UK Strategy for Climate and Energy

Presentation in Japan

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DECC
September 2011
Temperature increases

Heat waves like 2003:
- the norm by 2040
- mild by 2060

Source: Met Office Hadley Centre
The Global Challenge

Cut emissions by 50% by 2050

UNEPA estimate of high Copenhagen Accord pledges 49 Gt

44 Gt in 2020

50% below 1990 levels in 2050

Trajectory with a 50% chance of 2°C
Legally binding UK carbon budgets

- Carbon budgets = cut of at least 34% in greenhouse gas emissions in 2020 (1990 levels).
- 4th carbon budget (2023-2027) = 50% over the period relative to 1990 levels.
- 2050 goal = 80%
UK Energy Mix

Our current supply mix is dominated by oil, coal and gas. Many other countries have more renewables and/or nuclear.

Source: 2009 DUKES
Electricity Supply

UK electricity supply by fuel input

Renewables 7%
Imports 1%
Gas 45%
Nuclear 18%
Other Fuels 1%
Coal 28%

from Digest of UK Energy Statistics
Aging energy infrastructure

Over the next decade, ~25% of capacity will close

From Electricity Market Reform supporting analysis
Import dependence growing

Net UK import dependence 2010:

- Total: 29% (c43-58% 2020)
- Oil: 15% (c48-60% 2020)
- Gas: 36% (c53-69% 2020)
- Coal: 67% (c59-65% 2020)
Public engagement through online 2050 software
DECC’s 2050 Pathways Analysis

http://2050-calculator-tool.decc.gov.uk/

- Domestic transport behaviour
- Domestic transport electrification
- Domestic freight
- International aviation
- International shipping
- Average temperature of homes
- Home insulation
- Home heating electrification
- Home heating that is not electric
- Electricity of home cooking
- Growth in Industry
- Energy intensity of industry
- Commercial demand for heating and cooling
- Commercial heating electrification
- Commercial heating that is not electric
- Commercial lighting & appliances
- Electrification of commercial cooking
- Nuclear power stations
- USA power stations
- CCS power station fuel mix
- Offshore wind
- Onshore wind
- Total wind
- Biomass power stations
- Solar panels for electricity
- Solar panels for hot water
- Geothermal electricity
- Hydroelectric power stations
- Small-scale wind
- Electricity imports
- Land dedicated to Bioenergy
- Livestock and their management
- Volume of waste and recycling
- Marine algae
- Types of fuels from biomass
- Bioenergy imports

Note: Conventional power stations are built automatically to fill any shortfall in electricity supply. Coal, Oil and Natural Gas are automatically imported to fill any shortfall in bioenergy.

Energy security

Storage, demand shifting & interconnection

2050 emissions will be 80% below 1990 levels.

Note: International aviation and shipping emissions are not included in the UK’s 2050 targets, but are included here to enable emissions from all sectors to be considered.

In 2050, 53% of primary energy will be imported.
Key pathways to 2050 all point to some common actions

The amount of energy required and the way we use energy need to change

Energy supply needs to be transformed

Emissions from all sectors need to be addressed
Renewables, nuclear, carbon capture and storage

Transforming our electricity sector

- 30% of electricity through renewables by 2020
- Support 4 new CCS demonstrations
- New nuclear power stations under way by 2018

Maintaining secure electricity supplies, seeking c.£110bn of new investment by 2020
Renewables

Policy mechanisms
Increase renewable energy generation from 48TWh now to 234TWh by 2020

Financial Incentives in place, e.g. **Renewables Obligation**

**Renewables Obligation (RO)**
- works by placing an obligation on licensed electricity suppliers to source a specified and annually increasing proportion of their electricity sales from renewable sources, or pay a penalty.

