

# Lean and clean

building manufacturing  
excellence in the UK

“green  
alliance...”



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# Improving resource efficiency is a futureproof route to higher productivity for manufacturing

Improving the performance of manufacturing is crucial to rebalancing the UK economy north to south. Manufacturing is 15-20 per cent of the economy of lagging regions. Although this includes some top performing companies, there is also a long tail of low productivity manufacturers that struggle to provide good jobs and wages.

Rising input costs, investors' concern over resource risks and businesses using environmental innovation for competitive edge, are all factors elevating resource efficiency from an operational to a strategic issue for UK firms.

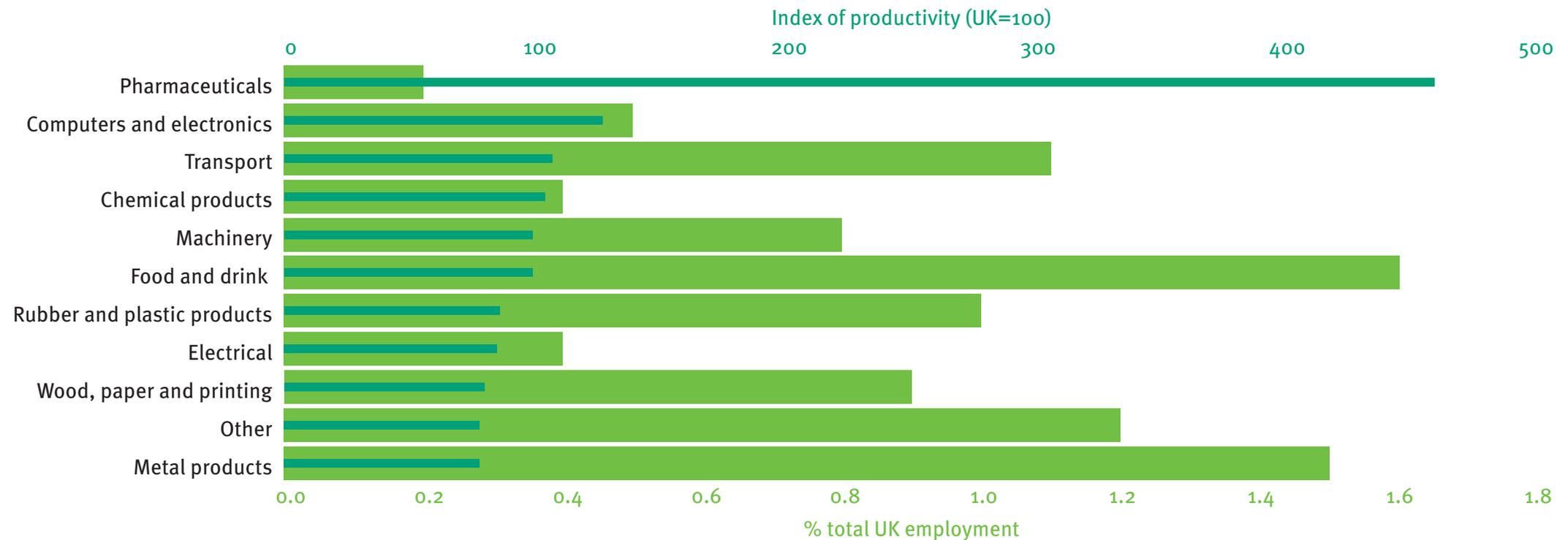
The best manufacturers are improving their energy efficiency by 50 per cent over ten years, whilst the rest only achieve 10-15 per cent. This gap will not be closed by businesses on their own. Faulty signals on current and future costs, and a lack of strategic insight on resource issues, means opportunities are not being realised.

A government supported manufacturing upgrade programme, which helps businesses to identify and capitalise on resource efficiency opportunities, is needed to spread best practice and stimulate investment and innovation.

