

# **BUSINESS DECARBONISATION**

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## A Review Of Cumbria Energy Intensive Industries

# INTRODUCTION

Manufacturing industry forms the backbone of the Cumbria economy providing nearly a quarter of the gross added value (GVA) for the county, providing over 25,000 direct skilled jobs with twice as many jobs in the wider supply chain and forms an integral part in our communities. Over a broad range of sectors, companies that are either locally owned, national or multi-national have operated successful worldwide renowned businesses from Cumbria over many decades.

Industry however is a significant factor in climate change accounting for nearly a fifth of CO<sub>2</sub> emissions in Cumbria and therefore industrial decarbonisation forms a key part of the drive to achieve net zero.

The Cumbria Local Enterprise Partnership's (CLEP) overall purpose is to promote economic growth in the county with three key touchstones to deliver net zero, improve productivity and to secure inclusive growth. For net zero CLEP has two priorities of Clean Energy Development and Business Decarbonisation whilst actively supporting the wider net zero aspects including transport and natural capital.

Clean energy growth is interconnected with business decarbonisation and CLEP have recently published its Clean Energy Strategy ([reference 1.](#)) CLEP have also issued a 10-point business decarbonisation plan that sets out approach to support the full range of businesses from SME's through to the large energy intensive industries (EI's). ([Reference 2.](#)) A key part of the plan is to work with the EI's in Cumbria to support their plans and track overall progress.

Cumbria industry is at the forefront of the net zero drive and through extensive engagement with our EI's, the purpose of this summary report is as follows;

- To provide an overview of how net zero is being approached across our diverse industries.
- To seek opportunities for shared learning and collaboration.
- To highlight the potential for shared decarbonisation opportunities.
- To act as a focal point for wider engagement with external stakeholders and potential investors.

Whilst this review focuses on the larger companies who dominate the overall industrial CO<sub>2</sub> emissions in the county, it plays an important role to share learning and opportunities to our SME community.

The document is focused on reduction of CO<sub>2</sub> and wider greenhouse gases (GHG) but it plays a key role in wider sustainability in which the principles of energy efficiency will lead to direct benefits in areas such as water consumption and waste reduction. Opportunities across Scope 1 (Direct emissions from process operations), Scope 2 (Indirect emissions e.g. for building heating) and Scope 3 (indirect from supply chain) are identified in the review.



## CONTEXT OF UK INDUSTRY DECARBONISATION

The government issued its Industrial Decarbonisation Strategy in March 2021 ([Reference 3.](#)) In the UK industry provides 9% of UK GDP with 2.6 million jobs and as in Cumbria is often situated in regions that are the focus for levelling up. Industry accounts for 16% of UK GHG emissions with 50% in recognised clustered regions and 50% in “dispersed” individual sites. The UK strategy identifies the following industrial clusters in Humberside, South Wales, Grangemouth, Teesside, Southampton, Merseyside and the Black Country.

In October 2021 the government selected two industrial clusters in track 1 to develop Hydrogen/CCUS schemes with HyNet in Merseyside and East Coast Hydrogen for Teesside and Humberside. A track 2 for two more schemes is anticipated in late 2022/early 2023.

All of Cumbria industry is within the “Dispersed Sites” category and as the big cluster schemes are developed it is vital that the importance of our dispersed sites is maintained within the UK industry decarbonisation strategy.

In the UK, CO<sub>2</sub> emissions have halved in the last 30 years and the strategy sets a target of a 90% reduction in industrial emissions by 2050 recognising a difficult final 10% that will need to be addressed by offsetting. This review is very much focused on decarbonisation rather than offsetting. The UK strategy makes it clear that this decarbonisation cannot happen through “carbon leakage” by de-industrialisation and sending emissions elsewhere. The goal in the UK as in Cumbria is to lead the way for decarbonisation offering new opportunities for industries to thrive through reduced carbon emissions.

## ROUTES TO DECARBONISATION

There are 3 main ways for industry to decarbonise.

- 1. Energy Use Reduction & Efficiency** – this covers all aspects of reducing the direct (scope 1&2) and indirect energy (scope 3) uses. This covers the broad range of investment in energy efficient plant and equipment, innovation in control of industrial processes, heat recovery, transport, supply chain management and wider behavioural aspects.
- 2. Fuel Switching** – this covers the transition to renewable energy sources leading to wider consideration of storage and flexibility.
  - **Renewable energy sources** – the replacement of fossil-based fuels with clean alternatives whether direct green electricity, hydrogen, biofuels or other clean sources. It is the replacement of gas for high temperature process requirements that is generally the most challenging aspect for industrial decarbonisation.
  - **Storage** – this is key to making optimum use of energy generated within Cumbria and unlocking additional flexibility
  - **Flexibility** – the use / generation of electricity in a more flexible way, responding to the needs of the National Grid and ENWL will mean businesses can capitalise on new revenue streams and help the UK move away from gas and coal-fired power stations when demand peaks.
- 3. Carbon Capture** – the government set out an ambition for 30 million tonnes of CO<sub>2</sub> storage by 2030 and will be important for the biggest of industrial users. In Morecambe Bay, Cumbria has the potential for one of the biggest potential CO<sub>2</sub> storage sites in the UK.

