Future Energy Scenarios

Gary Dolphin - Energy Forecasting Specialist
Electricity Operational Forum – October 2012
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
An uncertain energy future
An uncertain energy future

Accelerated Growth

Gone Green

Slow Progression
Gone Green

- Consumer energy behaviour
- Technology uncertainty
- Demand & network capacity
- Generation

Timeline:
- 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 carbon: ✓
- 2030 carbon: ✗
- 2050 carbon: ✗
**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**

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<thead>
<tr>
<th>Category</th>
<th>2011</th>
<th>2012</th>
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**Targets performance**

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**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**

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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)](chart)

- AG: 7.1m
- GG: 3.2m
- SP: 0.7m
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)**

- **AG: 12.8m**
- **GG: 8.8m**
- **SP: 0.7m**
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)**

- 2005: 250
- 2007: 275
- 2009: 300
- 2011: 325
- 2013: 350
- 2015: 375
- 2017: 400
- 2019: 425

Economic growth, heat & transport electrification

Accelerated Growth
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)

- Nuclear
- CCS Coal
- CCS Gas
- Marine / Solar PV
- Hydro / Pumped Storage
- Gas / CHP
- Biomass
- Imports
- Oil / Other
- Carbon Intensity g CO₂/kWh
Gone Green – generation capacity
Accelerated Growth – generation capacity

Source: National Grid
The future: efficiency, decarbonisation and electrification

- **Electricity**
  - Smart Meters & Appliance efficiency
  - Decarbonised electricity...
  - Gas backup & embedded generation

- **Heat**
  - Insulate and reduce
  - Heat pump
  - Biomethane
  - De-carbonise heat

- **Transport**
  - Efficiency and innovation
  - new homes & retrofit
  - and decarbonise transport
  - CNG
Q&A

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