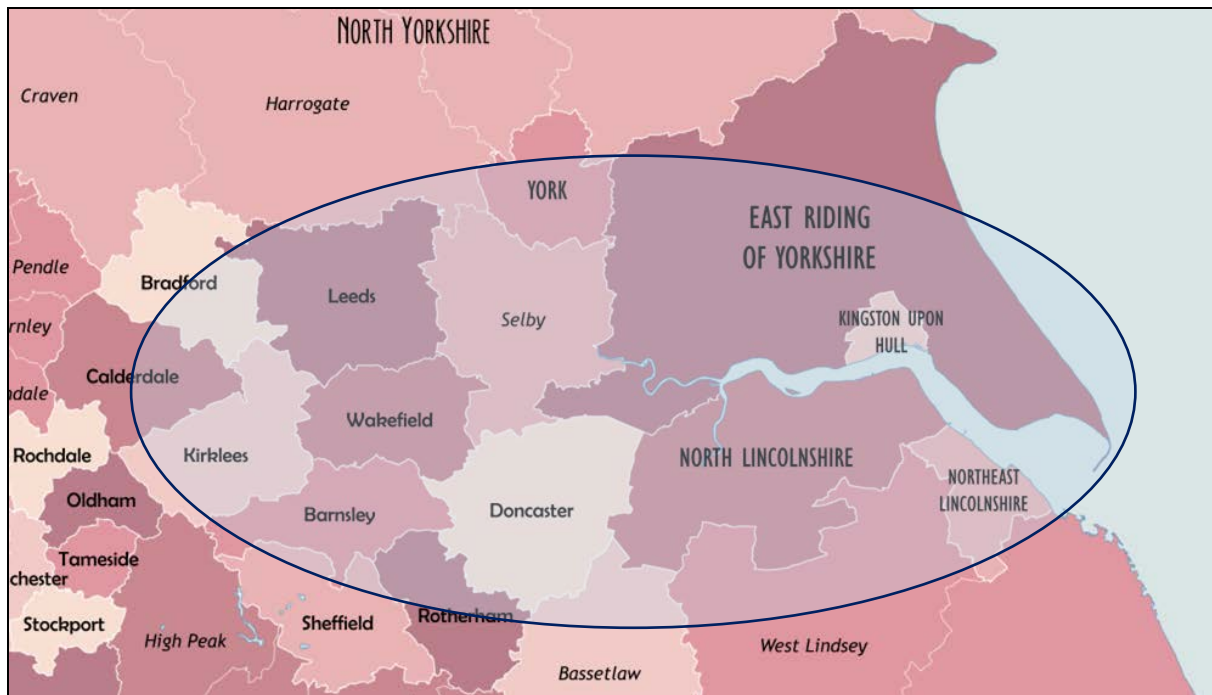




## Strategies for a low carbon industrial future in Yorkshire and the Humber



Trades Union Congress

2015

# Strategies for a low carbon industrial future in Yorkshire and the Humber

## 1. Acknowledgements

This report is based on original research carried out by Orion Innovations for the TUC and the European TUC. It forms part of an EU-wide study of *Industrial regions and climate change* funded with the support of the European Commission and coordinated by the ETUC. A copy of the full report is available on the TUC website.

## 2. Executive Summary

Yorkshire and the Humber has the potential to become Europe's leading low carbon industrial zone, a powerhouse of inward investment in low carbon energy, transforming its heavy industries through high productivity investments in new low carbon technologies and world-class carbon capture and storage infrastructure.

Yorkshire and the Humber stands out as one of the three great industrial regions of the *Northern Powerhouse*. With the North East and North West, these three regions discharge nearly one-third (30.1 per cent: chart 1) of the UK's industrial CO<sub>2</sub> emissions<sup>1</sup> and contribute a fifth of the UK's gross domestic output<sup>2</sup>.

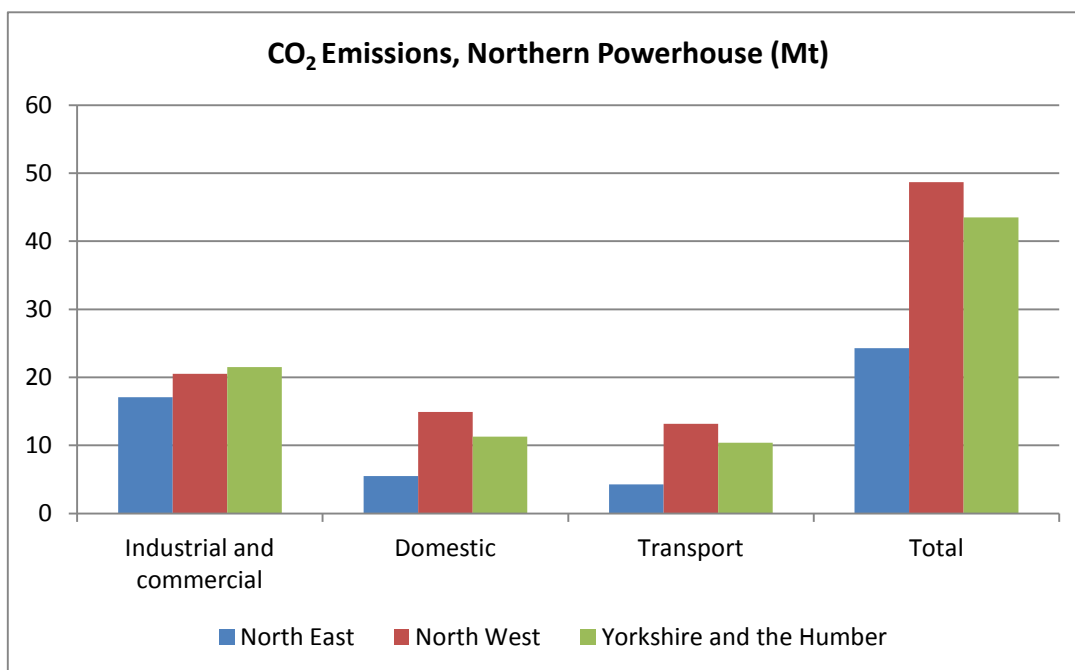


Chart 1

<sup>1</sup> Local Authority carbon dioxide emissions estimates 2013, July 2015: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/437384/2005\\_to\\_2013\\_UK\\_local\\_and\\_regional\\_CO2\\_emissions\\_statistical\\_release.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/437384/2005_to_2013_UK_local_and_regional_CO2_emissions_statistical_release.pdf)

