

Presentation

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The slides below are immediately followed by the speaking notes.

Booz & Company

London, November 24, 2010


Discussion Document

booz&co.

Changing behaviour - can a cultural shift be achieved in how people use energy?

The Foundation for Science and Technology

Survey supported by  2degrees

Thank you to  EDF
ENERGY

Discussion Overview

Questions

Do we need a cultural shift in how people use energy?

What are the specific areas of concern?

What are the options?

Topics

- UK 2020 targets
- Progress against targets
- Survey results
- Energy supply and demand - key risks
- Critical barriers
- Changing consumer behaviours
- Priority options to reduce the risk

Summary

- The delivery of the 2020 carbon reduction and renewable targets is at risk
- Demand reduction is a key enabler to achieve the targets
- Consumer technology adoption and changing consumption patterns are critical
- More needs to be done to change consumer behaviours

2020 greenhouse gas (GHG) reduction and renewable targets

Carbon/GHG Reduction Targets

- **34%** reduction in 2020 relative to 1990 levels
- Meet 5 year **interim budgets**
- **80%** reduction in 2050 relative to 1990 levels

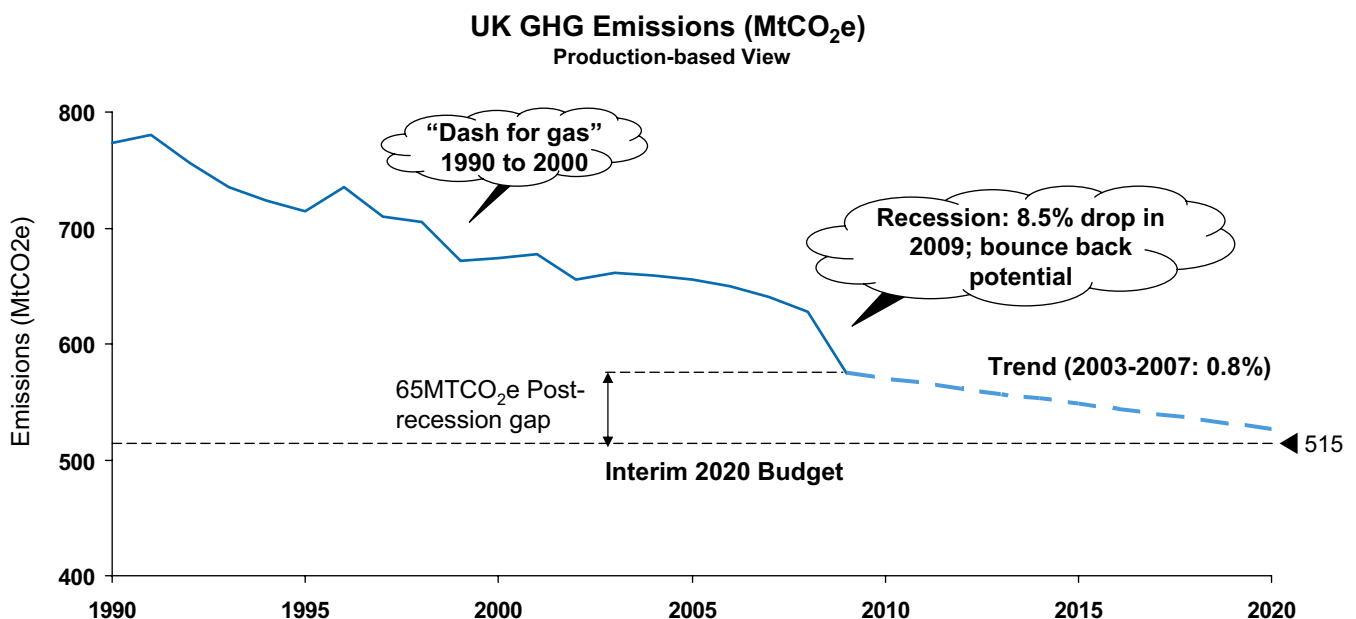
Renewable Targets

- UK to achieve 15% renewable deployment by 2020
- UK Renewable Energy Strategy (2009) sets out a lead scenario:
 - Electricity:**30%**
 - Heat:**12%**
 - Transportation:**10%**

Source: DECC, RES, CCC

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The UK has made significant progress - - 2020 delivery is still at risk



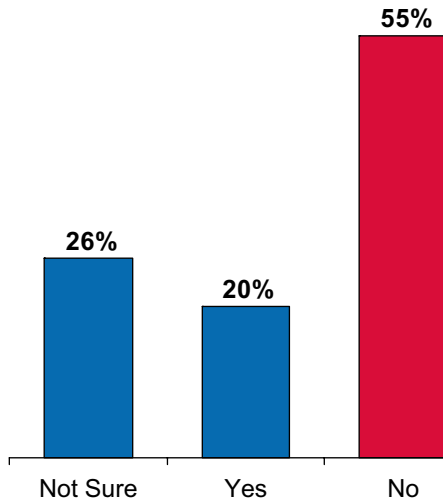
Source: DECC, CCC, Booz & Co. analysis

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In our survey, most people believe the UK will not meet the 2020 CO₂ targets - - most expect a 5+ year delay

