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Future Energy Scenarios

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Electricity Operational Forum – October 2012

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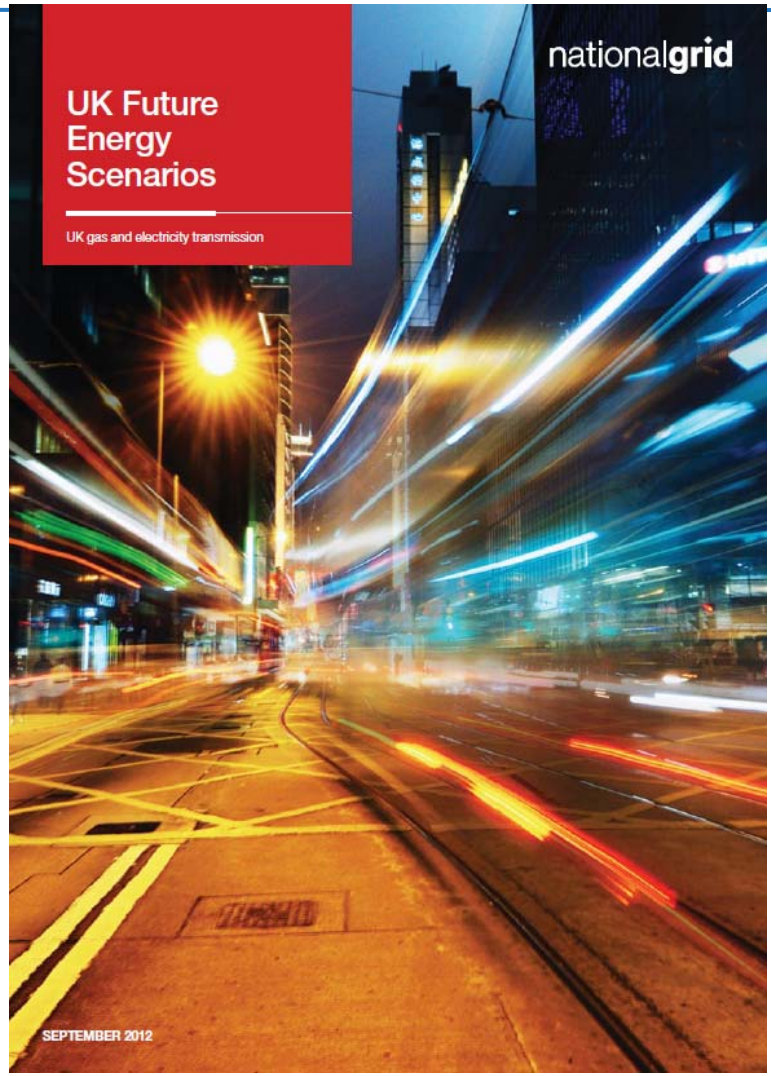
UK Future Energy Scenarios



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Background

The Climate Change Act 2008
34% reduction in greenhouse gas emissions by 2020, and 80% reduction by 2050

