CBI
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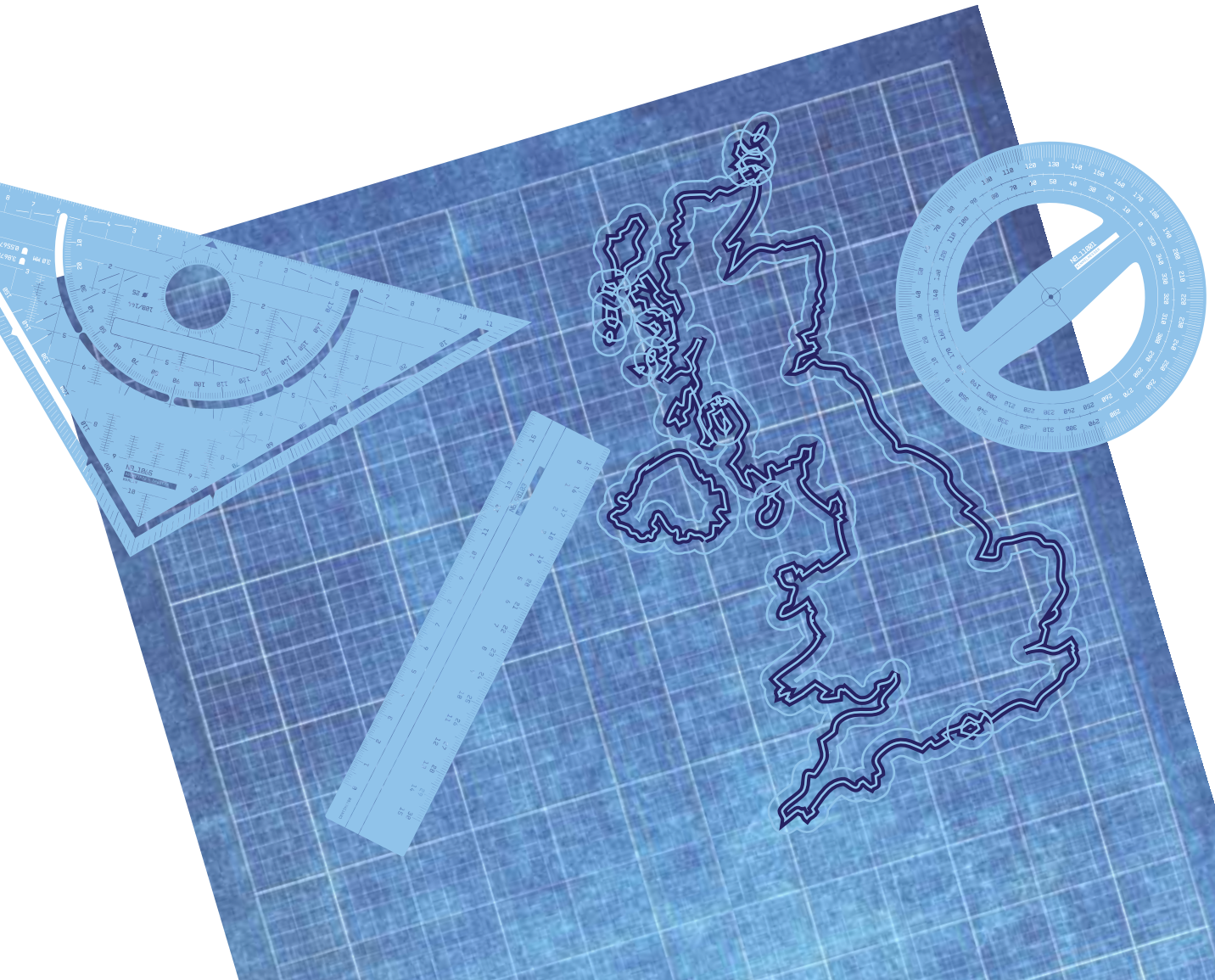
Protecting the UK's foundations

A blueprint for energy-intensive industries



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Overview and recommendations

A successful low-carbon economy will include industries that require a lot of energy. These energy-intensive industries (Exhibit 1**) have an essential role to play in delivering the UK's transition to a low-carbon economy as well as contributing to economic growth and employment. They provide the lubricants for wind turbines, the light-weight materials for electric vehicles and the fibreglass to insulate our homes.**

But the UK's energy-intensive industries are at risk of being undermined by increases to their energy costs. Without mitigating action, damage to their competitiveness could endanger their chances of remaining in the UK. If we do not secure the future of these industries, we will be forced to import what we should be exporting.

Energy costs have to rise...

The CBI has led industry calls for carbon emission reduction polices on the basis that climate change poses a significant risk, but also presents major opportunities for UK businesses. Change on this scale does not come free. Businesses fully understand this will mean increased energy costs for everyone in the short to medium term. The CBI believes this cost is a worthwhile price to pay for the massive upgrade needed to provide a more secure, lower-carbon energy mix for tomorrow. But we need to ensure that those businesses most reliant on energy are able to survive and grow through this transition.

... but they must not put energy-intensive industries at risk

We set out our landmark report for a sustainable energy future in 2009 in our CBI *Decision time*[1] report. Two years later we remain committed to delivering a future energy mix which is secure, low-carbon and achieved in a way which does not undermine the UK's competitiveness. In the case of certain energy-intensive industries, however, the cumulative impact of climate change and energy polices – and in particular the recently announced carbon floor price – risks making them uncompetitive within the European Union as well as outside it.

The government has rightly recognised the issue

We welcome the government's plan to produce a strategy this autumn to support energy-intensive industries. This report is intended to help shape the forthcoming strategy, based on the following analysis:

1. **Energy-intensive industries are essential to the UK's low-carbon economy**
2. **The cumulative impact of energy and climate change policy is putting the competitiveness of key UK energy-intensive industries at risk**
3. **Policy changes are needed to support energy-intensive industries:**
   - **Exemption from the carbon floor price is the most effective immediate solution**
   - **A range of other policy changes – at no cost to the government – could help ensure these energy-intensive industries remain in the UK**
   - **Much can also be done to support further development of energy efficiency technologies.**

Exhibit 1 **What are energy-intensive industries?**

Energy-intensive industries have been defined as companies in the EU 2000 Regulation on Pollution Prevention and Control, and within the 2006 EU Energy Products Directive whose energy intensity is more than 3% (ie energy costs must be 3% or more of their production costs.[2])

Companies which typically qualify as energy-intensive according to this definition include companies in sectors such as chemicals, steel, cement, aluminium, glass, paper and ceramics.

CBI solutions to support energy-intensive industries

As a contribution to help the government as it draws up its strategy for the UK's energy-intensive industries, this blueprint sets out 13 recommendations:

Recommendation 1:
The government should work with businesses to assess the cumulative impact on energy-intensive industries of current and proposed energy and climate change policies. The exercise should identify which industries are most at risk of carbon leakage, through evidenced-based international comparisons using transparent, measurable criteria.

Recommendation 2:
The government should consider a rebate-based exemption from the carbon floor price for energy-intensive industries most at risk of carbon leakage. The model should be linked to energy efficiency benchmarks. This offers the most immediate and direct solution to alleviate the impact of the carbon floor price, ensuring UK energy-intensive industries most at risk of carbon leakage remain competitive while reducing their carbon emissions.

Recommendation 3:
The government should help shape EU state aid guidelines to enable member states to protect the competitiveness of industries most at risk of carbon leakage. It must then fully utilise these rules to support UK energy-intensive industries.

Recommendation 4:
The government should work with energy-intensive industries to investigate how conglomerates could negotiate long-term power contracts with energy suppliers. Energy-intensive industries could secure lower energy prices by buying in bulk and low-carbon energy suppliers would have certainty over future revenues, allowing them to secure funding for new energy infrastructure.

Recommendation 5:
The government should explore with specific sectors how they are able to reduce power consumption when called upon for short periods, in order to help balance demand in the electricity network. Energy-intensive industries would benefit financially from being able to offer flexibility in demand and they could better contribute to energy security.

Recommendation 6:
The government, in conjunction with business partners, should explore the potential for giving credit for de-carbonising UK supply chains. Energy-intensive industries would benefit from being able to obtain credit while maximising potential for improved energy savings across supply chains.

Recommendation 7:
Business and government should explore the creation of private procurement standards for low-carbon energy-intensive products. The government could help develop thinking on what these procurement standards might look like and how they might be implemented. Procurement standards would help to reduce carbon emissions in the UK, while reducing the risk of carbon leakage by ensuring that there is a level playing field for energy-intensive industries in the domestic market.