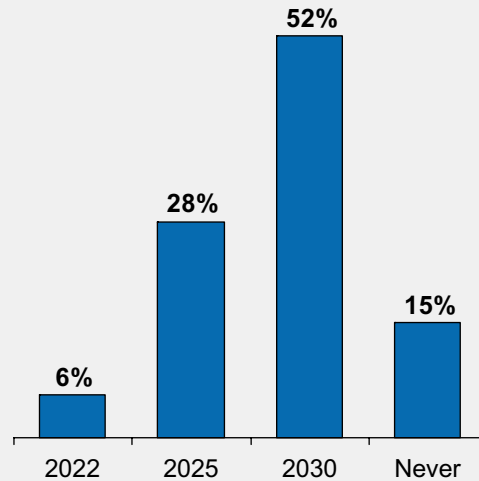
Do you expect the UK to achieve the set targets for carbon reduction by 2020?

(Industry survey; Oct 2010; Sample size >100)



When do you expect the emission cuts set out in the 2020 target to be achieved?

(Industry survey; Oct 2010; Sample size >100)



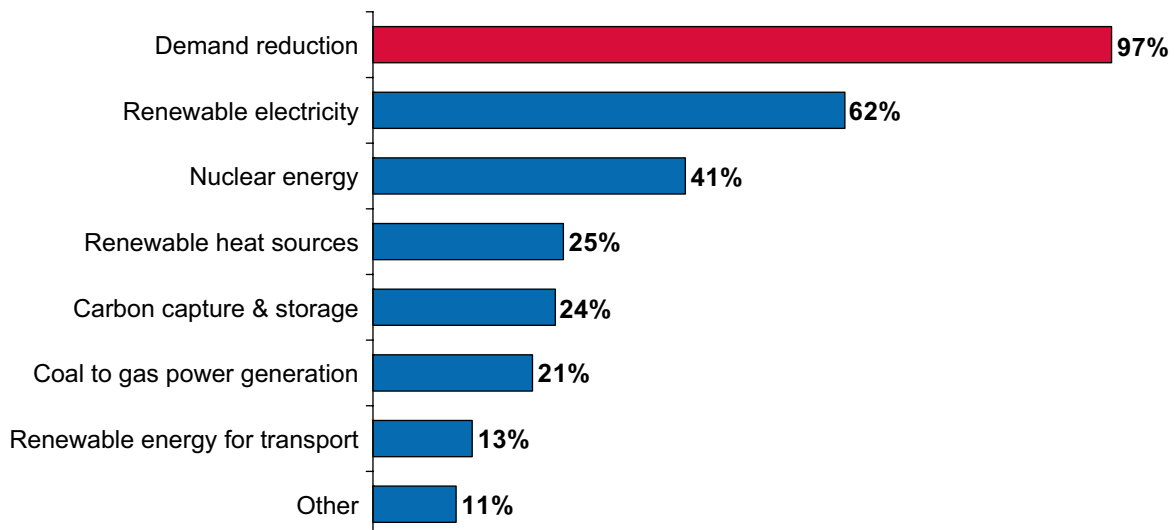
Source: 2degrees, Booz & Company

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“Demand Reduction” is expected to be the single largest contributor to CO₂ reduction by 2020

LEVERS to contribute by 2020?

(% of participants selecting lever as one of top 3; Industry survey; Oct 2010; Sample size >100)



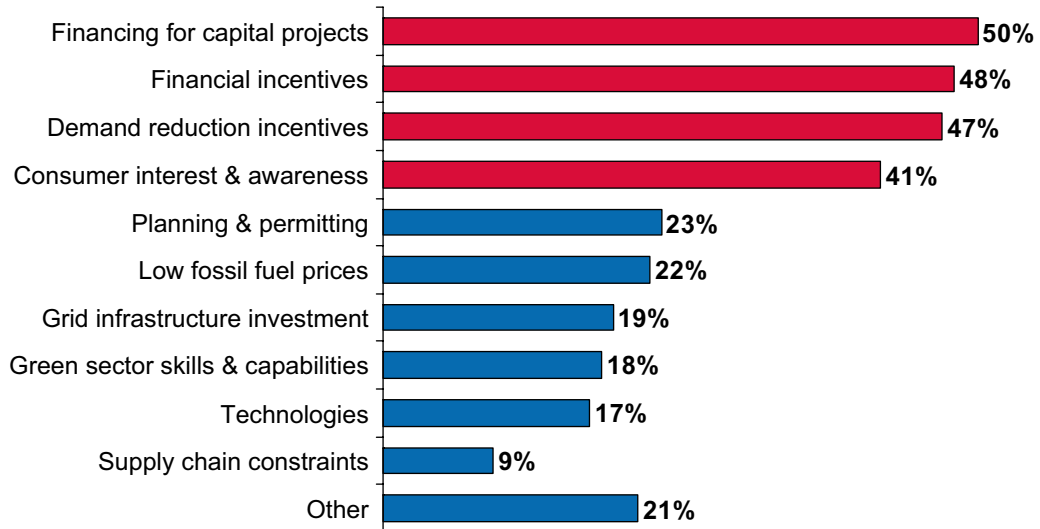
Source: 2degrees, Booz & Company

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Three of the top four barriers to delivery relate to demand side / consumer issues

BARRIERS to implementation?