<sup>2</sup> [www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcn%3A77-339598](http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcn%3A77-339598)

The foremost concern of this report is to help secure the future of the White Rose Carbon Capture and Storage (CCS) project, which has the potential to create Europe's first and largest CCS network for both power and industry, and act as a magnet for inward industrial investment. *White Rose* stands alongside the other great energy projects that signal the region's future, including the massive offshore wind power developments at Westermost Rough, and the UK's first major onshore wind turbine manufacturing plant led by Siemens at Green Port Hull. Yet there is a wider opportunity for the region to act as a hub for the government's *2050 Roadmaps*<sup>3</sup> for the decarbonisation of all the UK's foundation industries: not just steel, chemicals and cement for which CCS technology is an immediate requirement, but also glass industries, ceramics, petrochemicals and metals for whom low carbon action plans are an urgent necessity. Whilst CCS is less relevant for these industries, other elements of the *2050 Roadmaps* would secure their transition. This report also advances the broader case for investment in these activities: the electrification of heat used by industry; fuel switching on site; waste heat recovery; and renewed efforts to promote materials recovery and recycling in the region, a high priority for glass manufacture, for example.

In all of these developments – White Rose, the green power projects and the greening of our heavy industries - there is considerable appetite amongst stakeholders we have consulted in preparing this report to work together to ensure a successful transition to a low carbon economy in the region, and to retain and create high quality, high productivity employment. These include representatives from local industry, Local Enterprise Partnerships, local government, trade unions and academia. It is also widely recognised that this timely transition would make a significant contribution to the development and success of the *Northern Powerhouse*.

There was also broad recognition amongst participants in this project that all parties have a leadership role to play in ensuring the necessary collaboration between government, business, academia, trade unions and society as a whole.

Yet evidence from this study suggests that we are only just beginning to address the huge industrial challenges involved in meeting the two objectives of emissions abatement and the re-growth of UK manufacturing industries.

## **2. Yorkshire and the Humber: an energy and industry powerhouse**

The Yorkshire and the Humber region spans 90 miles from Bradford to the Humber Estuary. The region is home to the full range of the UK's emerging and foundation industries:

- Two of the UK's six oil refineries.
- One of the UK's four chemical industry clusters.
- Four of the UK's seven steel manufacturing sites.
- Nine out of 18 large glass industry sites.
- One of the UK's four cement manufacturers.
- 17 ceramics manufacturers.
- Significant representation of most other energy intensive industries (EIIs), including 17 several paper industry manufacturing sites.

The region also hosts a large number of the UK's gas and coal-fired power stations. One of the largest natural gas-fired power generating facilities in England is based at the Saltend Chemicals Park, north of the Humber. Four gas fired power stations and a combined heat and power station are located south of the Humber. Three of the UK's largest coal-fired power stations are in the Selby area.

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<sup>3</sup> [www.gov.uk/government/publications/industrial-decarbonisation-and-energy-efficiency-roadmaps-to-2050](https://www.gov.uk/government/publications/industrial-decarbonisation-and-energy-efficiency-roadmaps-to-2050)

The biggest of these power stations, Drax, emits more than 20 million tonnes of carbon dioxide (MtCO<sub>2</sub>) into the atmosphere each year, making it the largest single emitter in the UK.<sup>4</sup> It is also the anchor site for the White Rose Carbon Capture and Storage project, which may see the construction of the UK and Europe's first CCS regional network.

In addition, progress in the region's decarbonisation and renewable energy agenda is underway at Alexandra Dock at Green Port Hull, where Siemens and its partner Associated British Ports are investing £310m in the construction of a new wind turbine manufacturing facility.<sup>5</sup> It is estimated that 1,000 jobs will be directly created, and many more indirectly through the supply chain.

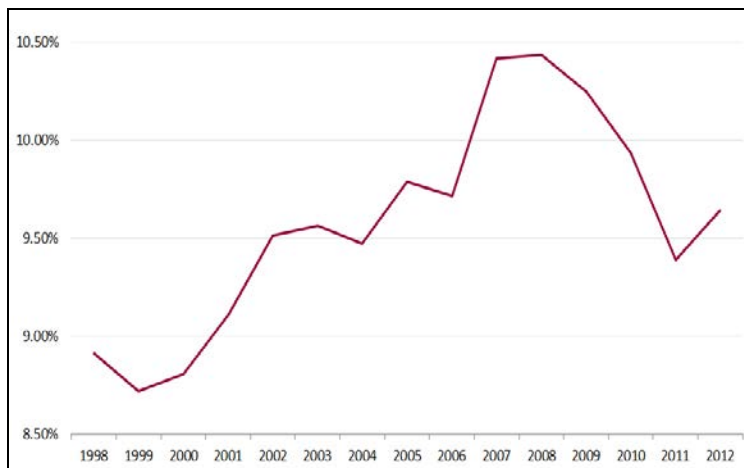
Due to be completed in 2015 is the Dong Energy construction of an off-shore wind farm at Westermost Rough, 35 kilometres from the Humber Estuary, where 35 turbines of 6MW capacity will provide enough electricity to power around 150,000 homes. As part of this project £11m of the government's Regional Growth Fund has been invested into the Grimsby Royal Dock.

Together the White Rose CCS, Siemens and Dong Energy projects have put Yorkshire and the Humber at the forefront of Europe's regional decarbonisation and renewable energy agenda. Nevertheless, emissions emanating from the energy intensive industries (EIIs) and power stations in Yorkshire and the Humber pose a challenge to the UK's carbon abatement strategy.

### 3. A manufacturing region

Industry has historically played a key part in the economy of Yorkshire and the Humber, and remains the biggest contributor to its Gross Value Added (GVA): manufacturing contributes 15 per cent of GVA for Yorkshire and the Humber<sup>6</sup>, making it the UK's most industry-intensive region.