All of these have been addressed within this review and the CLEP Business Decarbonisation Plan in conjunction with the CLEP Clean Energy Strategy sets out our approach in a complex and dynamic energy global business environment to support Cumbria businesses, both small and large. Wider aspects of Transportation is addressed in the Cumbria Transportation Infrastructure Plan. ([Reference 4](#))



## **CARBON PRICING**

An introduction is provided to both the levies to incentivise energy efficiencies and to the government funded schemes to promote investment into climate change initiatives. It is provided to set the scene rather than as definitive guidance. There are a range of other innovation funds in specific sectors and routes to investment financing for net zero schemes. As part of the CLEP Business Decarbonisation Plan further work will be done to provide more comprehensive guidance.

## **UK EMISSIONS TRADING SCHEME (UK-ETS)**

The UK -ETS scheme applies to energy intensive industries with a thermal energy consumption of greater than 20MW and will apply to most of the Cumbrian industries in this report. It is a “Cap and Trade” market driven means of incentivising emissions reductions and investment in less polluting techniques. Every year the emissions cap is lowered which means the cost of emissions allowances goes up. It has replaced the EU ETS scheme in the UK.

## **CLIMATE CHANGE LEVY**

This is a tax levied on all non-domestic users in the UK against electricity and gas use to encourage all business's to be more energy efficient.

## COMPETITIVE SUPPORT

The government recognised that carbon pricing has the potential for “carbon leakage” that could lead to energy intensive industries moving out of the UK with the associated emissions leading to economic loss and no net environmental benefit. There are three schemes to address this.

- UK – ETS Free allowances.
- Financial Relief for energy intensive industries electrical costs which is currently set at 85% for eligible businesses but in a consultation opened in August 2022 is proposed to rise to 100%.
- Climate Change Agreements on a company-to-company basis.

## DEMONSTRATION FUNDING

There are a range of government funding schemes aimed directly at industrial decarbonisation

- Industrial Energy Efficiency Accelerator (IEEA); a £8m BEIS scheme administered by the Carbon Trust/ Jacobs and UKRI to promote early technology readiness level stage (TRL 5-8) novel approaches that could lead to energy efficiency to industry. The scheme closed to new applicants in September 2022.
- Industrial Energy Transformation Fund (IETF); a £315m BEIS scheme to take novel schemes to demonstration level through TRL levels 7-9 to be able to deliver output measured in MWh or CO<sub>2</sub> emission saved. A further phase of funding is open through 2022. ([Reference 5](#))
- Whilst these live schemes will complete by January 2023 it is anticipated that further rounds may become available and as publicly funded schemes it is important that there is wider learning from the schemes already implemented in the wider UK.
- Industrial Decarbonisation Challenge – this is aimed at schemes within the recognised UK industrial clusters.
- Net Zero Innovation Portfolio that flows down to a number of areas including Industrial Fuel Switching, Energy Storage, Carbon Capture and BioEnergy. The programme is currently open to applications. [reference 6](#)

## DEPLOYMENT FUNDING

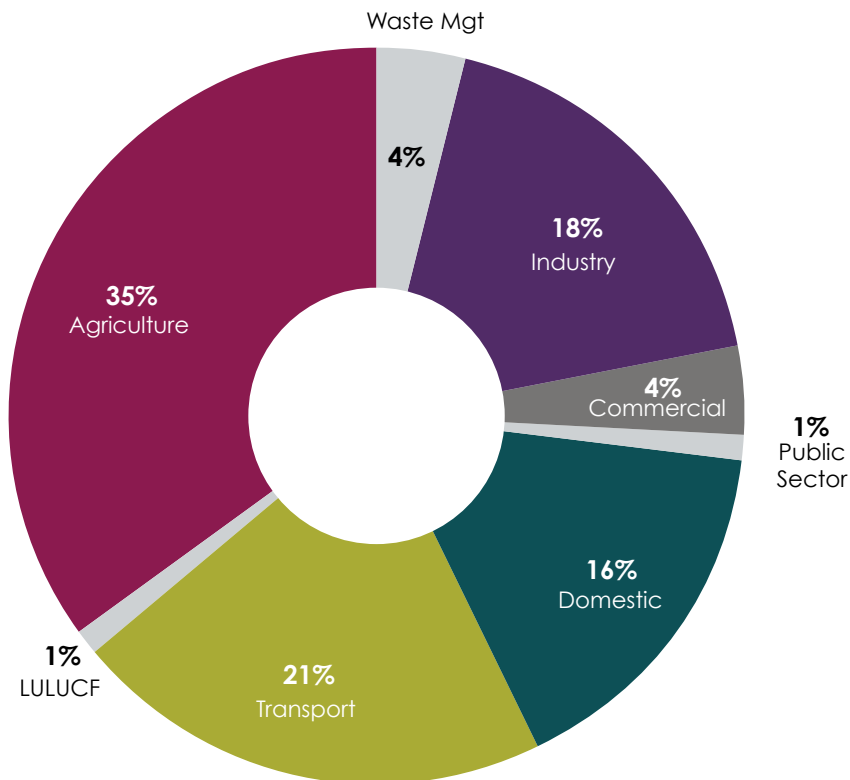
There are a range of funds directed at specific industry sectors, a Non-Domestic Renewable Heat Incentive is now closed to new applicants, there is a Heat Networks Investment Project fund to help create the conditions necessary for a sustainable heat network market to develop, a net zero hydrogen fund and an industrial heat recovery fund. Funding is also emerging for CCUS infrastructure and Clean Steel. A funding scheme for Demand Side Policy (DSP) is also anticipated to incentivise the smoothing out of cyclical energy demands.