(% of participants selecting barrier as one of top 3; Industry survey; Oct 2010; Sample size >100)



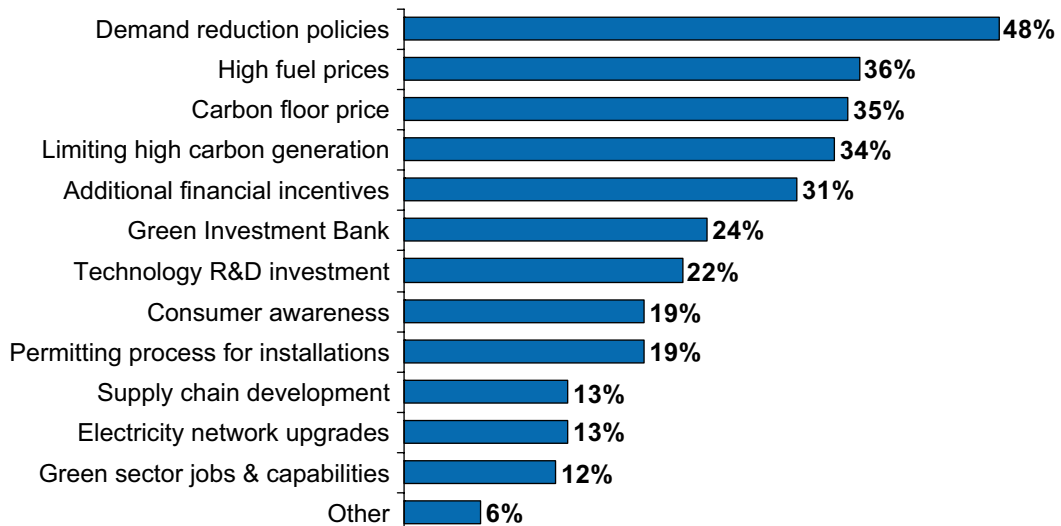
Source: 2degrees, Booz & Company

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There is limited consensus on which enablers are expected to have the greatest impact

ENABLERS to implementation?

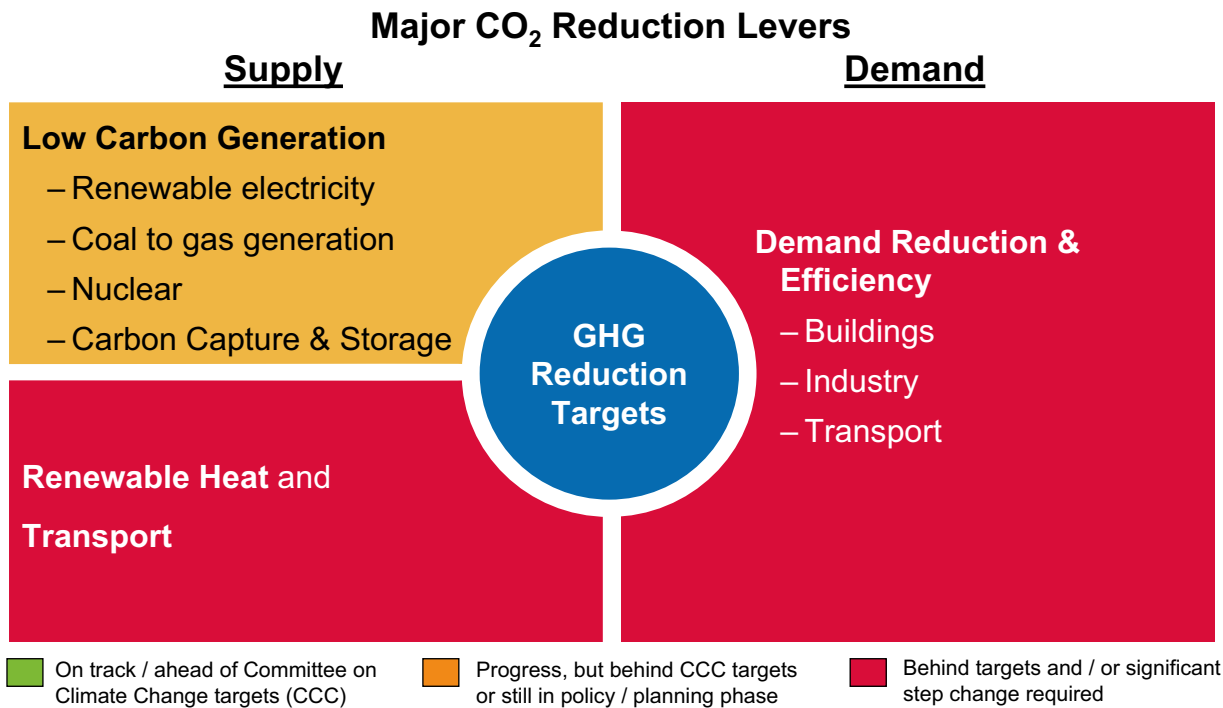
(% of participants selecting barrier as one of top 3; Industry survey; Oct 2010; Sample size >100)