Manufacturing GVA in Yorkshire and the Humber contributed an increasing proportion of the national manufacturing GVA throughout the decade leading up to the economic downturn. Since 2011 it has made a slight recovery, but remains well below its pre-crisis peak (chart 2).<sup>7</sup>



**Chart 2: Yorkshire and the Humber contribution to UK manufacturing output**

Since the new millennium the region has also experienced a significant decline in manufacturing employment (chart 3), from more than 380,000 employees in 2000 (16 per cent of the regional total) to less than 260,000 (10 per cent) a decade later.

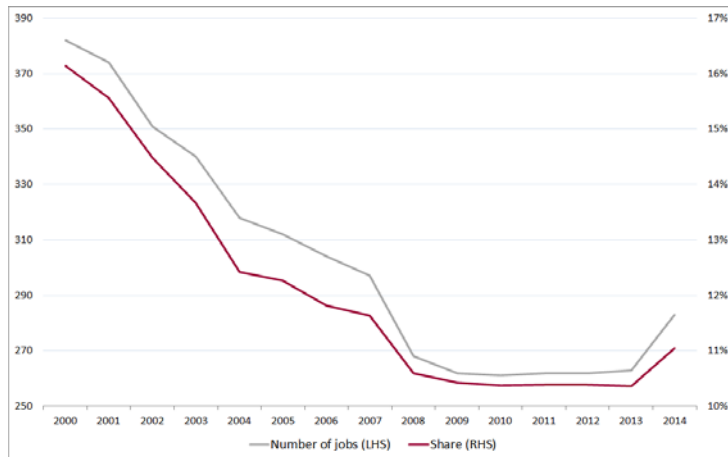
<sup>4</sup> EU ETS Registry data.

<sup>5</sup> [www.siemens.co.uk/en/news\\_press/index/news\\_archive/2014/major-uk-offshore-wind-manufacturing-site-to-be-built-by-siemens.htm](http://www.siemens.co.uk/en/news_press/index/news_archive/2014/major-uk-offshore-wind-manufacturing-site-to-be-built-by-siemens.htm); [www.siemens.co.uk/en/news\\_press/index/news\\_archive/2014/siemens-announces-green-port-hull-wind-manufacturing-site-improvements.htm](http://www.siemens.co.uk/en/news_press/index/news_archive/2014/siemens-announces-green-port-hull-wind-manufacturing-site-improvements.htm)

<sup>6</sup> Published in February 2015, referring to 2012. There is a lag in the collection and scrutiny of official data in this level of detail. Source: [www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--production-approach-/december-2014/rft-nuts1-data-tables.xls](http://www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--production-approach-/december-2014/rft-nuts1-data-tables.xls)

<sup>7</sup> Calculations based on February 2015 prices (Yorkshire and the Humber) and October 2014 prices (UK)

In line with the national uptick in employment levels, there has been a slight increase over the last eighteen months to 283,000 or 11 per cent of the regional total. Manufacturing continues to account for a substantially larger share of the Yorkshire and the Humber workforce than the national average of 7.8 per cent.<sup>8</sup>



**Chart 3: Manufacturing jobs (top line) and as % of region's workforce**

#### 4. Regional governance

Our study has shown that there is no single unitary authority with responsibility for economic development in the Yorkshire and the Humber region. From a public policy perspective, a multitude of different organisations are actively involved in economic development, but no one entity encompasses the entire area covered by this study. Yorkshire and the Humber is now served by five Local Enterprise Partnerships (LEPs), two of which participated in this study, and 14 local authorities.

There are also a number of non-governmental forums in the region that foster discussion with and help to influence the decision makers. These include government regional offices and two Enterprise Zones within the Humber region: Humber Renewable Energy Super Cluster and the Green Port Corridor which, together with the local LEPs, have been instrumental in creating growth in renewable energy-related sectors. A notable achievement has been attracting wind turbine manufacturer, Siemens, to the area.

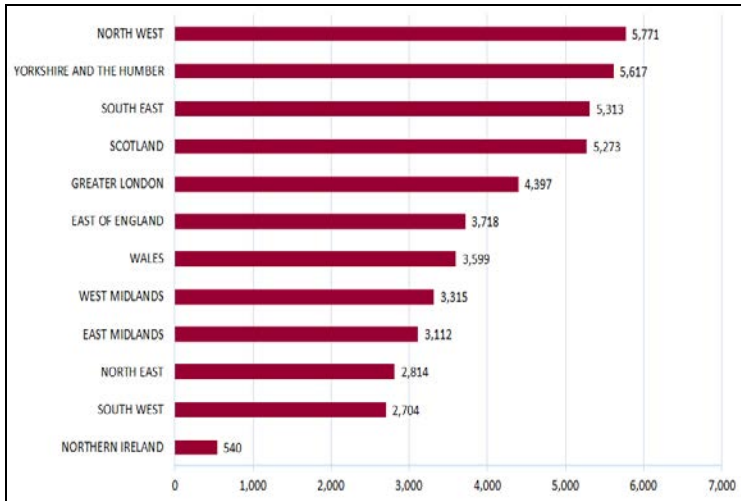
#### 5. The region's low carbon transition

The dominance of foundation industries and power generation in Yorkshire and the Humber is reflected in energy consumption and associated emissions.

Yorkshire and the Humber is the second biggest energy consuming region in the UK (chart 4). It has historically emitted roughly 10 per cent of the UK's CO<sub>2</sub> emissions, with industrial activity accounting for half of these emissions.<sup>9</sup>

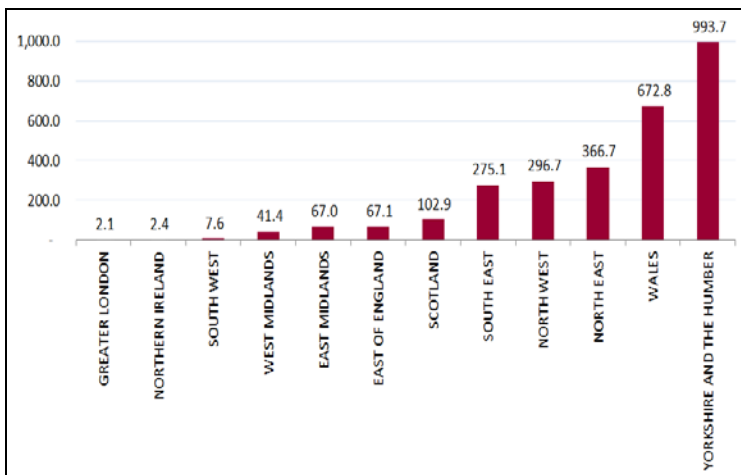
<sup>8</sup> ONS, March 2015: see JOBS05

<sup>9</sup> Local and Regional CO<sub>2</sub> Emissions Estimates for 2005-2012, Ricardo-AEA, September 2014



**Chart 4: Regional industrial consumption of energy, 2012 (ktoe)**

Industries in Yorkshire and the Humber consume more oil and coal (manufactured fuels)<sup>10</sup> than those in Wales, Scotland and Northern Ireland put together.<sup>11</sup> 34 per cent of the UK's manufactured fuels used in industry are consumed in the region (chart 5). Yorkshire and the Humber is also second only to the North East in its use of gas for industrial applications.