Government policy on energy pricing and incentivisation funding is clearly dynamic and it is important that assistance is provided to Cumbria businesses on changes and new initiatives.

## CUMBRIA ENERGY INTENSIVE INDUSTRIES

Over many decades Cumbria has built up a diverse range of industries that now form the backbone of our economy. It spans from the nuclear sector relating to Sellafield and BAE to paper and dairy industries to a wider range of other manufacturing industries. In Cumbria, industrial emissions account for 18% of total emissions slightly more than the overall UK figure of 16% reflecting the importance of industry to the Cumbrian economy.

## CUMBRIA CO<sub>2</sub> EMISSIONS BY SECTOR 2020



<https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2020>

Fifteen companies have been identified in this review that are either subject to the UK-ETS scheme or sit just below. Together they have approximately 25,000 direct employees with a much wider supply chain and indirect jobs. There is a combined CO<sub>2</sub> emission of nearly 1 million tCO<sub>2</sub>/year (scope 1 and 2) that accounts for over 95% of industrial emissions for Cumbria and approximately 80% for overall Cumbria business incorporating the Commercial sector as well.

It is difficult to reconcile the BEIS data with the individual company responses. For example, there are differences in the reference year, whether wider greenhouse gases including methane and Nitrous Oxide are included and there are some gaps in data. The data is only included to give impression of scale and to allow comparison. This is an area for improvement in the CLEP business decarbonisation plan.

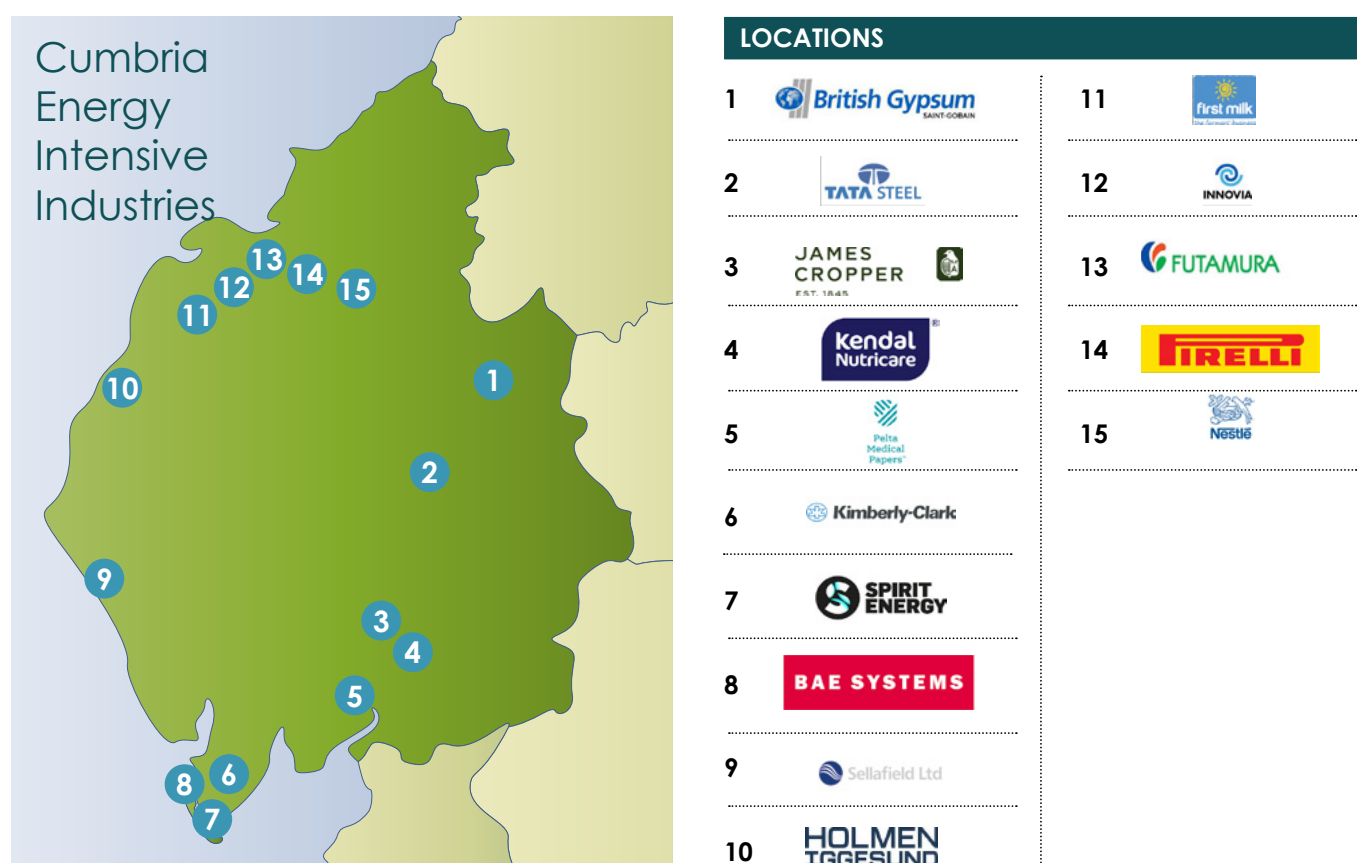
In each case, there has been engagement with each company to understand the following;