Raising manufacturing productivity  
will rebalance the economy

# Manufacturing employment is concentrated in low productivity sectors

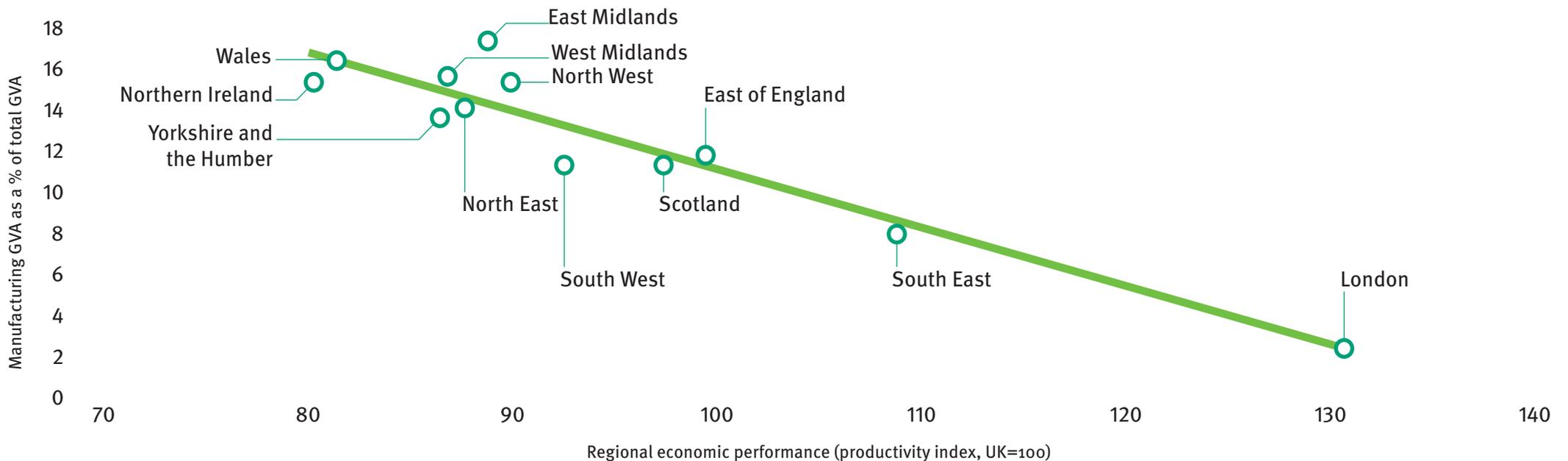
There is a huge difference between the productivity of different regions, firms and sectors. Some sectors, like pharma and electronics, are amongst the highest performers in the UK, but the majority of manufacturing jobs are in relatively low productivity sectors which are less able to support good jobs and higher wages.



# Raising manufacturing productivity will have most benefit in lagging regions

Parts of the country with a larger manufacturing economy also have lower overall productivity. But manufacturing is not the cause of low productivity, in fact, it could be part of the solution. Raising the performance of manufacturing will have bigger benefits in lagging regions and help to close the UK's productivity gap.

To raise productivity, most UK regions will need to focus on manufacturing



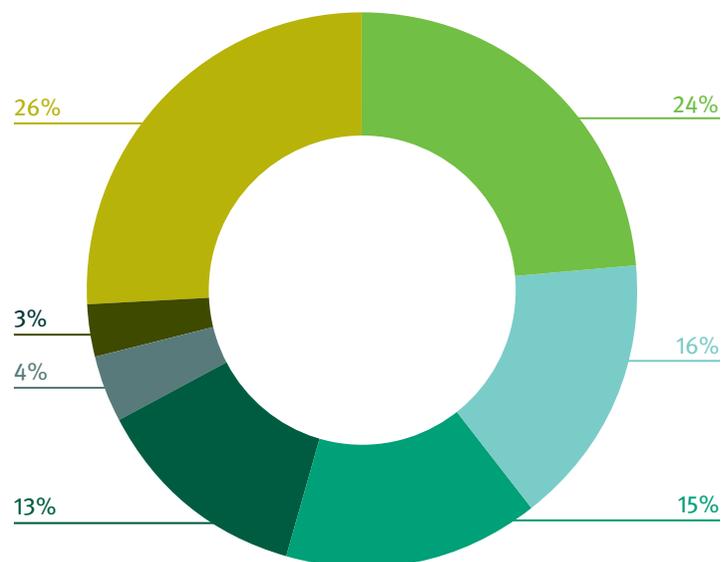
# Manufacturing is a significant source of carbon emissions

Industry accounts for 33 per cent of all UK emissions, 25 per cent from the direct use of oil and gas and eight per cent from electricity demand. Manufacturing is responsible for around 60 per cent of this, or a fifth of total carbon emissions. Reducing these emissions by reducing energy use and increasing resource efficiency supports manufacturing competitiveness by lowering costs and extracting more value per resource input used.