**Chart 5: Regional industrial consumption of manufactured fuels, 2012 (ktoe)**

Regional energy use and emissions can be measured at source or use, but government data is collected by use only. Industrial emissions within Yorkshire and the Humber are estimated at 21 MtCO<sub>2</sub> per annum by use. If however emissions from power generation are included irrespective of location of use, then industrial emissions within the region more than double to well in excess of 50 MtCO<sub>2</sub> per annum.<sup>12</sup>

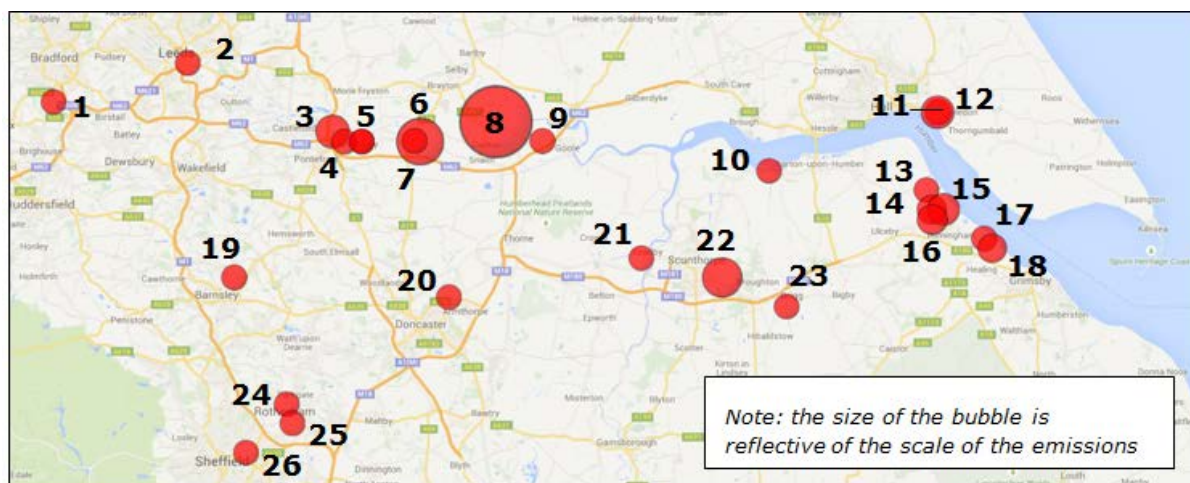
<sup>10</sup> This includes coal/petroleum (as appropriate) consumed in heat generation, energy industry use, industry, public administration, commerce, agriculture, and 'miscellaneous'. See: DECC, October 2014: Sub-national final energy consumption in the United Kingdom 2005-2012

<sup>11</sup> Ibid.

<sup>12</sup> Based on EU ETS Registry data, 2014

## 6. The region's 27 major carbon emitters

The 27 largest carbon dioxide emitting sites in Yorkshire and the Humber include 18 industrial sites and 9 power generation sites. Together they emit in excess of 44 MtCO<sub>2</sub> every year<sup>13</sup>. The TUC estimates there are at least 20,000 people directly employed at these 27 sites and thousands more contractors and employees in supply chains.



Note: the site number in the table below correspond with the map above.

Table 1

Site No.	Sector	Name	2013 CO <sub>2</sub> emissions	2014 CO <sub>2</sub> emissions	% change	Notes
10	Cement	Cemex, South Ferriby	283,208	19,312	-93.1	Flooded
1	Chemicals	BASF, Bradford	7,952	5,682	-28.5	Under redevelopment
11	Chemicals	BP Chemicals, Saltend	352,471	392,923	+28.5	
17	Chemicals	Cristal Pigment, Stallingborough	177,982	192,460	+8.1	
14	Refinery	Total UK, Lindsey	1,662,086	1,653,025	-0.5	
16	Refinery	Phillips 66 Ltd, Humber	1,890,830	1,863,580	-1.4	
22	Steel	Tata Steel, Scunthorpe	5,456,826	5,172,746	-5.2	
26	Steel	Outokump Stainless Ltd	32,414	34,499	+6.4	
25	Steel	Tata Steel, Rotherham	124,906	132,526	+6.1	
3	Coal Power Station	Ferrybridge C	8,311,632	3,053,338	-63.0	Temp. closure (fire).
6	Coal Power Station	British Energy, Eggborough	11,495,905	7,799,832	-32.1	
8	Coal Power Station	Drax Power Station	20,319,513	16,595,193	-18.3	
15	CHP station	VPI Immingham	2,199,240	2,544,552	+15.7	
21	Gas Power Station	Scottish and Southern Energy, Keadby	24,417	51	-99.9	Mothballed for upgrading
12	Gas Power Station	IP Saltend Cogeneration	2,879,178	2,820,501	-2.0	

<sup>13</sup> Ibid.