- Overall profile of the business in Cumbria.
- Understanding of the carbon intensity and to provide an understanding of the energy intensive aspects of the business.

- Overall approach to net zero; the companies represent a wide range of ownership with a number of multi-national business's to locally owned. There are learning opportunities to be gained across this spectrum.
- Key decisions and milestones.
- Potential Opportunities.

A summary table is provided in Appendix 1 for each of the companies which provides a comprehensive basis to understand challenges and to seek collaboration, learning and opportunities for clustering initiatives.

As seen from the map below, the business's form a circle around the national park demonstrating the disperse locations whilst offering some opportunities for localised clusters.



## LOCATION OF COUNTY INTENSIVE INDUSTRIES

Cumbria industry has particular challenges in transport distances from big population centres but Cumbria has a wealth of high performing businesses who have established prominent positions in their respective industries. There is a clear determination to commit to net zero as set out in clear corporate vision statements and evidenced in projects on the ground and strong interest in new opportunities. This is captured in the tables below which can be used as a stimulus to promote collaboration.

Note; No engagement with GSK due to intention to shut down site operations by 2025 but currently a significant energy intensive facility.

Engagement is also planned with United Biscuits owned by Pladis and with other significant higher energy using businesses to provide an even more comprehensive assessment.



## OPPORTUNITIES FOR “CLUSTERING” IN CUMBRIA

There are a number of “fuel switching” opportunities that have been identified in the Cumbria Clean Energy Strategy and there is ongoing engagement with potential developers.

### 1. Ridge Energy – Great Oaks Renewable Energy Park

Ridge Clean Energy are in the early stages of developing a combined “Great Oaks” 41MW onshore wind, solar and 20MW battery storage site in north Cumbria. ([Reference 7.](#)) There is a potential to provide direct connection clean electricity to local industry in Wigton to West Carlisle area and introductions have been made to potentially interested businesses.

### 2. Carlton Power – Barrow Green Hydrogen Hub

Carlton Power have submitted an application in October 2022 against the Net Zero Hydrogen Fund (NZHF) Electrolytic Hydrogen deployment fund in September 2022 ([Reference 8.](#)) Kimberley-Clark would potentially be the “anchor” industry to decarbonise their Barrow site and introductions have been made to wider industry in the area. There is also strong interest to extend to other areas of Cumbria in future funding rounds.

### 3. ARUP – Workington Green Energy Feasibility Study

ARUP have submitted a feasibility study proposal in July against the NZHF Industrial Hydrogen Accelerator Fund to potentially link green energy from RWE's Robin Rigg Offshore Wind Farm with industry in the Workington Port Area. Whilst the initial application was not successful there is still commitment to further develop this proposal.

### 4. Spirit Energy – Morecambe Bay Net Zero Hub

Spirit Energy are working on a Carbon Storage licence application to the North Sea Transition Authority by mid-September 2022 for the Morecambe Bay Gas Field that is operated through the Barrow Gas Terminal. This would potentially open a significant CCUS facility where CO<sub>2</sub> could be shipped in from wider UK energy intensive industries. It would also open up opportunities for carbon capture from industries within Cumbria. The scheme also has potential for significant hydrogen generation capacity.

### 5. New Nuclear in Sellafield Vicinity

The CLEP Clean Energy Strategy identifies a number of potential new nuclear generation opportunities in line with the government's commitment to new nuclear through its Energy Security Strategy. Of particular interest is Small Modular Reactors that could play a key role in the decarbonisation of the Sellafield site.

The CLEP clean energy strategy identifies wider renewable energy opportunities where all could be linked to business decarbonisation and providing off-grid localised community schemes. Growth in clean energy generation capacity in Cumbria also could potentially attract new energy intensive industries and thus grow this vital economic sector in the county.



## SELLAFIELD Ltd. Seascale Cumbria, CA20 1PG

### Cumbria Profile

Nuclear decommissioning site with major hazard reduction mission and radioactive waste management. Reprocessing ceased in 2022.  
Approximately 9800 direct employees.

