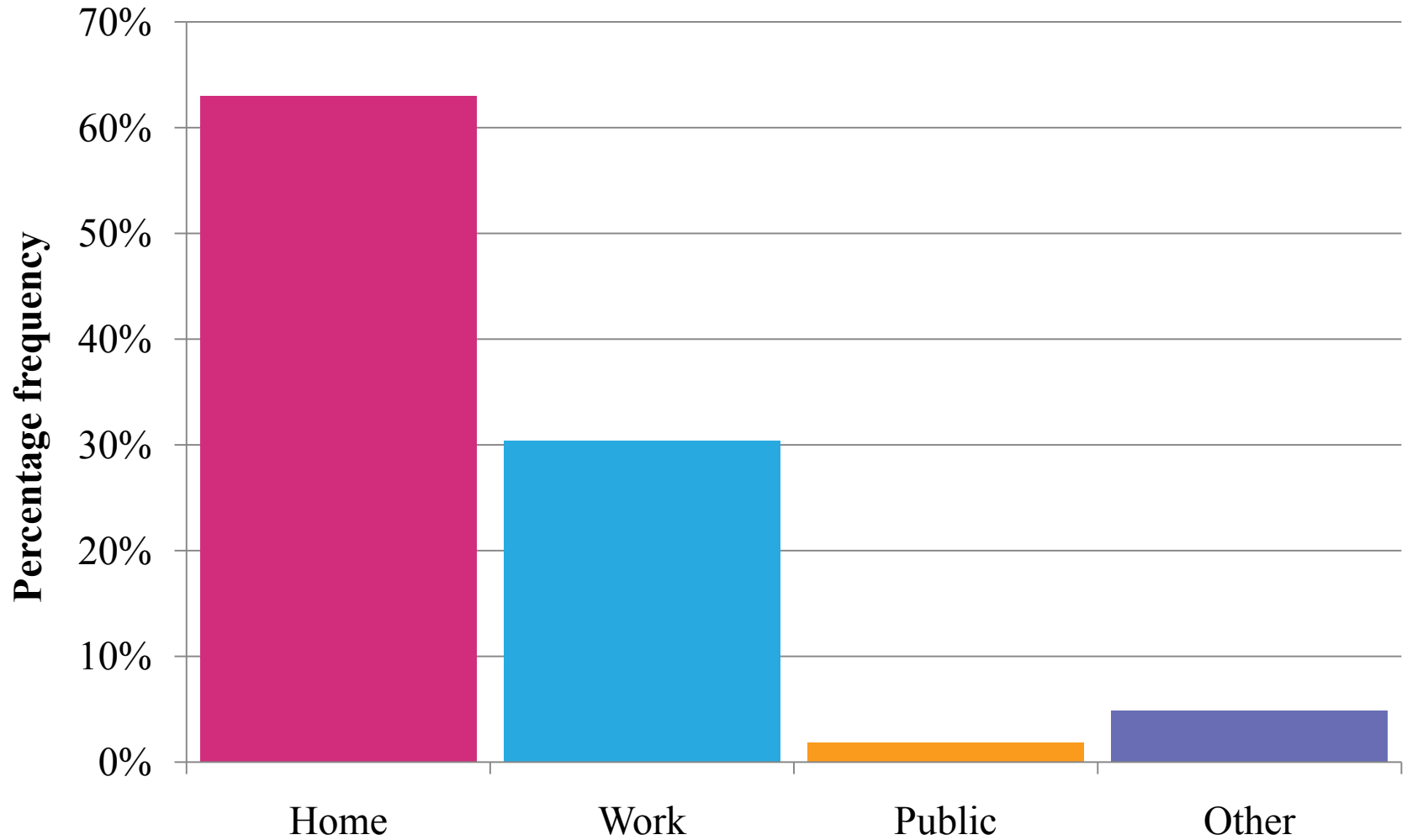
Journey Lengths



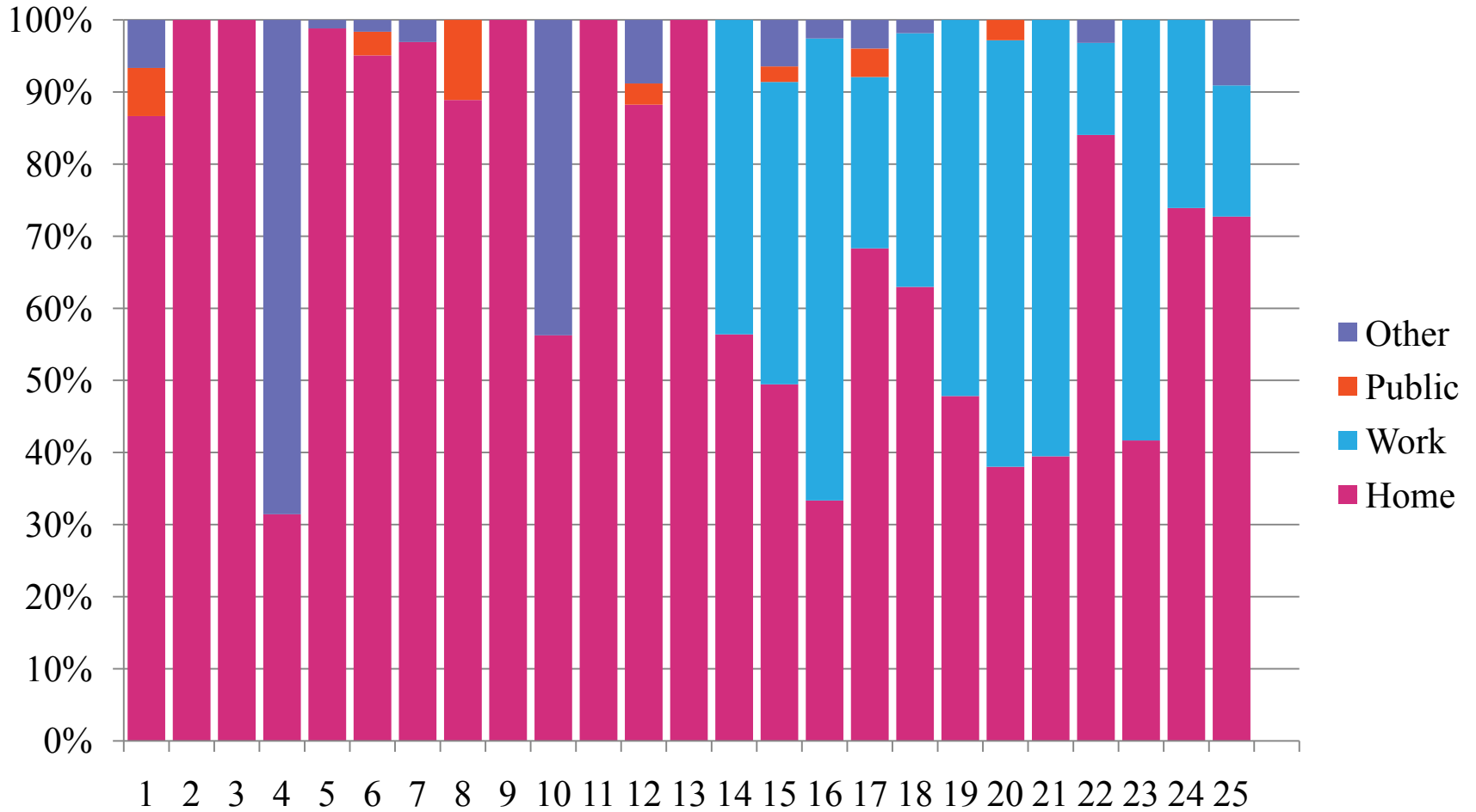
Daily Mileage



Charging Location

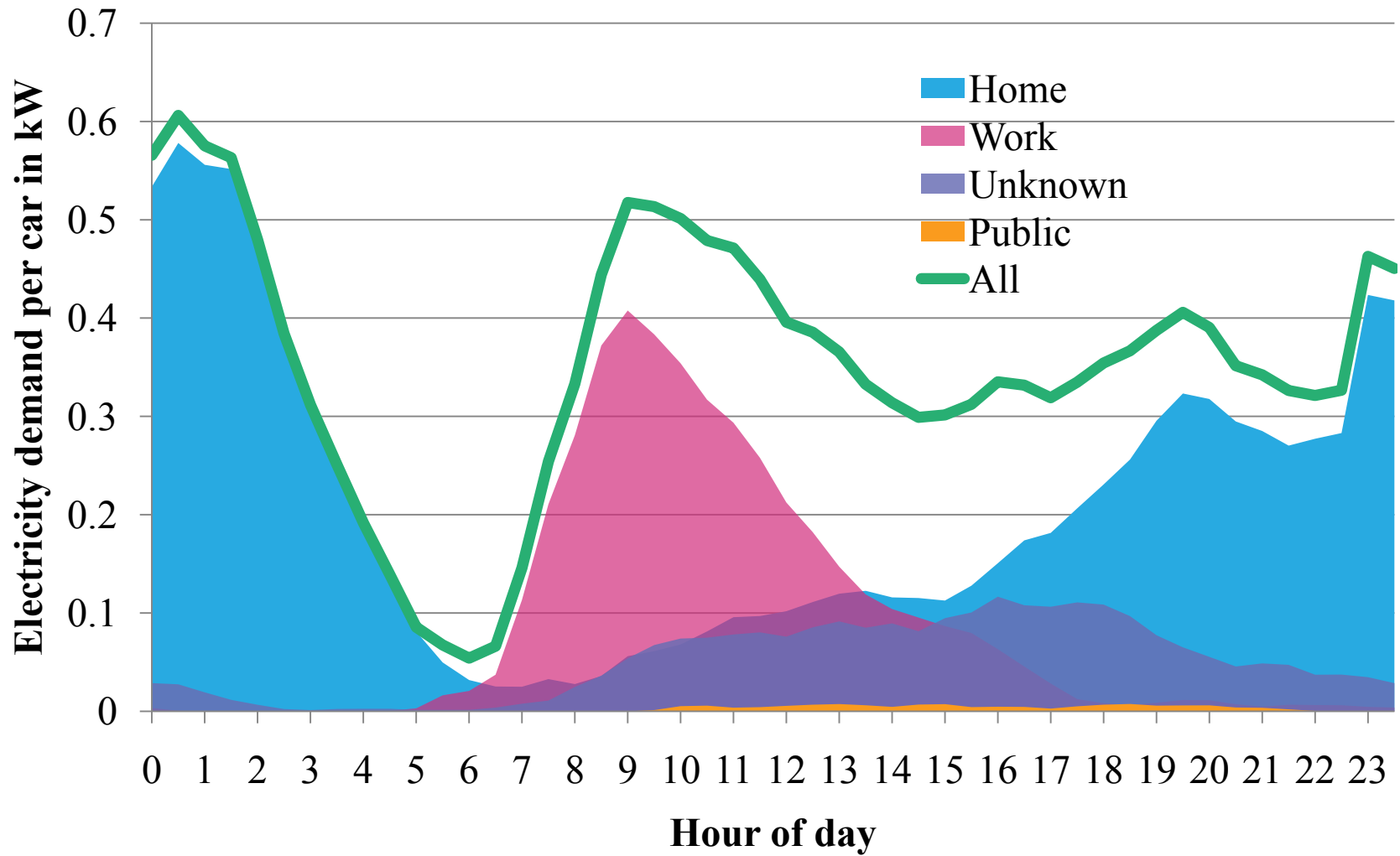