Recommendation 8:
The government should assist businesses in energy-intensive industries most at risk with development of sector decarbonisation roadmaps. Greater visibility and clarity of the future steps required to decarbonise energy-intensive industries will help encourage innovation and investment, enabling these sectors to reduce carbon emissions cost-effectively.

Recommendation 9:
The government should set out its plans to further support combined heat and power (CHP) and should support this via feed-in-tariffs, recognizing that CHP and CCHP can offer some energy-intensive industries a cost-effective way of increasing energy efficiency.

Recommendation 10:
The government should support and encourage development of a carbon capture and storage (CCS) strategy for energy-intensive industries. A strategy for the implementation of CCS for energy-intensive industries, developed in consultation with those businesses, will allow greater certainty and thus enable infrastructure investment.

Recommendation 11:
The government should ensure the Green Investment Bank delivers finance to support industrial efficiency programmes. This will help energy-intensive industries increase investment in new industrial low-carbon projects.

Recommendation 12:
In consultation with businesses, the government should develop a low-carbon heat strategy and a bio-energy strategy that includes encouraging the use of waste heat and takes energy-intensive industries into account. Energy-intensive industries could benefit directly if utilised waste heat formed part of CCAs or indirectly through commercial contracts with third parties, who would gain benefits under other appropriate schemes such as the Carbon Reduction Commitment (CRC) scheme.

Recommendation 13:
The government must address barriers to better waste management for energy-intensive industries by linking waste and energy policies. Removing barriers to recycling waste as fuel will help energy-intensive industries to reduce their own third-party energy demands or may allow them to benefit from sales of waste to biomass producers.

1 Energy-intensive industries: essential for the UK's low-carbon economy

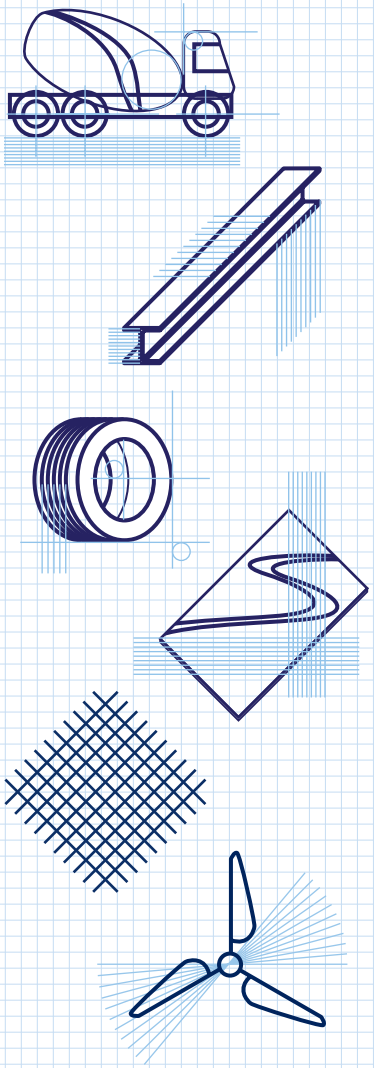
Energy-intensive industries have a crucial role to play in the UK's transition to a low-carbon economy. They are also major contributors to economic growth and employment. Businesses in these sectors have already made significant cuts to their carbon emissions and some are reaching the limits of what is achievable with current technology. For further progress to be made, it is essential the government puts in place the right framework to encourage these companies to continue to invest in energy-efficient technology in the UK.

Energy-intensive industries are a crucial piece of the UK's low-carbon jigsaw

Transformation of the UK into a low-carbon economy will depend on products made by businesses which rely on a high-intensity of energy use. For example, new power plants, low-emission cars, higher-efficiency home appliances, energy-efficient plant and machinery, and energy-efficient homes all require a myriad of energy-intensive materials. These include steel, cement, rubber, numerous chemicals, glass, ceramics and other products. If we do not produce these materials in the UK, we will need to import them. **Exhibit 2** further illustrates the role energy-intensive industries play in the UK's low-carbon economy.

Exhibit 2 **The role energy-intensive industries play in the UK's low-carbon economy**

- A wide variety of chemicals are needed in products like insulation, double glazing, materials for wind turbines, lightweight materials in planes and cars and low-temperature detergents. It is estimated that use of these materials saves over twice the amount of CO_2 produced during their manufacture.[3]
- The International Energy Agency estimates that 9-150 tonnes of cement and 25-150 tonnes of steel are needed for each megawatt of gas power, nuclear or offshore wind.[4]
- Increasing amounts of strong, but lightweight steel, aluminium and plastic materials are needed to help increase the fuel efficiency of new vehicles.
- Low-rolling resistance tyres can save significant carbon emissions when used, far exceeding the emissions associated with their manufacture.
- Among the materials needed for retrofitting buildings to make them more energy efficient, 0.5-3kg of glass and 10-100kg of bricks and tiles are needed for every square meter of retrofitted housing space.[5]
- High-tech textiles are used for fire protection in wind turbines.
- Robust ceramic refractory materials are needed to improve the efficiency of producing various metals and glass.



Global demand for high-energy goods and materials – both for use in low-carbon solutions and in other products – is forecast to increase rapidly. The Carbon Trust estimates that global demand for ferrous metals, such as steel, will double by 2050.[6] We need to find ways to ensure production of these goods is compatible with developing a global low-carbon economy.

As businesses in energy-intensive industries are an essential part of the UK's low-carbon jigsaw, it is vital there is a strategy in place which enables them to remain in the UK.

Energy-intensive industries contribute to economic growth and job generation...

Energy-intensive industries account for 1% of the UK's GDP and directly employ an estimated 225,000 people in the UK, according to a study for the Energy-intensive Users Group (EIUG).[7] This is a significant contribution, but they also play an important role in the success of many other companies through their supply chains, so the multiplier effect on economic growth and jobs is far greater.

Tata Steel, for example, estimates it creates five indirect jobs for every one direct employee. As the case study on process industries illustrates, keeping energy-intensive industries competitive is important for maintaining a far wider range of UK industrial sectors successfully (**Exhibit 3**). Energy-intensive industries are often located in clusters, resulting in an important localised manufacturing supply chain.

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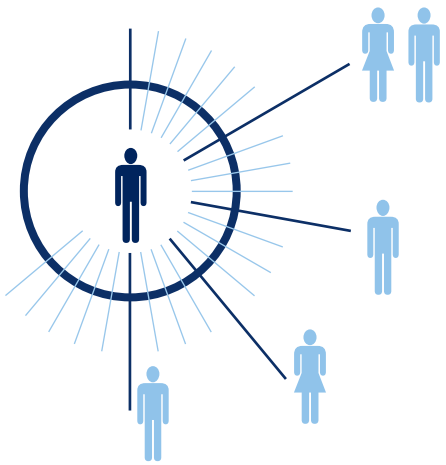


Exhibit 3 Process industries show a multiplier effect on economic activity

The term 'process industries' includes chemicals, petrochemicals, cosmetics, mining, and manufacturers of paper, glass and metals as well as their supply chains. These are high-tech, highly-skilled sectors where raw materials are taken through a chemical or physical process to be transformed into finished products. Process industries differentiate from other manufacturing sectors in that their final products cannot be 'reverse processed' back into their raw materials.

At the heart of the UK process industries sector are four clusters: Grangemouth (Scotland), Teesside (North East), the Humber Estuary (Yorkshire) and Runcorn (the North West). The infrastructure associated with these is significant, so once attracted, investment is likely to be long term, enabling the development of significant supply chains – and generating jobs. The viability of one part of any given industry cluster significantly supports the viability of the cluster as a whole.

Equally, loss of part of the cluster affects the viability of the other parts. For instance, the closure of an ethylene oxide plant on the Wilton Site in Teesside in 2010 has resulted in longer supply chains, increased logistics costs and risks, and a loss of competitiveness in remaining businesses at this business cluster.

... as well as boosting innovation and exports

The clustering effect can also lead to cross-fertilisation of ideas and concepts, helping to develop UK technology, expertise and skills. Many examples of UK successes in the low-carbon area are highlighted in the 2009 CBI report *Pulling ahead: innovating for low-carbon leadership*.[8]

Energy-intensive industries also make a major contribution to UK exports. Currently, manufacturing accounts for 55% of the UK's exports, helping to reduce the UK's trade deficit.[9] Energy-intensive industries contribute to exports both directly and indirectly. As one vehicle manufacturer puts it, "*we export 70% of our goods, and*

energy-intensive industries are a critical part of our UK manufacturing supply chain." The strategy for energy-intensive industries needs to reflect their essential role in the wider economy.

