

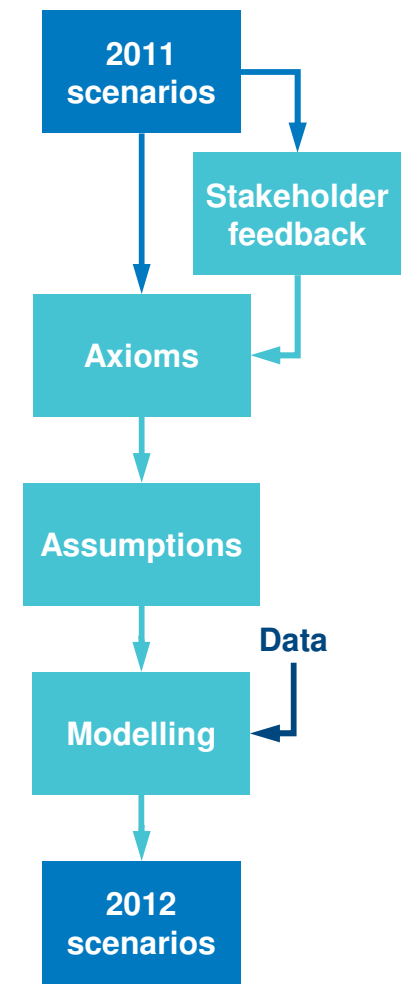
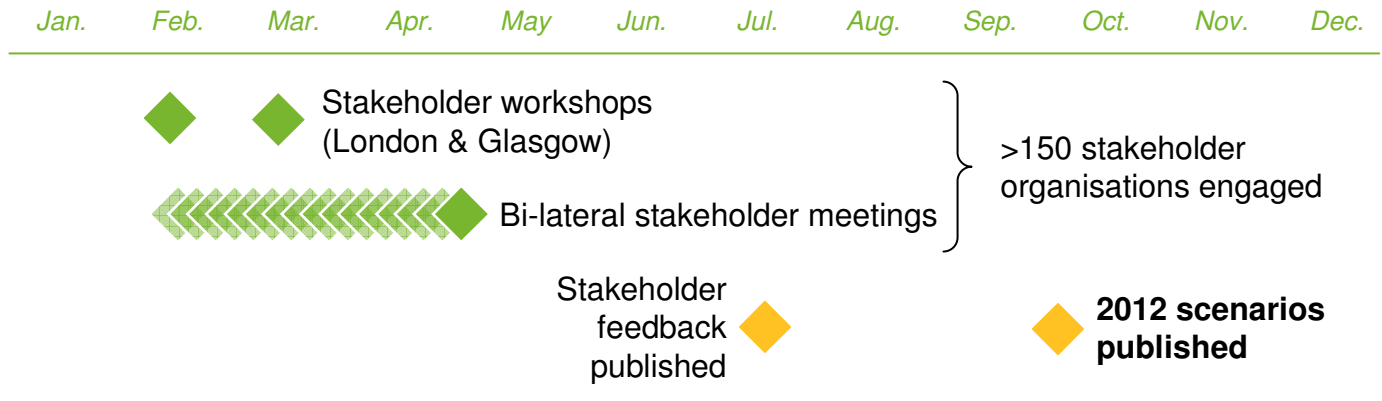
UK Energy Futures