### Carbon Intensity

193,100 tCO<sub>2</sub> (2020/21). Scope 1 & 2 and limited scope 3.  
Dominated by Fellside CHP plant that provides both electricity and steam for site operations since the shutdown of Calder Hall nuclear power station in 2004.  
Electricity exported to grid and repurchased at wholesale prices.  
Electricity demand on site dominated by large ventilation systems for radioactivity management.  
Steam use split between low pressure steam for space heating of large buildings and high-pressure steam for process uses. Process use will decline following post operational clean out of reprocessing facilities.  
An estimate of Scope 3 emissions has been completed using expenditure data. The majority of Scope 3 emissions relates to purchased goods and services, and initiatives to reduce these emissions feature within the Sellafield Carbon Management Plan.

### Strategic Approach to Net Zero

Set out in the Sellafield Carbon Management Plan and Integrated Energy Strategy, and linked to overall NDA strategy.

### Key Decisions/Milestones

Target for 70% reduction in scope 1 & 2 emissions by 2030 and 90% by 2050.  
80% reduction in scope 3 by 2050.  
The following key decisions are required to support these targets, whilst retaining the required level of service to site;

- How to generate electricity beyond the operational life of the existing Fellside Combined Heat and Power Plant (currently 2030)
- How to generate steam beyond the operational life of the Auxiliary Boiler (currently 2035)
- How to generate steam beyond the operational life of the Fellside Boiler Park (currently 2045)

### Opportunities

New buildings on site will not be connected to site steam ring main.  
Comprehensive energy efficiency programme in place.  
Interest in potential hydrogen use from offsite schemes for steam generation.  
Potential to use offsite green electricity from wind or solar.  
Potential of new nuclear to provide both clean electricity and steam.  
Reduction in steam use will lead to corresponding water demand.  
Example scope 3 initiatives are;

- Continued use of low-carbon concrete.
- Increase the proportion of ULEV fleet vehicles and continue to increase the EV charging network.
- Collaboration with supply chain and delivery partners on lower-carbon delivery opportunities.
- Inclusion of carbon reduction within new contracts, contract renewals, and business cases.



## Pirelli Tyres, Carlisle CA2 6DR

### Cumbria Profile

Italian owned high profile brand and UK's last remaining volume tyre manufacturing facility.  
Produces 10,000 tyres per day focusing on SUV market.  
920 direct employees.

### Carbon Intensity

The facility has a high energy baseload with 85 million kwh of gas and 30 million kwh of electricity used in 2021.  
26,000te CO<sub>2</sub> emission. (2020)

### Strategic Approach to Net Zero

Pirelli have a global roadmap to 2030.  
Carbon neutrality by 2030 (scope 1 and 2).

- 25% reduction absolute scope 1 & 2 CO<sub>2</sub> emissions by 2025 vs 2015.
- 100% renewable electricity usage by 2025.
- 9% reduction absolute scope 3 CO<sub>2</sub> emissions from purchased raw material by 2025 vs 2018.

Worldwide group ring fenced funding for sustainability projects.

### Key Decisions/Milestones

December 2021 – 100% Electricity from renewable sources.  
2023 – Commissioning of a range of energy optimising projects (e.g. heat recovery, curing press insulation, LED lighting.)  
2023 – Completion of feasibility studies for renewable energy generation/hydrogen.

### Opportunities

Interest in wider Cumbria hydrogen clusters and local clean energy generation providers.  
Interest in Pyrolysis for end-of-life tyres.

## Iggesund, Workington, CA14 1JX

### Cumbria Profile

Swedish owned Holmen Iggesund Group operate a premium paperboard manufacturing mill used in wide range of globally recognised products. Mill capacity of 220,000 tonne paperboard per annum. 350 direct employees.

### Carbon Intensity

39,054 te CO<sub>2</sub> (2019).

Energy intensive process with 1 tonne paperboard consuming;

- 1MWh Electricity.
- 2 MWh Steam.
- 25 tonne water.

### Strategic Approach to Net Zero

Biomass CHP plant in operation since 2013.

Certified under Renewable Obligation Certificate scheme till 2033 using sustainable harvested biomass and bi-products from mill. Overall negative carbon footprint.

### Key Decisions/Milestones

Uncertainty with regards to biomass strategy and policy.

Bio-energy Carbon Capture and Storage may become necessity.

Participating in a funding application to UKRI under Industrial Strategy Challenge Fund for a "Flue2Chem" CCU scheme to utilise waste gases for chemical feedstocks.

### Opportunities

Flue2Chem as described above.

Further development of heat recovery.

Clarity on energy policy unlocks potential continued manufacturing investment.

## Tata Steel, Shapfell Works, CA10 3QG

### Cumbria Profile

Tata Steel manufactures lime at its Cumbrian facility from UK-quarried limestone. Lime is used to improve the quality of steel as well as removing impurities. Also produce Agri-lime. 4000 te/week production with 90% exported to Tata Steel Port Talbot by rail. Quarry not operational and under restoration. Limestone imported by road from Peak District.

30 direct employees.

### Carbon Intensity

194,549te CO<sub>2</sub> (2019).

Shapfell uses an energy intensive process, principally using natural gas to convert limestone to lime, although the technology employed (using parallel shafted heat regeneration kilns) is highly efficient, CO<sub>2</sub> is emitted from both the chemical calcination of stone, and the burning of gas to achieve the calcination. Gas plays an important role in the manufacture of lime; the cost of gas has risen in the last couple of years from approx' 40% to approx' 85% of the overall lime cost.

