

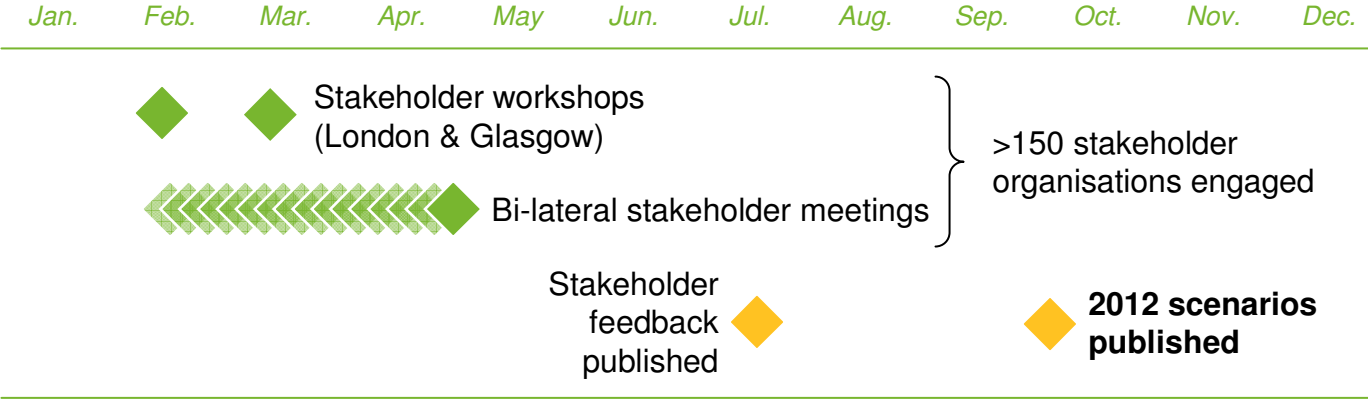
# UK Energy Futures



Richard Smith  
Head of Energy Strategy & Policy

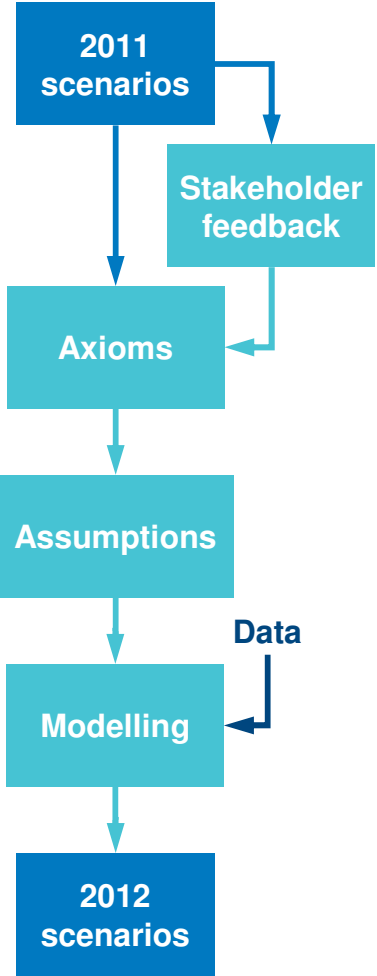
September 2012

# Our 2012 scenario development



**Feedback key themes:**

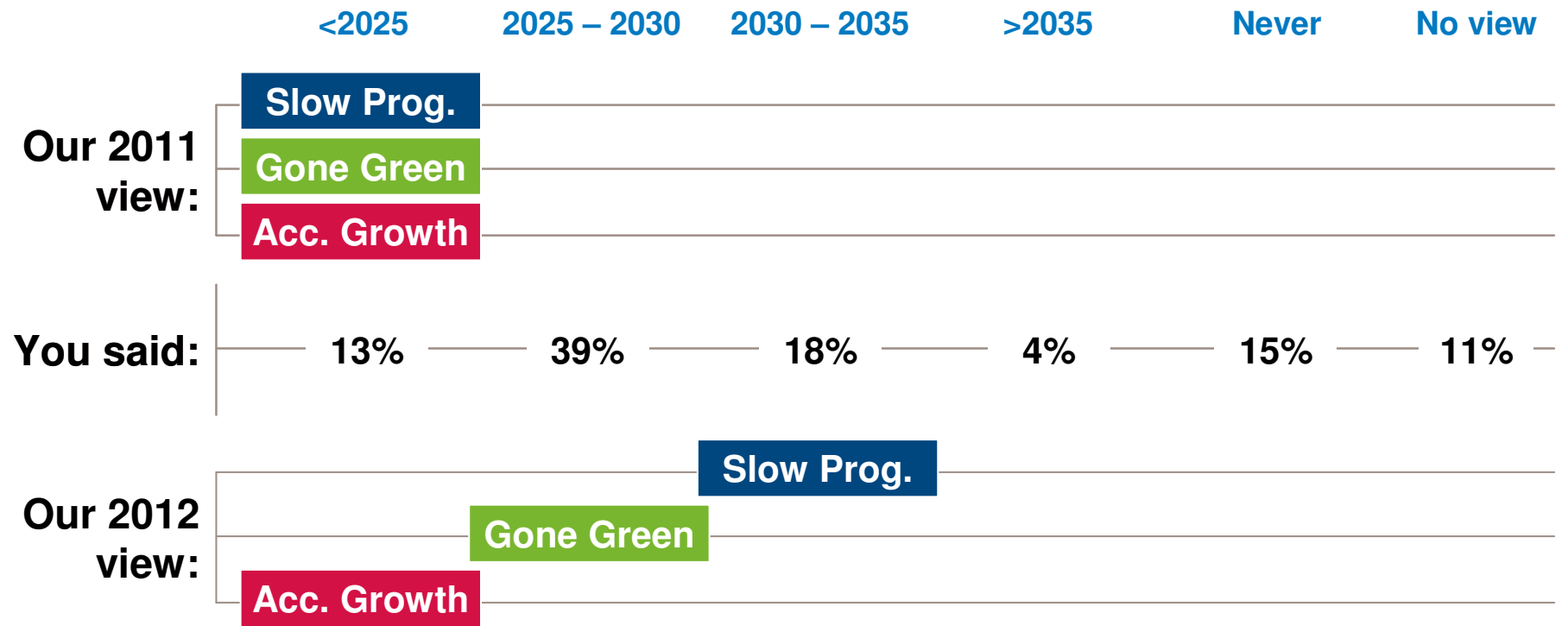
<p><b>Macro uncertainties:</b></p> <ul style="list-style-type: none"> <li>■ Government policy</li> <li>■ Costs (new technologies, economics)</li> <li>■ Economy</li> <li>■ Fuel price (fuel supply, carbon prices etc)</li> </ul>	<p><b>Demand:</b></p> <ul style="list-style-type: none"> <li>■ Capture a range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



## 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

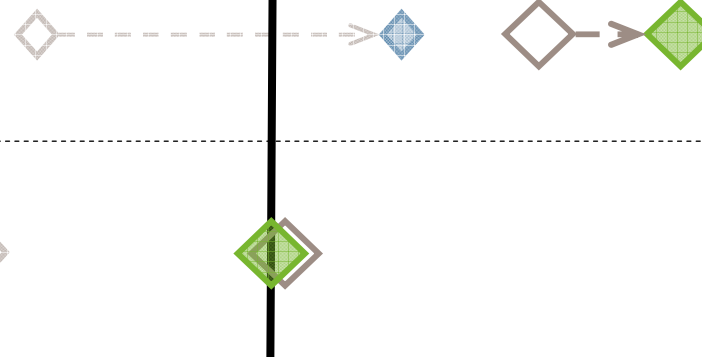
- Electricity demand =
- Nuclear generation ↓
- Renewable generation ↑
- Interconnection ↓
- Thermal generation ↑
- Heat pump deployment ↑
- Electric vehicle deployment ↓