Richard Smith
Head of Energy Strategy & Policy

September 2012

Our 2012 scenario development



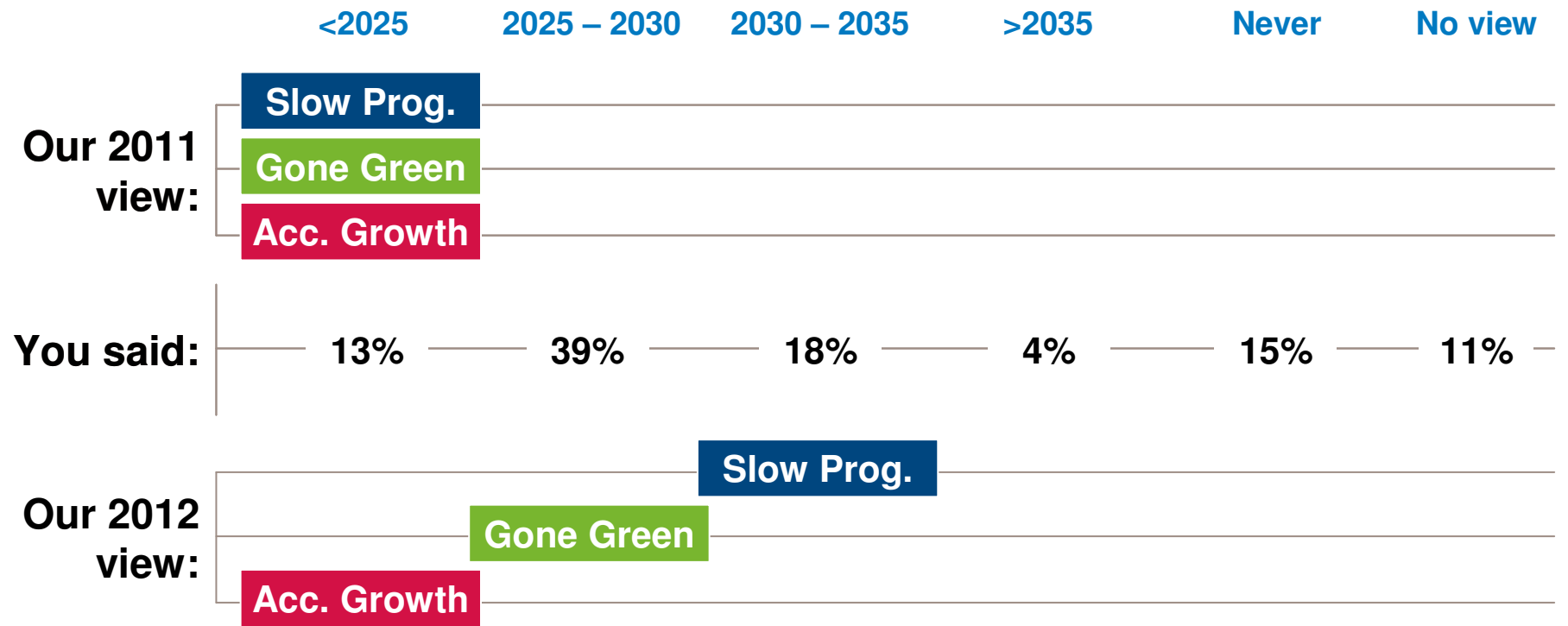
Feedback key themes:

<p>Macro uncertainties:</p> <ul style="list-style-type: none"> ■ Government policy ■ Costs (new technologies, economics) ■ Economy ■ Fuel price (fuel supply, carbon prices etc) 	<p>Demand:</p> <ul style="list-style-type: none"> ■ Capture a range of demand uncertainties <p>Supply uncertainty:</p> <ul style="list-style-type: none"> ■ Capture a range of energy supply options <p>General feedback:</p> <ul style="list-style-type: none"> ■ Tension on breadth of scenarios ■ Is Gone Green a central case?
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Axioms and your feedback

An axiom is a premise or starting point of reasoning.
It is a logical statement assumed to be true.

The first GB large scale commercial (gas or coal) CCS station will become operational in:



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	✗



2020 targets



◇ 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

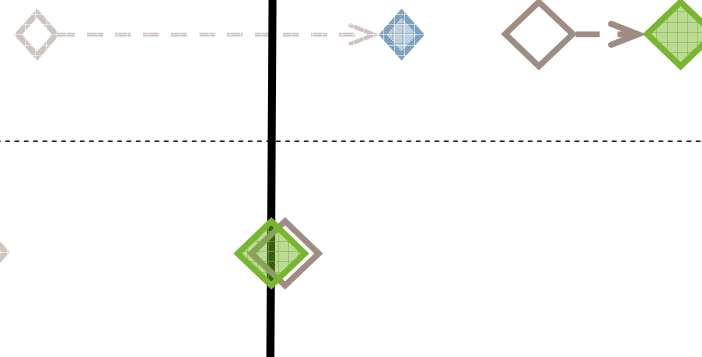
Electricity demand	=
Nuclear generation	↓
Renewable generation	↑
Interconnection	↓
Thermal generation	↑
Heat pump deployment	↑
Electric vehicle deployment	↓