Source: 2degrees, Booz & Company

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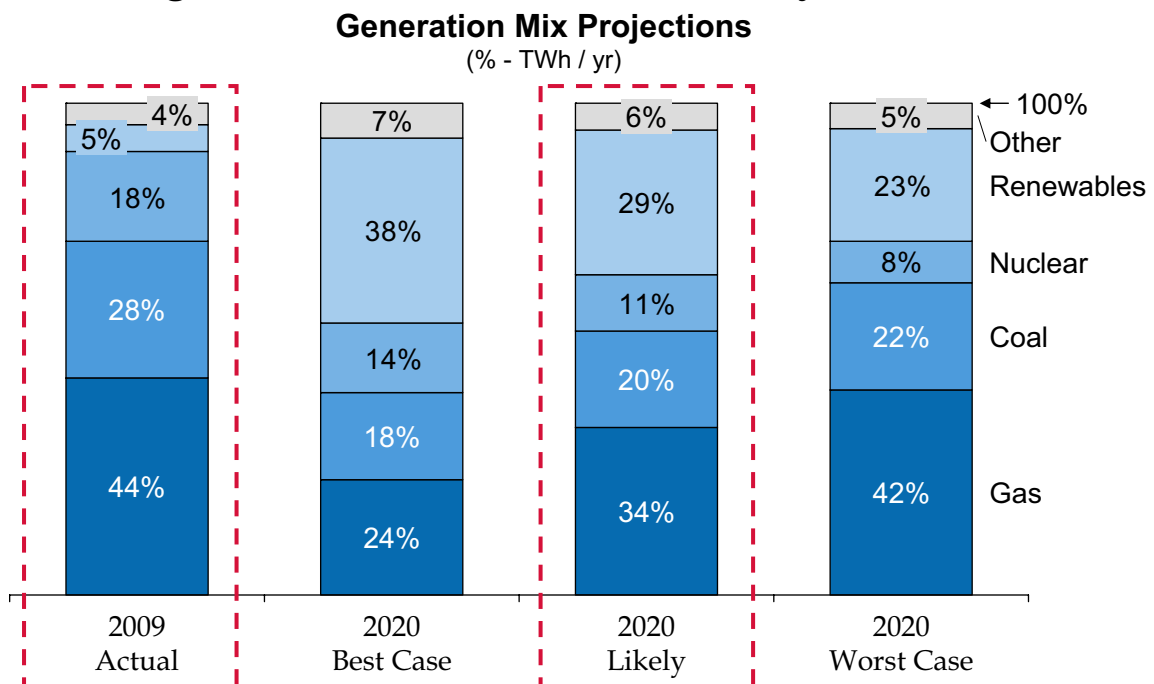
Overall, we believe the *“pace of change”* is insufficient



Source: Booz & Company analysis, CCC



Low Carbon Generation: we think we will get close to the renewable target, but there are risks to delivery