## Targets performance

2020	renewable	✓
	carbon	✓
2030	carbon	✓
2050	carbon	✓



2020 targets



◇ 2011 scenario outcome

◇ 2012 scenario outcome

# Accelerated Growth

## Overview

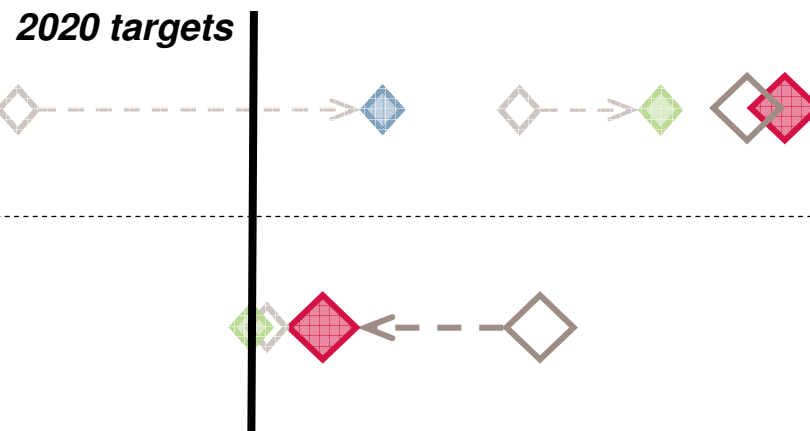
- Government climate targets met early
- Sustained economic growth in medium to long term
- Significant energy efficiency
- Significant reduction in gas demand