Targets performance

2020	renewable	✓
	carbon	✓
2030	carbon	✓
2050	carbon	✓



2020 targets



◇ 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

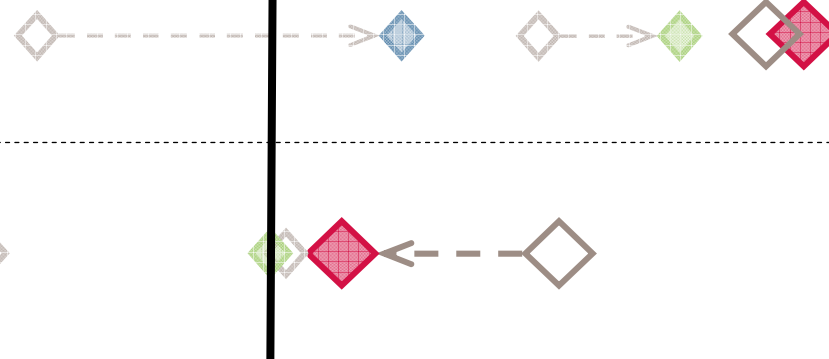
Electricity demand	↑
Nuclear generation	↑
Renewable generation	↓
Interconnection	=
Thermal generation	=
Heat pump deployment	↑
Electric vehicle deployment	↓