Site No.	Sector	Name	2013 CO <sub>2</sub> emissions	2014 CO <sub>2</sub> emissions	% change	Notes
18	Gas Power Station	Centrica Killingholme A	212,818	33,888	-84.0	
18	Gas Power Station	Centrica SHB	1,094,402	1,364,050	+24.0	
23	Gas Power Station	Glanford Brigg Generating Station	10,146	9,642	-5.0	
2	Container Glass	Allied Glass, Leeds	65,408	63,976	-2.19	
5	Container Glass	Allied Glass Knottingley	56,003	56,309	0.55	
4	Container Glass	Ardagh Glass Knottingley	79,713	73,059	-8.35	
20	Container Glass	Ardagh Glass, Wheatley	112,725	101,012	-10.39	
19	Container Glass	Ardagh Glass, Barnsley	145,452	160,094	10.07	
24	Container Glass	Beatson Clark, Rotherham	44,843	43,120	-3.84	
9	Flat Glass	Guardian Ind., Goole	138,718	146,540	5.64	Flat Glass, recovering from recession
7	Flat Glass	Saint Gobain, Eggborough	98,666	106,695	8.14	Flat Glass, recovering from recession
5	Container Glass	Stoelzle Flaconnage, Knottingley	30,127	30,898	2.56	

In the chemicals sector, in addition to these very largest CO<sub>2</sub> emitters there is a long tail of some 32 chemical sites in the region making basic and consumer chemicals and sharing interdependencies. Examples include including FTSE quoted companies such as Victrex, Synthomer and Croda and those from large global concerns like Dow Chemical, Solvay and Novartis.

## 7. Securing the future: government energy policy support packages

The TUC and the Energy Intensive Users Group<sup>14</sup> both support the shift to a low carbon economy as an essential response to the challenge of climate change and believe that the foundation industries have a vital role to play to realise this ambition. They produce the primary inputs of much of what we manufacture and consume, contribute hugely to the national economy, provide high quality employment, and their products are essential in the shift to a low carbon future.

However, government has acknowledged that energy and climate change policies have added significantly to the energy prices paid by energy intensive industries – the UK's standalone carbon tax of £18.08 per tonne of CO<sub>2</sub> emitted is one example, a tax unique to the UK.

In response to representations from industry and trade unions, the government has devised a series of compensation payments (table 2). The first was paid to around 50 firms in 2013 and was worth about £30m to offset the UK's carbon tax and the EU ETS.

The package is forecast to pay out £60m this year, with the budgeted sum rising to £430m in future years as other forms of compensation for the pass through costs of Renewable Obligation (RO) and Feed-in Tariffs (FITs) come on stream. The RO and FIT plans are also subject to EU State Aid approval this year, for which the UK government has committed £25m of support.

<sup>14</sup> [www.eiug.org.uk/](http://www.eiug.org.uk/)



**Table 2: Foundation industry compensation packages, £m<sup>15</sup>**

Package	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
<b>EU ETS</b>	20	20	30	30	30	30
<b>Carbon tax</b>	40	80	70	70	70	70
<b>RO</b>	-	-	230	240	260	260
<b>Feed-in Tariff</b>	-	-	60	60	70	70
<b>Total</b>	<b>60</b>	<b>100</b>	<b>390</b>	<b>400</b>	<b>430</b>	<b>430</b>

However, the cost burden of UK government policies appears to be much heavier than among EU competitors, notably Germany, and its relief measures appear to be less generous in scope and duration. The TUC estimates<sup>16</sup> just 53 (or 1 per cent) of the UK's 5,000 foundation industry enterprises have received compensation from the various government support packages.

Nine of these enterprises are in Yorkshire and the Humber. Furthermore, industries such as ceramics, cement and glass manufacture do not qualify for support, either because they do not appear on EU approved lists of sectors exposed to carbon leakage and eligible for support<sup>17</sup>, or because the UK Government has chosen not to extend support schemes to all eligible sectors.

**Table 3: Yorkshire and the Humber companies receiving compensation, 2012-2013<sup>18</sup>**

Firm	Location	Sector
AMG Aluminium UK Ltd	Rotherham	Metal alloy
Sapa Profiles UK Ltd	Chesterfield	Aluminium can recycler
Weidmann Whiteley Ltd	Otley	Paper and board
Lenzing Fibers Grimsby Ltd	Grimsby	Man-made fibres
SGL Carbon Fibers Ltd	Hebden Bridge	Man-made fibres
INEOS Manufacturing Hull Limited	Hull	Chemicals
Tata Steel UK Limited	Scunthorpe	Steel
Sheffield Forgemasters	Sheffield	Steel
Caparo Merchant Bar Plc	Scunthorpe	Steel

## 8. 2050 roadmaps for low carbon technologies

Vital though transitional support programmes are, the future of our heavy industries lies in an ambitious investment programme in "innovative low carbon technology solutions."<sup>19</sup> In spring 2015, the government published national *Low carbon industrial roadmaps* for eight of the energy intensive industries. Representatives from many of the industries involved in this study contributed to these roadmaps and the conclusions will undoubtedly impact on their future.

The 2050 pathways for the eight industrial sectors have the potential to cut three-quarters (73 per cent) of their CO<sub>2</sub> emissions, potentially avoiding 59 million tonnes (MtCO<sub>2</sub>) of carbon emissions.

<sup>15</sup> Source: BIS communication – response to Freedom of Information request, 12 March 2015.

<sup>16</sup> Manufacturing in the balance, TUC, 2015 <https://www.tuc.org.uk/industrial-issues/regional-policy/manufacturing/energy/manufacturing-balance>

<sup>17</sup> <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014D0746&from=EN>

<sup>18</sup> Derived from information provided by BIS, 2014.

<sup>19</sup> *Technology Innovation for Energy Intensive Industry in the UK*, Centre for Low carbon Futures for the Energy Intensives Users Group (EIUG) and TUC, July 2011

**Achieving this ambitious but essential goal relies on four developments:**

- o Successful development of CCS, making the role of Yorkshire and the Humber pivotal.
- o Grid “decarbonisation” by replacing coal and gas fired power stations with renewables, new nuclear power, and applying CCS to coal and gas stations.
- o Fuel switching on site, to use biogas or synthetic gases.
- o Waste heat recovery and energy efficiency processes.

**The next stage in this process is the development of action plans for each of the sectors.**

Action plans are an urgent priority for the industries involved and have been called for by the government’s chief climate advisory body, the Committee on Climate Change.<sup>20</sup> But funding is a key issue: the net present value of the investment required ranges from £6bn to £16bn.