Charging Location by Vehicle

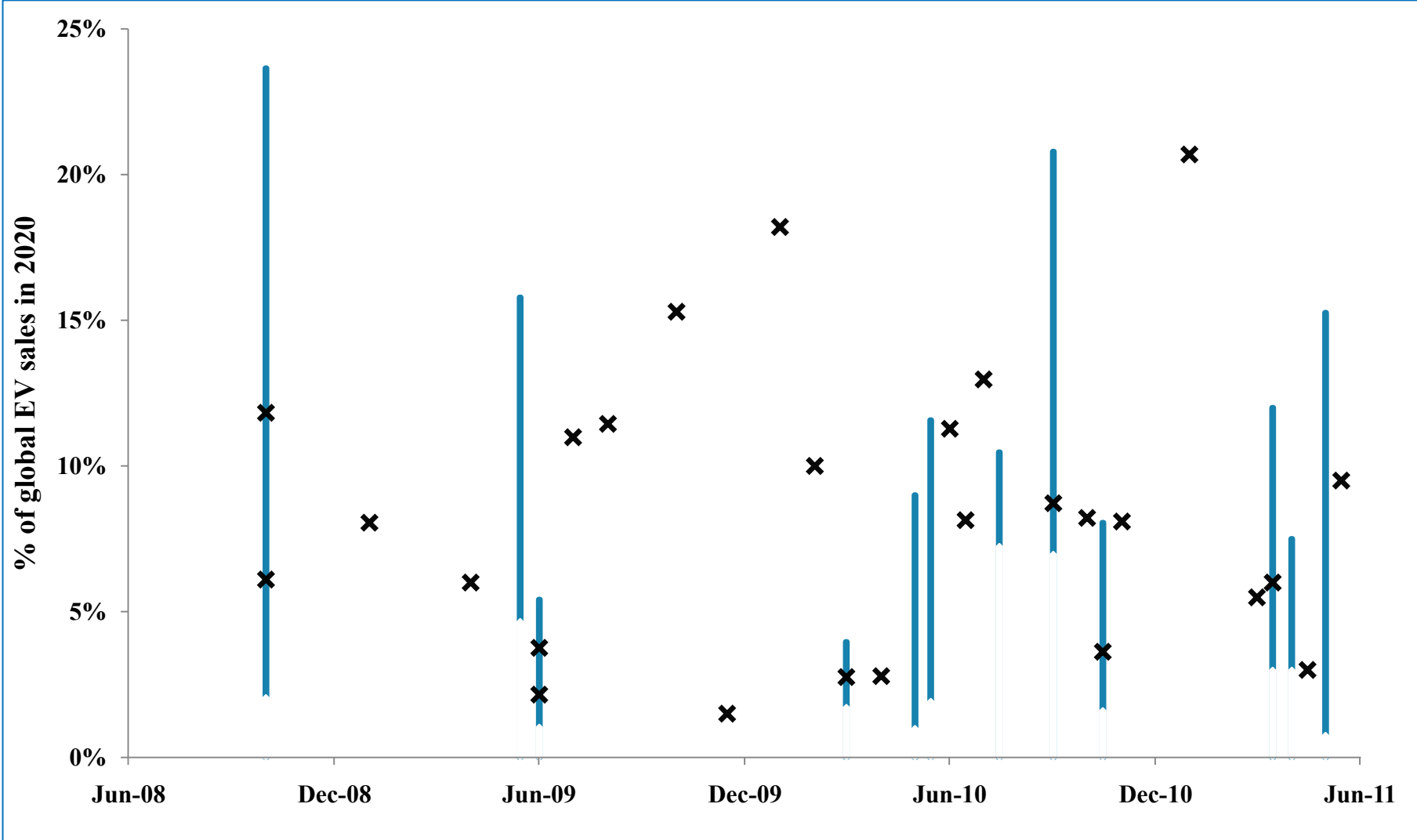


Each column represents one vehicle

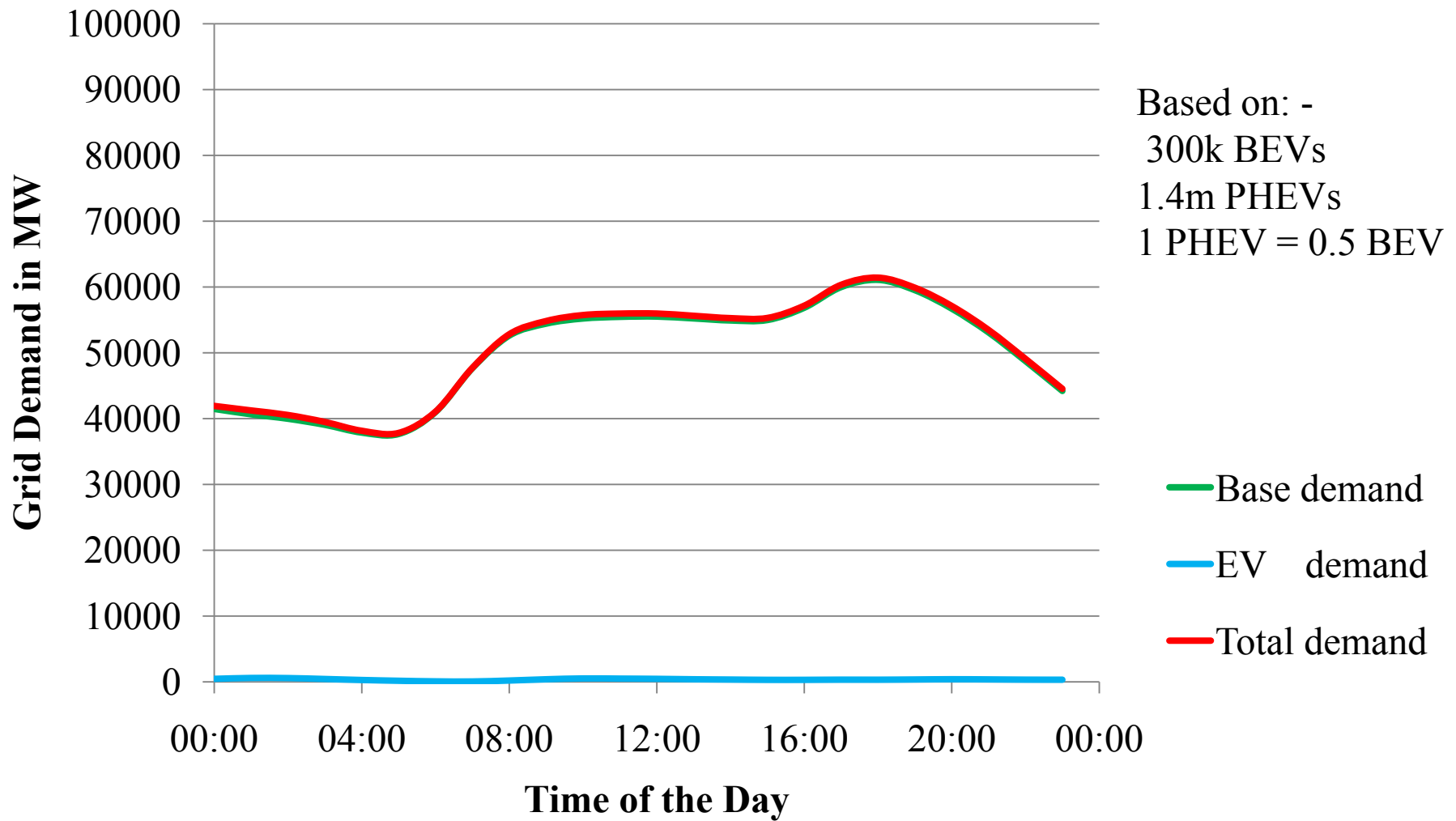
Electricity Demand Profile



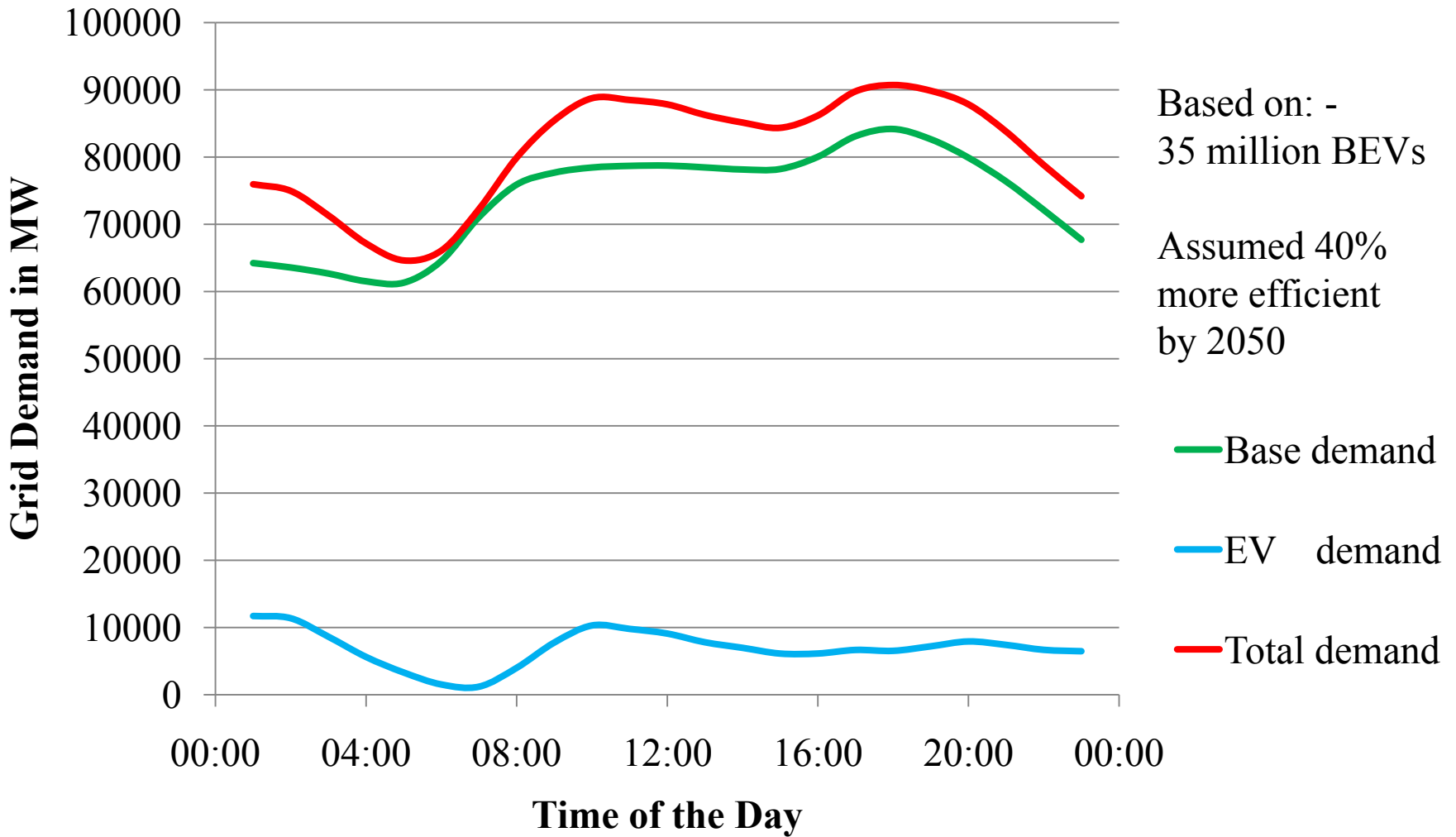