2009 Renewable Energy Directive
15% of all energy from renewable sources by 2020

Government Policy
EMR, RHI, Green Deal, ECO, FiTs, CERT, CRC

Economic Background
Demographics, GDP, manufacturing output, fuel prices

Heat
Heat pumps, energy efficiency improvements

Electricity Efficiency
Lighting, appliances, smart meters

Transport
Electric vehicles, alternative fuels

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An uncertain energy future

An uncertain energy future

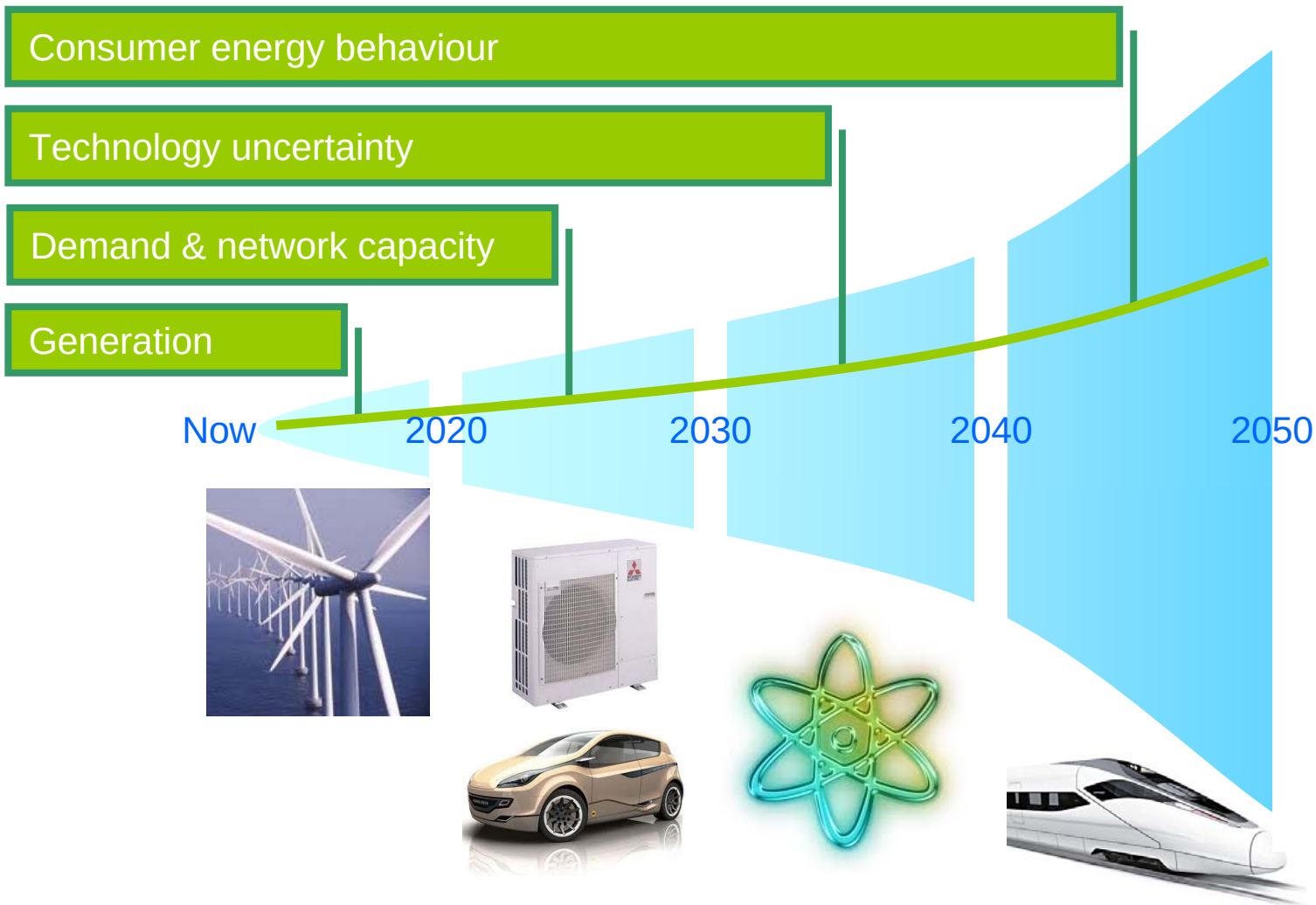
Now

Accelerated Growth

Gone Green

Slow Progression

Gone Green


Consumer energy behaviour
Technology uncertainty
Demand & network capacity
Generation
Now
2020
2030
2040
2050

Slow Progression

Overview

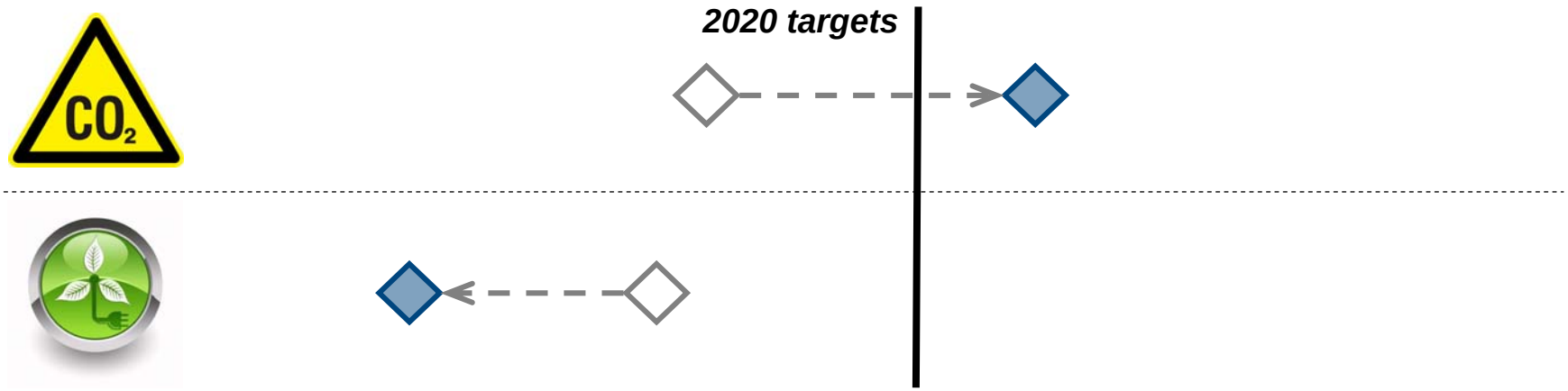
- Government climate targets missed / abandoned
- Continued economic hardship, low GDP growth
- Limited energy efficiency / Green Deal impact
- Domestic gas demand broadly flat, higher in power generation

Main changes vs 2011

Electricity demand	↓
Nuclear generation	↑
Renewable generation	↓
Interconnection	↓
Thermal generation	↓
Heat pump deployment	↓
Electric vehicle deployment	↓

Targets performance

2020	renewable	✘
	carbon	✓
2030 carbon		✘
2050 carbon		✘



◇ 2011 scenario outcome ◆ 2012 scenario outcome

Gone Green

Overview

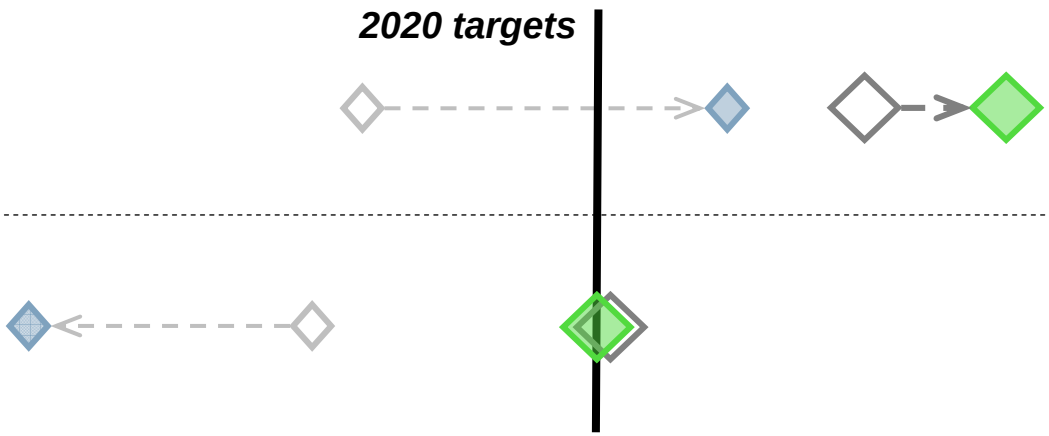
- Government climate targets met, balanced approach
- Modest GDP growth in medium term at historic averages
- Energy efficiency is driven / Green Deal is effective
- Gradual decline in gas demand