Energy-intensive industries have already made significant cuts in their carbon emissions

All sectors will need to continue to reduce emissions to ensure that the UK meets its ambitious climate change commitments. Through the 2008 Climate Change Act, the UK is committed to a legally binding target of an 80% reduction in greenhouse gas emissions by 2050 against 1990 levels. The government has translated this into a shorter term target of a 34% reduction by 2020. At the EU level, the UK is legally bound to reduce carbon emissions by 20% by 2020 compared to 1990 levels.

Official figures from the department for energy and climate change highlight the contribution that different sectors make to the UK's CO_2 emissions (**Exhibit 4**) and the reductions that they have achieved since 1990 (**Exhibit 5**).

For many energy-intensive industries, implementing technological innovations has led to significant improvements in energy efficiency over the past decade. There are also major investments underway which will reduce emissions further once they become operational, such as the INEOS energy from waste combined heat and power (CHP) project in Cheshire. These investments have ensured that these companies are at the forefront of the UK's progression to a low-carbon economy.

Further cuts depend on the right framework for investment

Many energy-intensive industries, however, have already implemented the majority of the CO_2 abatement options available. For some companies, continued significant energy efficiency savings will only be possible with new technological breakthroughs or through full replacement of long-term production assets when they are due for renewal. The latter investment is a long-term one that requires that investors feel confident about the long-term viability of their business in the UK. So the implication for these energy-intensive industries is that there will be limited opportunities to further reduce or mitigate rising energy costs beyond what they have already projected.

For other energy-intensive industries, technological innovation and higher energy efficiencies may still be an option. The right long-term framework for investment will be critical to ensuring that these companies are able to adopt new and proven technologies to reduce their energy consumption. The government needs to ensure that its strategy for energy-intensive industries reflects the need to both encourage companies to continue to invest in energy-efficient technology where this is still possible, as well as recognise those energy-intensive industries which are already doing as much as they can.

Exhibit 4 **2009 UK CO_2 emissions by sector (%)**[10]

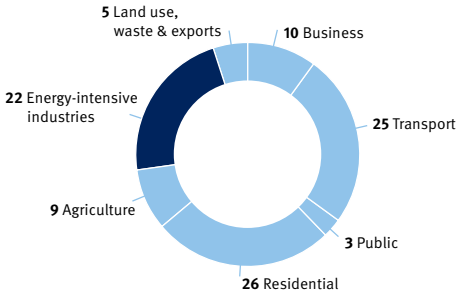
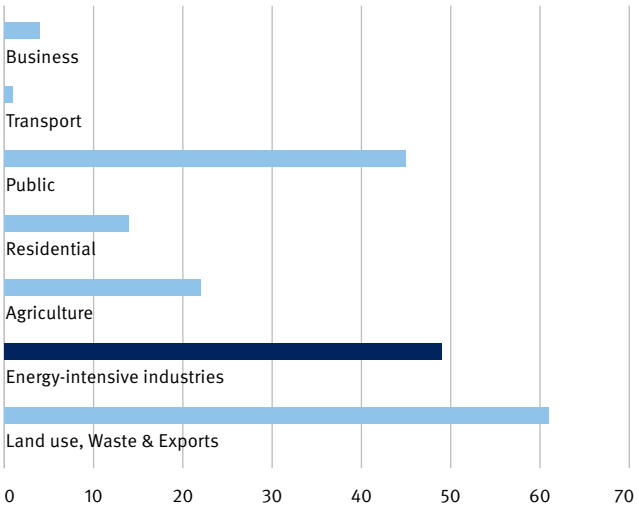


Exhibit 5 **2009 percentage reduction on 1990 levels**[11]



CBI has reclassified iron and steel combustion and other industrial combustion within DECC's business category and the entire industrial category as energy-intensive.

2 Competitiveness of key UK energy-intensive industries is at risk

To meet European and UK climate change targets, a series of climate change and energy policies are in place – or are being designed – to incentivise businesses to reduce carbon emissions. The CBI has consistently called for and welcomed a target-based approach, but it has warned that these policies must not undermine business competitiveness. Without government action, we now face the prospect that the cumulative impact of climate change and energy policies is placing some energy-intensive industries at risk of losing their competitiveness.

Energy-intensive industries have coped with policies to date

In the short term, each carbon-reduction policy will have varying degrees of impact on the businesses and industrial plants subject to it. There may be upfront costs to achieve compliance, such as investment in technology enhancement, new technology or new management and operating systems.

Exhibit 6 Snapshot of main EU and UK energy and climate change policy

The EU Emissions Trading Scheme (EU ETS)

Launched in 2005, the scheme allows the most cost-effective carbon reduction opportunities to be realised by enabling businesses to trade 'carbon allowances' across the EU. This market fosters take-up of carbon reduction options as companies can invest or must buy credits from other companies who have invested instead.

The scheme was also designed to address competitiveness by applying measures to sectors determined to be most exposed to losing their global competitiveness by allocating sectors 'at risk' free allowances.

Renewable obligation

Introduced in 2002, the UK government's renewable obligation legislation mandates electricity companies to supply a percentage of their electricity annually from renewable sources. This policy thus helps the UK meet its separate commitment of 15% renewable energy by 2020. If an energy supplier fails to meet the annual target, they are subject to a penalty. Each year, the targeted amount for renewable electricity increases along with the cost of the penalty to reflect changes in RPI.

UK Climate Change Levy and Climate Change Agreements

Introduced in 2002, the Climate Change Levy (CCL) is a tax that is applied to electricity, gas, liquefied petroleum gas (LPG) and solid fuels. The CCL is applied to the supply of these commodities to businesses and the public sector. Because the CCL created competitiveness concerns when first introduced, the government reduced the CCL by 80% for energy-intensive industries exposed to international competition through sector-based Climate Change Agreements (CCAs).

As a result, more emissions have been reduced than originally forecast through companies cooperating via their sector associations. There are now 54 sectors with CCAs. In the spring 2011 budget, the government extended CCAs to 2023 and restored the CCL discount on electricity from 65% to 80% for new CCAs.

In the case of energy-intensive industries, the policies put in place to date have by and large enabled them to reduce their carbon emissions while maintaining their competitiveness. Energy emissions reduction is already a top priority for businesses in these industries given that, by definition, energy accounts for a large percentage of their production costs. **Exhibit 6** provides a snapshot of the main energy and climate change polices impacting on energy-intensive industries

Introducing the carbon floor price could tip the balance

In 2009, the CBI led industry calls for reforms to electricity market policies, as set out in our *Decision time*[12] report, on the basis that reform was needed to deliver a secure, low-carbon and affordable long-term energy mix. This led to the most recent package of energy policies – the July 2011 energy white paper and the carbon floor price.

The energy white paper is targeted at energy generation, aiming to reform the electricity market by better incentivising investment in low-carbon infrastructure, including nuclear. The white paper includes a feed-in tariff for low-carbon energy generation, capacity payments for generation of back-up energy supplies and an energy emissions standard.

In addition, in the 2011 budget, the government introduced a 'carbon floor price' mechanism (CFP). This imposes a tariff on energy generation. It will come into force in 2013 and is designed to supplement the European price of carbon under the EU ETS if carbon prices fall below the government's target trajectory. Every year, the CFP will be set for the next two years ahead. It will act as a 'floor' if European market prices for carbon fall. However, there is no guarantee that the tariff would come down (fast enough) to avoid companies paying the UK tariff on top of the European cost of carbon allowances. This means that, unlike their European counterparts, UK firms may have to pay twice for their carbon emissions – once through the EU ETS and then again through the CFP.

Some commentators have argued that this could be offset by the stockpiling of EU ETS credits during the recession. Allowances protect only against EU ETS costs, however, and do not protect energy-intensive industries from other energy policy costs. Furthermore, many companies sold excess allowances to generate essential funds during the economic down turn (**Exhibit 7**).

The policies set out in **Exhibit 6** have had a growing cumulative impact over the past decade. Indeed, an independent study for the Energy-intensive Users Group, updated in 2011,[13] estimates that energy accounts for as much as between 25%-60% of production costs for companies in energy-intensive sectors such as steel and forging, ceramics and brick, fertiliser, aluminium, pulp and paper making and industrial gases.