Range of EV forecasts



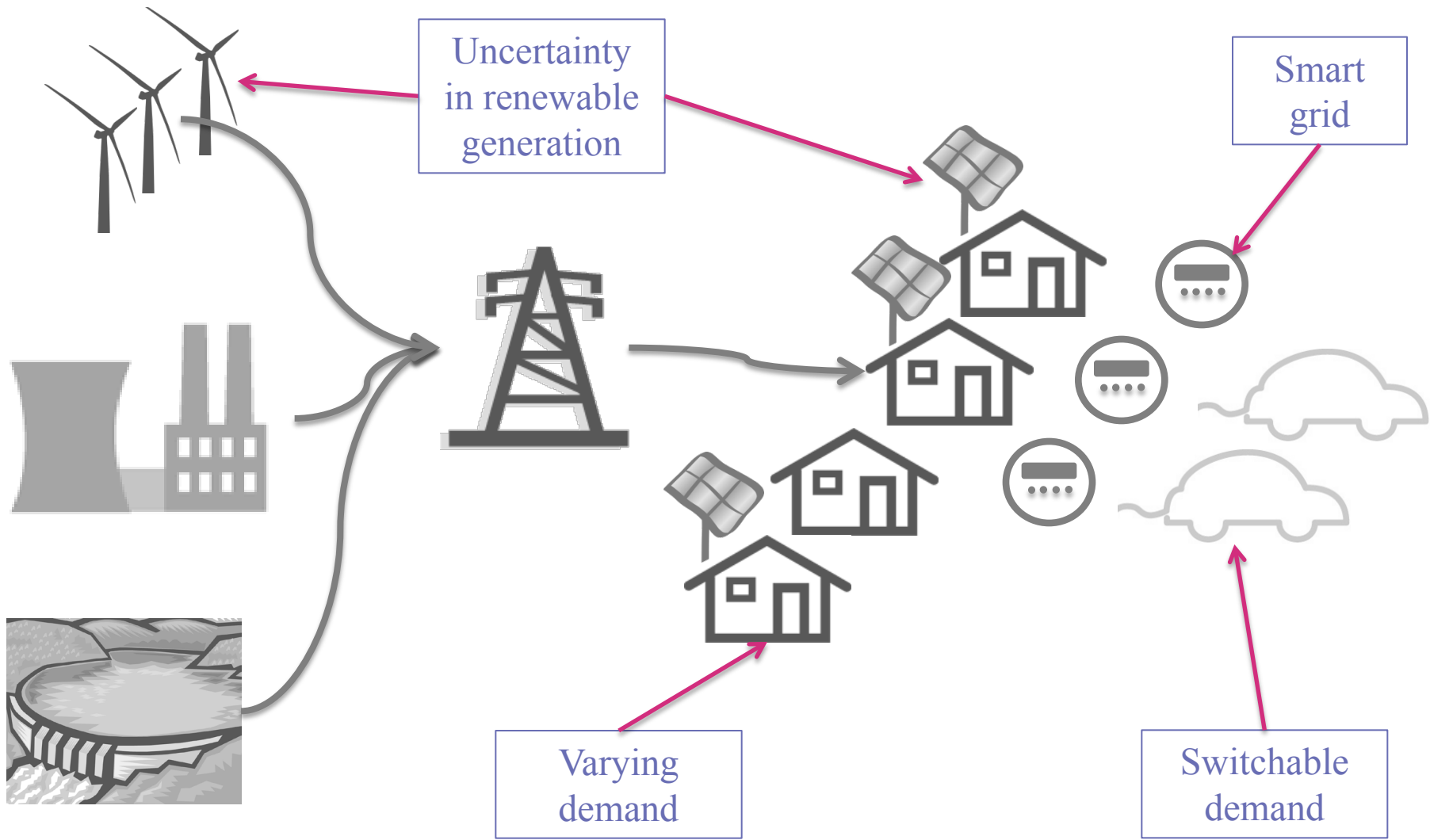
Total Grid Demand in 2020



Total Grid Demand in 2050

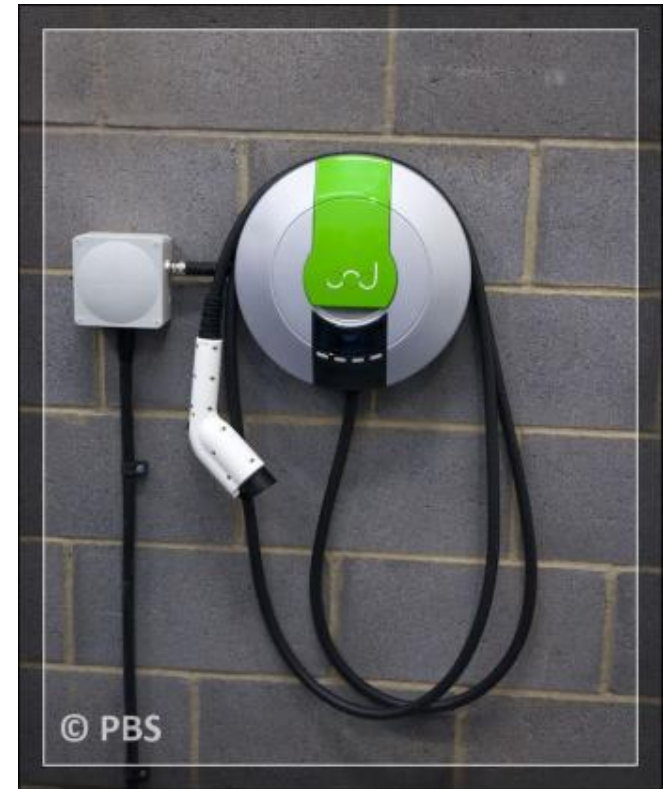