Main changes vs 2011

Electricity demand	=
Nuclear generation	↓
Renewable generation	↑
Interconnection	↓
Thermal generation	↑
Heat pump deployment	↑
Electric vehicle deployment	↓

Targets performance

2020	renewable	✓
	carbon	✓
2030 carbon		✓
2050 carbon		✓



2011 scenario outcome

2012 scenario outcome

Accelerated Growth

Overview

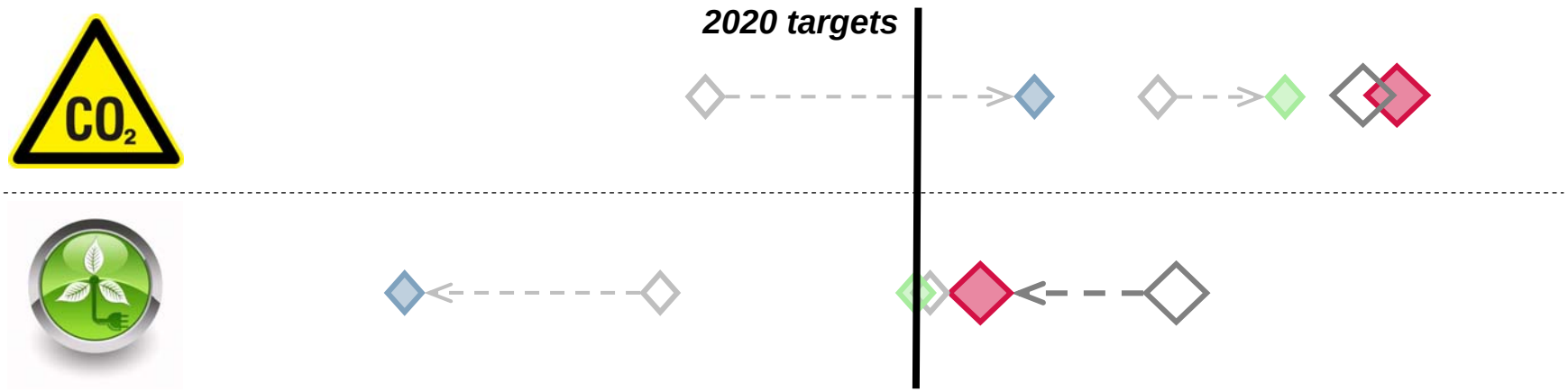
- Government climate targets met early
- Sustained economic growth in medium to long term
- Significant energy efficiency
- Significant reduction in gas demand

Main changes vs 2011

Electricity demand	↑
Nuclear generation	↑
Renewable generation	↓
Interconnection	=
Thermal generation	=
Heat pump deployment	↑
Electric vehicle deployment	↓

Targets performance

2020	renewable	✓
	carbon	✓
2030 carbon		✓
2050 carbon		✓



2011 scenario outcome

2012 scenario outcome

Transport

Slow Progression

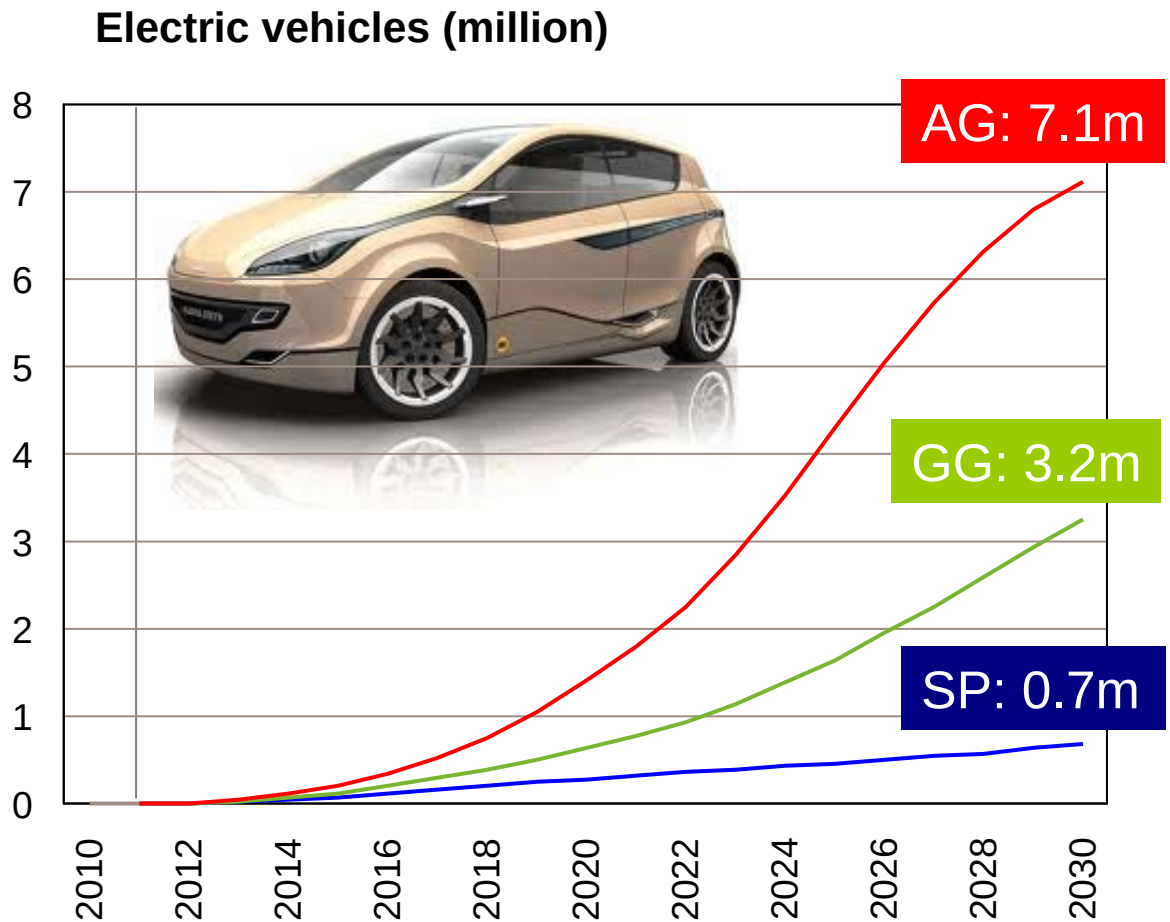
- Modest EV growth
- More hybrids in early years, more pure EVs in later years