**If this level of investment in our industrial future is to be realised, there are several key requirements or “enablers” (according to the government’s report):**

1. Government leadership and recognition of long term strategic importance of the sector.
2. Stable energy and CO<sub>2</sub> policy framework that enables companies to maintain competitiveness.
3. Location near to CCS infrastructure.
4. A high level of collaboration between industry, government, trade associations and academia, in to support demonstration projects.

**But there are barriers to overcome, including:**

1. Companies with their HQs outside the UK are reluctant to sanction investment in plant that are often seen as expensive to operate (including UK energy and policy costs) in comparison with other regions.
2. Lack of a consistent regulatory environment that reduces risk of carbon leakage.
3. Lack of capital (access to alternative financing therefore key)
4. Lack of certainty over government backing for CCS.
5. Long equipment replacement cycles.
6. Shortages of key skilled staff.

## **9. 2050 Roadmap implications for Yorkshire and the Humber**

This report focuses on two elements of the *Roadmaps* that are extremely applicable to the region. Their implementation could make Yorkshire and the Humber the number one low carbon industrial zone in Europe: the implementation of CCS and industrial clustering.

CCS is recognised as being a significant potential contributor to emissions reduction, but no single sector produces emissions of sufficient scale to justify their own CO<sub>2</sub> pipeline and storage infrastructure. Key barriers include the need for demonstration at scale, the need for R&D into sector specific CCS solutions, uncertainty about return on capital, access to sources of financing, regulatory uncertainty, and operational complexity. Section 9 provides further detail on the potential for CCS in Yorkshire and the Humber.

Each of the government’s proposed strategies also recognised the benefits of industrial clustering. Collaboration between companies with aligned interests helps to drive progress, both in new technology demonstration, such as among and between chemical companies, and to deliver CCS solutions for industries with a common interest in carbon capture, such as steel, cement and chemicals. Clustering also helps in the sale of by-products and waste streams to neighbouring sites, share infrastructure, and develop a local supply chain.

Clustering also presents challenges, including the need for collaboration across companies and the risk that cluster partners will exit, leaving a crucial gap in the supply chain. Strong encouragement

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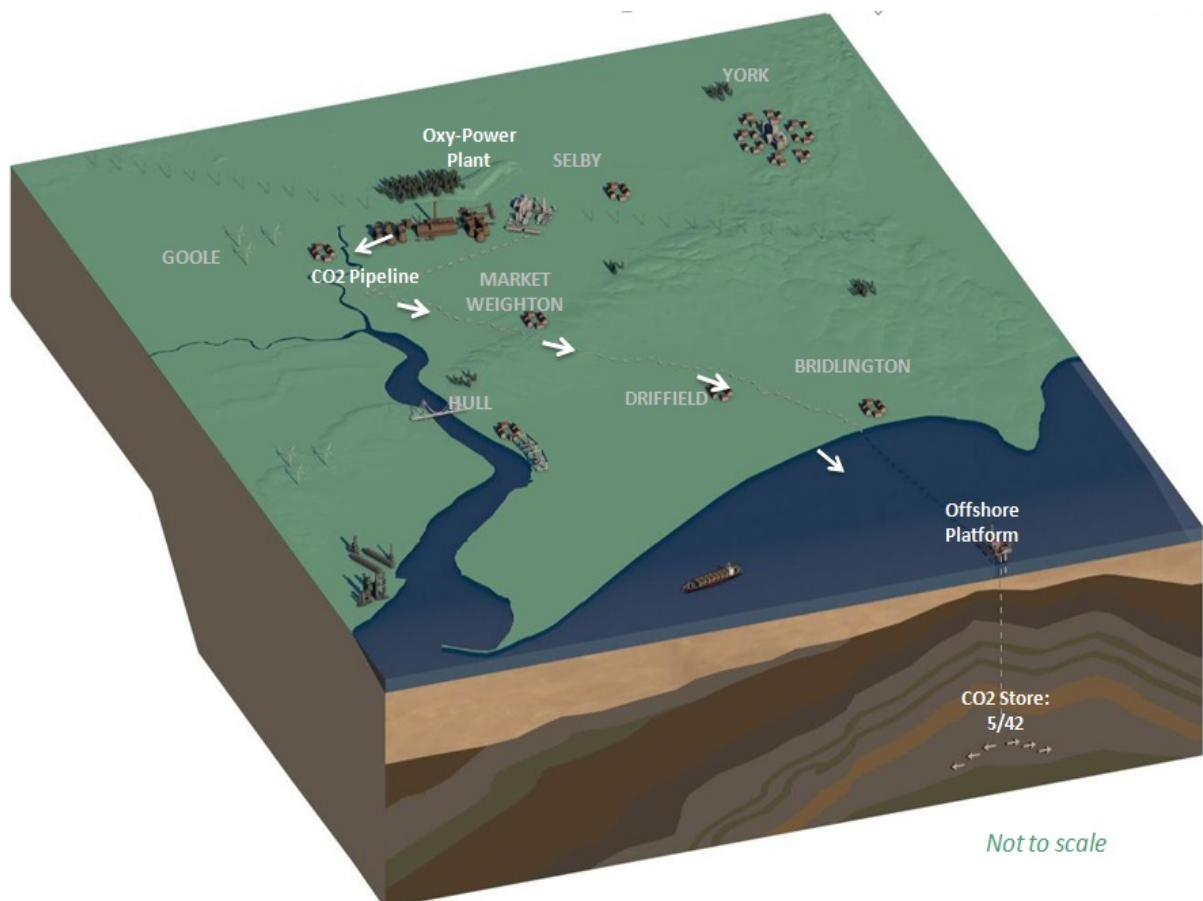
<sup>20</sup> [www.theccc.org.uk/wp-content/uploads/2015/06/6.738\\_CCC\\_ExecSummary\\_2015\\_FINAL\\_WEB\\_250615.pdf](http://www.theccc.org.uk/wp-content/uploads/2015/06/6.738_CCC_ExecSummary_2015_FINAL_WEB_250615.pdf) p. 21

for increased clustering needs to be established, including a means for companies to reflect the benefits of clustering in business cases.