Demand Management and Energy Storage

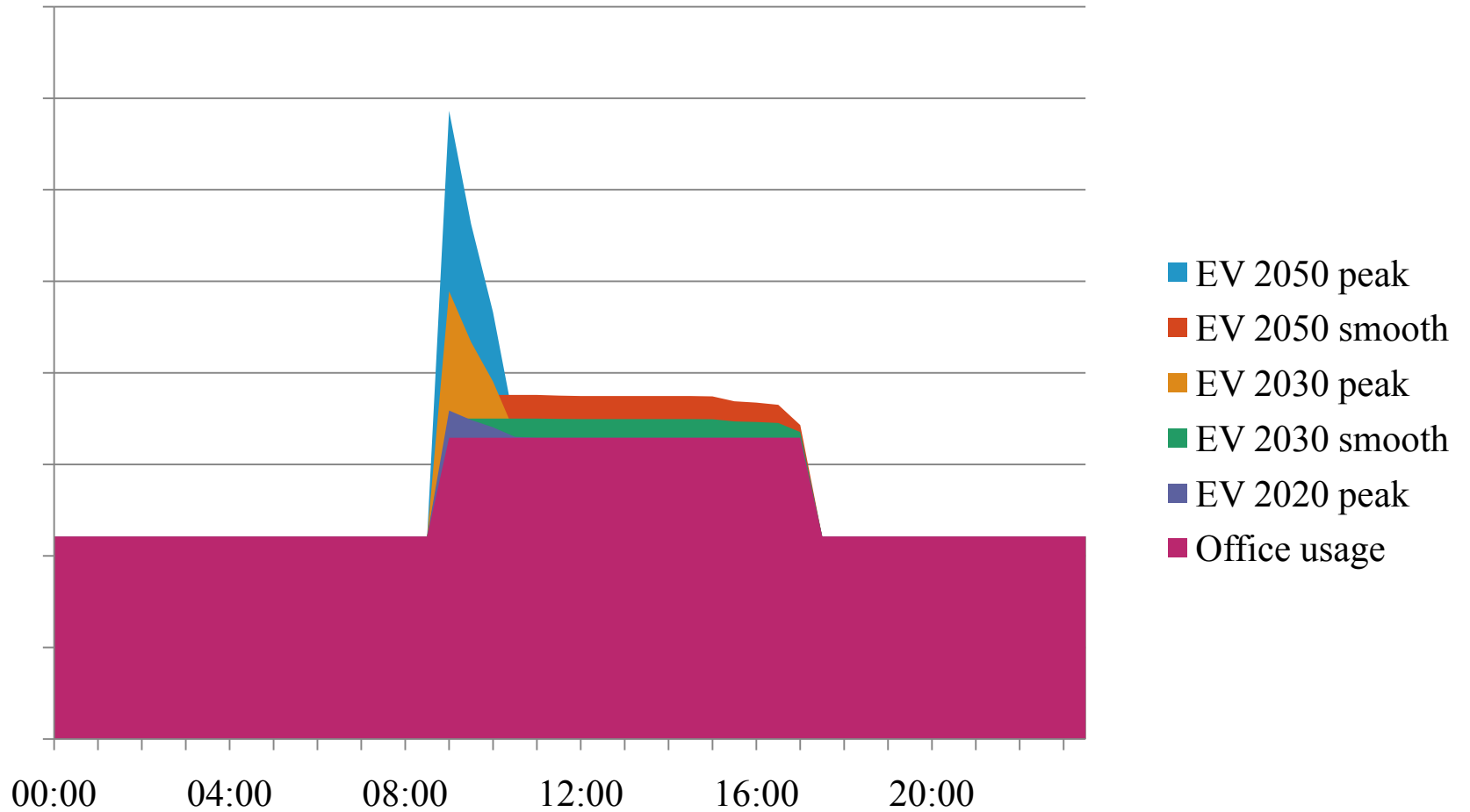


Home Charging

- Domestic overall demand around 5000kWh per annum or 14kWh per day
- Domestic EV charging per car is 5kWh per day
- If we assume one EV per household, we would see an increase in average domestic load of 36%
- Need to be “smart” with timing of charging of EVs to minimise network reinforcement