Targets performance

2020	renewable	✓
	carbon	✓
2030	carbon	✓
2050	carbon	✓



2020 targets



◇ 2011 scenario outcome

◇ 2012 scenario outcome

Economic background

Slow Progression

- EU economic hardship
- Scarcity of finance
- Low GDP growth

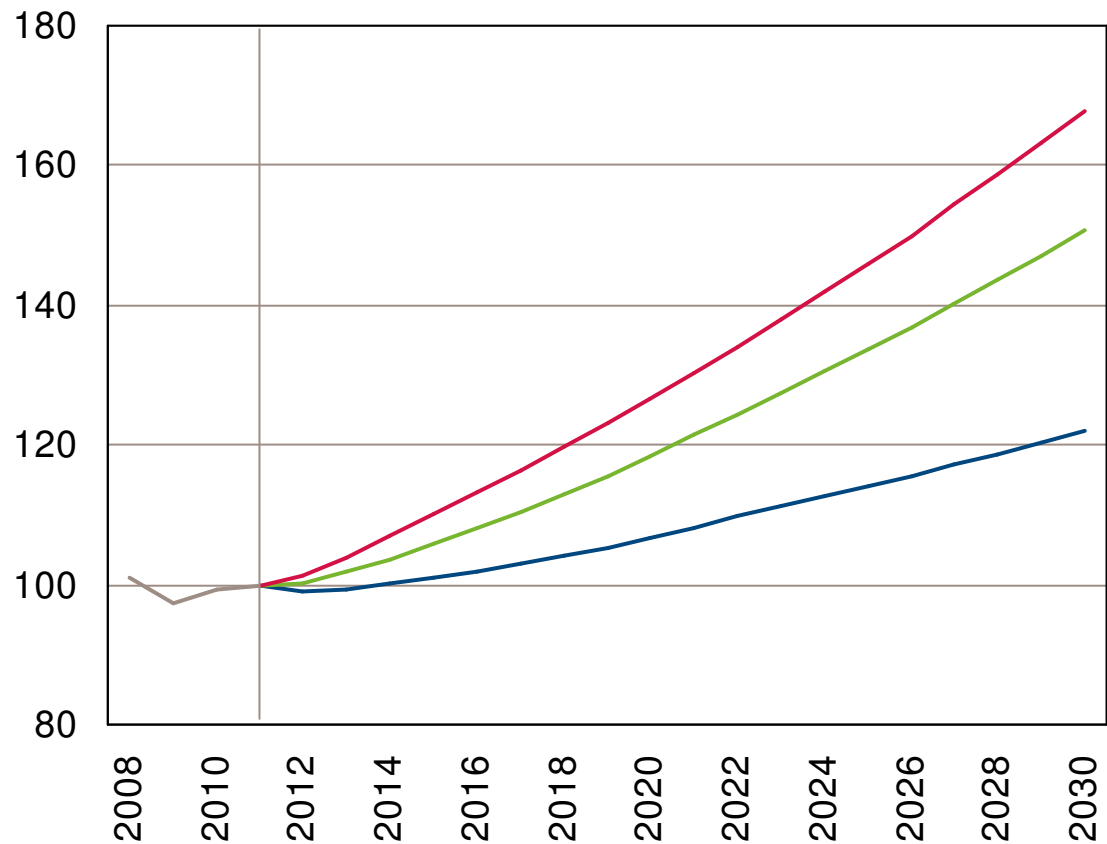
Gone Green

- Modest GDP growth in the medium term
- Historical average from 2017

Accelerated Growth

- Sustained economic growth across Europe
- High GDP growth

GDP growth (indexed to 2011)



Fuel prices

Slow Progression

- Wholesale prices flat to 2015
- Low carbon price
- 2030 prices similar to today

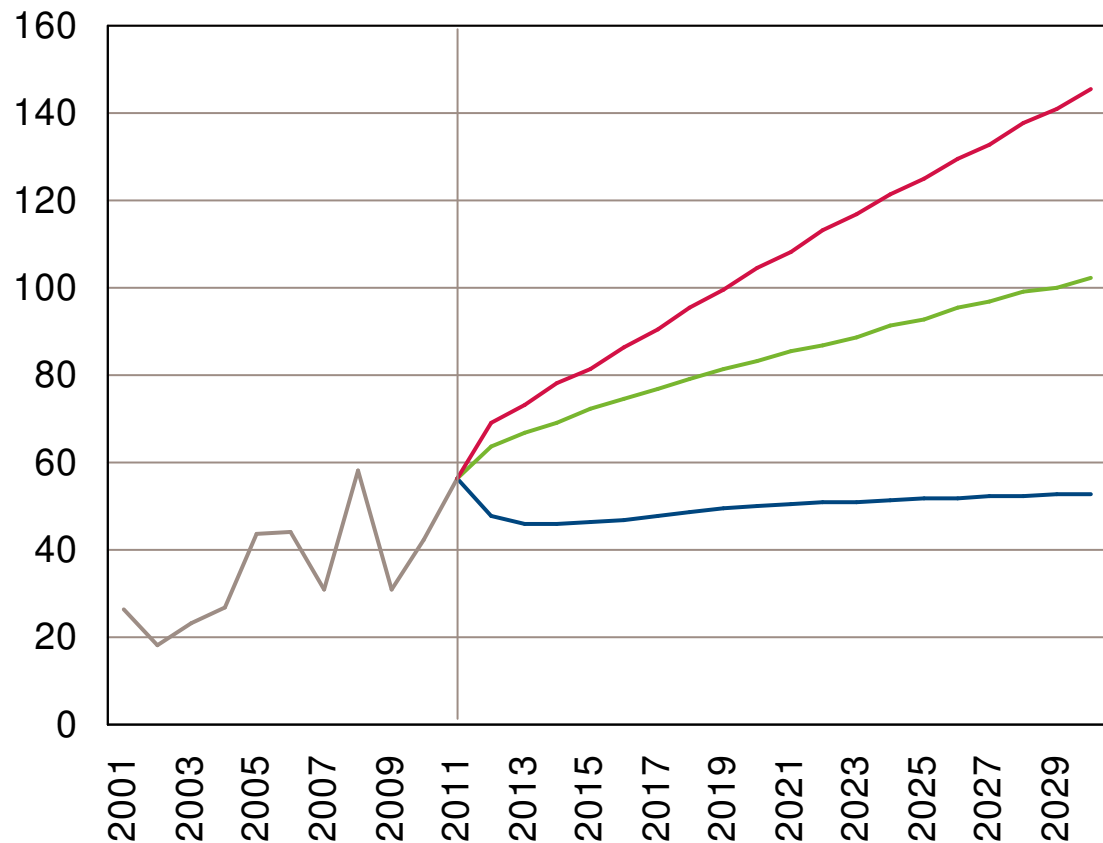
Gone Green

- Hydrocarbon fuel prices increase steadily from 2015+
- Carbon price increases

Accelerated Growth

- All fuel prices rise strongly
- Gas & oil prices linked
- Carbon price at EMR floor

Wholesale gas price (p/therm)