## 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	✓



◇ 2011 scenario outcome

◇ 2012 scenario outcome

# Economic background

## Slow Progression

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

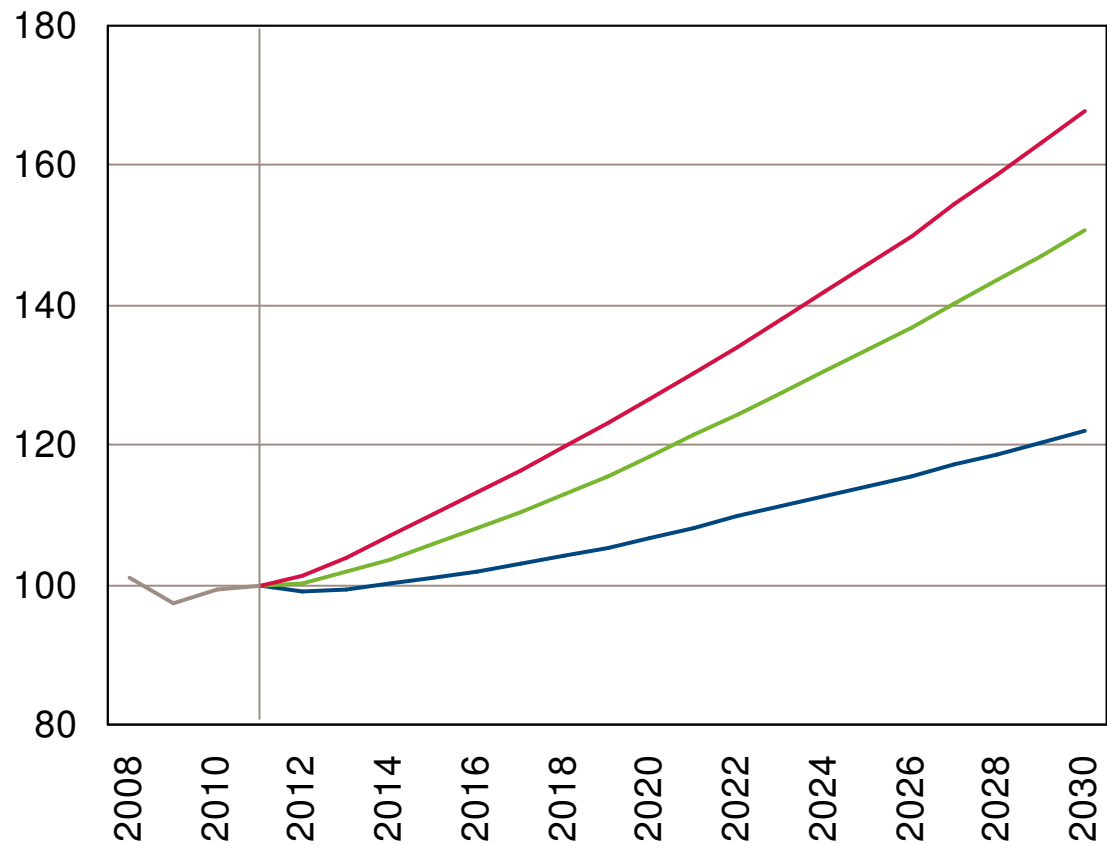
## Gone Green

- 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

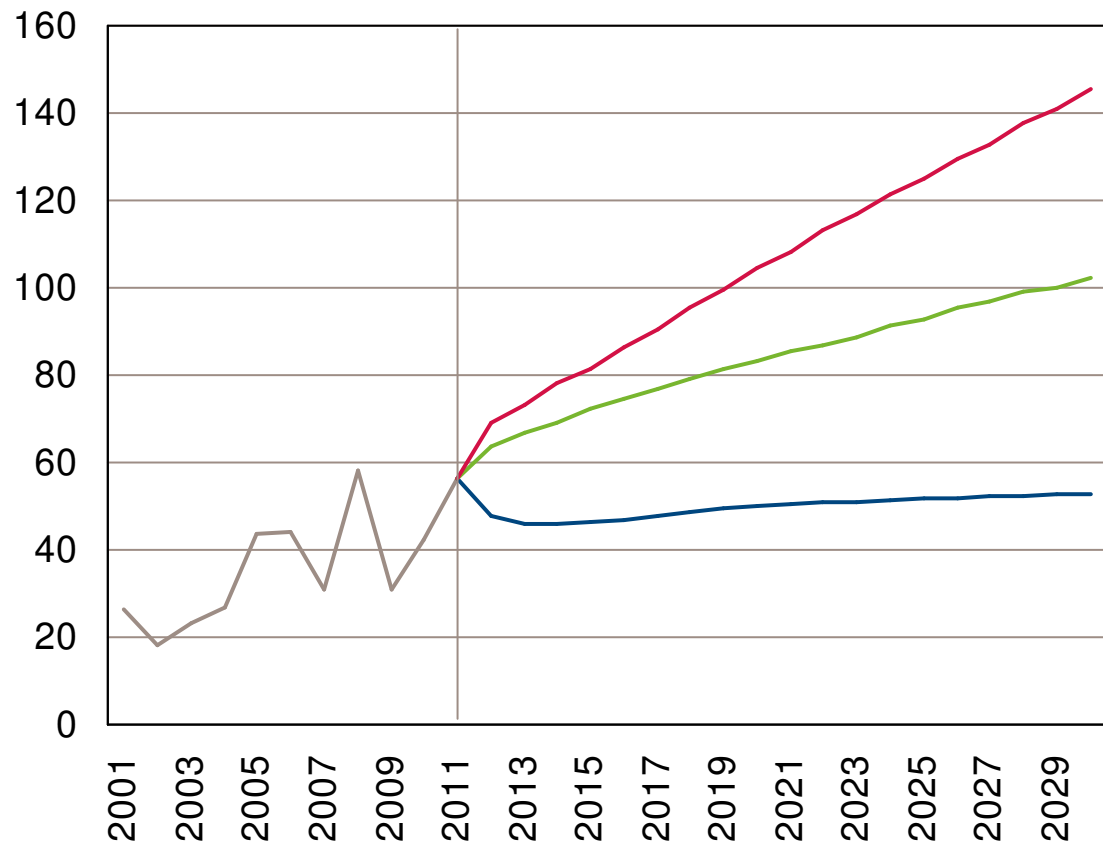
## Gone Green

- 