Exhibit 8 illustrates the cumulative impact of EU and UK climate change and energy policies in terms of costs for energy users. By adding the impact of the CFP to this accumulation of policies, some energy-intensive industries will not be able to balance carbon-reduction policy compliance with staying competitive. The CFP risks becoming the tipping point which removes their ability to remain competitive as UK-based businesses.

Government should bear in mind that future policies could also become tipping points, for example, levies to pay for the new low-carbon feed-in tariffs. Government should therefore consider how it can exempt those most at risk from such future levies.

Some energy-intensive industries are now at risk of 'carbon leakage'

For UK firms competing primarily in the domestic market or for whom energy costs are only a small proportion of total costs, the direct impact of carbon reduction policies on energy prices should be manageable.

But for some sectors, climate change and energy policies risk making them uncompetitive in the European and global marketplace. In particular, for those energy-intensive businesses where energy costs make up a substantial element of their cost base, increases will drive up costs of production and erode profit margins. Companies in this situation will be forced to increase their prices, if market conditions permit.

Exhibit 7 Stockpiling of EU ETS allowances

Due to the economic downturn and corresponding reduction in industrial production, some companies may have managed to stockpile their free EU ETS allowances to use in subsequent years.

This does not matter for carbon reduction targets as the overall target level of CO_2 emissions is based on a long-term decreasing trajectory. Any increase in emissions in following years through excess free allowances will have been offset by CO_2 savings during the recession, so planned reductions in CO_2 over time will be achieved.

Furthermore, from 2013, free allowances will be allocated through a sector-based benchmarking process. Through this mechanism, the amount of free allowances given will depend on the most carbon-efficient companies in each sector (the top 10%). This should reduce any stockpiling of allowances.

For those businesses that export extensively or which face international competition, price increases may not be sustainable. Businesses based overseas will not be subject to higher energy prices in their home markets as a result of unilateral UK climate change policies. They will be able to continue to market their goods and services at competitive prices. The end result would be that some UK businesses may simply not survive, and the products they currently make will instead be sourced from overseas, where they are not subject to the same carbon reduction policies. This process is referred to as 'carbon leakage', meaning the net impact – including added transport emissions – is an increase in carbon emissions.

Carbon leakage must be avoided

Carbon leakage risks two damaging consequences, both of which are central to reasons for protecting energy-intensive industries. First, it risks the loss of UK jobs and damage to economic growth through shrinkage of the energy-intensive sector's output. The UK may lose these industries as mobile international investment capital shifts to countries where the margins are greater.

The second risk is of causing net CO_2 emissions to increase. This would occur if energy-intensive industries move – or choose to commit future investment – to production locations where the cost of carbon compliance or regulation is less burdensome than in the UK, allowing higher emissions. UK-based businesses will continue to source goods from energy-intensive industries, but they would have to source them from overseas, adding transport CO_2 emissions into the equation.

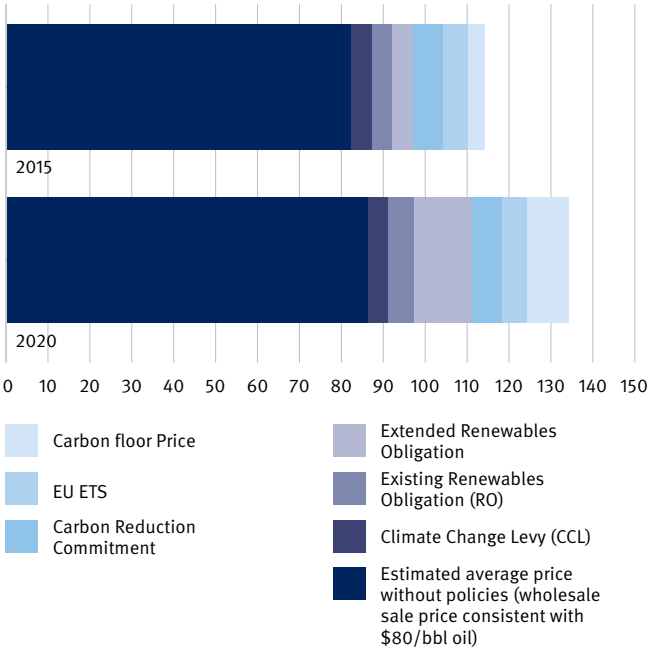
The fate of ThyssenKrupp's steel mill in Dortmund in the late 1990s typifies the image of carbon leakage as meaning the physical relocation of industrial plants to other countries where the cost of production is cheaper (in this case, the entire ThyssenKrupp steel plant was dissembled, and rebuilt in China). Modern carbon leakage discussions focus more on lost future investment in the UK, alongside losing existing manufacturing.

Some argue that if a company already has plant and machinery in the UK and a skilled labour workforce, the relocation costs of moving operations are prohibitive and will prevent carbon leakage. But two main factors would counteract this view.

First, many energy-intensive businesses in the UK are part of international companies that already have operations in other counties. For these companies, the decision is not whether to relocate a business, but which operations to invest in, which to expand and which to scale back.

Secondly, if a company cannot compete at international prices then it will lose customers, unless it can sufficiently differentiate its product from its global competitors. For some industries, higher specifications and quality or branding can allow them to charge higher prices. In the case of most energy-intensive industries, there are limited opportunities to do this – it is for example unrealistic to charge higher prices for premium-branded sheet steel.

Exhibit 8 **Cumulative impact of UK and EU policies (£/MWh)**[14]



By adding the impact of the CFP to this accumulation of policies, some energy-intensive industries will not be able to balance carbon reduction policy compliance with staying competitive. The CFP is the tipping point which removes their ability to remain competitive in the UK.

Wholesale prices are already higher than our competitors

UK energy-intensive industries are already at a disadvantage vis-à-vis their European competitors, as UK wholesale energy prices have generally been higher than elsewhere in Europe even before government policies have added to the cost (**Exhibit 9**).

International comparisons by Eurostat, including energy and climate change taxes, appear to show the UK has lower energy costs than Germany. It is not clear, however, how these graphs have incorporated the wider subsidies and exemptions available in countries such as Germany or how these graphs have taken account of arrangements in countries such as France, where companies can negotiate conglomerate prices. The UK government must therefore undertake its own assessment of the risk posed by carbon leakage once accumulated policy costs have been added.

We need a clear understanding of which firms are most at risk of carbon leakage

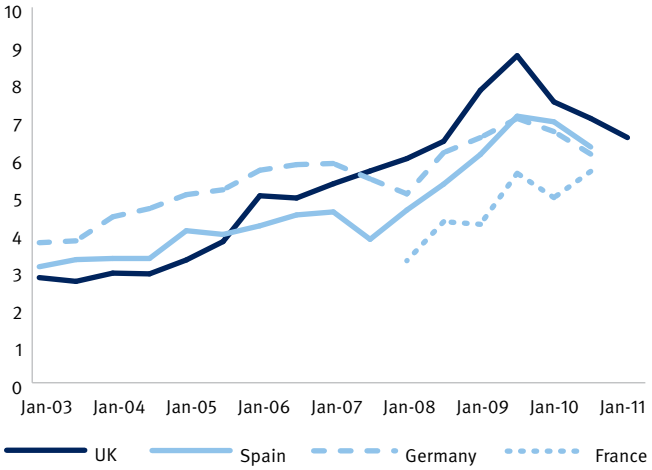
Potential exposure to carbon leakage for any sector is complex to assess, given the number of variables that can contribute to firms choosing to relocate or invest overseas. For this reason, the CBI has not attempted to determine which sectors are most at risk. Instead, we want to work with the government to do this, applying an evidence-based approach.

The CBI recognises that the government is undertaking an extensive analysis to identify areas at risk of carbon leakage. In doing this, it is reasonable that government use the categories identified by the treasury or the EU ETS scheme as a starting point to guide its assessment (**Exhibit 10**). The CBI also suggests the government should use two criteria for assessing carbon leakage – exposure to international competition and energy costs as a percentage of gross value added (GVA).

It is important to learn from previous attempts to classify and assess energy-intensive industries most at risk of carbon leakage across Europe. For example, some businesses consider that the EU categories are sometimes too broad to accurately assess the true risk of carbon leakage. For instance, industrial statistics for the refining sector include 116 EU refineries, but also include 995 other enterprises that manufacture lubricating oils and white spirits, which are not included in the EU ETS. It is essential that the process and data used allows for specific business types to be measured and assessed, while endeavouring not to be excessively bureaucratic.

