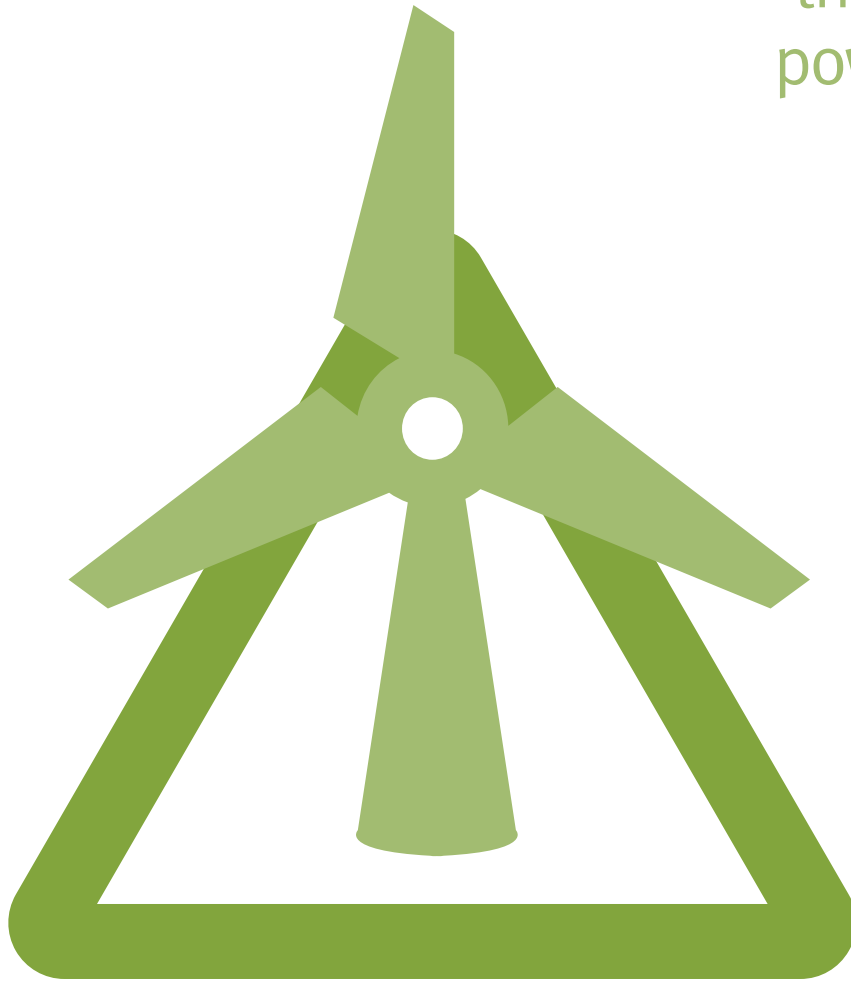


**Going the distance:**  
the low-carbon  
power roadmap



Nearly 40% of UK carbon emissions come from electricity generation, mostly from our coal- and gas-fired power stations. To help achieve the government's target the CBI believes it is possible to reduce carbon emissions from power generation by 39MtCO<sub>2</sub> by 2020, although it will be very challenging, particularly when energy security considerations are taken into account. Only by deploying the full range of low carbon energy technologies – renewables, nuclear and in time carbon capture and storage – will this level of decarbonisation be possible.

With the electricity generation mix in 2020 to be determined by the investment choices of market participants, the CBI believes we should not aim for a preset energy mix. But we must be clear over how much emissions reduction the power sector can practically be expected to deliver: **Exhibit 1** sets out an ambitious but feasible scenario which we believe would deliver the 39MtCO<sub>2</sub> reduction. Action on these recommendations could ensure a credible path towards a decarbonised power sector.