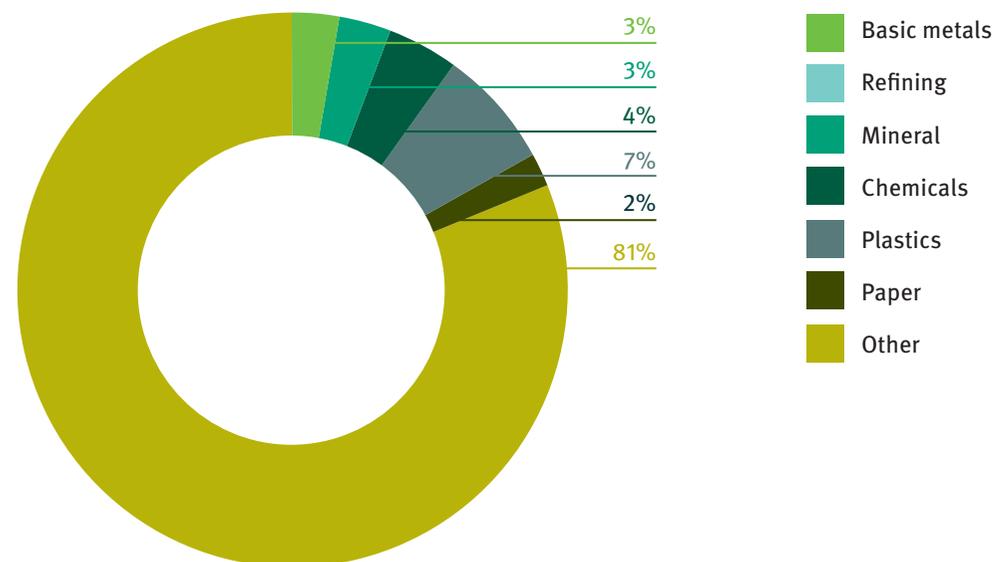
Supporting the transition to low carbon manufacturing also avoids offshoring manufacturing employment and emissions to countries with more carbon intensive production methods.

## UK manufacturing emissions and employment by sector

Direct CO<sub>2</sub> emissions



Employment



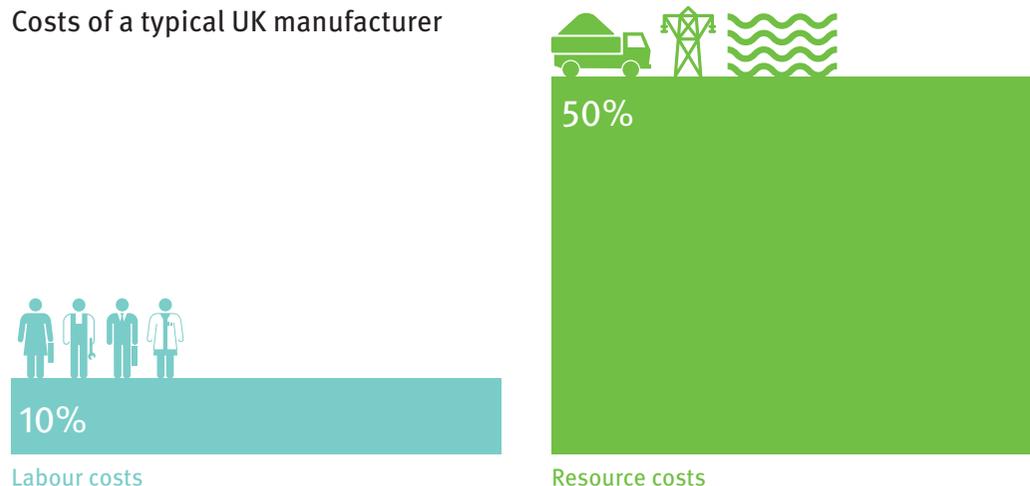
# Resource efficiency improves productivity and cuts carbon

## Labour productivity

Labour productivity measures much more than the efficiency of labour, it shows how effective a country is at creating value in the economy as a whole. Growing profitable businesses through investment in resource efficiency increases labour productivity by generating more value and less waste for every hour worked.

The average UK manufacturer spends five times as much on resource costs as they do on labour, so there is more scope to raise productivity via resource efficiency than through labour efficiency alone.