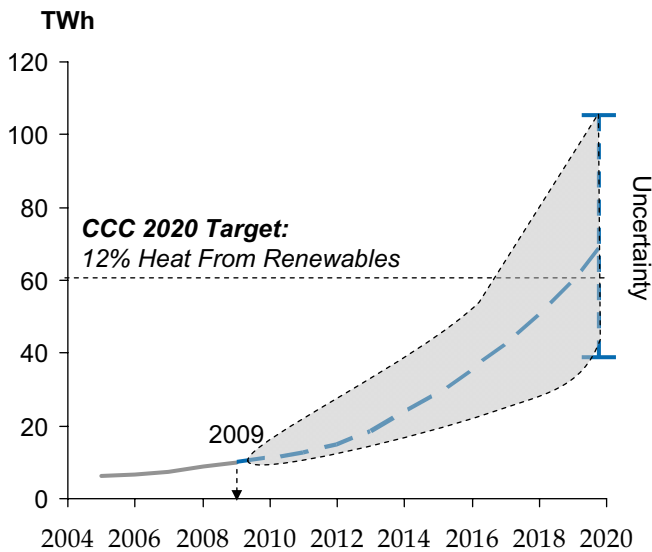


Source: Booz & Company analysis

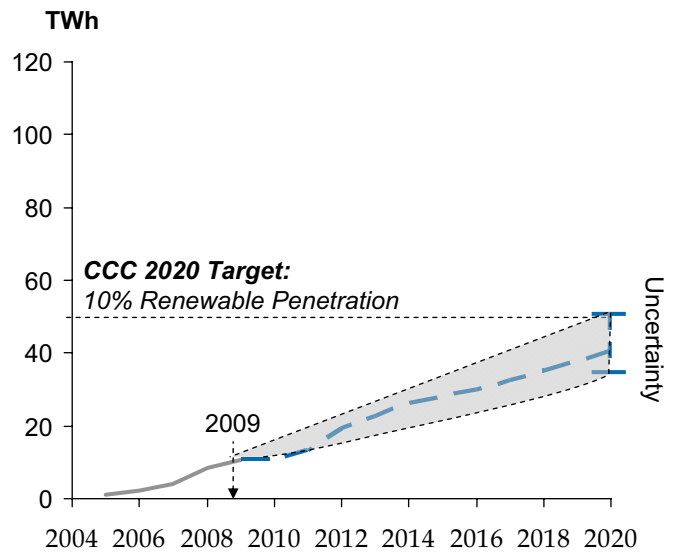


Renewable Heat and Transport: deployment will increase - - high uncertainty, particularly around consumer adoption of technology

Projection for Renewable Heat



Projection for Renewable Transport



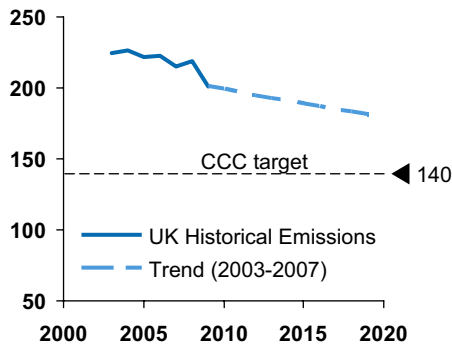
Source: Booz & Company analysis



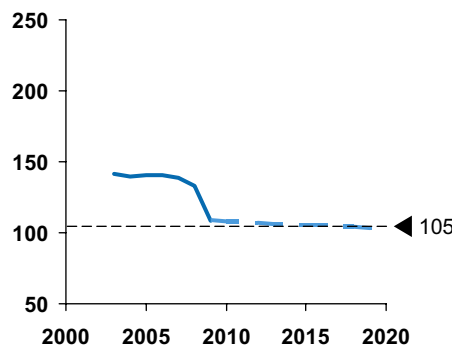
Demand Reduction & Efficiency: current trends suggest there will be limited reduction - - a step change is required

Sector Emissions
(Direct and Indirect Emissions - MtCO₂e)

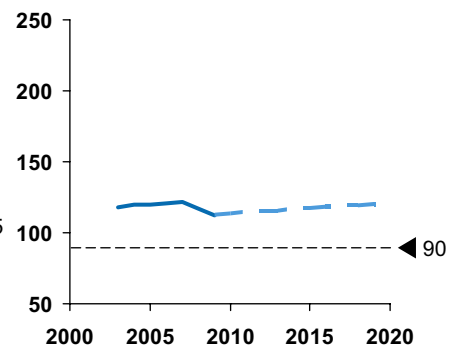
Building



Industrial



Surface Transport



- **Reduction scope:** insulation, boiler replacement, energy efficient appliances, demand reduction

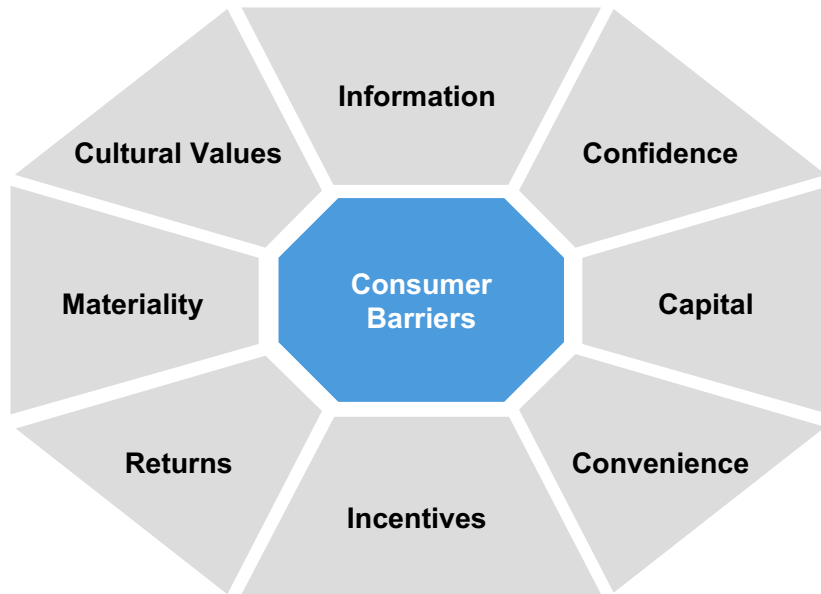
- **Reduction scope:** process, equipment and site-wide optimisation, O&M improvement

- **Reduction scope:** improved efficiency / lower emission vehicles, reduced miles

Source: CCC, DECC, Booz & Company Analysis

There are a number of barriers to both consumer adoption of technologies and changing consumption patterns

Consumer Adoption and Consumption Barriers



Source: Booz & Company analysis

There are practical approaches to change behaviours, outside of funding and regulation