Office Charging



Public Charging

- Less than 0.1kWh per day per car being taken from public charge points although this has increased in recent data with more cars on road
- If we had a comprehensive system of charge points it would be possible to extrapolate effect of growing from 25 cars to a full fleet of EVs
- Not possible at present to extrapolate effect of growing from the current small number of charge points to a comprehensive system
- Study required to look at recharge behaviour in a city with a comprehensive charge point system

Business models

■ **Business case for public infrastructure**

- Expect PHEVs to outsell BEVs in medium term
- Hence electricity price per mile < petrol price per mile which leads to electricity price < 60p per kWh

- Revenue required to cover 7kW post costs ~ £3 per day
- Need to sell ~6kWh (1 hour @ 7kW) per day
- Or at £100 subscription per annum - need 10 users per post

- Revenue required to cover 50kW station ~ £12 per day
- Need to sell ~24kWh (½ hour @ 50kW) per day

Effect on Urban Landscape

■ **Noise**

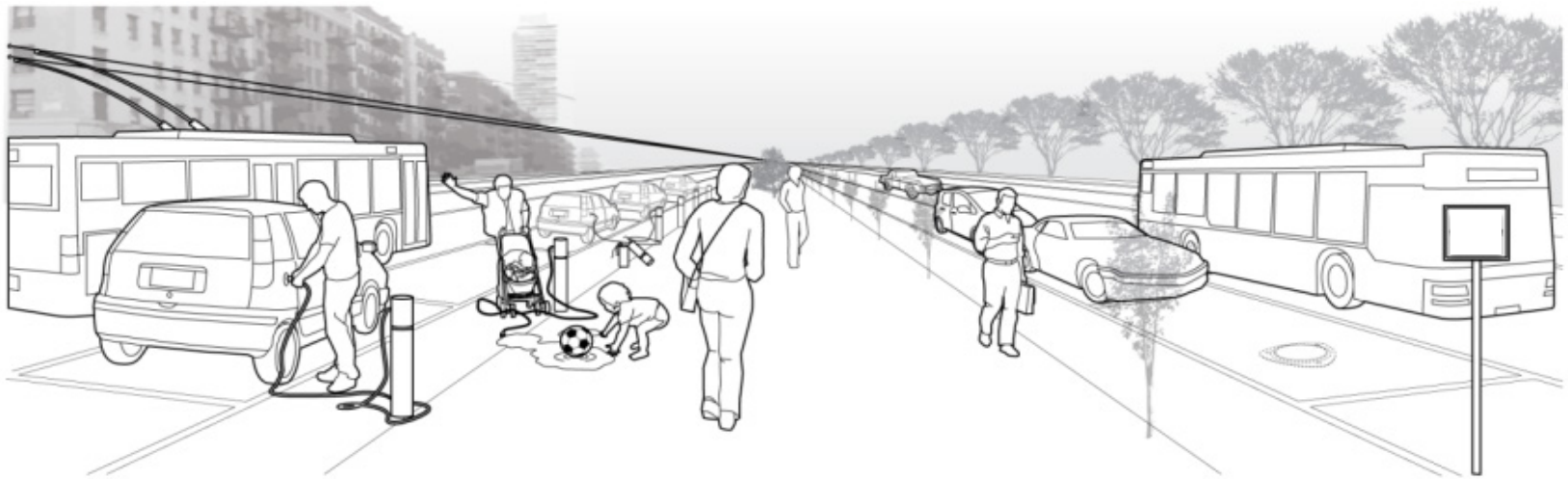
- 5dB reduction for a typical EV at 50kph compared to a typical petrol car
- Quieter traffic leading to reduced acoustic insulation requirements for buildings

■ **Local air quality**

- On top of CO₂ savings
- Government estimate £15bn is economic cost of health impacts of poor air quality in the UK
- EVs will assist in reduction of PM10 particulates and NO_x emissions

Effects on Urban Landscape

- **Street vision**



Charge posts

Inductive Charging

PA Consulting
Group



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Mark Fitch

THE FACTS AND FICTION OF ELECTRIC VEHICLES FOR A NETWORK BUSINESS

Facts and fiction of electric vehicles for a network business

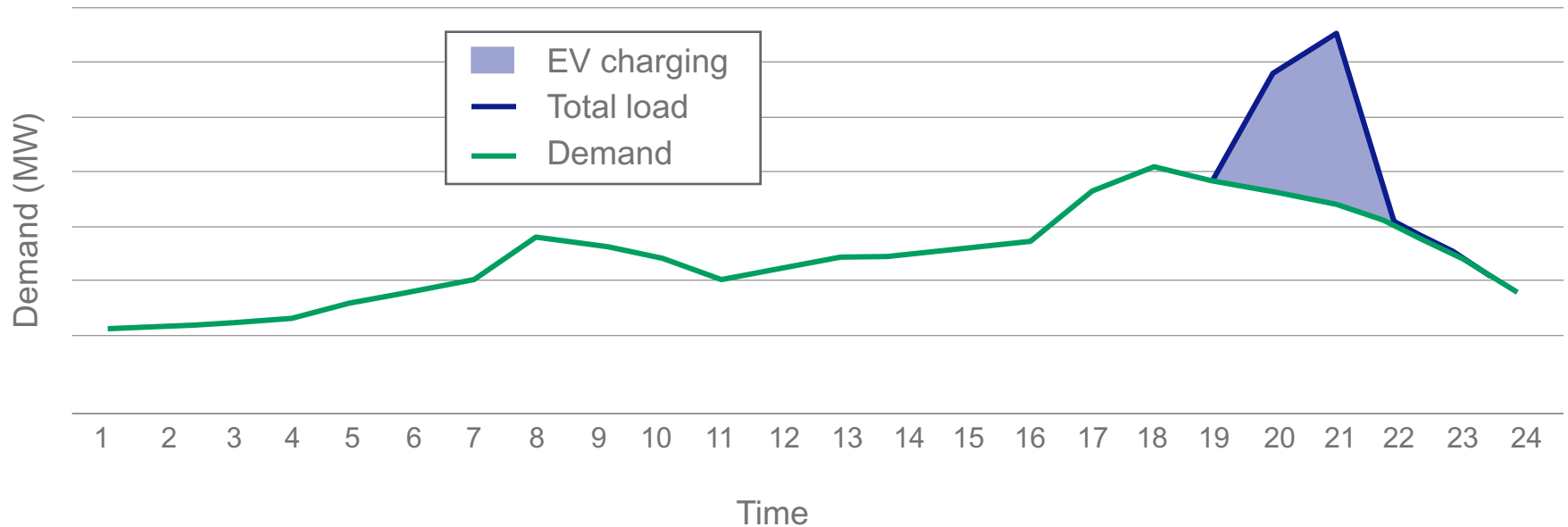
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Without smart charging, deployment of EVs will become very expensive (1)