Costs of a typical UK manufacturer

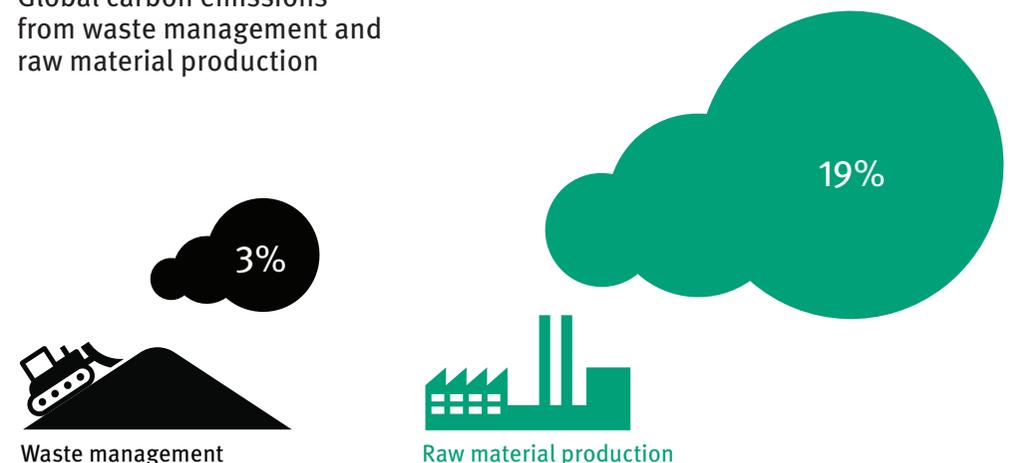


## Decarbonisation

There are more ways for industry to contribute to decarbonisation than just reducing energy use. Lowering the carbon intensity of production can be achieved by improving material and water use.

Globally, the production of raw materials is responsible for 19 per cent of carbon emissions and the waste sector contributes another three per cent.

Global carbon emissions from waste management and raw material production



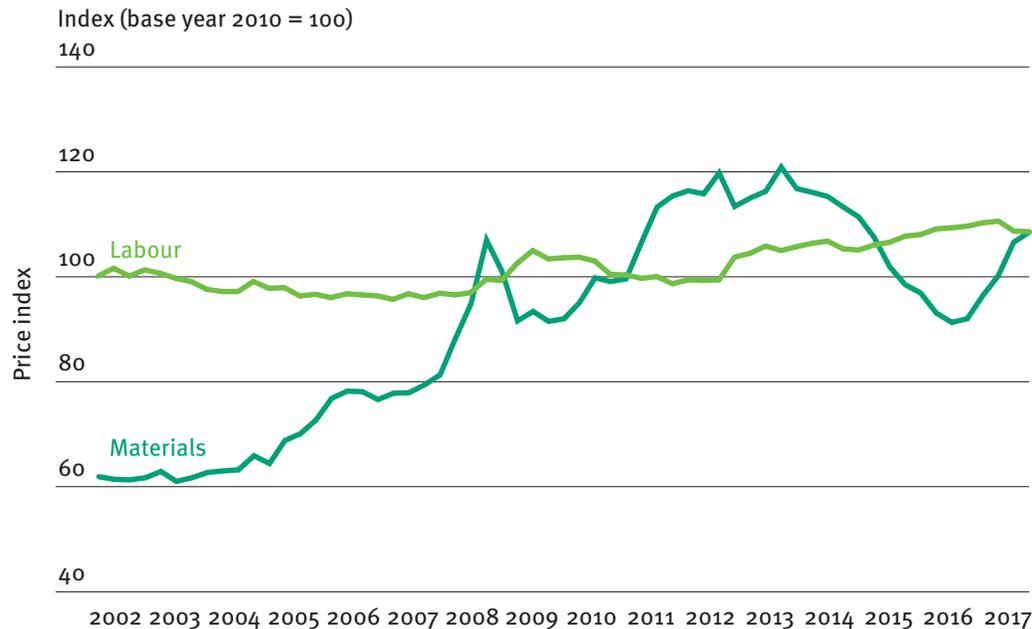
Investors have woken up to rising  
resource risks