Moreover, although energy-intensive industries are typically thought to be the first sectors at risk of carbon leakage, it is not clear which secondary and tertiary industries could also be affected, particularly where the energy-intensive industries are part

Exhibit 9 Historic wholesale energy prices have been higher in the UK than in other EU countries before taxes (pence/kWh)[15]



In 2008, Eurostat changed its methodology from prices at specific points in time to average period prices. This led to discontinuity within the price series. The CBI has used both types of data in the same graph as the methodology used was consistent across countries at all points in time. The change in methodology also led to data not being available in some countries for the transition period. The CBI has extrapolated between known data points in these cases.

of a cluster. Companies which use energy-intensive products may be able to accept some increases in the prices of these goods. But they may themselves face a tipping point at which they are no longer able to source supplies at prices which allow them to succeed against foreign competition. Determining which companies may be impacted in this way is difficult, as energy-intensive products will contribute to different secondary products to different degrees and these products will also have different price elasticities. Therefore, while the CBI recommends that the assessment focuses as its top priority on energy-intensive sectors, it must bear in mind that the consequences of carbon leakage may be greater than the loss of single industries.

As an urgent first step in the strategy to support energy-intensive industries, the government must work with business in an evidence-based process to identify which industries are most at risk of carbon leakage.

Recommendation 1: The government should work with businesses to assess the cumulative impact on energy-intensive industries of current and proposed energy and climate change policies. The exercise should identify which industries are most at risk of carbon leakage, through evidenced-based international comparisons using transparent measurable criteria.

Exhibit 10 Companies/sectors likely to be at risk of carbon leakage

As a starting point, the government-backed review could consider the following sectors as those which are likely to include companies most at risk of carbon leakage. This is an indicative list in order of exposure taken from European Commission analysis in 2009.[16] It is not exhaustive – for example it excludes any sectors which do not fall within scope of the EU Emissions Trading Scheme.

- Manufacture of lime
- Manufacture of cement
- Aluminium production
- Manufacture of other inorganic basic chemicals
- Manufacture of refined petroleum products
- Manufacture of basic iron and steel and of ferro-alloys
- Manufacture of paper and paperboard
- Manufacture of bricks, tiles and construction products, in baked clay
- Manufacture of flat glass
- Lead, zinc and tin production
- Manufacture of hollow glass
- Manufacture of starches and starch products
- Manufacture of malt
- Production of ethyl alcohol from fermented materials
- Copper production
- Manufacture of ceramic tiles and flags
- Manufacture of other organic basic chemicals
- Manufacture of sugar
- Preparation and spinning of cotton-type fibres

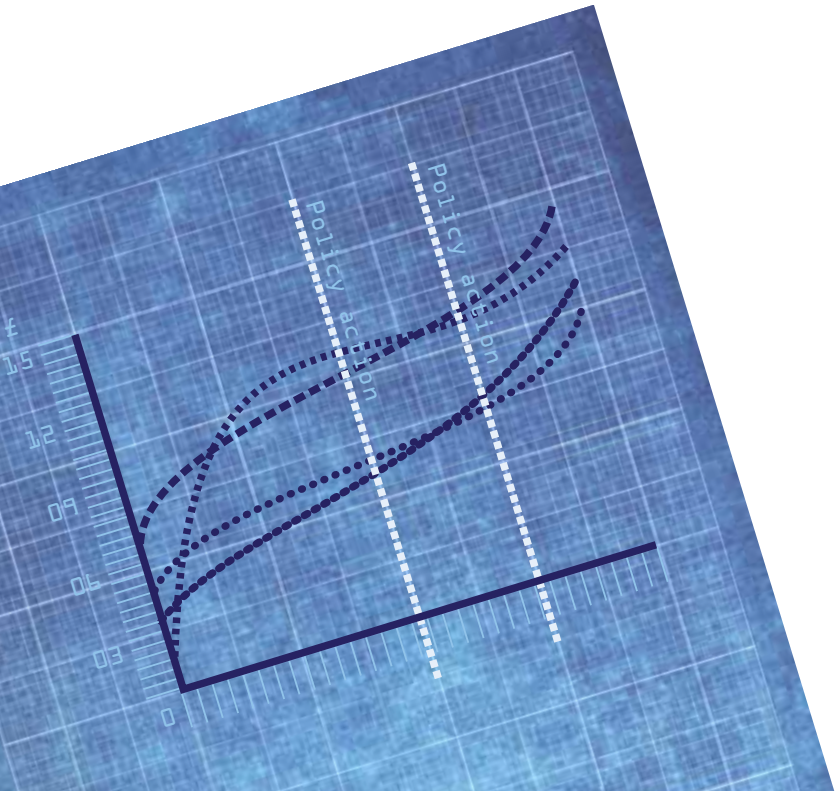
3 Policy changes are needed to support energy-intensive industries

Energy-intensive industries most at risk need exemption from the carbon floor price

A legally-binding international agreement would prevent carbon leakage by providing a level playing field. The government should certainly pursue this, but action is needed in the short term to overcome the risks and challenges facing the UK's energy-intensive industries. An exemption from the carbon floor price would be the most effective immediate solution.

The government is right to press for international agreement...

Ideally, a legally-binding international agreement would prevent carbon leakage by providing a level playing field on which to compete. An agreement would ensure that similar impacts from climate change and energy policy are experienced in all major emitting economies. The government must use the climate change talks in Durban this December as an opportunity to push for international agreement on carbon commitments, while ensuring measures taken in Europe do not further undermine the relative competitiveness of UK energy-intensive industries.



If a legally-binding international agreement were agreed, it might end the necessity of protecting energy-intensive industries. For this reason the CBI's *Trading up*[17] report proposed a 'trigger mechanism' for assessing whether future international agreements reduce the risk of carbon leakage and the necessity for competition-levelling policies.

… but action is needed now to safeguard the future of UK energy-intensive industries

As it is unclear whether, and on what timescales, an international agreement or sectoral approach will lead to genuine, comparable carbon costs increases across non-EU emitters, the government should pursue policy solutions to meet the needs of those UK energy-intensive industries most at risk.

Given the complexity of climate change and energy policy and the different businesses and sectors affected, a one-size-fits-all approach will not help those energy-intensive industries most at risk from carbon leakage. The upcoming strategy for energy-intensive industries will need to reflect this complexity. Different policy solutions will offer varying degrees of support to different energy-intensive industries. Indeed, as part of its forthcoming strategy, government should consider working with energy-intensive industries most at risk of carbon leakage to produce sector specific solutions and road maps.

In developing its strategy, action by the government is needed in three main areas:

- **Immediate policy changes must be made to support the energy-intensive industries most at risk of carbon leakage – an exemption from the carbon floor price would offer the most effective solution.**
- **Further energy-intensive industry-specific policy changes should be considered to provide support**
- **Measures focused on technology deployment could offer direct support to energy-intensive industries seeking to improve their energy efficiency cost-effectively.**

In developing an energy-intensive industries strategy it is clear that there is no silver bullet. The government must maximise the effectiveness of its full suite of policy proposals so the broader policy environment can support energy-intensive industries. For example, the government should finalise its current planning reforms and ensure these remain pro-growth. This will facilitate and speed up investment in energy and low-carbon solutions for both energy-intensive industries and energy suppliers.

Exemption from the carbon floor price could be achieved by a rebate mechanism based on an average weighted price

The CBI urges the government to consider a rebate mechanism to exempt energy-intensive industries most at risk of carbon leakage from the new carbon floor price tariffs – this would offer the most immediate and direct solution. Due to the difficulties in separating the effects of the carbon floor price from the price of electricity (**Exhibit 11,** page 20), the CBI believes that a centralised government approach is required, as users and electricity suppliers will not have visibility over the carbon floor price cost embedded in their electricity.

We propose that the government offer energy rebates to energy-intensive industries most at risk of carbon leakage, based on a weighted average of the annual carbon floor price rates for each fossil fuel type. The weighting given to each rate would depend on how much that fossil fuel contributed to the UK's energy supplies during the period. This would protect those energy-intensive industries at risk by mitigating the average carbon price floor impact across the UK. The weighted average mechanism is illustrated in **Exhibit 12** (page 21).