0.94te CO<sub>2</sub>/tonne lime.

40kg lime/tonne steel. Significant contributor to steel overall CO<sub>2</sub> emission.

### Strategic Approach to Net Zero

Tata Steel Net zero pathway to achieve net zero steel by 2050.

30% reduction target by 2030.

Lime expected to remain a key requirement for low carbon steel manufacture.

### Key Decisions/Milestones

A number of potential paths being explored as described below.

### Opportunities

Potential use of H<sub>2</sub> to replace natural gas but challenged by remote location.

Carbon capture with potential rail link to Barrow and Morecambe Bay CCUS.

Environmental restoration of quarry and redundant facilities.

Green transport opportunities for road receipt and rail export.



## Aspatria Creamery, CA7 2AR

### Cumbria Profile

First Milk, wholly owned British farmer owned co-operative producing cheese and whey protein products.

80 direct employees.

### Carbon Intensity

19,296 te CO<sub>2</sub> (2021) from Aspatria creamery with a total of 900,000 te from dairy farms.

Separate plans for on-farm CO<sub>2</sub> reduction not addressed in this report.

### Strategic Approach to Net Zero

Anaerobic Digestion(AD) facility uses on site waste to produce gas for site steam requirements.  
70% self-sufficient in gas.

AD reduces CO<sub>2</sub> emissions by 7000 te/year.

Strategic target for net zero by 2040 across farming and processing.

Target for 100% renewable electricity by 2025.

### Key Decisions/Milestones

Clear targets to achieve net zero.

### Opportunities

Energy efficiency programme on site looking at heat recovery etc.

5% stake in Agri-Carbon who are looking to unlock the value of soil carbon sequestration as a major carbon sink and have trials ongoing to establish a baseline for carbon sequestration from soil.

## Innovia Films, Wigton, CA7 9BG

### Cumbria Profile

Innovia is a major producer of Biaxially Oriented Polypropylene (BOPP) films and holds a leading position in the markets for labels and security films, coated packaging and overwrap films. The UK facility in Wigton manufactures the product (60,000 tonnes per annum) and is also a research and development centre. The site is shared with two other businesses: Futamura and CCL Secure where Innovia run the site CHP plant to provide steam and electricity for all companies.

500 direct employees.

### Carbon Intensity

98,179 te CO<sub>2</sub> (2020)

The process is heat intensive as plastic is melted and then reformed and coated using electricity and steam.

Innovia operate the CHP plant for all 3 companies on site with combination of gas turbine and gas engine to provide flexibility to the integrated site demands. Significant investment in recent years.

Innovia represent 75% of sites total electricity demand. CCL Secure being a minority energy user on site whilst Futamura has largest site demand for gas generated steam.

No agreement in place to export electricity to grid from the CHP plant.

### Strategic Approach to Net Zero

No target dates in place but commitment for both energy efficiency and interest in fuel switching schemes.

### Key Decisions/Milestones

Strategy to concentrate on quality margin rather than volume potentially reduces energy burden.

### Opportunities

Interest in external renewable energy schemes.

Interest in Hydrogen schemes where blend could be used in existing CHP facility.

Ongoing energy efficiency schemes.

## Futamura, Wigton, CA7 9BJ

### Cumbria Profile

Futamura Chemical UK Limited manufacture and sell film derived from cellulose. It is a Japanese company and the global leader of sustainable cellulose films for the packaging market, including the renowned NatureFlex™ compostable film brand. Futamura bought the cellophane side of the business in 2016 from the previous owners Innovia who share the same site.

290 direct employees.

### Carbon Intensity

31,167 te CO<sub>2</sub>

Futamura is the site dominant gas user for steam use in coating process. 75% of site gas and 25% of site electricity.

### Strategic Approach to Net Zero

At early stage of net zero journey.

Addressing energy efficiency with LED lighting replacement programme and pump upgrades leading to 42te/year CO<sub>2</sub> saving.

Development work in progress to reduce steam requirement in process operations.

Very supportive Japanese owners.

### Key Decisions/Milestones

Feasibility study progressing to replace site stack to address non-CO<sub>2</sub> emissions.

### Opportunities

In conjunction with Innovia interested in hydrogen fuel switching for CHP plant.

An IETF application made this summer to deliver initiative to make a 15% saving in energy use.

Process efficiencies to reduce steam demand for process uses.

Potential scope 3 emission reduction through 3rd party road transport of imports/exports. Raw material for cellulose process imported from Brazil.



## Kendal Nutricare, Kendal, LA9 6NL

### Cumbria Profile

Specialise in the manufacture of world-class nutrition products from early life nutrition to adult and senior formulations. Their product range includes baby milk, toddler milk and cereals and speciality formulas such as anti-reflux, anti-colic, lactose-free and hypo-allergenic.

130 direct employees.

### Carbon Intensity

5,094 teCO<sub>2</sub>/annum (latest data available 2012).