The current policy framework has generated some progress towards these levels of emissions reductions. Phase 3 of the EU Emissions Trading Scheme (EU ETS) will see emissions from the EU power and industry sectors decline year by year so that by 2020 they are 21% lower than in 2005. The Renewables Obligation (RO) has helped support the initial deployment of (primarily onshore) wind generation, and current plans to introduce a banding system to favour more expensive technologies will increase the incentives for the deployment of offshore wind power in particular. And the government has set up the Office of Nuclear Development to prepare the way for construction of a new fleet of nuclear reactors by the private sector.

**But we need urgent action to encourage a step-change in investment. This roadmap sets out what is needed to start de-carbonising the power sector:**

- Clear and detailed decision-making on key policy drivers
- Rapid action to implement the Planning Act
- Long-term principles for the post-2020 operation of the EU Emissions Trading Scheme
- An urgent strategy to unblock supply chain constraints
- A better regulatory framework for grid investment.

Together with roadmaps for the buildings, industry and transport sectors this roadmap represents an economy-wide vision for delivering a low-carbon economy by 2020. **Exhibit 2** explains how emissions from power generation can be reduced further – beyond 2020 – to help meet the UK's target of reducing economy-wide emissions by 80% by 2050.

**Exhibit 1 Cutting electricity emissions by 2020**

- 15** Seventy-five percent of the renewables target achieved<sup>1</sup>
- 14** Three new nuclear plants operational by 2020
- 9** Increase in electricity prices from the EU ETS reduces electricity demand
- 1** Two or three UK CCS 0.3GW demonstration plants
- 39** Total emissions reduction

Source: CBI analysis based on Committee on Climate Change data

<sup>1</sup> We recognise that the Government has committed to fully achieving the target, and have set out in our brief Renewable energy: generating business ([www.cbi.org.uk/climatechange](http://www.cbi.org.uk/climatechange)) policies which we believe might make achievement possible without excessive cost. However, given that the obstacles to achieving the renewable targets are significant, and it is achievement of the 2020 GHG target which must take priority, it is prudent to set a policy framework which would enable achievement of the GHG target if only 75% of the renewable target is met.

### Clear and detailed decision-making on key policy drivers

Energy companies are making multi-billion pound investments with payback periods that can be as long as 40 years. They must evaluate the returns they can make in the UK compared to investing elsewhere in the world. The UK energy policy framework is complex and can affect the returns from energy investment significantly. The risk is that where policies are unclear, companies are more likely to delay investment, which given the short timescales for meeting carbon targets, will undermine efforts to tackle climate change.

In some areas, such as whether non-CCS coal plants would be permitted, the government's whole approach is unclear. In most cases the broad policy direction is understood but specific details which investors need to understand before committing funds, have yet to be worked out – in particular:

- Arrangements for auctioning EU ETS Phase 3 carbon allowances
- How the Renewables Obligation will be updated in line with the Renewables Target
- How the UK CCS competition relates to the new funding made available by the EU to support CCS.

In some areas the problem is not so much policy uncertainty, as the urgent need to implement agreed policies. On nuclear, for example, the Office of Nuclear Development (OND) must ensure that the licensing of new reactor designs is completed on time. Likewise, the feasibility study of the Severn Barrage must be completed to time followed by a rapid political decision on construction.

### The role of energy efficiency

Carbon emissions from electricity generation can fall for two reasons: either because the carbon intensity (ie the emission needed to produce a unit of electricity) has reduced, usually because of a change in technology, or because of demand reduction – ie the amount of electricity consumed (and therefore generated) has fallen. Energy efficiency offers the prospect of demand reduction without a fall in living standards.

To get us on course to achieve an 80% cut in UK carbon emissions, large falls in carbon intensity and demand are required. This roadmap focuses on how to reduce the carbon intensity of electricity generation. The carbon savings set out in **Exhibit 1** only include that demand reduction caused directly by the uplift in electricity prices caused by EU ETS.

The buildings roadmap sets out a business vision for the energy efficiency that would deliver additional carbon savings from demand reduction.

### Impact of rising cost of capital

Although energy companies operating in regulated markets can find it easier than some firms to raise investment funds, they are still finding the cost of finance has increased, which in turn can undermine the economics of investment projects. The high cost of capital is a widespread problem with no straightforward solution.