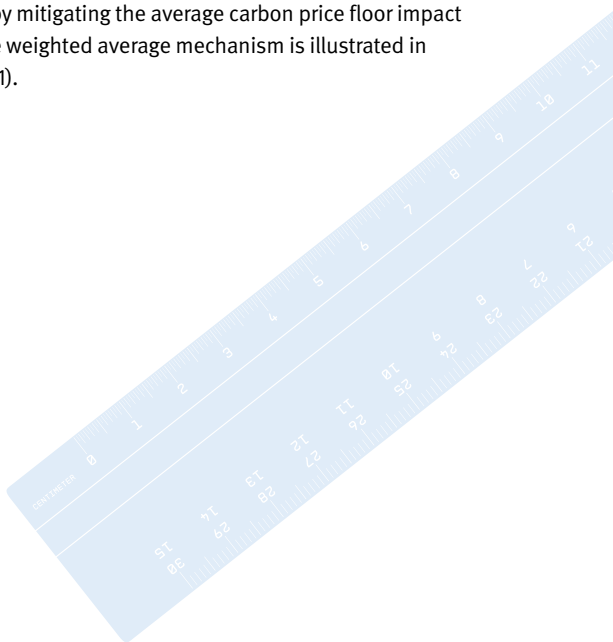
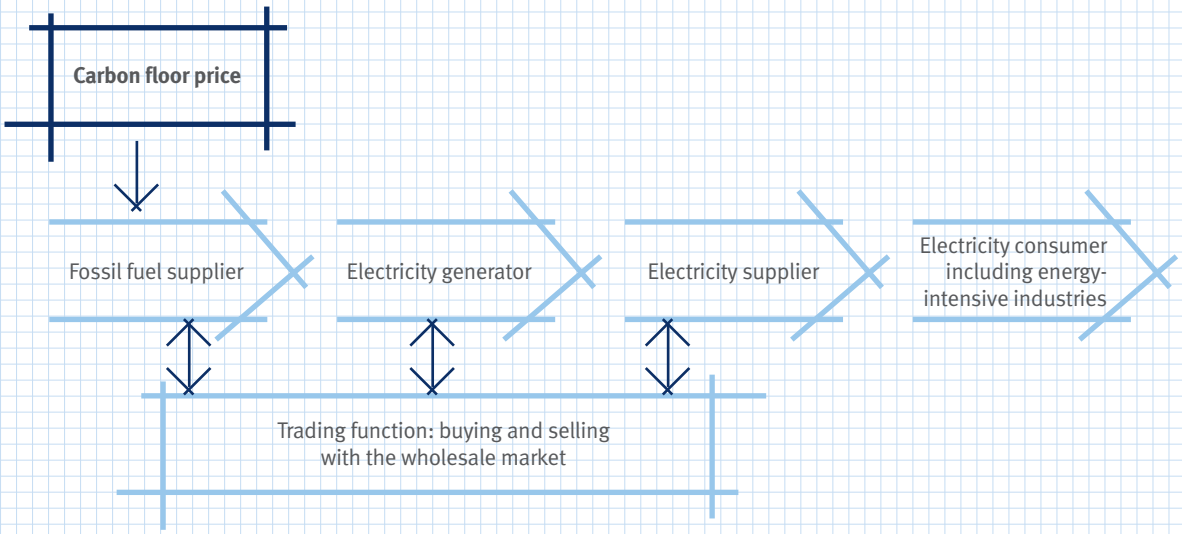


Exhibit 11 **Electricity price supply chain**



Although a weighted average by definition would offer an average amount paid and not the exact amount paid by each end user, we do not believe that this would be a material issue, given the electricity market mechanism and freedom over choice of supplier.

There will be intricacies and implementation questions as to how the percentage attributable to each fossil fuel rate would be calculated. Issues such as 'embedded generation' (generation from very small energy sources) and the export and import of power would also need to be considered. The CBI offers this as a simplified approach and an outline proposal. Alternate rebate models such as one based only on gas (as the price setting marginal plant) could also be considered.

To continue to incentivise energy-intensive industries to reduce their carbon emissions, a condition for receiving an exemption from the carbon floor price and any other future support should be that they improve efficiency through their climate change agreement (CCA). By creating a significant 'upside' to reaching CCA targets, more investment in cutting emissions is likely to be made.

Different rebate models should apply for different sectors, including for combined heat and power

For the most vulnerable energy-intensive industries that have already invested in combined heat and power (CHP) technology, a different mechanism will be required. These companies produce a large amount of their own power and so receive minimal electricity from the grid. The carbon floor price proposal includes CHP plants and so companies will pay the carbon floor price as it will be embedded in the fossil fuels consumed in their CHP plants for both heat and power generation.

These companies will have clear visibility over the fossil fuels used – and hence over the rate that will have been applied by the fossil fuel supplier to them. These companies could claim a rebate based on a return detailing the fossil fuels used in their CHP plants. A range of exemption models may therefore be required.

Exhibit 12 **Illustrative weighted average exemption**

Commodity	CFP rates 2013/2014 (p/kWh)*[18]	Standard thermal efficiencies	Percentage of UK power production**[19]	Weighted average price (p/kWh)
Gas	0.0891	50%	44%	0.078
Gas oil	0.12375	26%	0.5%	0.002
Solid fuel (coal)	0.15345	36%	28%	0.119
Fuel oil	0.13365	26%	0.5%	0.002
Non CPS qualifying (renewable, nuclear etc)	0	0	27%	0
Weighted average price				0.203

* Indicative carbon floor price rates per commodity based on a Carbon floor price rate of £4.94/tCO_2

** Illustrative figures based on DECC statistics tables, fuel oil and gas oil have been split equally based on an Oil figure of 1%

In designing an exemption mechanism, the government's up-coming energy-intensive industries strategy should ensure that the cost of the scheme is not met by increasing costs for other energy users. It must avoid simply shifting the tipping point for carbon leakage to other sectors by increasing costs for them too, to the extent that they then become exposed to carbon leakage.

The CBI estimates that the cost of such a rebate model would be in the region of £300m-£400m in 2013, rising to £600m-£700m by 2015, based on the latest carbon floor price announcements. This is an indicative estimate using the example company in the EIUG report *The cumulative impact of climate change policies on UK energy-intensive industries – are policies effectively focused?*[20] In support of the government's agenda to reduce the public deficit, the cost of such a rebate model must be weighed against the loss of business and employment taxes from 'capital flight' if there were to be no exemption – ie the potential loss of income from those energy-intensive businesses that would otherwise cut back investment in the UK.

Recommendation 2: The government should consider a rebate-based exemption from the carbon floor price for energy-intensive industries most at risk of carbon leakage. The model should be linked to energy efficiency benchmarks. This offers the most immediate and direct solution to alleviate the impact of the carbon floor price, ensuring UK energy-intensive industries most at risk of carbon leakage remain competitive while reducing their carbon emissions.

Policy changes could help energy-intensive industries

While an exemption from the carbon floor price would be the single best solution to reduce the risk of carbon leakage for energy-intensive industries, a number of broader policy changes could help ensure these industries play their full part in reducing emissions. The proposals in this chapter will not add to government costs, but could go a long way to unlocking more emissions reductions across the economy. The government and business will need to work closely together to make the most of them.

Shape EU state aid rules to help protect industries at risk of carbon leakage

The European Commission is currently designing state aid rules aimed at providing compensation to electricity intensive industries that will be impacted by 100% auctioning of carbon allowance in the power sector (under the EU ETS). These rules will provide greater clarity over what support can be given by member states and will make it easier to compare European energy costs and the risk of carbon leakage. The UK must implement state aid measures to their fullest permissible extent in order to ensure UK businesses can compete on a level playing field with their European counterparts.

Whilst negotiations continue, however, investment decisions are already being taken by companies based on UK policies. The exemption from the carbon floor price outlined on page 19 is needed to protect those energy-intensive industries most at risk, until EU agreement is reached. The government will need to ensure that this support does not breach existing state aid rules by being interpreted as an illegal subsidy.

Recommendation 3: The government should help shape EU state aid guidelines to enable member states to protect the competitiveness of industries most at risk of carbon leakage. It must then fully utilise these rules to support UK energy-intensive industries.

Consider long-term power contracts for energy-intensive industry conglomerates

In France and Finland, large energy users can consolidate their demand and contract for long-term power supplies as a conglomerate. There is interest in this idea from major energy-intensive industries and energy suppliers in the UK, but clarification with respect to competition law is needed.

Recommendation 4: The government should work with energy-intensive industries to investigate how conglomerates could negotiate long-term power contracts with energy suppliers. Energy-intensive industries could secure lower energy prices by buying in bulk and low-carbon energy suppliers would have certainty over future revenues, allowing them to secure funding for new energy infrastructure.