Transport

Slow Progression

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

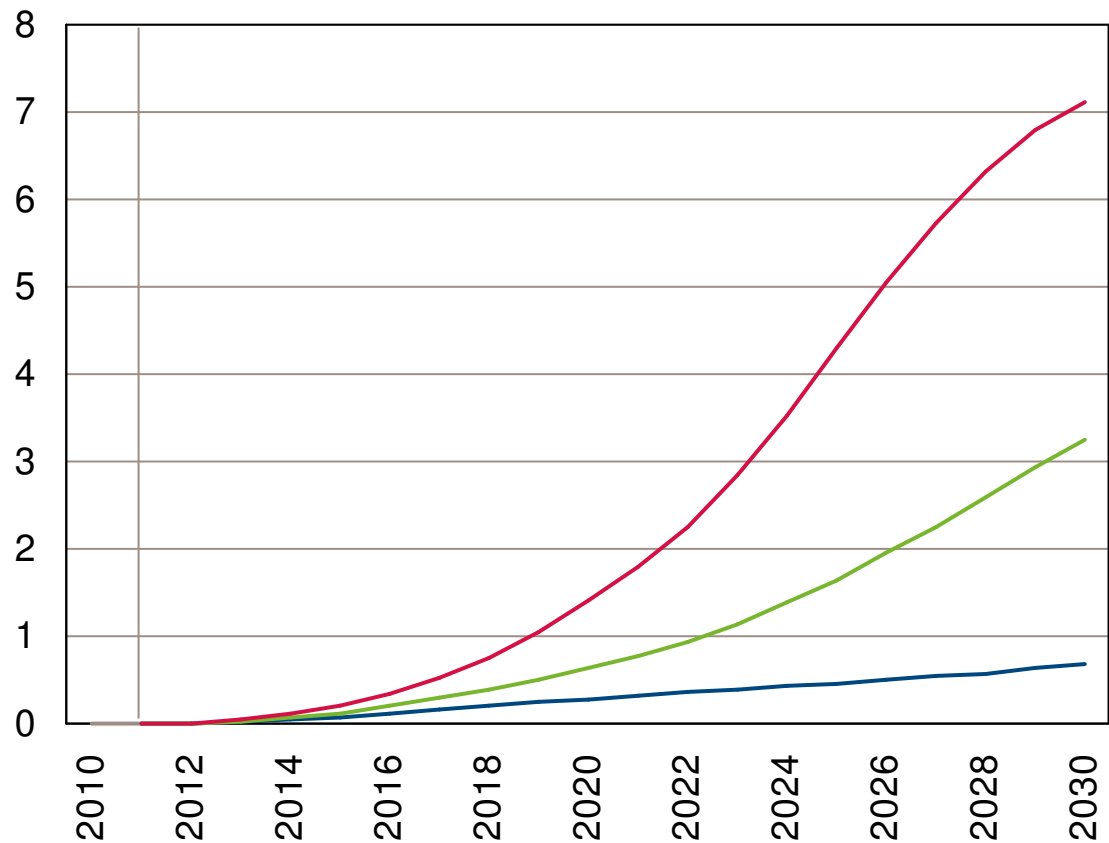
Gone Green

- 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

Electric vehicles (million)