Gone Green

- Strong EV growth
- More hybrids in early years, more pure EVs in later years

Accelerated Growth

- Robust EV growth
- More hybrids in early years, more pure EVs in later years



Heat

Slow Progression

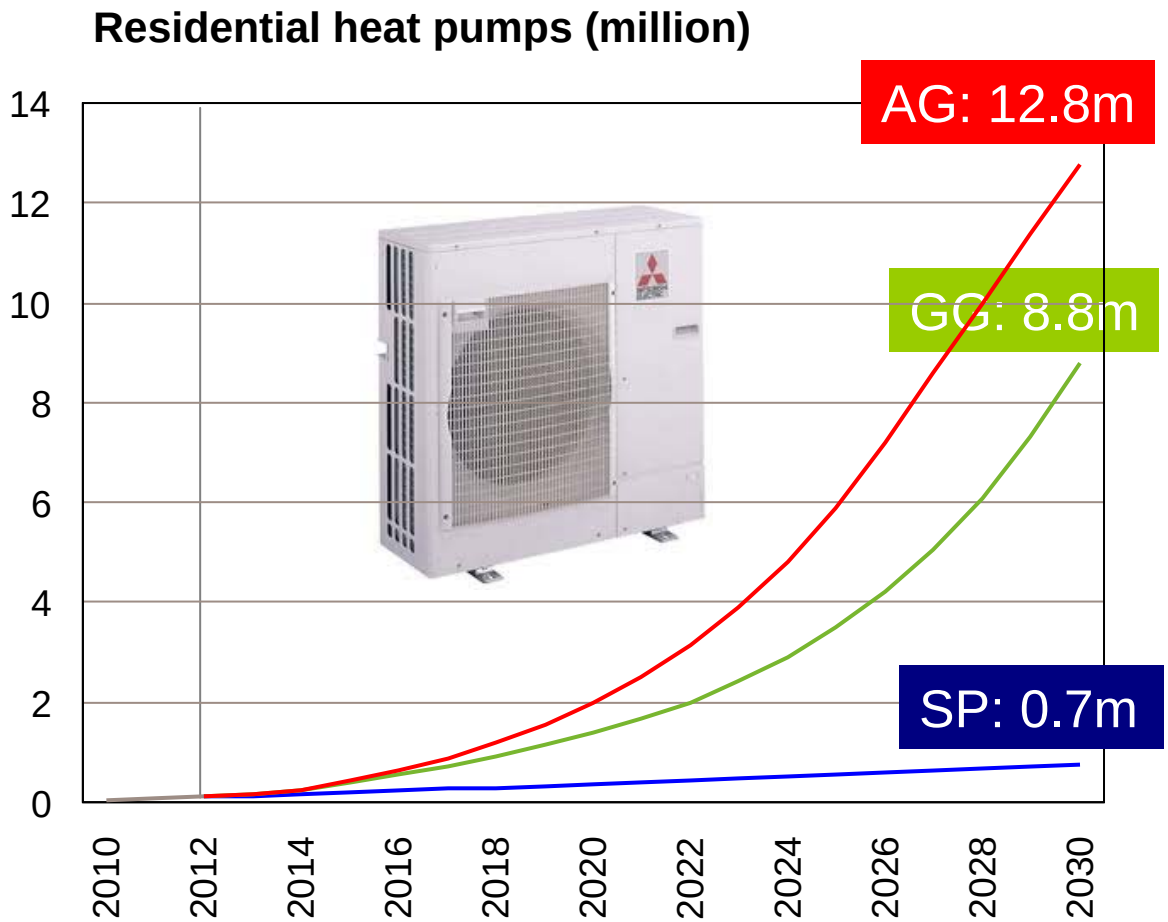
- Modest heat pump growth
- Limited insulation uptake