Enable energy-intensive industries to balance energy supply and demand in the electricity grid

Efforts are already being made to tap into the potential of energy users to help manage the electricity grid. Flexible demand has been put forward as one of the possible tools in discussions on capacity as part of the government's electricity market reform consultations. Energy-intensive industries form an obvious target group. If these users can be flexible, they can provide the greatest reserve capacity.

Recommendation 5: The government should explore with specific sectors how they are able to reduce power consumption when called upon for short periods, in order to help balance demand in the electricity network. Energy-intensive industries would benefit financially from being able to offer flexibility in demand and they could better contribute to energy security.

Provide credit to energy-intensive industries for decarbonising their UK supply chains

There is currently no direct incentive to reduce energy consumption through effective supply chain management and transport fleets, even though there is great potential to achieve improved energy efficiency. Examples include freight modal shifting, early retirement of high emission vehicles, early purchase of low-emission vehicles, employee travel brokerages, improved efficiency of refrigerated freight transport, reducing agricultural emissions, and helping those companies not currently subject to climate change polices to reduce their emissions via their own supply chains.

Indeed, the Climate Change Committee (CCC) estimates there is greater emission-reduction potential from sources not subject to climate policies than under the EU ETS and CRC (carbon reduction commitment, the UK mandatory scheme aimed at improving energy efficiency and cutting emissions in large public and private sector organizations).[21] But there are significant barriers to accessing carbon savings from these sources, such as energy costs being a low priority for supply chain companies, organisational inertia, 'hassle factor' and uncertainty regarding new ways of working. This suggests a mechanism could be developed to share the benefits and costs of carbon reduction across these wider sectors.

The breadth of carbon market expertise in the UK could be used to quantify emissions savings and create robust, workable solutions. Credit would be given only where additional carbon savings were made. Carbon market stakeholders are already considering such questions and there is private sector interest in creating a mechanism to link emission reductions in supply chains and transport fleets with targets under the CCAs and the CRC.

Recommendation 6: The government, in conjunction with business partners, should explore the potential for giving credit for de-carbonising UK supply chains. Energy-intensive industries would benefit from being able to obtain credit while maximising potential for improved energy savings across supply chains.

Support the design of private sector procurement standards for low-carbon energy-intensive materials

With many materials made by energy-intensive industries required in low-carbon technologies, there is an opportunity for the private sector to lead the development of procurement standards to provide some assistance to decarbonise energy-intensive industries while maintaining their competitiveness. The government could have a useful role to play in facilitating agreement on what these standards might look like and how they might be implemented.

This proposal would build on the work of leading companies in setting minimum environmental standards for their suppliers, thus driving environmental improvements. Examples include the Forest Stewardship Council (FSC) requirement that leading paper and timber companies have put on their suppliers, which is driving significant change in the forestry industry. Walmart (ASDA in the UK) is leading efforts to improve its supply chain environmental performance by setting procurement standards. Other schemes, such as Fair Trade and recycling labels, have a strong record of starting small but growing fast, creating significant benefits.

Private sector producers of low-carbon technologies could set procurement standards for energy-intensive materials and components of their technologies. For instance, vehicle makers and companies planning investments in power plants could begin to specify that their suppliers provide information on the carbon footprint of the materials being supplied. Suppliers should be able to support these requests and be able to demonstrate that measures are being taken to reduce the carbon footprint of the material being supplied.

This could be done by suppliers demonstrating operational improvements in manufacturing, for example by efficiency measures or investment in new technologies. It could also be achieved by their showing a commitment to improve the product properties that could enable the life-cycle impacts of the products' performance to be improved (ie from production to end use and waste). For example, components could be designed to be lighter in weight and thus more carbon-friendly to transport, and material properties could be made to allow higher levels of end-of-life recycling and material reuse.

This approach would not work for every business. There are areas of the economy where procurement standards would be difficult to implement either due to competitive price pressures or to difficulties in enforcing and monitoring standards. Also, applying standards to imports and exports would create some implementation questions (see **Exhibit 13** for controls over imports). But other schemes, such as that adopted by the FSC, have devised a chain of custody procedures aimed at tackling these types of issues. It is also clear that there are areas where low-carbon procurement standards would have natural synergies with the final goods and services provided. The low-carbon technology sector is one area that could be an obvious starting point for low-carbon procurement standards.

Despite the difficulties highlighted, it is worth business and government working together to explore this proposal. Other procurement schemes have started small, but grown fast to create a lasting impact. Once suppliers have the capability to meet increased standards, it becomes easier to meet further demands and they are able to market their goods using these credentials. These factors often lead to ethical and environmental standards growing organically and developing into the norm in other areas of the economy.

Recommendation 7: Business and government should explore the creation of private procurement standards for low-carbon energy-intensive products. The government could help develop thinking on what these procurement standards might look like and how they might be implemented. Procurement standards would help to reduce carbon emissions in the UK, while reducing the risk of carbon leakage by ensuring that there is a level playing field for energy-intensive industries in the domestic market.

Exhibit 13 Carbon border tariffs are not the solution

One proposal for applying controls on imports is to impose a border tariff. Under this proposal, certain sectors would have to pay a tariff on entry to the UK or EU for the carbon used during production of certain products so they compete with British businesses on a like-for-like basis. The CBI is opposed to this proposal for three reasons:

1 The EU has always been a staunch supporter of free trade and its benefits. Introduction of border tariffs by the UK or EU would weaken this position and may cause other countries and trading blocs to introduce further tariffs in reprisal, or strengthen their resolve to keep existing tariff structures.

2 Import tariffs would be enforceable only on goods entering the UK/EU and so would not protect UK exports to other markets from increased energy costs.

3 Import tariffs would shift the problem to other secondary industries, as raw materials in the UK would cost more than in other markets. These secondary industries would face the same problem as the energy-intensive industries and may become uncompetitive in global markets. For instance, UK construction and manufacturing companies would pay more for steel in the UK as UK steel would be more expensive to produce or would incur import duties. Product prices would have to increase relative to goods produced elsewhere.

Energy-efficiency technologies should be supported

For some energy-intensive industries, further significant energy-efficiency savings will only be possible with new technological breakthroughs. While this will not happen immediately, the prospect should be reflected in the government's strategy for energy-intensive industries as part of a longer-term approach to developing these foundation sectors. There is also much that can be done to help accelerate the pace of technological deployment.

Assist the development of sector technology roadmaps and demonstrations

For sectors which are approaching the upper limit of their current technical potential for energy efficiency, new technologies are required. Some technologies can be applied across different sectors with varying degrees of sector-specific adaptation, such as waste to energy, CHP, on-site renewable energy generation and CCS. But other low-carbon technologies are truly sector- or even sub-sector specific and would be likely to require piloting, as in the case of electrification of industrial facilities such as furnaces. Furnace electrification is less energy-efficient but would be a low-carbon approach as electricity decarbonises.

To understand this better, government should work with the most vulnerable sectors in the first instance to develop decarbonisation roadmaps, as some industries and companies have already been doing (**Exhibit 14** and **Exhibit 15** (page 26)). These approaches will help build insights into the steps needed to achieve the UK's long-term emissions goals and assist in planning for future technologies.

Recommendation 8: The government should assist energy-intensive industries with development of sector decarbonisation roadmaps. Greater visibility and clarity of the future steps required to decarbonise energy-intensive industries will help encourage innovation and investment, enabling these sectors to reduce carbon emissions cost-effectively.

Exhibit 14 Tata Chemicals Europe (formerly Brunner Mond) – a company approach

Tata Chemicals Europe has set out a four-stage plan to reduce its carbon footprint.

Stage 1: New CHP plant – completed
Closure of three on-site coal power stations and replacement with a single state of the art gas fired CHP plant.
Cost £140m

Stage 2: The current phase
Replacement of plant and equipment with modern, energy efficient alternatives. Investment in energy from low grade waste heat.

Stage 3: Due by 2015
Tata Chemicals Europe is currently in the design and planning stage of phase 3 which will see investment in new sustainable energy plant.
Potential cost: £350m

Stage 4: Early stage
Projects linked to the use of bio-gas and other bio-fuels to replace fossil fuels in the industrial process. CO_2 absorption technologies to provide raw materials for chemical manufacture.