# Non-labour input costs are rising rapidly for UK producers

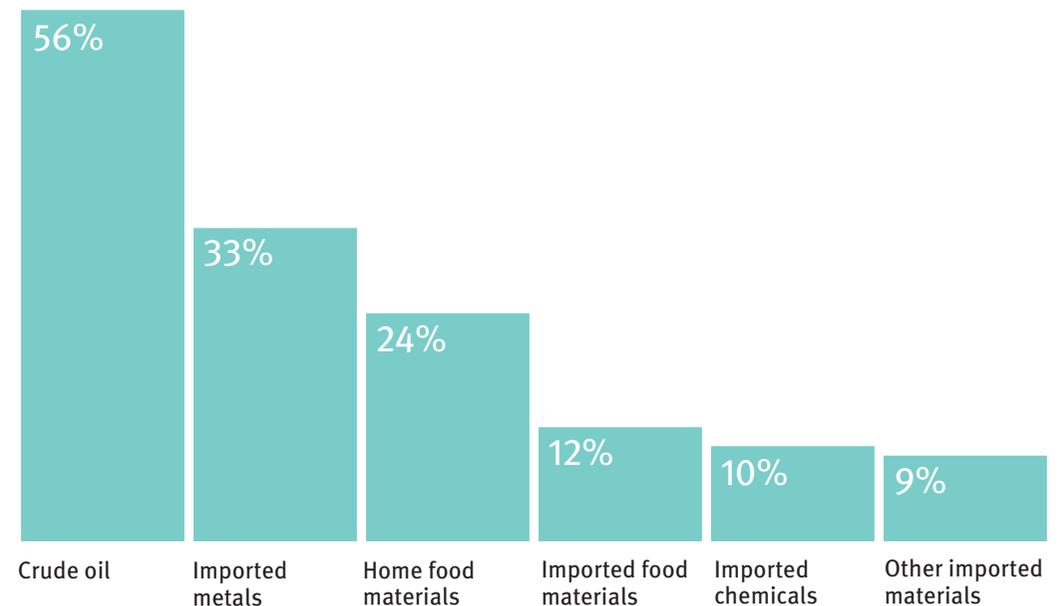
Material prices are volatile and rising over the long term. In the past 15 years manufacturers have experienced a 75 per cent increase in input prices, in contrast to manufacturing wage costs, which have only risen by eight per cent.

A rising oil price affects manufacturers everywhere, but the recent fall in sterling means the UK is particularly exposed. In 2016, when input prices rose by 18 per cent, the biggest cost increases were for crude oil and imported metals.

### Manufacturing labour and material prices



### Rise in input prices, March 2016 to March 2017



# Resource risk is a growing concern for investors

A growing number of businesses are asking their suppliers to disclose their climate change and water related risks. The Carbon Disclosure Project (CDP) has seen a 24 fold increase in interest from investors in these risks between 2003 and 2016.

## Resource scarcity risks

Four in five institutional investors would reconsider or rule out investment if made aware of resource scarcity risks.



## Supply chain risks

Nine out of ten investors would reconsider or rule out investment where risks in the supply chain have not been addressed.



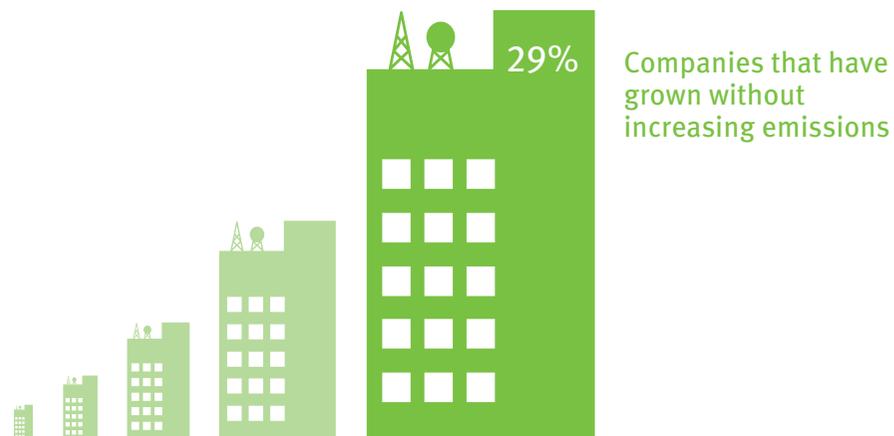
# Competitive pressures are increasing

Across the whole economy, the fastest growing companies are those that actively manage their environmental impact. Companies which have decoupled their growth from their greenhouse gas emissions have seen revenue growth of 29 per cent over a five year period while other companies saw declining revenues.