- The RO is the current main mechanism for supporting large-scale generation of renewable electricity.
Renewables (continued…)

UK Renewable electricity has tripled since the introduction of the RO
Renewable Roadmap

8 key technologies

• Onshore wind
• Offshore wind
• Marine energy
• Biomass electricity
• Biomass heat
• Ground source heat pumps
• Air source heat pumps
• Renewable transport
Delivering the first new nuclear power station without public subsidy by 2018 depends on a range of factors including:

- Underpinning policy instruments
- Dealing with ongoing waste legacy issues
- Efficient operation of planning process
- Securing final investment decisions
Carbon Capture and Storage

CCS can reduce CO₂ emissions from coal-fired power stations by around 85%
Electricity Market Reform – the Four Policies

**WHY?**

- Weak carbon signals
- “Bias to gas”
- Security of supply
- Scale of finance needed

**HOW?**

1. Long term contracts for low carbon generation
2. Carbon price support
3. Emissions performance standard
4. Encourage construction of reserve power plants
Electricity Market Reform - Measures

Carbon price floor illustration (in real 2009 prices and calendar years)

- EPS set at a level equivalent to 450g CO₂/kWh with specific exemptions for plant forming part of UK’s CCS Demo programme

Contract for Difference Feed-in Tariff

Capacity Mechanism
Green Investment Bank

£3bn 2012-2015

Borrowing itself from 2015

Intervene where financing is restricted to leverage up

Huge interest from financial community
The EU Emissions Trading System (ETS)

3 objectives

1. Setting a cap
   Certainty on level of emissions

2. Trading allowances
   Promote least cost abatement

3. Pricing Carbon
   Provides financial incentive to reduce emissions
Global Carbon Market

The creation of a functioning global carbon market relies on:

- Improving **existing mechanisms**, such as Clean Development Mechanism
- **New market mechanisms** to increase flow of carbon finance
- **Linking of emissions trading systems**
Carbon Markets – other instruments

- Climate Change Levy
- Climate Change Agreements
- Carbon Reduction Commitment – Energy Efficiency Scheme
Energy Efficiency – New Build

- From 2016 all new homes, and from 2019 all new buildings, should be “zero carbon”.
- An extra 23% more than 2006 levels of carbon savings must be made in “fabric” of property i.e. walls and roof.
- Must also meet “carbon compliance” levels
- Additional investment through other “allowable solutions” to deliver carbon savings.

“Zero Carbon” standard = 100% of regulated emissions of property

“Carbon Compliance” (LZC = Low and Zero Carbon)

Minimum to be done through fabric energy efficiency

2006 Buildings Regulations
### How does it work?

- **Commercial opportunity, providers will go to commercial banks for funding**
- **The customer doesn’t pay up front – pay back through savings on energy bills**
- **The legal charge is on the electricity meter, not the individual**
- **Capped costs so payback is never greater than savings**
- **Supplemented for certain products and fuel poor by new Energy Company Obligation (ECO)**
Energy Efficiency
– Energy Company Obligation

Energy Company Obligation (2012 – 2022) Objectives:

- **Deliver carbon savings**
  Step change in energy efficiency across all housing

- **Support the vulnerable**
  Thermal improvement for poor & vulnerable household

- **Support equitable delivery**
  Ensure Green Deal works for all, encouraging innovation
Energy Efficiency
- “Green Deal” for retrofit

Green Deal (2012 launch)

- Assessment
  Up front survey and advice

- Finance
  no upfront cost

- Installation
  Accreditation standards

- Repayment
  Through energy bill savings
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– Energy Company Obligation

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Smart Meters

Energy suppliers will be responsible for:

• 53 million gas and electricity meters being replaced
• 30 million homes and businesses
• Rollout 2014–2019
• £7.1bn Net Present Value (NPV)
Renewable Heat

• Around half of UK’s final energy consumption and carbon emissions come from energy used to generate heat

• Renewable Heat Incentive (RHI)

• UK to move from 1 to 12% renewable heat by 2020
Case Study – Transport Sector

The Government is reducing emissions from road transport through:

- **Vehicle efficiency**
- **Supporting ultra-low carbon vehicles**
- **Smarter Choices**

**Rail**: increased energy efficiency and more electrification

European flights part of EU ETS from 2012; pushing for new global agreement on *international aviation and shipping*
Durban 28 Nov – 9 Dec 2011

- Cancun: Implement - Monitoring, Reporting and verification
  - Mitigation Pledges
  - Accounting

- Conditionality: EU on Kyoto Protocol 2

- Convergence: towards legal form