Percentage CO_2 emissions reduction per tonne of product

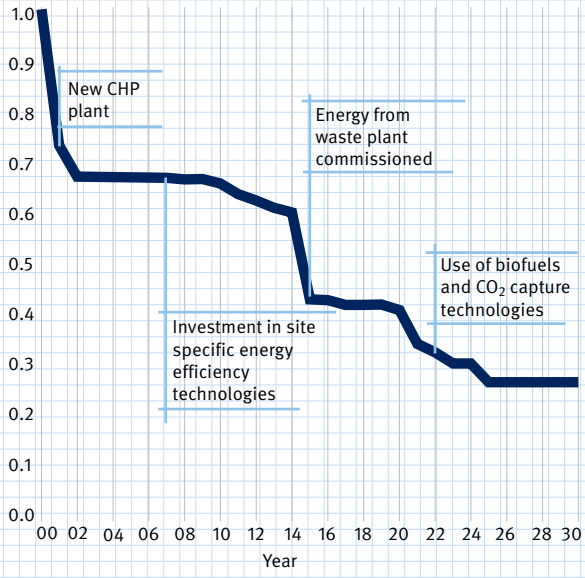


Exhibit 15 The ultra low-carbon dioxide steelmaking consortium (ULCOS) – a sector approach

ULCOS is a consortium of 48 European companies and organisations from 15 European countries that have launched a cooperative research and development initiative to enable drastic reductions in CO_2 emissions from steel production. The consortium consists of all major EU steel companies, energy and engineering partners, research institutes and universities and is supported by the European Commission.

The consortium was created in 2004 and, as its first step, investigated the application potential of over 80 low-carbon technologies. From this study, four technologies were identified.

Top gas recycling with CCS

An experimental gas separation plant has been built in Lulea, Sweden, which has successfully proved the concept of separating off gasses so that the useful components can be recycled, reducing the levels of coke used and facilitating the capture of CO_2 through CCS. Plans for a commercial-scale blast furnace are being developed.

HIsarna smelting

This is a technique which requires a reduced amount of coal and thus lowers CO_2 emissions. The process is also more flexible than conventional smelting and so allows for substitution of biomass or biogas fuels. A pilot scheme plant is being trialled in The Netherlands.

ULCORED

This is a process for direct reduction of iron ore by a reducing gas produced from natural gas using electric arc furnaces. The process is less energy-efficient than conventional coke ovens, but as electricity is decarbonised it will minimise carbon emissions. This concept will be further investigated and a pilot plant for the new concept will be commissioned.

ULCOWIN (Alkaline Electrolysis)

This is the least developed of the ULCOS proposals and is still in development stage. The process, however, is well established at an industrial scale in aluminium and zinc production. This process would also be dependent on low-carbon electricity but would eradicate the need for blast furnaces and coke ovens.

Support combined heat and power technology

Part of the strategy for energy-intensive industries – and indeed part of the sector roadmaps – must involve exploring the role for combined heat and power technology (CHP, also referred to as cogeneration technology). By coupling industrial and manufacturing needs for heat with electricity production or vice versa, carbon emissions can be saved relative to producing the two elements independently. Indeed, the International Energy Association estimates that current fossil fuel power plants have efficiencies of only 35%-37%, with the potential to reach 45% with the most modern technology. This compares to estimates of 75% to 90% efficiency for cogeneration plants.[22]

Furthermore, excess heat can also be used to provide the energy required for cooling processes by replacing mechanical compressor components, thus reducing conventional electricity requirements. The government should consider this technology in its up-coming strategy as tri-generation plants or combined cooling, heat and power (CCHP) can yield further increases in efficiency. This technology also allows companies with cooling needs (not just heat requirements) to implement the technology and so can expand the uptake of combining management of temperature needs with power generation.[23]

At present, the carbon floor price mechanism stipulates that it will apply to CHP plants. This acts as a disincentive to deploying CHP capabilities and penalises companies who have already invested in this energy efficient technology. We welcome the government's subsequent recognition of the need to change how the carbon floor price applies to CHP, but the removal of CCL exemption for CHP further undermines the business case for CHP.

Analysis by the Combined Heat and Power Association has shown that current proposals will reduce the internal rate of return for a CHP unit by 0.8-6.2%, depending on the tax scenario and size of the CHP unit. The economic argument for CHP against conventional supply was already marginal due to the cost of the initial capital outlay, so for some companies CHP may no longer be an economical option. The CBI suggests the feed-in-tariffs announced in the electricity market reform white paper should be considered as a way to further support CHP.

Recommendation 9: The government should set out its plans to further support combined heat and power and should support them via feed-in-tariffs, recognizing that CHP and CCHP can offer some energy-intensive industries a cost effective way of increasing energy efficiency.

Lay the groundwork for industrial carbon capture and storage technology

In addition to CHP, carbon capture and storage technology has the potential to reduce carbon emissions from fossil fuels by up to 90%.[24] For some energy-intensive industries, CCS is the one technology that can generate significant emissions savings, particularly for industries such as cement, lime, steel and aluminium that produce CO_2 as a chemical by-product of their industrial processes, irrespective of how energy efficient they are. The IEA has estimated that the cost of meeting our emissions targets globally will be 70% higher if CCS is not used to capture and store carbon dioxide.[25]

The government has announced up to £1bn of public funding for the first UK power CCS demonstration and is planning to fund three additional schemes through general taxation. This is a welcome development. CCS demonstrations will be needed for industrial facilities as a step-change technology and the government's energy technology programmes should lay the groundwork for this.

The initial four CCS demonstrations should be built to enable the development of CCS clusters. Energy-intensive industries located nearby could also demonstrate and deploy CCS, using the same CO_2-transport pipelines if the initial pipelines were 'over-sized'.

Recommendation 10: The government should support and encourage development of a carbon capture and storage strategy for energy-intensive industries. A strategy for the implementation of CCS for energy-intensive industries, developed in consultation with those businesses, will allow greater certainty and thus enable infrastructure investment. CCS technology can be used by energy-intensive industries to reduce their carbon emissions cost-effectively.

Develop low-carbon investment initiatives to support industrial energy efficiency

The government can play an important role to facilitate investment in low-carbon solutions, by providing a method for companies to gain finance for new low-carbon projects. The government's Green Investment Bank (GIB) looks set to provide a welcome initiative in this area. But the government needs to press ahead with its design and ensure that the GIB can enable investment in industrial projects to deliver energy efficiency. Providing energy-intensive industries with access to finance for energy efficiency measures as soon as possible should be a key priority for the GIB.

Recommendation 11: The government should ensure the Green Investment Bank delivers finance to support industrial efficiency programmes. This will help energy-intensive industries increase investment in new industrial low-carbon projects.

Support cost-effective low-carbon heat and better waste management technologies

With 37% of carbon emissions attributed to demand for heat in OECD countries, decarbonising heat energy use is critical.[26]

The CBI report, *The heat is on*, described how some energy-intensive industries are making greater use of low-carbon heat technologies such as energy from waste. The report also identified the ability to use significant amounts of waste heat from industrial facilities in district heating schemes.[27]

The government has recognised the role of heat in helping decarbonise energy-intensive industries through the Renewable Heat Incentive (RHI) – a subsidy for renewable heat. This is welcome, particularly as it is strongly targeted at businesses. The CBI also welcomes the RHI being funded through government revenue. The proposal of another energy tax would have significantly damaged competitiveness and added to the risk of carbon leakage for energy-intensive industries.

But, energy-intensive industries could be further supported through more joined-up policy that would allow them to contribute to more efficient heat and waste resource management. For example, they could be encouraged to share heat with third parties under CCA agreements or enable third parties to obtain CRC benefits from using their waste heat.

The use of biomass could also play a more important role. A bio-energy strategy is needed to consider the pros and cons of all of the different energy end uses for our bio-resources as well as important uses of bio-resources as a business raw material.

Finally, energy-intensive industries are making greater use of wastes to provide energy to their facilities and insulate them from energy price increases. The CBI report *Going to waste*[28] shows that the UK could quadruple the proportion of energy the UK generates from waste from 1.5% to 6% by 2015. This will require joined-up policy approaches across several government departments.

Recommendation 12: In consultation with businesses, the government should develop a low-carbon heat strategy and a bio-energy strategy that includes encouraging the use of waste heat and takes energy-intensive industries into account. Energy-intensive industries could benefit directly if utilised waste heat formed part of CCAs or indirectly through commercial contracts with third parties, who would gain benefits under other appropriate schemes such as the CRC scheme.

Recommendation 13: The government must address barriers to better waste management for energy-intensive industries by linking waste and energy policies. Removing barriers to recycling waste as fuel will help energy-intensive users to reduce their own third party energy demands or may allow them to benefit from sales of waste to biomass producers.

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