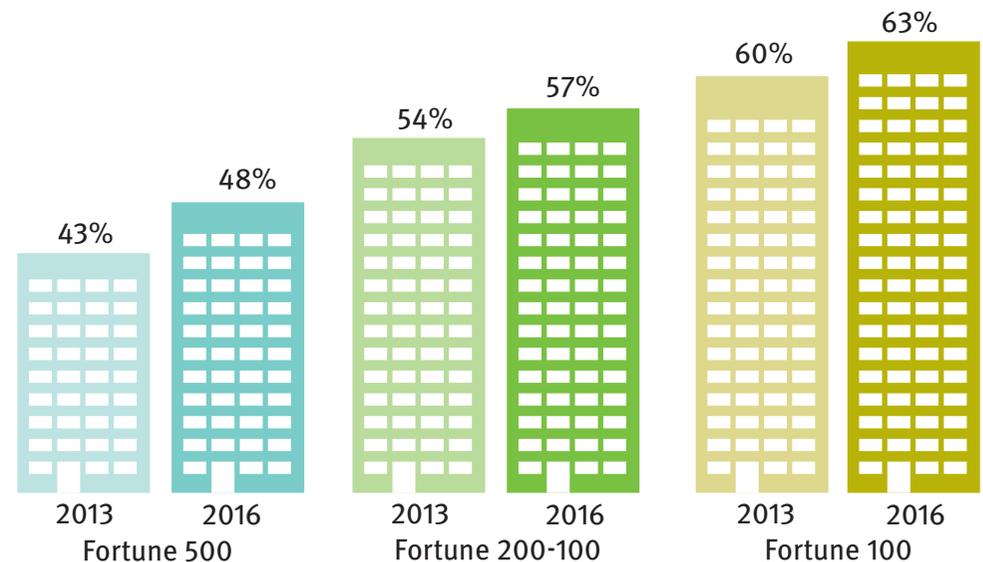
Stoxx, a low carbon index, shows that companies tackling their emissions have outperformed global benchmark stocks by six per cent over the past four years

In 2016, 48 per cent of the Fortune 500 and 63 per cent of the Fortune 100 set targets to improve their energy efficiency and environmental footprint. As a result, 190 of these companies achieved \$3.7 billion in savings in 2016.