Heat

Slow Progression

- Modest heat pump growth
- Limited insulation uptake

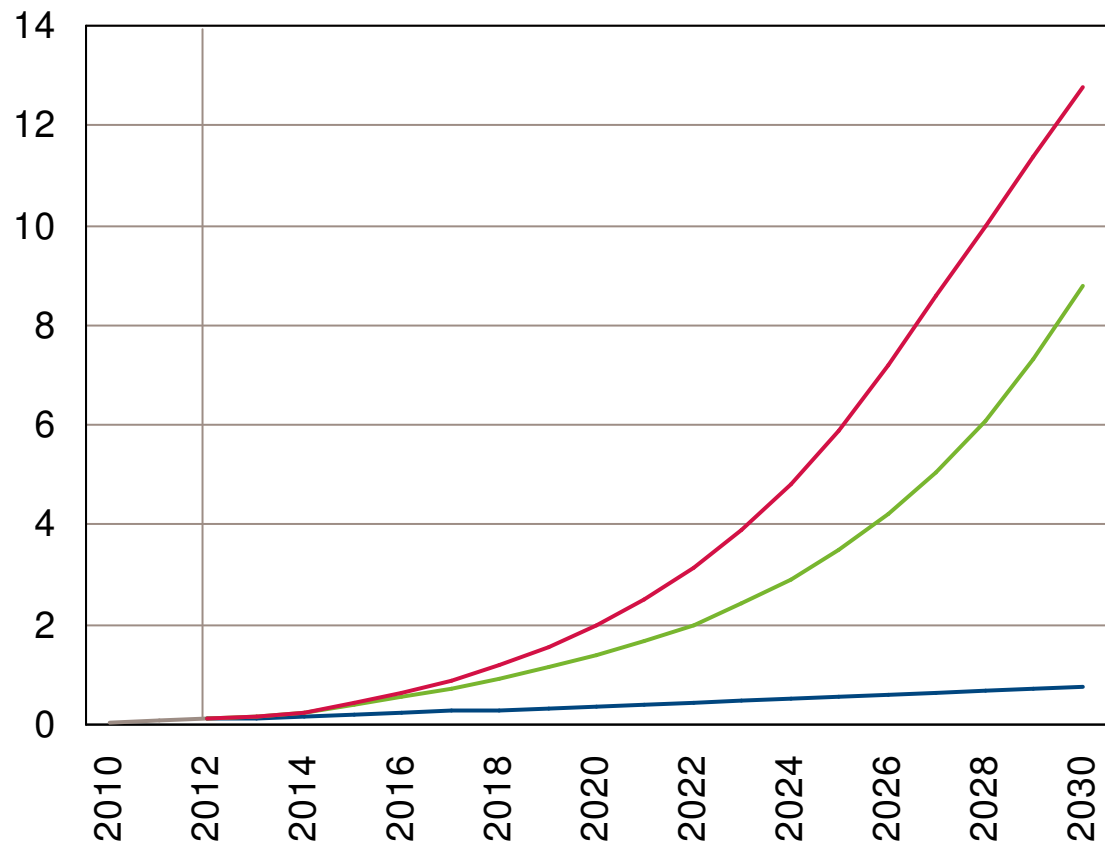
Gone Green

- Strong heat pump growth
- Strong insulation uptake

Accelerated Growth

- Robust heat pump growth
- High insulation uptake

Residential heat pumps (million)