CBI proposals for unblocking credit flows to business must be taken forward, and avoiding policy uncertainty can help lower the risk premium for investment in the UK energy market.

### Rapid action to implement the Planning Act

Planning delays undermine the economics of investment projects. Large energy infrastructure investments such as the Sizewell B nuclear power station or the London Array offshore wind farm are often affected by planning delays which companies find hard to predict.

The government has recognised this risk and the new Planning Act should streamline and improve the planning system for large-scale projects (eg nuclear power stations, large offshore wind farms). Sir Michael Pitt has been appointed as chair of the Infrastructure Planning Commission (IPC) but the Commission is not yet operational, nor are National Policy Statements (NPSs) in place. Rapid implementation of the act is essential to investor confidence.

### Long term principles for post-2020 operation of the EU Emissions Trading Scheme

Despite the media spotlight over the recent fall in the carbon price, there is little evidence that it has undermined investor confidence, given that what matters for investors is not the current spot price, but likely carbon prices in Phases 3 (2013-2020) and 4 (2020+) – the period when low-carbon generation such as new nuclear or offshore windfarms are likely to be coming online and needing to earn returns. By then, the factors that caused the Phase 1 (2005-07) price volatility – over-allocation, leaking of market sensitive information - will no longer occur, and the recession which has depressed current prices is likely to have ended.

More important to consolidating investor confidence in the medium- to long-term carbon market is the provision of further detail and clarification over the rules governing Phases 3 and 4. The technical detail for the implementation of Phase 3 must be agreed as soon as possible, and the EU should explore how it can give more policy certainty for the post-2020 ETS – a start has been made with the inclusion of a cap trajectory for the first five years of Phase 4.

### An urgent strategy to unblock supply chain constraints

As the scale of the investment becomes clearer, supply chain constraints are becoming an issue in some areas. For example:

- Up to 3,000 offshore turbines would need to be installed to deliver the 14GW of offshore wind capacity implied by the government's renewable targets, yet the current supply chain is not geared up to deliver this scale of deployment, and UK demand will be competing with that from other countries investing in offshore wind. Supply chain constraints also push up costs and undermine the economics of offshore wind investment.
- Research by COGENT (the Sector Skills Council that covers the nuclear industry), suggests the nuclear industry will need to quadruple the number of apprentices entering the industry in the next five years to avoid a skills gap emerging at technician level as the nuclear renaissance gets underway.

The risk is that such constraints become bottlenecks preventing rapid progress towards decarbonisation. They also tend to push up costs, making the economics of some low-carbon energy projects increasingly marginal. But supply chain constraints are also opportunities for incumbent companies to expand and for other companies to enter the market. Skills shortages are also opportunities for employees seeking new jobs or retraining.

The market will respond to supply chain constraints if firms see the prospect of a steady flow of new orders in particular sectors. This requires long-term policy clarity from government and good information flows to enable companies to identify opportunities. There may also be a case for some direct incentives – the government's low-carbon industrial strategy will be key here.

For skills, the need is for sectors with likely shortages to be able to offer attractive careers – for example for nuclear technicians the opportunity for progression to foundation and higher degrees.

The government must work with business sectors and the higher education sector to develop a route map to increase the supply of skills to shortage areas and to help the supply chain increase capacity.

### **A better regulatory framework for grid investment**

New nuclear stations, a massive deployment of offshore and additional onshore large scale wind, and more use of small scale decentralised generation will require significant change and investment to the existing electricity grid. The Electricity Networks Strategy Group estimate grid investment of £4.7bn by 2020 may be required.

But current Ofgem regulation does not help grid investment looking to anticipate deployment of new generation. The risk is that neither generators nor the grid companies are able to accelerate investment plans with the confidence that they will mesh together. The same problem will occur with the connections needed for offshore windfarms.