Multi-stakeholder collaboration is therefore essential in overcoming these barriers. This is especially true in order to progress with R&D, to establish shared heat networks, and to share costs and improve access to project finance. Clustering around sites near the North Sea is a particularly good early opportunity, as it is geographically viable for CCS. Elsewhere in the Northern Powerhouse the industrial cluster of the Teesside Collective has been taking a lead role in demonstrating the business case for CCS in the neighbouring region. Drawing on conclusions from our interviews with key organisations in the region as well as best practice seen in Teesside, section 10 of this report provides further analysis on what form multi-stakeholder collaboration should take in the region.

## 10. The White Rose carbon capture network

The White Rose carbon capture and storage (CCS) project is led by Capture Power Ltd, whose current Front End Engineering and Design (FEED) study is supported by consortium members, Alstom, Drax and BOC. In September 2015, Drax<sup>21</sup> announced that on conclusion of the FEED study it would not invest further in the project, but would continue to support the project through the provision of land adjacent to the Drax Power Station site, shared site services and infrastructure, thereby enabling the construction of the White Rose plant. Alstom and BOC have announced that they remain committed to delivering the project.



Source: Capture Power Ltd.

<sup>21</sup> <http://www.drax.com/news/news-articles/2015/09/drax-announces-plan-to-end-further-investment-in-white-rose-carbon-capture-storage-project/#sthash.yN4Dh4ru.dpuf>

Subject to development consent and government funding, a new 448MW coal-fired oxy-fuel power plant with full CCS equipment will be constructed on land adjacent to the existing Drax Power Station near Selby, Yorkshire. The plant will also have the potential to co-fire low percentages of biomass. The power station will generate electricity for export to the grid as well as capturing approximately 2 million tonnes of CO<sub>2</sub> (2 MtCO<sub>2</sub>) per year, approximately 90 per cent of CO<sub>2</sub> emissions produced by the plant. The CO<sub>2</sub> will be transported through National Grid's proposed pipeline for permanent undersea storage in the North Sea. As a separate associated project, National Grid will construct and operate the CO<sub>2</sub> transport pipelines and, with partners, the permanent CO<sub>2</sub> undersea storage facilities at a North Sea site.

The project is now over half-way through its two-year FEED study - a detailed engineering, planning and financial exercise to examine and finalise all aspects of the project ahead of taking the final investment decision. In December 2014, a Development Consent Order application was accepted by the Planning Inspectorate; a final decision about whether to grant consent to White Rose is likely to be announced in the first half of 2016.

If successful, a construction period lasting up to 60 months could begin in 2016. The scheme will create an average of 1,000 new construction jobs over its development period, as well as at least 60 operational jobs at the new plant and further indirect supply and maintenance posts. In addition, National Grid's proposed pipeline is expected to create up to 1,000 construction jobs and around 40 permanent jobs thereafter. The White Rose project is believed to have the potential to play an important role in establishing a carbon dioxide transportation and storage network in Yorkshire and the Humber that would be available for decades to industrial users.

## 11. Multi-stakeholder collaboration in Yorkshire and the Humber

Orion Innovations and the TUC interviewed with more than 40 individuals from 30 organisations across industry, the public sector, LEPs, trade unions, and academia in order to explore their perspectives on regional low carbon industrial strategies, and how this might work in Yorkshire and the Humber. Insights were gathered through questionnaires, interviews and a one day conference in Leeds in June 2015.

### **The views of stakeholders were largely consistent and can be summarised as follows:**

Currently, in the Yorkshire and the Humber region, no single organisation has assumed overall responsibility for low carbon industrial strategy or the region's energy and resource productivity. Such an approach does not feature significantly within the current priorities of the region's Local Enterprise Partnership. However, as structured partnerships between public and private sector stakeholders, LEPs were considered to be well placed to facilitate stakeholder engagement and having good access to Ministers.

It was felt that the LEPs could help facilitate an appropriate regional governance for the development of a low carbon industrial strategy, with stakeholders expressing interest in regional low carbon working groups focused on mutually beneficial projects. Two Enterprise Zones in the region (Humber Renewable Energy Super Cluster and the Green Port Corridor) have, together with the local LEPs, already played a considerable role in supporting the growth of renewable energy projects – notably in attracting wind turbine manufacturer, Siemens.

So far as CCS is concerned, no single LEP has taken a leadership role within the region. By contrast, our stakeholders noted that in the North East through the Teesside Collective<sup>22</sup>, industry and local government have come together to promote a regional CCS cluster in an effort to overcome the problem of a proportionate governance structures for CCS.

Looking back, a number of industry stakeholders familiar with the region's recent economic history acknowledged that the former regional body, Yorkshire Forward, had begun to shape a low carbon industrial strategy in the region, as a coordinating force behind the Yorkshire and the Humber CCS Partnership. This Partnership between business and the regional body made a significant

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<sup>22</sup> Teesside Collective: [www.teessidecollective.co.uk](http://www.teessidecollective.co.uk)

contribution in highlighting the evidence base for CCS infrastructure and developing its political support.

A number of interviewees commented that for CCS to prosper, an open forum was required to enable National Grid and Drax to interact with local regional interests in a manner that encourages the uptake of their transport and storage infrastructure. The Yorkshire and the Humber CCS Partnership is also looking for seed funding for administrative costs.

## 12. A regional low carbon industrial strategy?

### **Interviewees expressed contrasting views on the need for and nature of a regional low carbon industrial strategy:**

There was consensus among businesses and local government that businesses need clear energy policy certainty from national government assuring investors that the low carbon economy is fully supported. All parties agreed that a clearly defined low carbon industrial approach and leadership was needed for its implementation, whether at a regional or national level.

It was felt that energy policies were required that deliver energy security and internationally competitive energy prices. Many interviewees suggested that the approach to business policy should address the cost of capital, competition for capital, and the business case for investment in low carbon solutions, coupled with a form of government support for industrial technology innovation that encouraged the value chain and cross-sector collaboration needed to deliver solutions such as CCS or heat networks. Furthermore, all parties agreed that industry, local government and unions should work together to ensure relevant skills, training and infrastructure are available to industry.

Although there was consensus on the need for active low carbon industrial strategy, there was a difference of opinion on the balance of effort between national and regional approaches and, if a regional strategy is needed, what form it should take.

## 13. Summary

Yorkshire and the Humber stands out as one of the three great industrial regions of the Northern Powerhouse. With the North East and North West, these three regions discharge nearly one-third of the UK's industrial CO<sub>2</sub> emissions<sup>23</sup> and contribute a fifth of the UK's gross domestic output<sup>24</sup>.