Electricity demand

Slow Progression

- Annual demand broadly flat
- Peak demand flat / falling

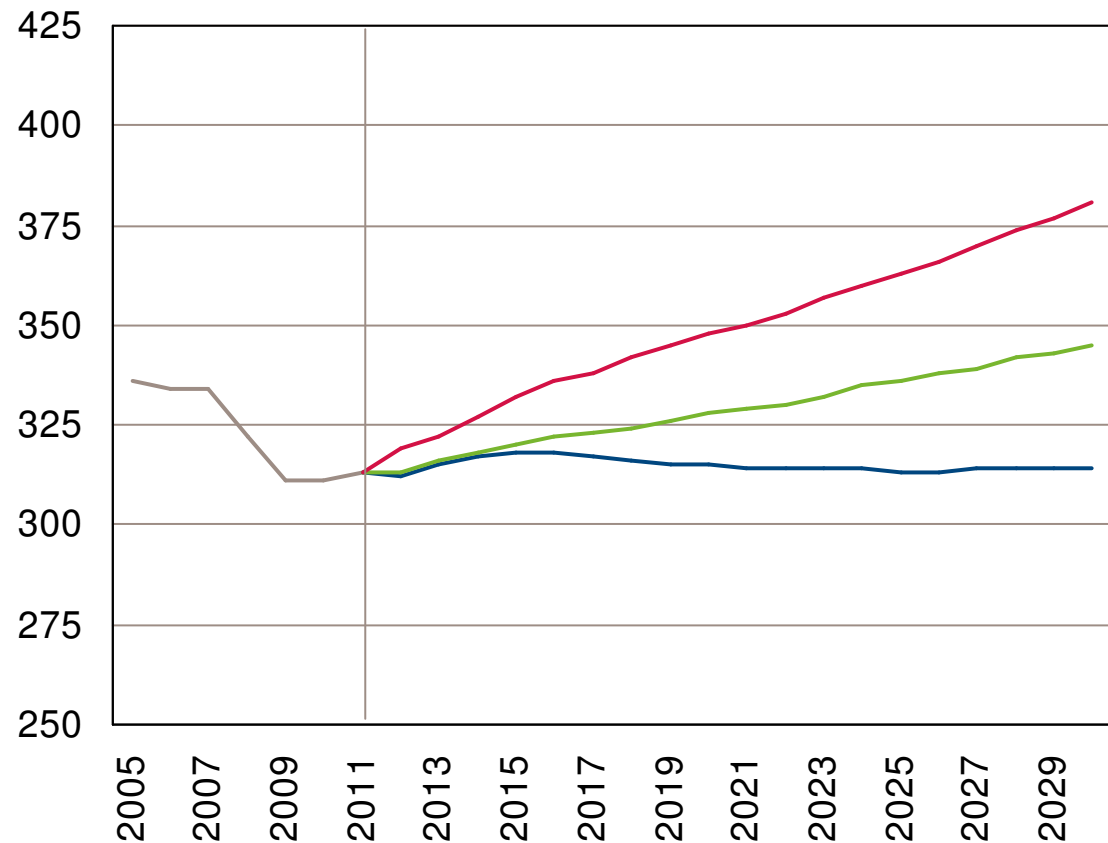
Gone Green

- 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 CO₂ deployment

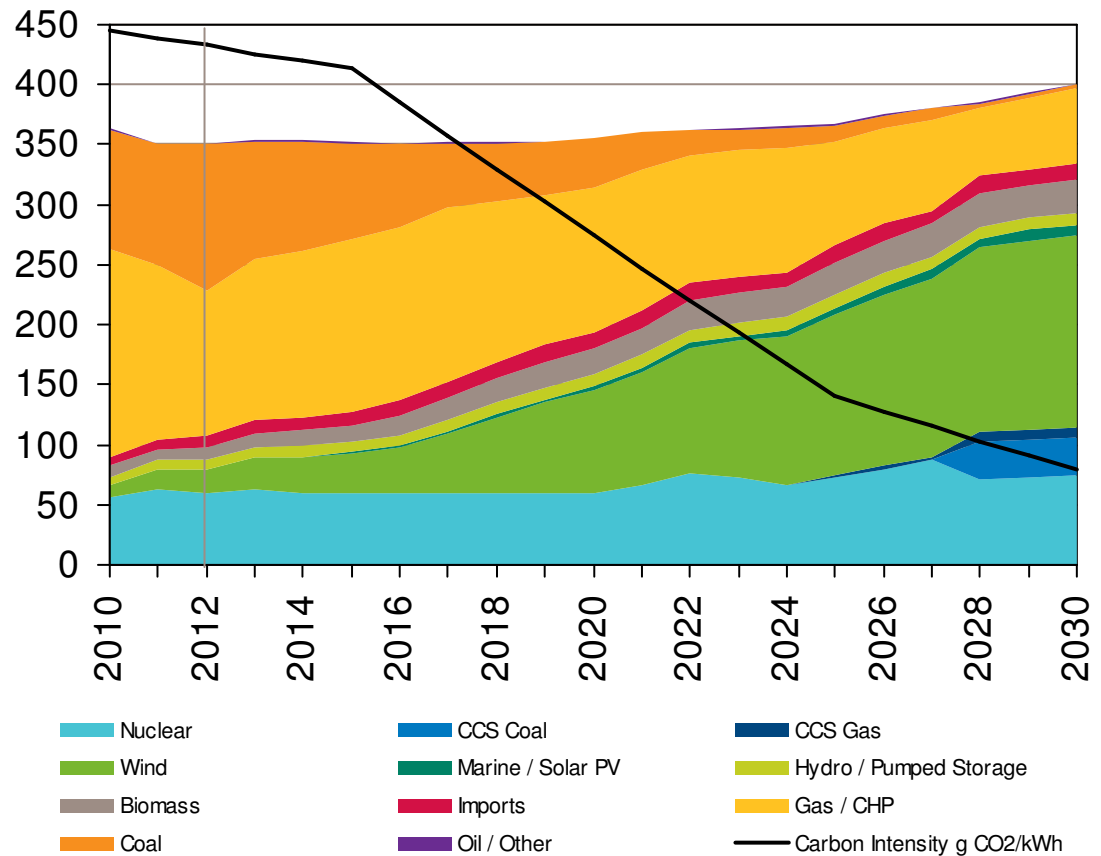
Gone Green

- Balanced approach
- Contributions from different technologies

Accelerated Growth

- Faster low CO₂ deployment
- Strong micro generation deployment

Gone Green: Power generation (TWh) & carbon intensity (gCO₂/kWh)