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

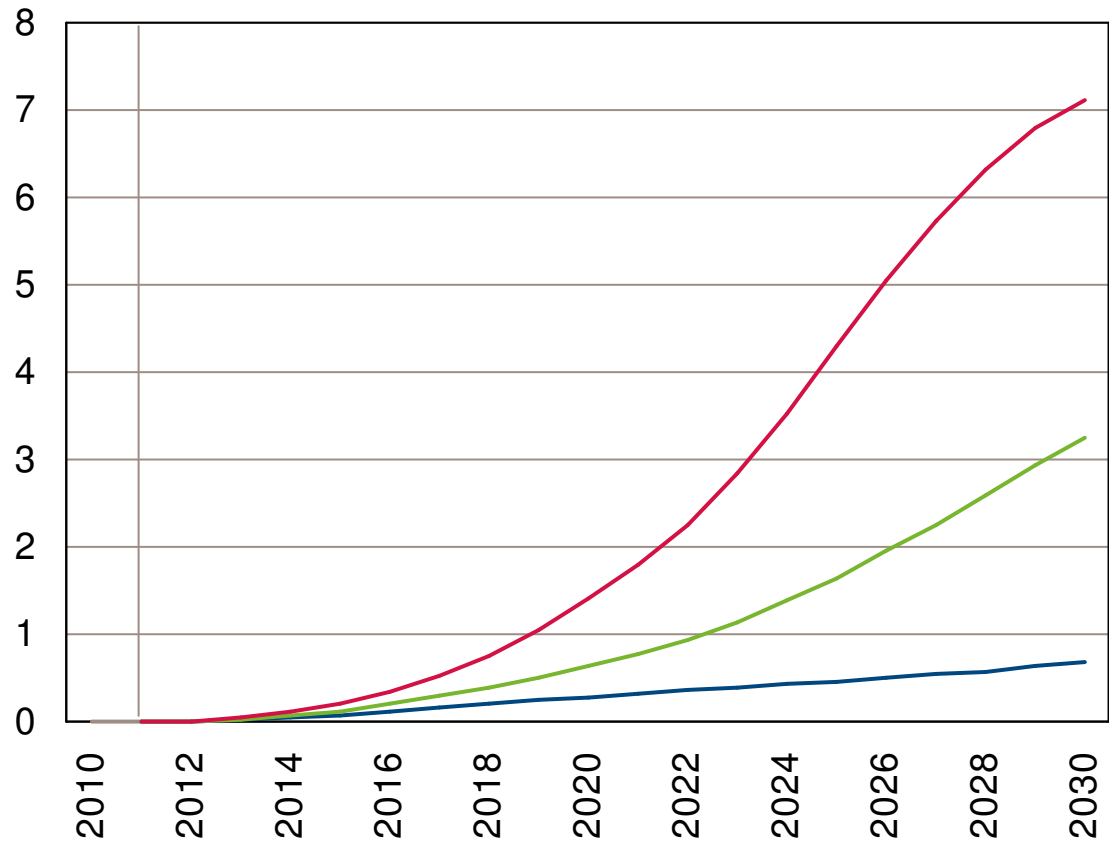
## Gone Green

- 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

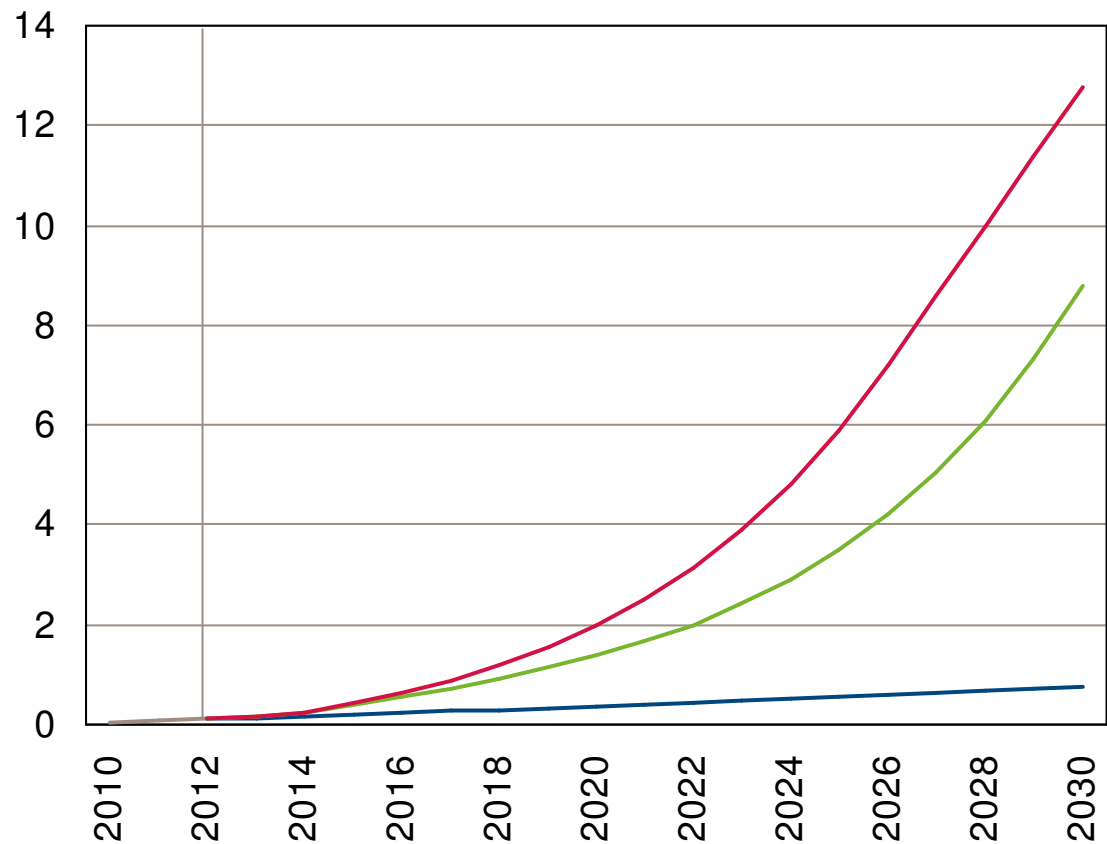