Gone Green

- Strong heat pump growth
- Strong insulation uptake

Accelerated Growth

- Robust heat pump growth
- High insulation uptake



Electricity demand

Slow Progression

- Annual demand broadly flat
- Peak demand flat / falling

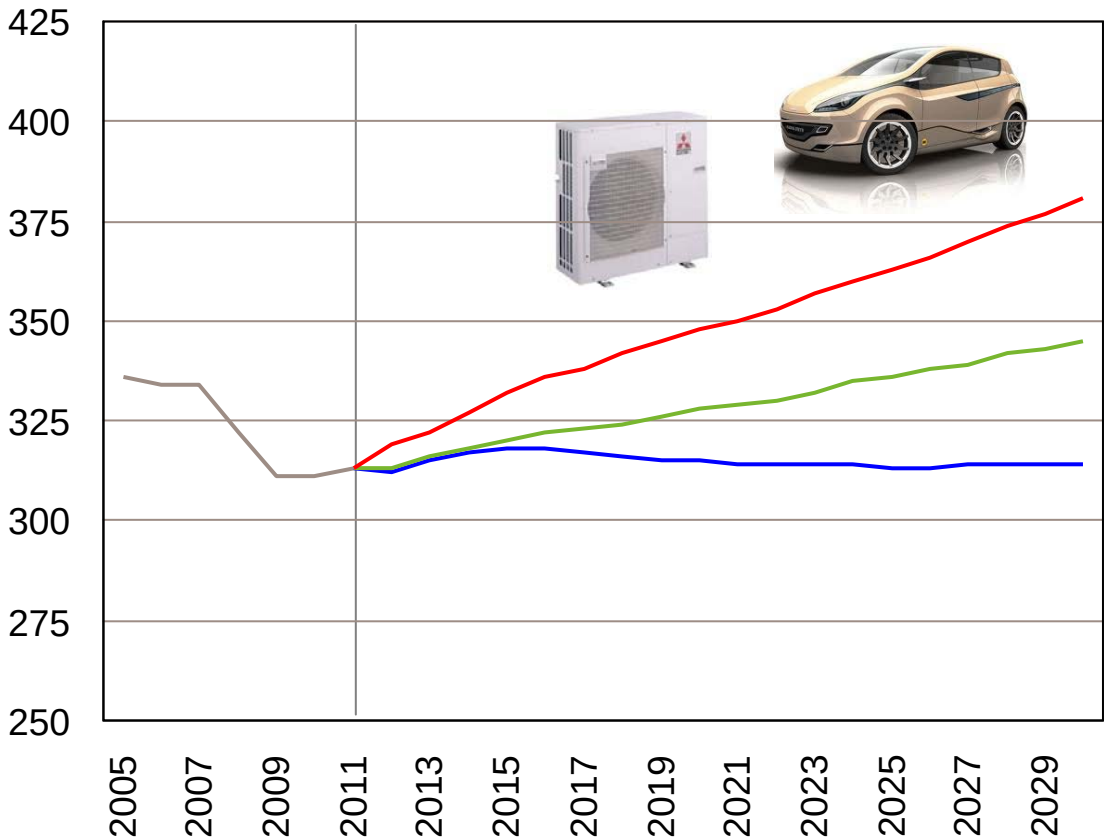
Gone Green

- Economic growth, heat & transport electrification
- Peak demand grows steadily

Accelerated Growth

- Reflects greater economic growth and electrification of heat & transport

Annual electricity demand (TWh)