Practical Methods to Overcome Barriers

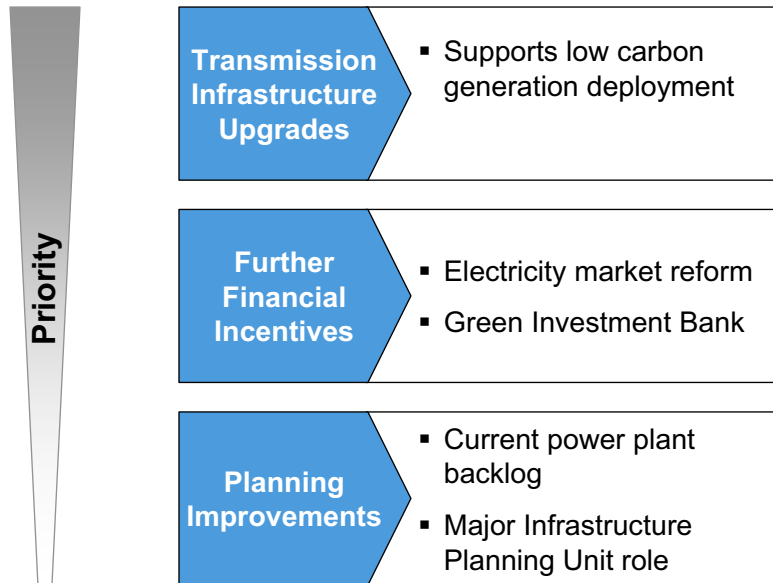
EXAMPLES

- Information**
 - Home energy checks
 - Personalised feedback and advice (e.g. smart meters)
 - Energy Performance Certificates (EPC), labeling
- Motivation**
 - Public education / appeals
 - Reputation drivers
 - Real-time data (e.g. local, national, international)
- Aligning Incentives**
 - Green mortgage
 - Benefits sharing
- Community Action**
 - Peer to peer communication
 - Stakeholder communities

Source: Booz & Company analysis

Our analysis indicates a priority set of actions to relieve supply-side constraints

Priority Supply-side Actions

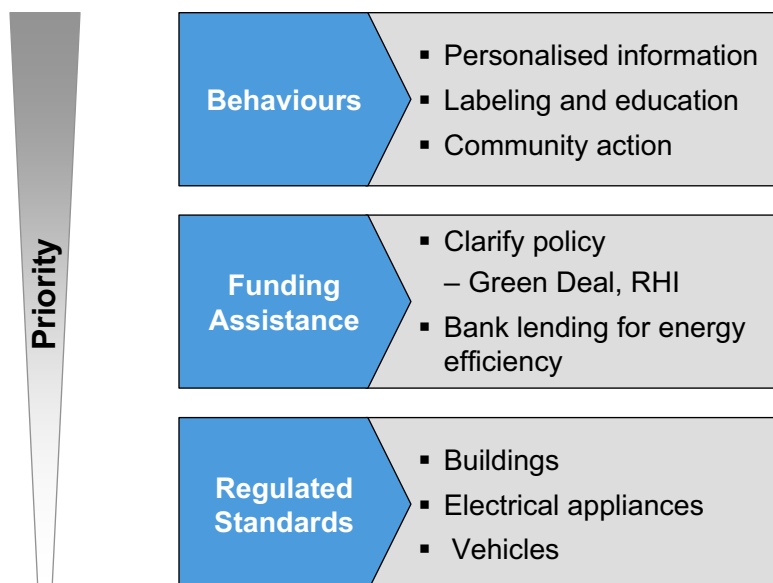


Source: Booz & Company analysis

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On the Demand-side, we have identified a prioritised list of actions - - there is *"no silver bullet"*

Priority Demand-side Actions



Source: Booz & Company analysis

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Questions to Consider

- 1 What is the prioritised set of actions to change consumer behaviours with regards to:
 - The adoption of low carbon technologies
 - Reducing overall consumptions

- 2 Are current government and private sector initiatives sufficient?

**“Changing behaviour - can a cultural shift be achieved
in how people use energy?”**

The Foundation for Science and Technology

*Speech presented by Stuart Groves
Principal, Booz & Company
November 24, 2010*

I. Introduction (Slides 0-1)

I would like to thank Professor Goodman for inviting Booz & Company to discuss “Changing Behaviour - can a cultural shift be achieved in how people use energy?”

At Booz, we have worked with both governments and the private sector on issues related to low carbon, sustainability strategy, and technology deployment.

In preparation for this discussion we conducted a survey with *2degrees*, which was sponsored by *EDF Energy*. We would like to thank both organisations for their support.

In addressing today’s discussion topic, the first question we asked ourselves was what group of “people” are we considering in this cultural shift. We are thinking of consumers (both home and businesses) who make decisions with regards to energy technology deployment and energy consumption.

We have chosen to focus this discussion on how we can change consumers’ behaviours to help meet the 2020 carbon reduction and renewable targets. An alternative approach would have been to take a much longer-term holistic perspective (e.g. thinking about Green cities such as Masdar).