## Gone Green

- 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

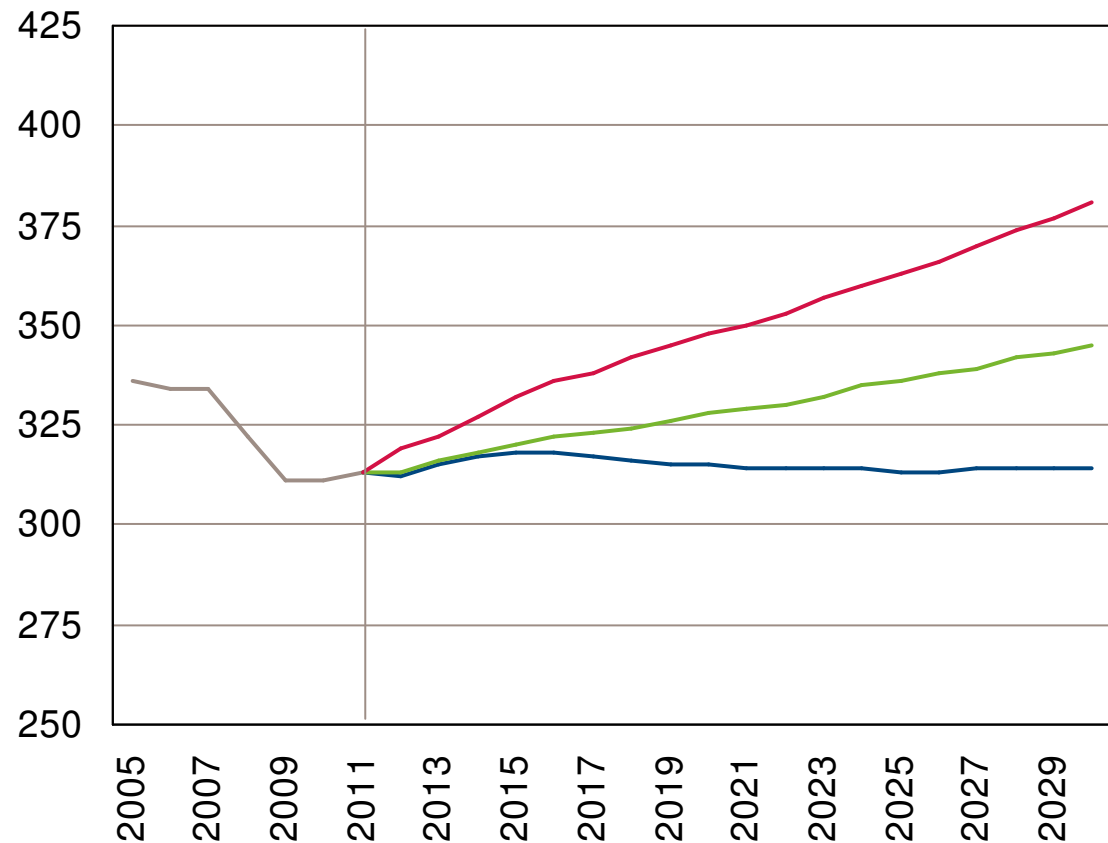
## Gone Green

- 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 CO<sub>2</sub> deployment