A revised mechanism of strategic investment is required so that investment is undertaken prior to 'connection signals' from generators. Regulatory funding to allow this investment – and the mechanism for this – needs to be agreed rapidly between Ofgem, DECC and the industry so that preliminary engineering work can begin in 2009. A strategic approach to offshore network connections is also needed.

### **Exhibit 2 Reducing carbon emissions from the power sector beyond 2020**

The conclusions of the Committee on Climate Change (CCC) point to the need for a near total decarbonisation of the power sector if the UK is to be sure of reaching the target of an 80% cut in emissions by 2050. This is likely to require a continued expansion of the new nuclear programme to 2030, possibly taking nuclear generation above current levels of 20% of the electricity mix. In addition, if coal is to have a long-term role then coal stations will increasingly need to have CCS, and the same will increasingly be true of gas fired power stations.

It should also be noted that beyond 2020, once significant decarbonisation has been achieved, there could be significant abatement in the transport and buildings sector through widescale deployment of electric vehicles, and by converting space and water heating in buildings and domestic cooking from predominantly gas-fired today to electric. Our view of the feasibility of this approach is given in the buildings and transport roadmaps, but going down this route could increase total electricity demand at peak times from current levels, requiring additional grid upgrades and reinforcement.

# A power roadmap to 2020

## 2009

### Existing policies:

- Renewables Strategy needed to clarify how Renewable Obligation (RO) will be updated to drive level of wind power to meet UK renewables target
- Infrastructure Planning Commission (IPC) formed
- National policy statements on renewables, nuclear, networks and fossil fuels consulted on and designated
- Carbon Capture and Storage (CCS) competition winner announced
- CCS Directive transposed into UK law and international regulations agreed

### New policies:

- Support for at least one more UK CCS demonstration project announced
- Strategic grid investment mechanism agreed

### Market response:

- Offshore wind turbine supply chain starts to scale up

## 2010-2012

### Existing policies:

- New government (regardless of party) to reiterate commitment to new nuclear programme, RO and IPC
- Ofgem approves specific grid proposed upgrades necessary to connect additional renewable capacity
- Nuclear reactor design licensing to be completed by 2011

### New policies:

- Decision on funding and development of shared CCS pipeline network
- Positive decision on Severn Barrage

### Market response:

- First nuclear planning applications made 2010/11
- Increasing take-up of apprenticeships across power sector

Delivering total  
emissions reductions of  
-39MtCO<sub>2</sub> by 2020

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## 2013-2017

### Existing policies:

- Planning consented for at least three nuclear plants

### Market response:

- Severn Barrage construction begun
- Offshore wind turbines supply chain continues to scale up – ongoing construction of offshore wind farms
- Construction started on at least two nuclear plants
- Planning applications for 2-3 more nuclear plants being considered by IPC
- Two UK CCS demonstration projects operational

## 2018-2020

### New policies:

- European Union members states agree proposals for the 4th phase of the EU Emissions Trading Scheme reflecting the new 2012 international deal on climate change

### Market response:

- 27GW of wind capacity operational
- Severn barrage close to completion
- Three new nuclear stations operational with two more under construction
- Applications for three more being considered by IPC
- A further UK CCS demonstration project operational
- Eight to ten other EU CCS demonstration projects operational
- CCS costs down to below €50/tonne
- Some coal/gas operators commit in principle to retrofit CCS to existing power stations



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For further information about CBI work on climate change or a copy of this report in large text format contact:

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## Climate change: everyone's business

The CBI climate change board:  
building a low-carbon economy

The CBI climate change board was set up in 2008 to deliver the commitments set out in the CBI 2007 climate change taskforce report 'Climate change: everyone's business.' The report recognised that government, business and consumers all have a role to play in making the shift to a low carbon economy. The board brings together senior business leaders from a range of sectors to demonstrate business commitment to managing the risk of climate change by:

- promoting business-led policy solutions to realise carbon savings
- showcasing business opportunities for green growth
- leading by example on corporate commitments to manage carbon footprint
- monitoring progress by government and business in realising the UK's carbon targets
- influencing a post-2012 international climate change agreement.



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