Distribution networks will need to create additional network capacity to support peak time charging

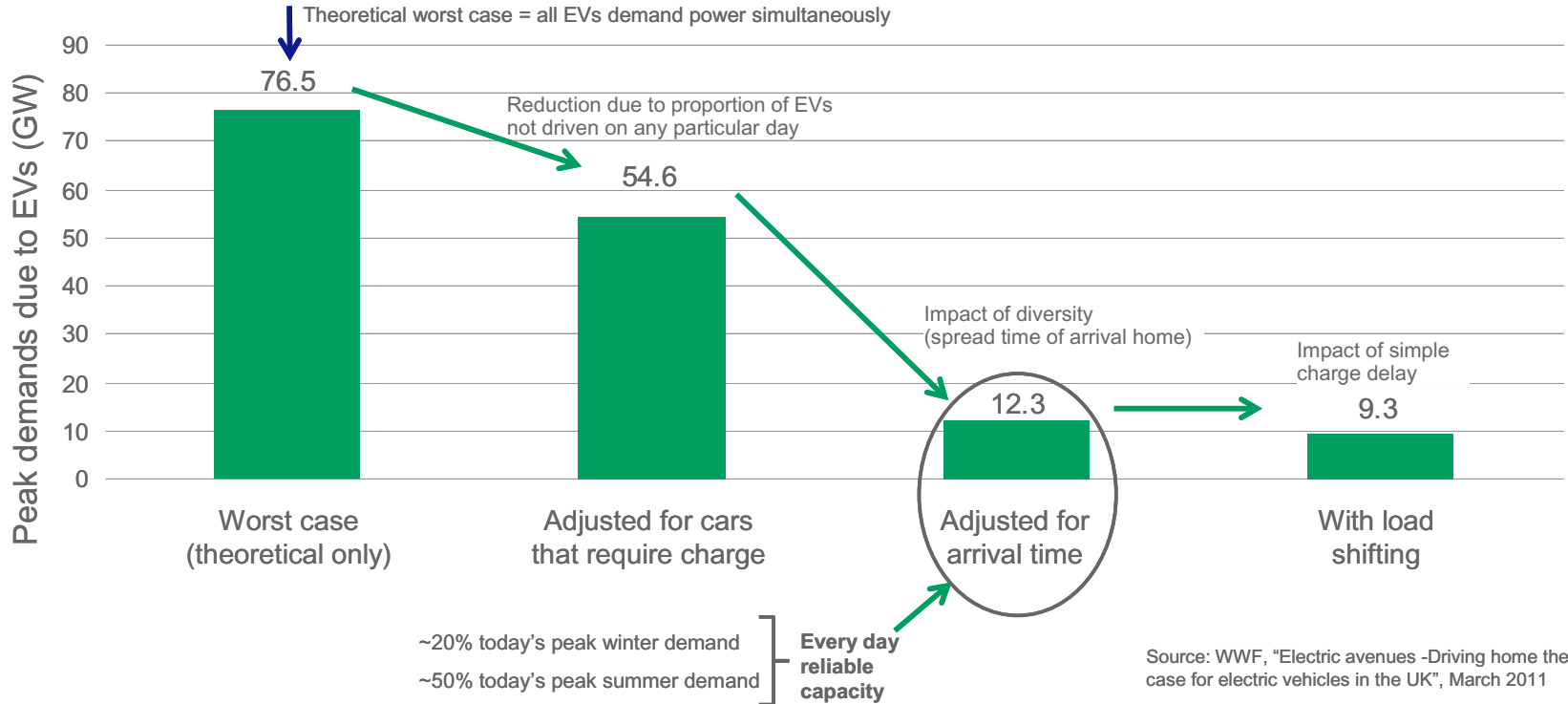


Source: Centre for Sustainable Electricity and Distribution Generation (SEDG) – “Benefits of Advanced Smart Metering for Demand Response based Control of Distribution Networks” April 2010

Without smart charging, deployment of EVs will become very expensive (2)

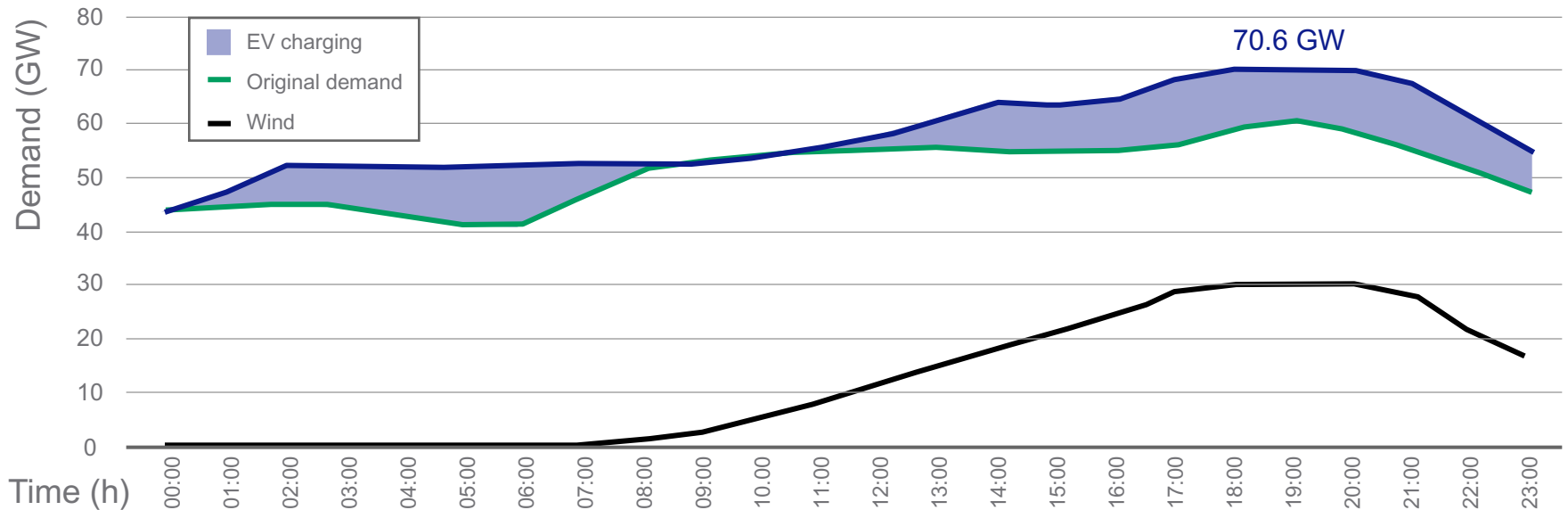
Generation companies will need to build additional peaking generation to support peak time charging