Industry has historically played a key part in the economy of Yorkshire and the Humber, and remains the biggest contributor to the region's economy. Manufacturing provides 15 per cent of Yorkshire and the Humber's Gross Value Added<sup>25</sup>, making it the UK's most industry-intensive region. More than one in ten of the region's workforce (283,000 people) are employed in the manufacturing sector, with powerful concentrations of employment in the "foundation industries": iron and steel, chemicals, cement, glass, ceramics, metals and other energy intensive industries.

The dominance of foundation industries and power generation in Yorkshire and the Humber is reflected in energy consumption and associated emissions. Yorkshire and the Humber is the second biggest energy consuming region in the UK. It has historically emitted roughly 10 per cent of the UK's CO<sub>2</sub> emissions, with industrial activity accounting for half of these emissions.<sup>26</sup>

The 27 largest carbon dioxide emitting sites in Yorkshire and the Humber include 18 industrial sites and 9 power generation sites. Together they emit in excess of 44 MtCO<sub>2</sub> every year<sup>27</sup>. The

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<sup>23</sup> Local Authority carbon dioxide emissions estimates 2013, July 2015: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/437384/2005\\_to\\_2013\\_UK\\_local\\_and\\_regional\\_CO2\\_emissions\\_statistical\\_release.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/437384/2005_to_2013_UK_local_and_regional_CO2_emissions_statistical_release.pdf)

<sup>24</sup> [www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-339598](http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-339598)

<sup>25</sup> Published in February 2015, referring to 2012. There is a lag in the collection and scrutiny of official data in this level of detail. Source: [www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--production-approach-/december-2014/rft-nuts1-data-tables.xls](http://www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--production-approach-/december-2014/rft-nuts1-data-tables.xls)

<sup>26</sup> Local and Regional CO<sub>2</sub> Emissions Estimates for 2005-2012, Ricardo-AEA, September 2014

<sup>27</sup> Ibid.

TUC estimates there are at least 20,000 people directly employed at these 27 sites and thousands more contractors and employees in supply chains.

The region's energy intensive industries and its investment in renewable energy infrastructure are on the frontline of the UK's climate change policies. The foundation industries have a vital role to play in the UK's transition to a low carbon economy – both through their own efforts to cut carbon emissions and because their products are essential in the shift to a low carbon future.

The future of our heavy industries lies in an ambitious investment programme in “innovative low carbon technology solutions.”<sup>28</sup> In spring 2015, the government published national *Low carbon industrial roadmaps* for eight of the energy intensive industries. Representatives from many of the industries involved in this study contributed to these roadmaps and the conclusions will undoubtedly impact on their future.

In the meantime, as evidence in this study has shown, the costs of carbon and other government energy policies have imposed significant costs on heavy industries, at levels not seen among our European competitors. Welcome though the government's compensation schemes are, they provide a thin cover for a minority of firms (including just nine firms in the region).

This study and its stakeholder contributions demonstrate that what is really required is for the *2050 roadmaps* to be turned into action plans and investment.

This report focuses on two elements of the *Roadmaps* that are extremely applicable to the region. Their implementation could make Yorkshire and the Humber the number one low carbon industrial zone in Europe: the implementation of CCS and industrial clustering:

- CCS is recognised as being a significant potential contributor to emissions reduction for power and industry. No single industrial sector produces emissions of sufficient scale to justify their own CO<sub>2</sub> pipeline and storage infrastructure. Key barriers include the need for demonstration at scale, the need for R&D into sector specific CCS solutions, uncertainty about return on capital, access to sources of financing, regulatory uncertainty, and operational complexity.
- Industrial clustering is recognised as integral to sector strategies. Collaboration between companies with aligned interests helps to drive progress and technology demonstration, such as among and between chemical companies, and to deliver CCS solutions for industries with a common interest in carbon capture, such as steel, cement and chemicals. Clustering also helps in the sale of by-products and waste streams to neighbouring sites, share infrastructure, and develop a local supply chain. Multi-stakeholder collaboration is especially important to develop shared heat networks, and to share costs and improve access to project finance.

The White Rose CCS project, led by Capture Power Ltd, is the keystone of a new industrial architecture in the region. The project will bridge the needs of both power and heavy industries in the region for decades and act as a magnet for inward investment for industries in need of carbon storage.

In drafting this report, Orion Innovations and the TUC interviewed with more than 40 individuals from 30 organisations across industry, the public sector, LEPs, trade unions, and academia in order to explore their perspectives on regional low carbon industrial strategies, and how this might work in Yorkshire and the Humber. Insights were gathered through questionnaires, interviews and a one day conference in Leeds in June 2015.

There is consensus that a “silo” approach to the four strands of energy, environment, new technology and industrial policy will never realise the region's industrial, low carbon and economic potential. The four need to be woven together nationally and regionally.

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<sup>28</sup> *Technology Innovation for Energy Intensive Industry in the UK*, Centre for Low carbon Futures for the Energy Intensives Users Group (EIUG) and TUC, July 2011

## 14. Conclusions

**No single organisation has currently assumed overall responsibility for facilitating the Yorkshire and the Humber region's drive for energy and resource productivity. There is a need for all the key stakeholders, including businesses, local agencies, local government, trade unions and others, to take a proactive approach to make the most of these governance structures.**

LEPs provide a recognised platform in the region, and have the potential to form an appropriate regional governance structure for effective development and deployment of regional low carbon industrial strategy.

A number of stakeholders recommended the creation of a regional forum to work with the LEPs, as well as low carbon working groups focused on mutually beneficial projects.

**This need is met with considerable appetite amongst stakeholders to work together to ensure a successful transition to a low carbon economy in the region to retain, to create high quality sustainable employment, and to deliver of enhanced productivity.**

It is also widely recognised that this timely transition would make a significant contribution to the development and success of the Northern Powerhouse agenda. The deployment of concrete and deliverable action plans to take forward the government's *2050 Roadmaps* are considered to be vital for the sustainable future for the industries assessed in this report.

**All parties have a leadership role to play in ensuring the necessary collaboration between government, business, academia, trade unions and society as a whole.**