The mains systems/process that create the most emissions are the production of steam for spray driers and the heating of a warehouse.

Expansion plans expected to increase energy demand on site with significant growth by becoming the first international company to export into USA market.

### Strategic Approach to Net Zero

Overall ambition to achieve net zero but no date target or specific plan.

### Key Decisions/Milestones

Commitment to expand operations and investment into new processing capability.

### Opportunities

Ongoing energy efficiency programme on site.

Opportunity to reduce scope 3 emissions from dairy farm operations.

Interest in hydrogen hubs for fuel switching.



## Pelta Medical Papers, Milnthorpe, LA7 7AR

### Cumbria Profile

Pelta Medical Papers provide an extensive range of sterile barrier paper products for the medical industry. The paper mill in Beetham has a capacity of around 45,000 tonnes per year and was acquired by new owners Inspirit Capital in late 2021.

130 direct employees.

### Carbon Intensity

20,395 tonnes CO<sub>2</sub> (2021).

There is steam generation on site from 4 boilers utilising natural gas, aggregated together totalling a net thermal input of 24.2MW. Also related to the paper manufacturing process are 2 direct gas-fired drying units for paper sheet drying (5.2MW total), gas heating of calendar rolls for smoothing the paper sheet surface (0.284MW), and gas-fired warehouse space heating (2.931MW).

### Strategic Approach to Net Zero

Net Zero targets, but targets within Climate Change Levy Agreements and UK Emission Trading Schemes are set in line with UK Net Zero ambitions. Net zero is a key focus for the new owners.

### Key Decisions/Milestones

No specific milestones.

### Opportunities

Interested in fuel switching opportunities for Hydrogen.

Recently formed Energy Committee to start looking at potential developments and/or efficiencies. Small projects including power factor correction, voltage optimisation and reductions of compressed air usage. Larger transformative projects related to gas consumption will be required.



## James Cropper, Burneside LA9 6PZ

### Cumbria Profile

James Cropper is an advanced materials and paper products group, with an operational reach in over 50 countries. Using materials from cotton and wood to carbon fibre they support industries from packaging to digital imaging and aerospace. They provide niche solutions such as materials essential for a hydrogen fuel cell, a bespoke colour and texture for a luxury brand's packaging or moulded fibre alternatives to single use plastics.

600 direct employees.

### Carbon Intensity

38,811 tCO<sub>2</sub> for FY 2021/22.

Energy intensive process with gas turbine CHP system providing steam for the paper drying processes and power for the site.

Community led Solar scheme on roof space provides approximately 2% of site electricity requirements.

### Strategic Approach to Net Zero

Committed to sustainable manufacturing with target to reduce our direct carbon emissions by 80% by 2030 and become net-zero through our entire supply chain by 2040.

Environmental, Social and Governance Committee in place to drive forward all aspects of sustainability.

### Key Decisions/Milestones

100% purchased electricity from renewable sources from 2021 including the Burneside Solar scheme and hydro from Ellergreen Estate.

### Opportunities

Bid into the IETF fund for an advanced heat recovery feasibility study.

Interested in hydrogen fuel switching opportunities.

Ultimately will switch from gas to electric for process heating.

Also looking at innovation to reduce water usage and waste.

## BAE Systems, Barrow, LA14 1AF.

### Cumbria Profile

Design, manufacture and support of UK nuclear powered submarine fleet.  
7600 direct employees.

### Carbon Intensity

2019 scope 1 & 2 carbon output was circa 33,000tCO<sub>2</sub>e, 2020 was circa 26,750tCO<sub>2</sub> and 2021 was circa 36,250tCO<sub>2</sub>.

Natural gas currently contributes to roughly half of the Scope 1 and 2 emissions (2021 - 8,753 tCO<sub>2</sub>).

Diesel Oil is the largest contributor of the Scope 1 and 2 emissions – when the diesel fuelled steam generation system is used for infrequent trials (2021 - 7,729 tCO<sub>2</sub>).

Utilisation of Aviation fuel is a large contributor to Scope 1 and 2 emissions (2021 - 1,574 tCO<sub>2</sub>).

### Strategic Approach to Net Zero

BAE Systems have set a target to achieve net zero greenhouse gas emissions across operations by 2030 and across the value chain by 2050 as well as joining the United Nations' Race to Zero campaign, by signing up to the Business Ambition for 1.5°C.

The Submarines business has a high-level strategy in place for implementation and the implementation plan is evolving as feasibility studies are carried out to define the activities that will support achieving the corporate target.

### Key Decisions/Milestones

Feasibility project ongoing for replacement of diesel fuelled steam generation system used to support boat trials.

### Opportunities

Replace Natural Gas as the fuel source for space heating around site to Hydrogen or electric heating. (high level discussions held with Spirit Energy regarding potential to connect to their proposed Blue Hydrogen network).

Switching SMITE (for trials) fuel source from Diesel Oil to Hydrogen or another renewable fuel source. (initial discussions held with Carlton Power re potential to connect to their proposed 35MW commercial Green Hydrogen hub).

Reduce number of flights and switch Aviation fuel to Sustainable Aviation Fuel (SAF).