Company revenue change over five years



Percentage of US companies setting environmental targets

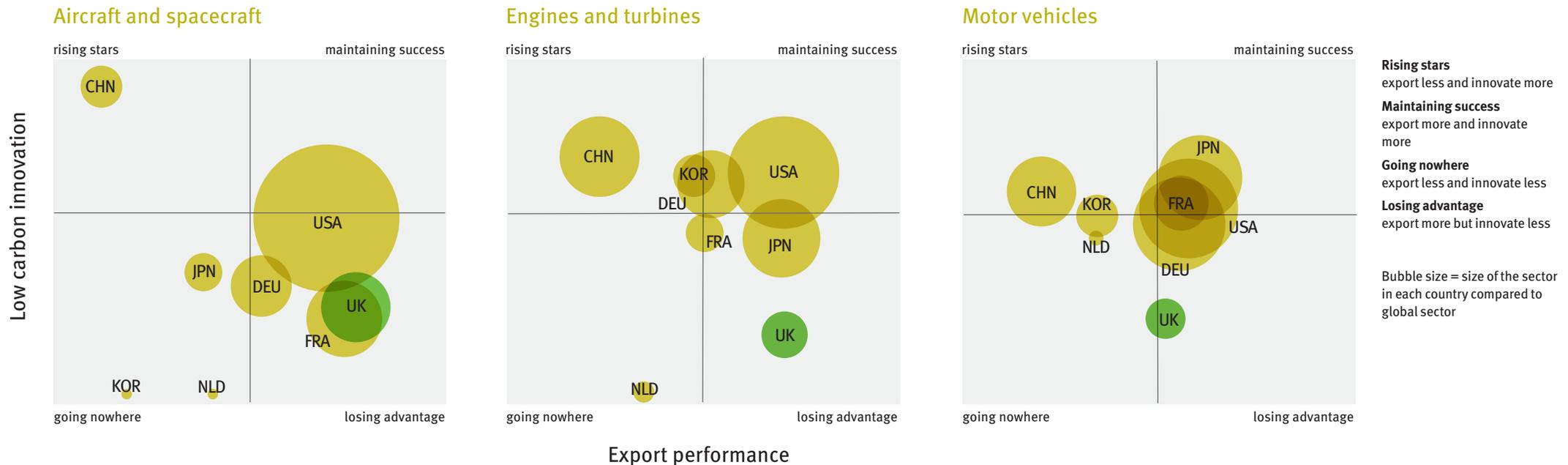


# The UK's leading sectors are not adapting fast enough

As the pressure to decarbonise increases, it will be necessary to redesign products, processes and business models to improve resource and energy productivity and stay competitive. The UK's leading manufacturing sectors have seen limited low carbon

innovation. The UK aerospace, engine, turbine and motor vehicle sectors could lose their comparative advantage to Germany, Japan and other countries which are investing more in R&D to commercialise low carbon technologies.

Countries gaining and losing advantage by sector, compared to the global average



Businesses need help to raise  
resource productivity

# Businesses will not address these issues on their own

Our analysis of industrial resource efficiency evaluations in the UK and Europe has identified three market failures which prevent businesses from capitalising on resource opportunities.



## Key market failures

### The failure of price signals

The environmental costs of extraction, resource depletion and waste are not fully reflected in market prices. Since 2015, there has been a 23 per cent increase in the number of companies building carbon and resource pricing into their decision making but most companies do not have the information to understand where they are exposed to future resource constraints or policy shocks.



### Underinvestment in information and innovation

Companies often lack the ability to identify and quantify inefficiencies and vulnerabilities in their operations, so they underinvest in product or process solutions. Between 2002 and 2012, most companies achieved 10-15 per cent energy efficiency gains but, in the same time frame, some companies were able to achieve efficiencies of over 50 per cent.



### A lack of strategic foresight

Incumbents and small supply chain players tend to minimise disruption to operations, maintain existing product standards and focus on incremental change. Energy and resource efficiency issues, despite their significant potential to affect long term continuity and performance, rarely figure in a business's strategic foresight and planning.

# Other nations support businesses to innovate and grow

Other leading manufacturing nations believe improving resource efficiency is a problem that they should help businesses to solve. Governments can help with ‘push’ policies focused on businesses, offering them advice and support to drive improved performance, and ‘pull’ policies which stimulate new innovation by creating more demand for products with higher environmental standards.

## Push policies



Germany supports businesses to achieve greater resource efficiency as part of ProgResS, a programme focused on securing sustainable raw material supplies, improving production and achieving sustainable consumption. The strategy sets targets and drives productivity to help businesses to improve their performance.



Japan built industrial resource efficiency through a legal framework for the Effective Utilisation of Resources. The law requires groups of manufacturers to co-own reprocessing plants, so they can directly benefit from the recovered materials and components. Between 2000 and 2012 Japan increased the circularity of its material use by 15 per cent and reduced domestic and imported resource use by over 30 per cent.

## Pull policies



The US has used forward commitment contracts as a ‘golden carrot’ to accelerate the commercialisation of R&D into products. The Super Efficiency Refrigerator Program (SERP) was a competition for the most energy efficient, cost effective refrigerator. Whirlpool won the competition but evidence shows energy efficiency R&D increased across all appliance manufacturers as a result.



Sweden’s innovation agency VINNOVA uses pre-commercial procurement to de-risk innovations that could address environmental challenges. This approach groups together procurers, with a joint interest in innovation, to provide the necessary critical mass to stimulate the development and commercialisation of new products and processes.

A new programme to improve UK  
manufacturing productivity

# A manufacturing upgrade programme

The Institute for Manufacturing says that improving the resource efficiency of manufacturers to the level of the best in their sector would yield an additional £10 billion per annum in profits for UK firms and a 4.5 per cent reduction in carbon emissions.

We propose a manufacturing upgrade programme to improve resource productivity, backed by low cost loans to overcome cashflow barriers and a government procurement policy which increases demand for high environmental standards of production.

## A five step programme

### Target decision makers

Target resource intensive manufacturing, extractive and construction sectors with tailored programmes engaging CEOs and finance executives.

1

### Holistic support

Deliver holistic support covering the whole range of inputs: energy, water and materials, which is more effective than single issue interventions.

2

### Trusted providers

Build a network of trusted providers, guaranteeing confidentiality of operational information.