Gas demand

Slow Progression

- Higher domestic & power generation demand
- Peak demand broadly flat

Gone Green

- Steady decline in domestic & power generation demand
- Peak demand ~25% lower

Accelerated Growth

- Strong decline in domestic & power generation demand
- Peak demand ~40% lower

Annual gas demand (TWh)



Gas supply

Slow Progression

- Higher UKCS & Norwegian supply; higher global LNG
- New seasonal storage

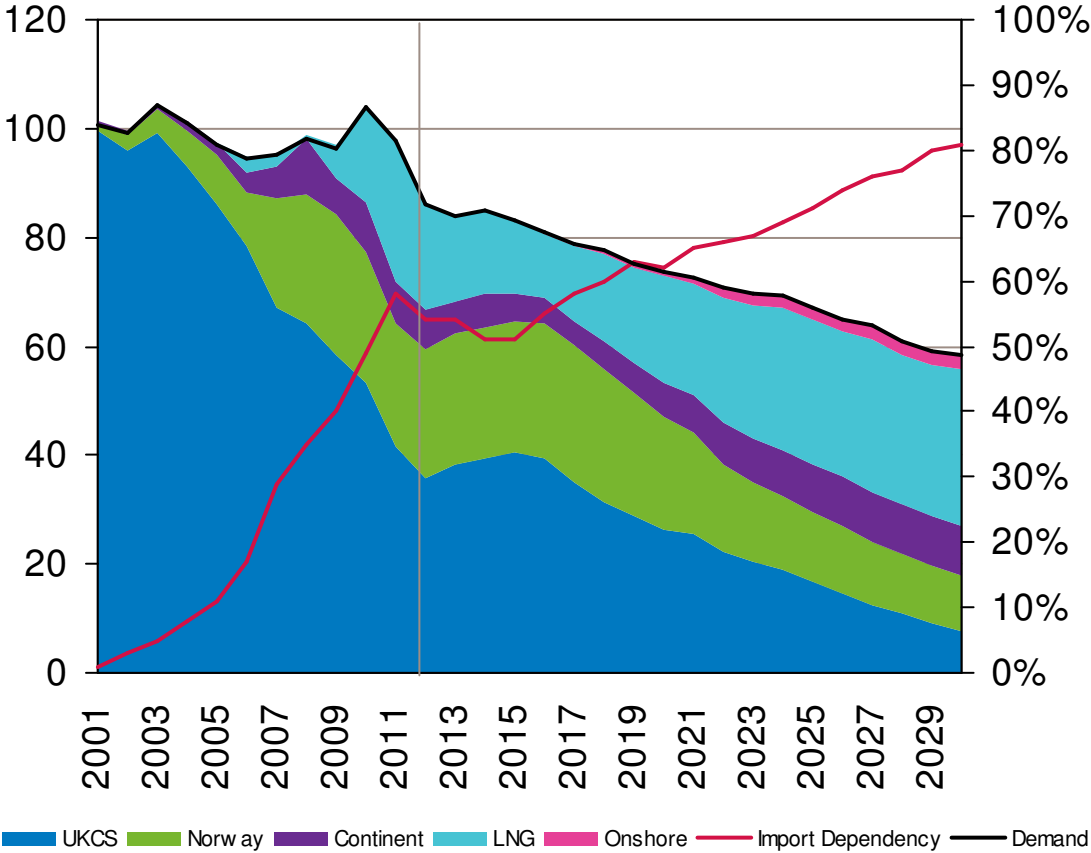
Gone Green

- Balanced approach
- Flexible storage driven by market requirements

Accelerated Growth

- Lower UKCS & Norwegian supply; tight global LNG
- Storage under construction

Gone Green: Gas supply (bcm/year) & Import dependency (%)



The future: efficiency, decarbonisation and electrification