Electricity generation

Slow Progression

- Extension of existing plant; new gas generation
- Slower low CO_2 deployment

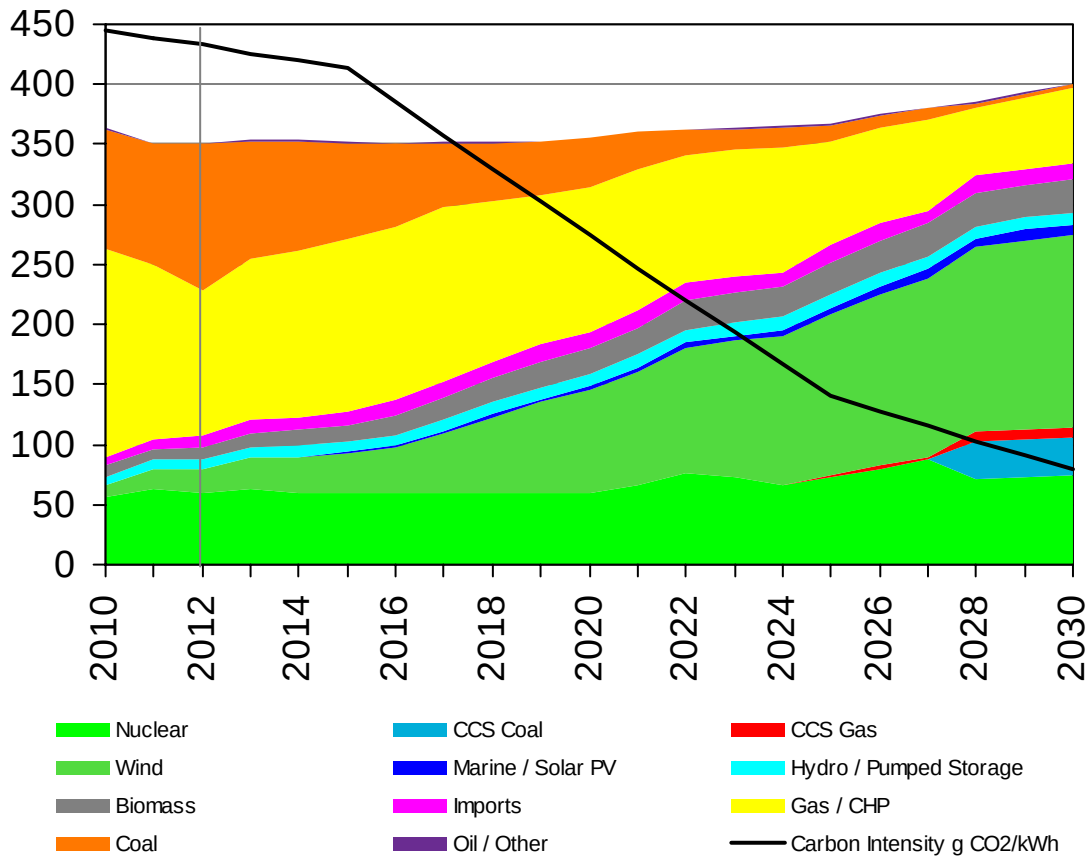
Gone Green

- Balanced approach
- Contributions from different technologies