In good consulting style, we challenged the question “Do we NEED a cultural shift in how people use energy”. In doing so we looked at:

- Current UK 2020 targets;
- Progress against targets; and
- Survey results.

We then focused on identifying the specific consumer areas of concern taking an Energy supply and demand perspective. We also assessed the key barriers to:

- Consumer adoption of energy efficiency technologies; and
- Changing consumer consumption patterns.

Finally, we looked at the options to address the concern areas and identified priority next step actions.

II. Summary (Slide 2)

In summary, the UK has made significant progress in delivering the 2020 carbon reduction and renewable targets; however, 2020 delivery is still at risk.

Our recent survey of low carbon experts indicates that a majority believe the 2020 target will not be met, and demand reduction is a key enabler to achieving the target.

Consumer technology adoption of low carbon heat, transportation and demand reduction technologies, and changing consumption patterns are critical to driving down demand.

More needs to be done to change consumer behaviours.

III. Background (Slides 3-4)

Today, the UK has two major targets.

The first is the carbon reduction target, which has been set in law:

- Carbon emission reductions of 34%, relative to 1990 levels, by 2020;
- 5 year interim carbon budgets, with the last one ending in 2022; and
- Carbon emissions reductions of 80%, relative to 1990 levels, by 2050.

The second is the renewable target. The UK target is to source 15% of its energy from renewable sources by 2020. The UK Renewable Energy Strategy sets out a lead scenario to achieving this 15% target:

- Electricity: more than 30% of our electricity generated from renewables;
- Heat: 12% of heat generated from renewables;
- Transportation: 10% of transport energy from renewables; and
- It is also assumed there will be a level of demand reduction.

The UK has made significant progress, making a 25% reduction in carbon emissions since 1990.

However, going forward, and based on trends, the UK will get close to, but is unlikely to meet, the carbon target. In addition, deployment of renewables is still at low levels – the UK is currently far from the renewable target. Furthermore, there is an argument raised by academics such as Dieter Helm - that we have exported a great deal of emissions. In fact, when taking a consumption perspective, emissions have actually risen.

As a result, we believe it will become important to accelerate emissions reductions, particularly by influencing the demand side and consumers.

IV. Survey Results (Slides 5-8)

Our survey supports these findings. We asked low-carbon experts whether they expect the UK to achieve the set targets for carbon reduction by 2020. A majority said “no”. Of those who answered “no”, over 50% expect the target not to be achieved until 2030.

We then asked “Which levers do you expect to contribute most to carbon reduction in the 2020 timeframe?” All survey participants recognise demand reduction as the key lever. Whether or not “we need a cultural shift in the way people use energy” is the right topic to be debating.

We also asked, “Which barriers to implementation do you expect to have the greatest impact between now and 2020?” Three of the top four barriers to delivery relate to demand side / consumer issues:

- Inadequate financial incentives;
- Inadequate incentives for demand reduction; and
- Limited consumer interest and awareness.

Interestingly, most respondents believe we do not have technology limitations to deliver the target - i.e. with current technologies we can get there.

Finally, we asked “Which of the enablers to implementation do you expect to have the greatest impact between now and 2020?” As you might expect, there is no “silver bullet”. Whilst policies to support demand reduction were considered important, there was overall limited consensus.

V. Booz & Company Perspective (Slides 9-12)

Overview

Taking an alternative perspective, Booz & Company assessed whether the UK is on track to meet the 2020 targets.

We analysed from both a Supply and Demand perspective:

- Supply: Low Carbon Generation, Renewable Heat and Transport; and
- Demand: Buildings, Industry, Transport.

From the Low Carbon Generation side, the UK is making progress, but the targets are still at risk. For Renewables Heat and Transport - current deployment levels are low and there is a high degree of uncertainty related to consumer adoption. From the Demand and Efficiency perspective, we believe a significant step change is required through:

- Consumer deployment of efficient technologies; and
- Changes in consumer consumption patterns.

Low Carbon Generation

We have looked at UK energy generation deployment in detail through several projects. Overall, we expect there will be a shift from coal and gas to renewable technologies over the next 10 years. Today, renewable energy deployment is low. However, if the vast majority of projects in the planning phase get built (particularly in onshore wind / offshore wind, biomass), and the projected new projects come online, we believe we can get close to the 30% renewable target based on our likely estimate.

Renewable Heat and Transport

When looking at the renewable targets, overall Renewable Heat and Transport current deployment levels are low, and required trajectories are steep. Influencing consumers is relevant here because technologies (e.g. air and ground source heat pumps) will tend to be deployed on a small scale. There is however considerable uncertainty over the likely uptake levels amongst consumers. Particularly with Renewable Heat, influencing behaviours is critical.

Demand and Efficiency

Taking a carbon target perspective rather than a renewable targets view, current trends suggest there will be limited reduction from Demand and Efficiency improvements. In fact there may be an increase as we emerge from the recession. Particular attention should be paid to the Building and Surface Transport sectors, as these are two areas where influencing consumer behaviour is critical. In addition, in the following sectors, there is scope for reduction:

- **Buildings:** insulation, boiler replacement, energy efficient appliances, increased standards on new homes, changing consumption patterns leading to demand reduction; and
- **Surface transport:** improved efficiency / lower emission vehicles, changing day-to-day driving practices.