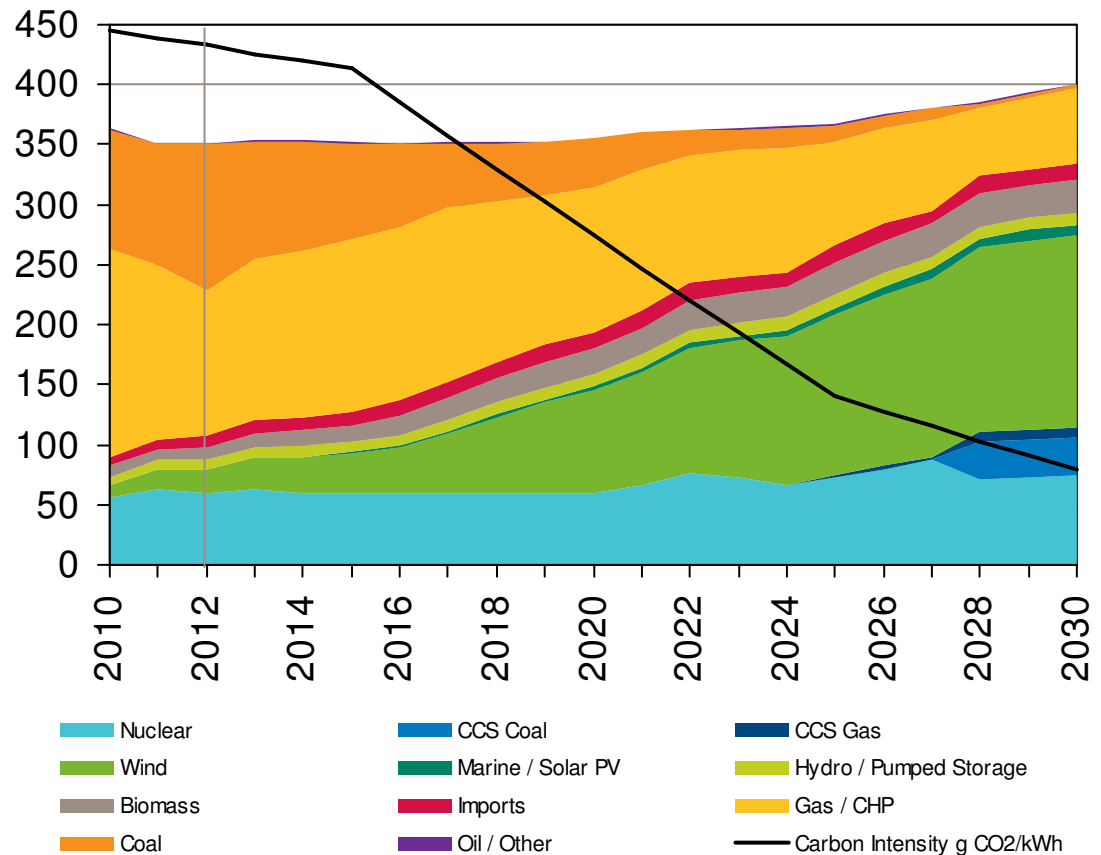
## Gone Green

- Balanced approach
- Contributions from different technologies

## Accelerated Growth

- Faster low CO<sub>2</sub> deployment
- Strong micro generation deployment

**Gone Green: Power generation (TWh) & carbon intensity (gCO<sub>2</sub>/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

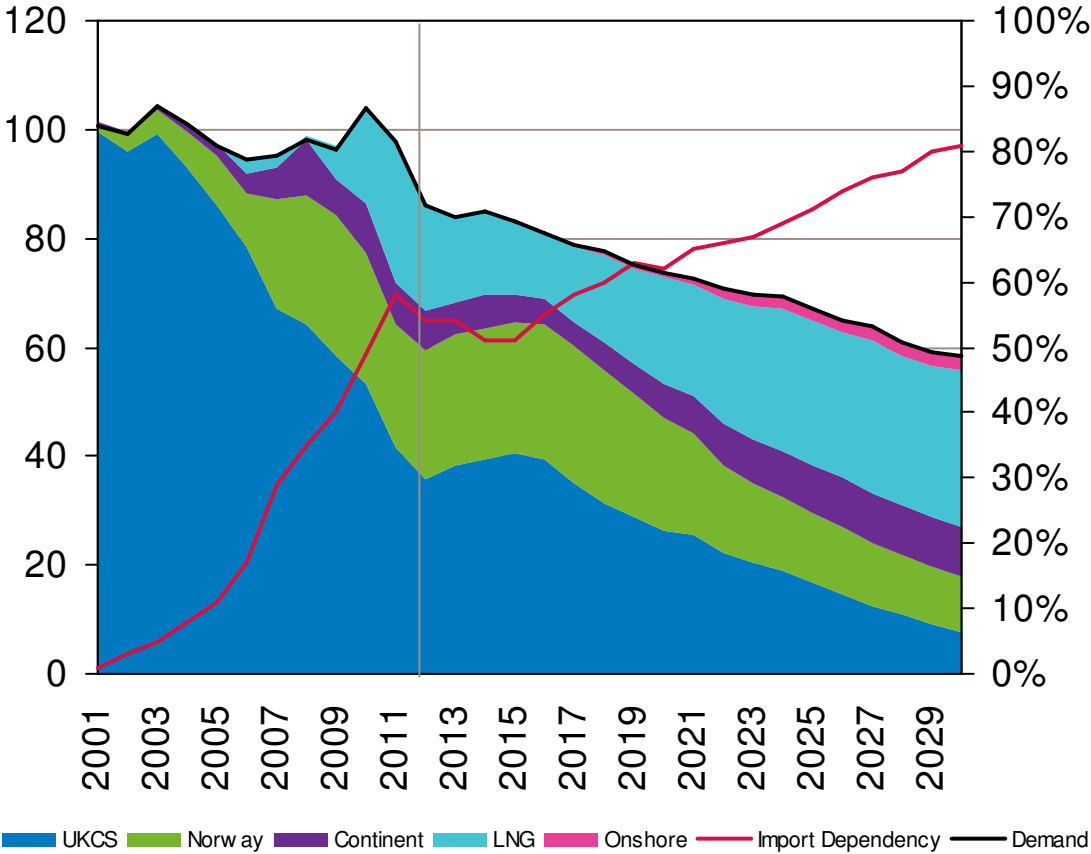
## Gone Green

- 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