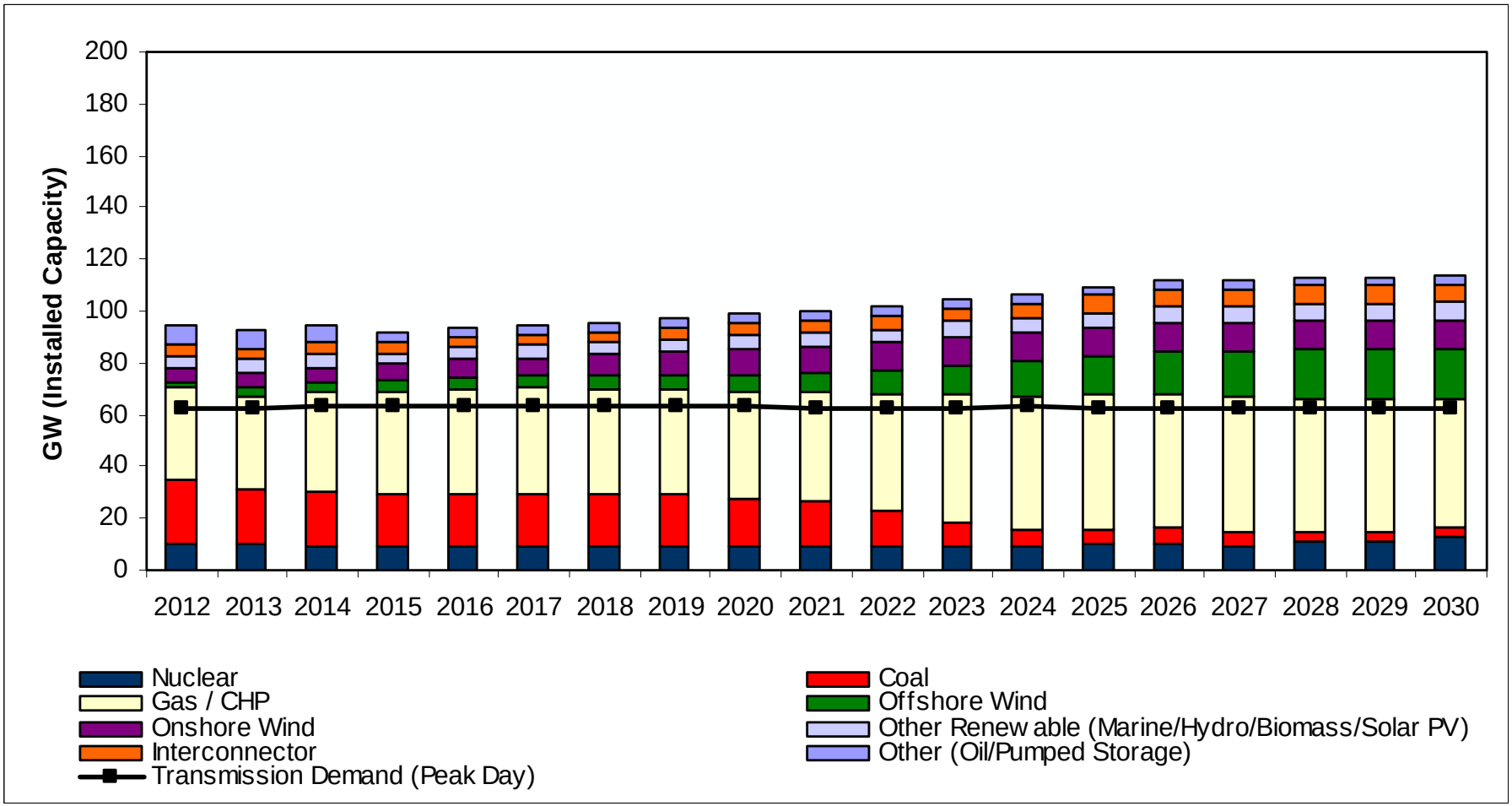
Accelerated Growth

- Faster low CO_2 deployment
- Strong micro generation deployment

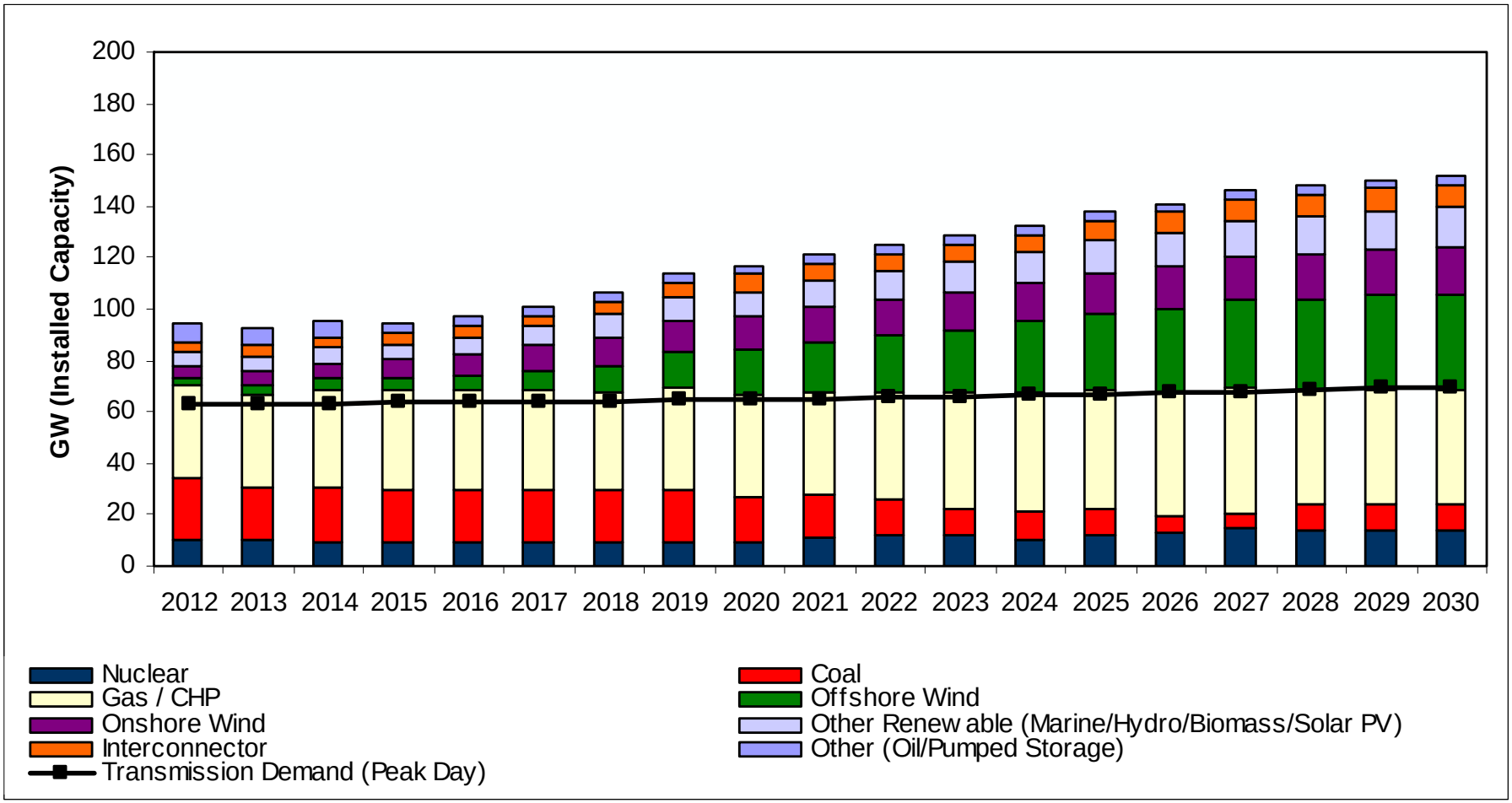
Gone Green: Power generation (TWh) & carbon intensity (gC02/kWh)