Estimated peak demands on British grid in 2030 due to EVs under the Stretch scenario



Smart charging, changes how we need to think about our energy system

Optimised EV operation with wind increase during system peak

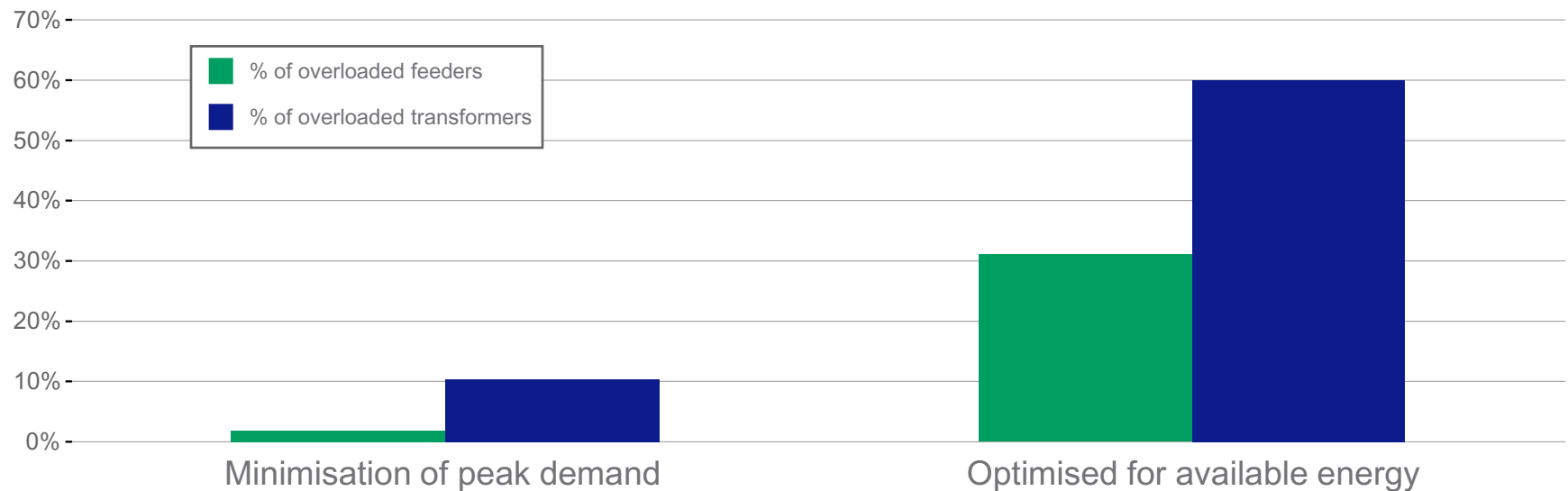


Source: Centre for Sustainable Electricity and Distribution Generation (SEDG) – “Benefits of Advanced Smart Metering for Demand Response based Control of Distribution Networks” April 2010

Consumers need to learn to share the energy infrastructure

There will need to be greater collaboration across the industry to make mass EV charging sustainable

Percentage of overloaded elements for two conflicting strategies

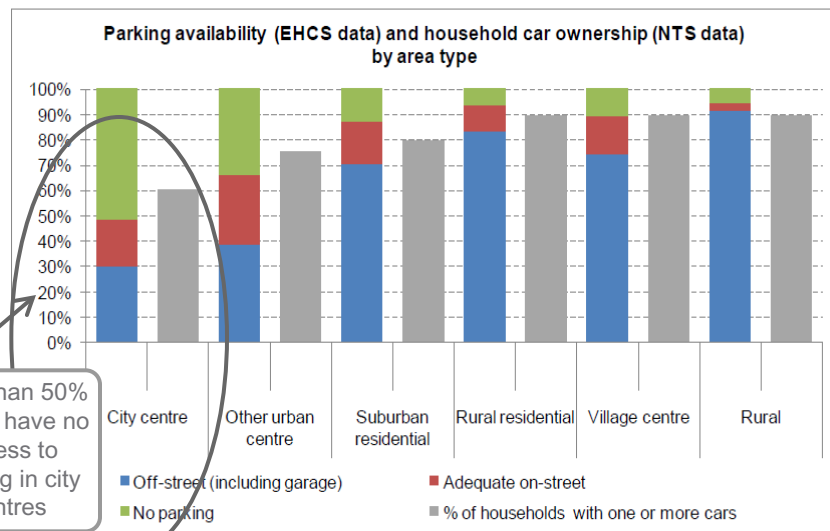


Source: Centre for Sustainable Electricity and Distribution Generation (SEDG) – “Benefits of Advanced Smart Metering for Demand Response based Control of Distribution Networks” April 2010

Service offerings to the consumer need to reflect the costs imposed across the energy supply chain

It may not be commercially viable to service all consumer groups with EV charging infrastructure

Will competition drive down the costs of infrastructure to allow access to EV charging facilities for all?



“ there may be some discrete sectors of the infrastructure market. Such as on-street infrastructure for those without off-street domestic parking, where a [Regulated] approach could be more applicable

Source: OLEV Infrastructure Strategy

Figure 1: Parking availability and car ownership by area

Connect with Mark post the LCV 2011 event



Mark Fitch is a leading energy industry expert in strategic analysis and critical evaluation of regulatory arrangements, developments in energy industries and performance incentive mechanisms.

He works for utility companies and energy regulators providing C-level strategic advice on the impact of major industry issues such as carbon reduction, smart metering, smart grid and electric vehicles.

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PANEL DISCUSSION

THANK YOU FOR VISITING

We hope you enjoyed LCV2011