

GGBP Case Study Series

Low-Carbon Pathway of the United Kingdom

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Country: [United Kingdom](#)

Sector(s): [electricity](#), [buildings](#), [transportation](#)

Key words: [plan](#), [analysis](#), [electricity](#), [energy](#), [climate](#)

The United Kingdom has a sophisticated analytical framework for analyzing green growth benefits. The green growth discussion centers on how to meet long-term greenhouse gas mitigation targets, adapt to the impacts of climate change, and deal with other environmental issues while maintaining economic growth.

Context

The natural resources of the United Kingdom include natural gas, oil, and coal; the country is currently a net exporter of fuel (in terms of volume). It has an extensive infrastructure system and high levels of capital investment. Markets are well developed and London is a major financial center. Services contribute the greatest proportion to gross domestic product (GDP), with a declining share of output from industry.

The economic growth path of the country is managed by HM Treasury, with the growth prospects assessed independently by the Office for Budget Responsibility. The Department of Energy and Climate Change is the lead department for greenhouse gas (GHG) emissions and climate change policy. HM Treasury also looks at the macroeconomic implications of GHG emission reductions and environment-related fiscal instruments. Its Green Book¹ impact assessment approach considers the efficiency and equity implications

¹ The Green Book is guidance by the UK Treasury for public sector bodies on how to appraise proposals before

committing funds to a policy, program or project. See for more information:

of policy change. In addition, the United Kingdom has a strong statistical agency that leads to a reliable data source for analysis.

Public support for action on climate change is strong and there is cross-party political consensus to reduce GHGs. The policy debate therefore often centers on how ambitious and rapid the transition should be and what pathway it should follow, in particular in relation to different electricity options (CCC, 2012). However, the cost implications of green policies for consumer fuel bills remains a contentious issue.

Debate and practice on the economic transition to a low-carbon world is supported by a very well-developed industry, including professional service firms, support to the private sector² and homeowners.³ environmental non-governmental organizations, and research institutes.

Approach

The analysis of and public debate on the benefits of climate action has been framed by a 'science first' approach focusing on the contribution that the United Kingdom needs to make to global GHG mitigation – broadly equivalent to a 50 percent reduction in GHG emissions by 2050 (CCC, 2008). This frames the policy response and assumes that the primary benefits of action will be reduced impacts of climate change globally through international cooperation.

The framing of the benefits of proactive intervention has been seen through an economic lens; for example, assessing the impacts on GDP of adopting emission reduction options (CCC, 2010), the macroeconomic

implications of adaptation and mitigation (CCC, 2008 and Vivid Economics, 2013), what economic transition means for individual sectors (DECC, 2010), and the role of innovation (e.g. CCC, 2009). The cost of achieving a 50 percent reduction has been estimated as 1-2 percent of GDP by 2050, taking into account efficiency gains and 'negative cost options' (CCC, 2010). The analysis shows there are win-win interventions in most sectors (e.g. energy and fuel efficiency) but in order to meet the overall target higher-cost interventions are needed.

To assess the best options a full suite of analytical tools is used, including macroeconomic models, climate model of emission scenarios and social inclusion analysis. Cost-benefit analysis, statistical modeling and marginal abatement cost curves are widespread and very well developed. Real options analysis and MARKAL (Market Allocation) type models have been used for energy sector optimization. Different technology options are assessed, and, to a lesser extent, behavior change opportunities.

The framing of benefits addresses the impacts of measures such as carbon taxes on the competitiveness of high-carbon and heavy industry. This analysis has been developed together with the industries concerned (DECC, 2012 and CCC, 2013). There are also political risks around additional costs to households on fuel bills – although the analysis shows that in the near term average fuel bills for households that install energy-efficient products will fall in real terms (DECC, 2012).

Emphasis is also put on the potential industrial gains of green growth for clean industries such as renewable energy and energy efficiency technologies.

<https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

² <http://www.carbontrust.com>

³ <http://www.energysavingtrust.org.uk>

While it has not carried out a comprehensive exploration of all the benefits of green growth, the United Kingdom government has experimented with a pathways calculator with respect to low-carbon pathways and the long-term energy transition of the country. The 2050 Calculator allows users to modify assumptions about the future energy mix and demand for energy, and to look at the validity of different low-carbon pathways and explicit trade-offs in understanding the energy demand and supply in 2050. This facilitates an analysis of emissions, energy, security of supply, and additional costs to the country versus a scenario that does not address climate change. In addition to the analytical outputs, the calculator also produces a 'story' about key sectors of the economy, homes, business, industry, and transport. The scenarios can be saved and the outputs can be compared against other modeling exercises (DECC, 2013).

For adaptation, climate models are used to predict impacts and risks. Multi-criteria analysis, cost-effective analysis, and scenario-based Cost-benefit Analysis are used for options analysis. Statistical and econometric modeling has also been used. The framing of adaptation has been based on economic benefits. Where the economic case is difficult to make because of uncertainty, benefits related to environmental protection and precautionary action to avoid future impacts are given.

Outcomes

Investment in data and analysis has led to a sophisticated debate and good understanding of the implications for all key sectors of a green growth transition.

This has supported the development of climate change policy with extensive legislative backing,

including the overarching Climate Change Act 2008, which commits the country to an 80 percent reduction in GHG emissions by 2050, and the development of near-term 'carbon budgets'.

The analysis gives support to a long-term perspective, taking account of the dangers of 'lock-in' and the need to take decisions which affect future development paths, for example in the power sector. Subsidies for some technologies have been justified not by their short-term benefit, but by their longer-term requirement to meet the overall green growth objective.

An example of treating uncertainty in policy planning is found in the design of the Thames Barrier, which used a method of iterative risk management in relation to flooding and sea level rise.

Lessons

What led the United Kingdom's efforts to success was, first of all, the extensive engagement of stakeholders in producing analysis for climate change mitigation and adaptation. For example, there is a long-running dialogue with British industry on climate change action, as well as public consultations.

There is also a long history of investment in data and analysis. At the national level, an extensive suite of tools has been used to assess the risks and benefits of different economic pathways. Considerable supplementary material on how the analysis was conducted also informs framing and helps to set the context.

Other successful features include:

1. *Integrated benefits assessment* covering economic development, mitigation and

adaptation – however, more comprehensive analysis to develop an integrated understanding of the different strands of green growth could be beneficial;

2. *Strong regional focus* – while policy is driven from the center, there is a clear role for regional policy tailoring and decentralized delivery models;
3. *Strong link between economic and environmental benefits* – in the annual budget, environmental considerations are explicit and the economic benefits of environmental measures are considered. The social elements of creating a low-carbon economy are also the subject of analysis and policy response;
4. *Political risks have been explicitly identified* – in particular, the implications for competitiveness and carbon leakage, with policy support offered to those industries most at risk.

While the green growth analysis is comprehensive, it is fragmented and included in different strategy documents and planning documents on mitigation (CCC, 2010 and DECC, 2011), adaptation (Defra, 2011), and economic development (HMT, 2013), along with a raft of other governmental initiatives to address other policy issues. This raises concerns regarding consistency of analysis in one of the most complex climate change policy architectures in the world (Bowen and Rydge, 2011).

Further Information

Budget Includes Green Growth Strategy:

<https://www.gov.uk/government/publications/budget-2013-documents>

Climate Change Commitment:
<http://archive.theccc.org.uk/aws3/TSO-ClimateChange.pdf>

Adaptation Policy:
<https://www.gov.uk/government/policies/adapting-to-climate-change>

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