Replace existing lighting across the site with LED lighting and incorporate PIR's wherever possible/ practicable.

PV installation Site Wide. (quotes for PV installation on key buildings received and further optioneering exercise underway to establish other potential locations / opportunities).

## Spirit Energy, Barrow, LA13 0QU

### Cumbria Profile

Spirit Energy majority owned by Centrica operate the Morecambe Bay Gas Field and the Barrow Gas Terminal where gas is processed and distributed into the national transmission system. At its peak Morecambe Bay provided 20% of UK gas demand, now dropped to 1.5% and gas production expected to cease by end of decade.

Approximately 400 direct employees.

### Carbon Intensity

160,000 te CO<sub>2</sub>/Anum (2021) from Gas Terminal operations.

90,000 teCO<sub>2</sub>/Annum from offshore operations. (Excluded from Cumbria totals).

### Strategic Approach to Net Zero

Gas production will cease this decade.

Proposal being developed for a CCUS scheme with option for hydrogen production where Morecambe Bay has a potential carbon storage capacity of 1 Billion tonnes as a major UK asset.

### Key Decisions/Milestones

Carbon Storage licence application being made to North Sea Transition Authority/Crown Estates by mid September 2022.

Preparing for BEIS Industrial Sequencing Cluster 2 in late 2022 for Morecambe Bay Net Zero Scheme.

End of gas production date driven by economic factors and UK energy security.

### Opportunities

Potentially provides a CCUS storage capability for industry in Cumbria as well as ship import from wider energy intensive industries.



## Nestle, Dalston, Carlisle, CA5 7NH

### Cumbria Profile

The Dalston factory produces Coffeemate and a range of dairy based coffee products for UK and worldwide markets. It processes 350,000 litres/day of milk from Cumbrian farms in partnership with First Milk and there are expansion plans to increase capacity.

360 direct employees.

### Carbon Intensity

CO<sub>2</sub> emission data not available.

Overall energy mix of 40% gas/60% electricity with gas boiler for process steam requirements.

Emissions dominated by scope 3 emissions from dairy farms but still energy intensive manufacturing process.

### Strategic Approach to Net Zero

Overall Nestle sustainability roadmap for 50% reduction in greenhouse gases by 2030 and to achieve net zero by 2050.

£70 million investment in Dalston facility over the last ten years.

### Key Decisions/Milestones

Dalston facility already use 100% renewable electricity in power purchase scheme from Scottish offshore.

### Opportunities

Working with First Milk to address sustainability and to reduce environmental impact of farm activities.

Ongoing investment in energy efficiency measures.

Interest shown in local green energy schemes.

## Kimberly-Clark, Barrow, LA14 4QS

### Cumbria Profile

Manufacture of Kleenex and Andrex products with £85m announced investments to upgrade Barrow facility which is Kimberly-Clark's biggest facility in the UK.

Andrex is biggest non food brand in UK with Barrow facility providing 70% of output.

320 Direct employees.

### Carbon Intensity

51,420 te CO<sub>2</sub>/annum (2019).

Approximately 50/50 split between gas and electricity.

194GWh gas consumption for steam and hot air requirements.

### Strategic Approach to Net Zero

50% Greenhouse Gas Scope 1&2 emissions reduction by 2030 (2015 baseline) as part of a wider set of ambitious sustainability targets.

Selected by BEIS to deliver underpinned Net Zero Road Map that will be completed by the end of 2022.

### Key Decisions/Milestones

Power Purchase agreement signed with Octopus to provide 80% green electricity to all UK facilities.  
41% achievement against 2030 target to date.

### Opportunities

Supporting Barrow Green Hydrogen Hub submission to BEIS with Carlton Power to switch from natural gas.

## British Gypsum, Kirkby Thore, CA10 1XU

### Cumbria Profile

British Gypsum owned by Saint Gobain manufacture of bagged plaster and plasterboard products where Kirkby Thore is one of 5 manufacturing facilities in the UK.

158 direct employees with a nearby owned mine that is managed separately.

### Carbon Intensity

38,414 teCO<sub>2</sub>/annum (2019).

Energy intensive process through grinding, drying, calcination and processing into final products.

Electricity provided through accredited green supply.

Gas procured through Saint Gobain negotiated agreements at a corporate level.

60% of gas used in drying of plasterboard.

Raw materials are from locally sourced mined rock as well as imported Spanish rock by rail and road.

Other raw materials added to the process come by road. All product is exported by road.

### Strategic Approach to Net Zero

Saint Gobain corporate target for net zero by 2050.

33% scope 1&2 emissions and 16% scope 3 reduction by 2030 against 2017 baseline.

Similar manufacturing facilities across the UK with common road map.

Overall approach to electrification of drying processes to replace natural gas.

### Key Decisions/Milestones

No date set for electrification of gas drying.

### Opportunities

A range of process efficiencies being pursued such as fluidiser technology to reduce gas demand.

Solar feasibility considered but concerns about insurance/fire risks.

Thermal products to improve customer building insulation. "Make the world a better home" with onsite training academy for product demonstration.

Road fleet being converted to HVO fuel.