3

### Fund innovation

Use the Industrial Strategy Challenge Fund to identify resource efficiency innovation opportunities across supply chains and sectors.

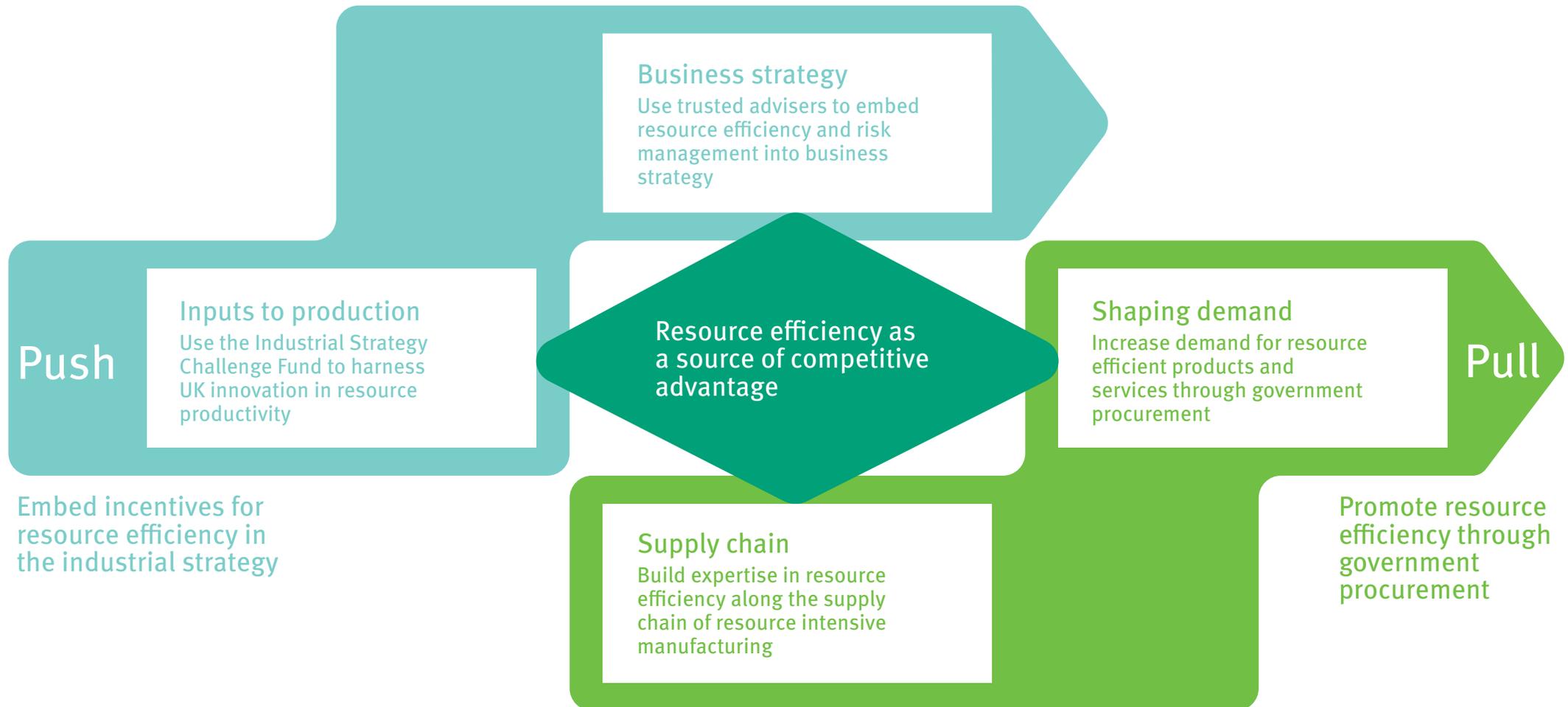
4

### Reward leaders

Design government procurement policy, including forward commitment contracts, to encourage resource efficient processes and products.

5

# How a manufacturing upgrade builds competitive advantage



# Endnotes

## Page 3

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## **Lean and clean: building manufacturing excellence in the UK**

### **Green Alliance**

Green Alliance is a charity and independent think tank, focused on ambitious leadership for the environment. With a track record of over 35 years, Green Alliance has worked with the most influential leaders from the NGO, business, and political communities. Our work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

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