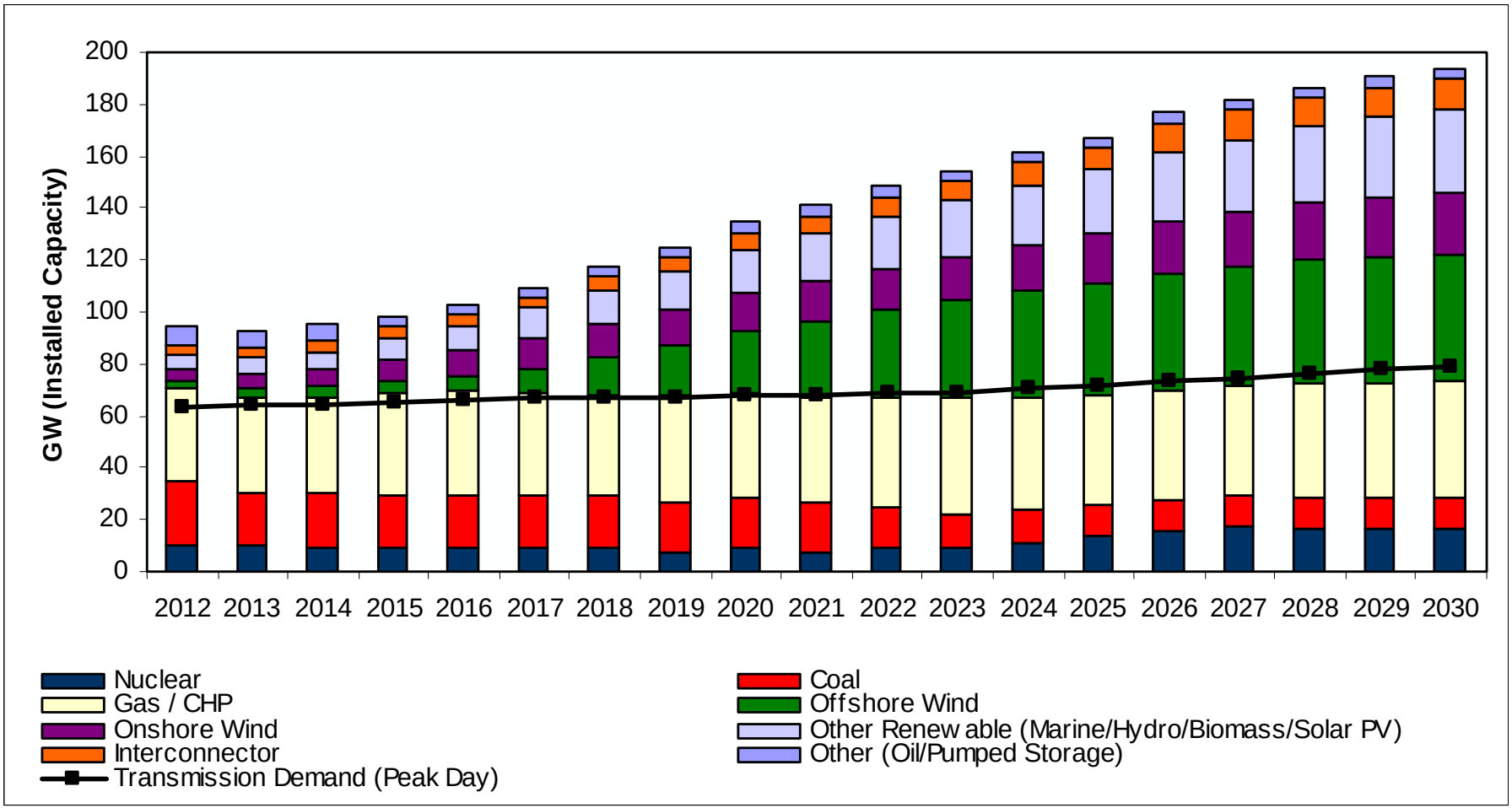
Slow Progression - generation capacity



Gone Green – generation capacity



Accelerated Growth – generation capacity



The future: efficiency, decarbonisation and electrification

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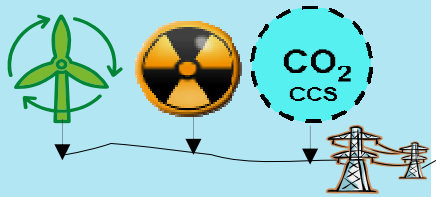
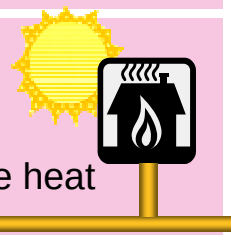
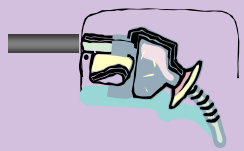
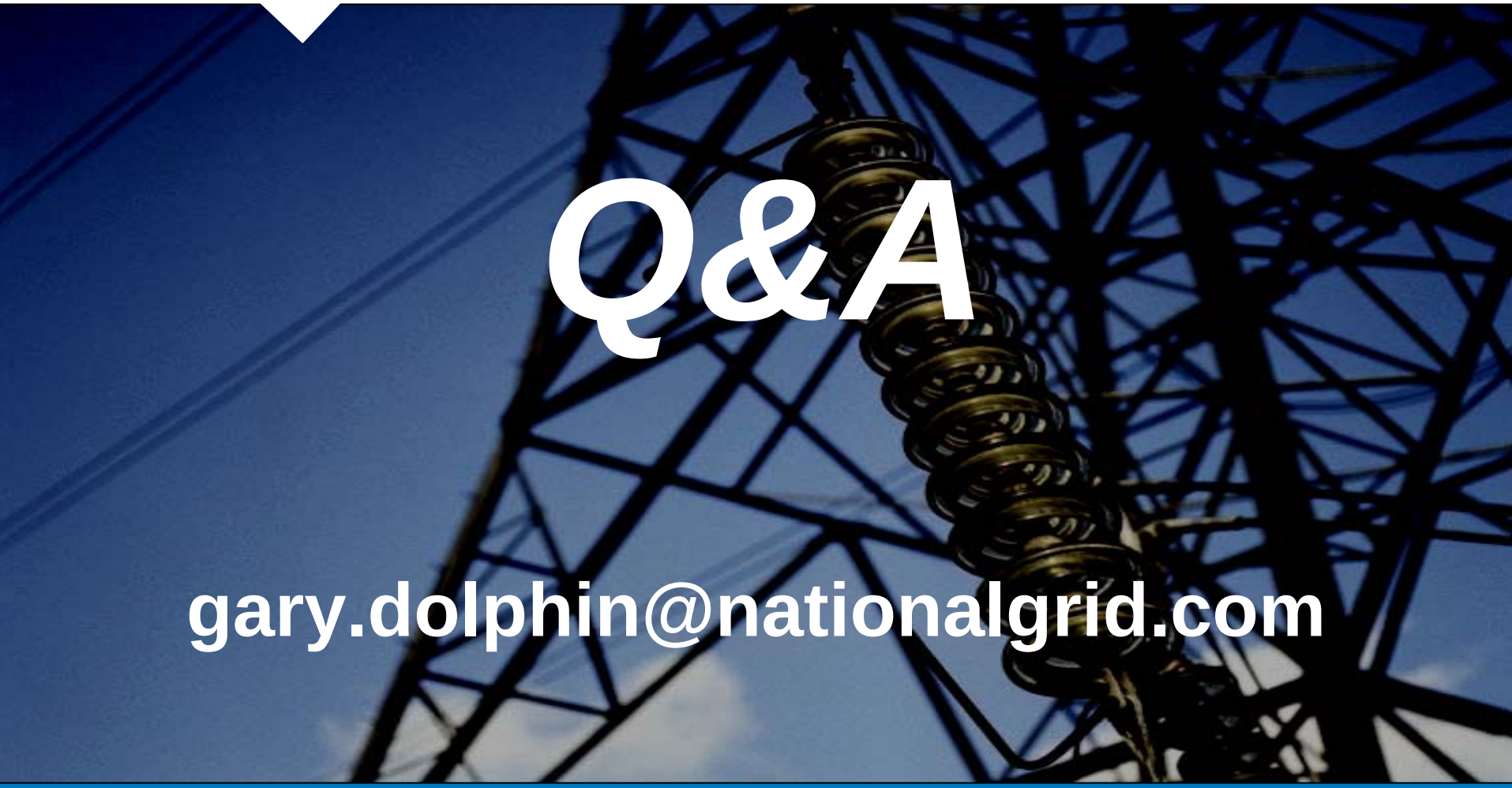
Electricity	Heat	Transport
 Smart Meters & Appliance efficiency	 Insulate and reduce	 Efficiency and innovation
 Decarbonised electricity…	 Heat pump new homes & retrofit	 and decarbonise transport
Gas backup & embedded generation 	 Biomethane De-carbonise heat	 CNG


Q&A
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