Overall, a step change is required

VI. Changing Behaviours (Slides 13-14)

Barriers

When focusing on Renewable Heat and Transport, and Demand and Efficiency, it becomes clear that consumer adoption and consumer consumption patterns are key barriers. The barriers are well documented and are classic market failures. We have provided a comprehensive list. However, to hone in on a few key examples:

Capital: Energy efficiency technologies typically require an upfront capital investment, which can be recouped through energy efficiency savings. However, in today's economic times, available capital is limited.

Convenience: This barrier relate to high transaction costs / lack of infrastructure / low technology availability.

Split incentives: The classic landlord / tenant issues where the beneficiary of an investment (landlord) is not the one who pays (tenant).

Materiality: Potential savings are a small proportion of household or company expenditure. In addition, there is a perception that individual personal impact is low - decisions of millions / billions of people are required to make a change.

Cultural values: Lack of inspirational role models; high consumption is not looked upon negatively - rather people aspire to have products and services

Insufficient returns: Payback period and risk levels do not justify investment.

Options to Address

Most measures to change consumer behaviour fall into 3 categories:

- Funding assistance;
- Regulation; and
- Encouragement of voluntary action.

To address the barriers, funding assistance and regulation are definitely required. The barriers are too significant. The UK has taken a proactive stance in this regard with measures such as the Climate Change Act, Feed-in Tariffs, the Renewable Obligation, and the proposed Green Deal and Renewable Heat Incentive.

However, funding assistance is limited by the extent of funding available and the opportunity cost of diverting resources away from other essential Government services. Regulation is limited in its application by community and commercial opposition. As a result, to really make a long-term difference, fundamental change in behaviours is also required. How can this be achieved?

Information: Promote transparency around how much energy individuals are using. Research in this area suggests that transparency can change consumption patterns. Technologies such as smart meters, or personalised billing can support.

Motivation: Motivate consumers to make a change. Again this approach has proven to be effective. Examples include conducting public education / appeals, identifying opportunities to improve reputation (e.g. company Brand - Tesco, HSBC have all made strides in this area), and real-time data showing the impact of climate change.

Aligning incentives: Ideas such a Green Mortgage or benefits sharing have been discussed.

Community Action: Promoting community action / peer group action. Building a shared sense of purpose within a community can often lead to results (American politics today offers several examples of this).

VII. Delivery of 2020 Targets (Slides 15-16)

As you might expect, there is no “silver bullet” to drive down emissions - the sectors are too broad, the technologies too specific and the barriers too diverse.

Priority Supply-side Actions

On the supply side, we have undertaken a structured analysis in the attempt to prioritise the most important barriers to address.

As an absolute priority, transmission upgrades must proceed as recommended by the Electricity Networks Strategy Group (ENSG) report. These investments are critical to support the delivery of onshore and offshore wind.

As a second priority, additional financial incentives are required to drive investment. Today, the carbon price is too low to stimulate significant infrastructure investment (~15/Euro Tonne). Furthermore, Renewable Obligation levels are unclear post 2014. We believe a carbon floor price is required to stimulate long-term investment. However, potentially a more structural change may be required.

As a third priority, and often mentioned, is planning improvements. We must consider the speed, efficiency and cost of the planning process as this may become a key bottleneck going forward. It would be very helpful to have increased clarity around the role of the Major Infrastructure Planning Unit, which will replace the Infrastructure Planning Commission (IPC).

Priority Demand-side Actions

Similarly on the demand side, we have developed a prioritised list of actions.

Behaviours

- *Personalised information:* smart meter roll-out with personalised information on energy consumption;
- *Labelling and education:* product labelling with increased education / awareness programmes regarding impact and opportunities to reduce consumption; and
- *Community action:* Continuing to support community action on climate change.

Funding Assistance

- *Clarify policy:* There are a number of key policies which have the potential to materially affect demand for energy which need to be clarified. In particular, the funding arrangements and delivery model for the Green Deal and RHI; and
- *Bank lending for energy efficiency:* SME's have limited access to financing to support energy efficiency investments. However, there is a potential carbon reduction prize within this sector.

Regulated Standards

- *Standards in buildings and electrical appliances:* if in buildings, for example, we could regulate to raise standards for the lowest-performing non-domestic buildings, we could save up to 15% of emissions in the sector; and
- *Vehicles:* in vehicles, we have learnt through some recent work with the World Economic Forum, that as well as the potential for electric

vehicles and fuel cells, there is a significant prize for fuel efficiency and carbon savings if existing technologies are deployed.

VIII. Questions for Debate (Slides 17)

- What is the prioritised set of actions to change consumer behaviours with regards to:
 - The adoption of low carbon technologies; and
 - Reducing overall consumptions

- Are current government and private sector initiatives sufficient?