

# The cluster effect

Why the UK needs a place-based green industrial strategy

“ green alliance...”



## **The cluster effect: why the UK needs a place-based green industrial strategy**

By Faustine Wheeler, Sam Alvis and Zoe Avison

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# Summary

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**Place matters because different regions have varying strengths and weaknesses in relation to green industries.”**

With the advent of the Inflation Reduction Act (IRA) in the US, and the Net Zero Industry Act in the EU, pressure is mounting on the UK to respond. While the UK does not have the spending power or market size of either, it has the advantage of being nimble, both in regulation and industrial relations.

Unfortunately, the UK is not in a prime starting position, with the economy struggling across three Ps: lack of purpose, not enough skilled people and stagnant productivity, particularly outside London and the South East.

The UK's response to US and EU moves needs not only to provide incentives for domestic green industries but to do so in a way that addresses the underlying challenges. We have previously charted the national productivity benefits of a green transition, here we delve into its regional effects.

Place matters because different regions have varying strengths and weaknesses in relation to green industries.

For instance, we found that:

- Scotland is likely to benefit from the net zero transition, due to its location advantages (its proximity to offshore wind and carbon capture and storage (CCS) sites in the North Sea) and its sectoral strengths. East and North East Scotland could house renewable energy generation clusters

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Developing new  
green industrial  
clusters is the  
most effective  
way for these  
regions to use  
their strengths.”

while the Glasgow city region is well placed for a green services cluster.

- Eastern England has a comparative advantage in professional, scientific and technical services, access to offshore wind sites in the North Sea and high grade agricultural land. It could host clusters of renewable energy generation, agri-tech and alternative protein production.
- The Solent has strengths in transport and storage services and refining, and professional, scientific and technical services. The Solent industrial cluster intends to become a leader in the production of sustainable transport fuel but may be hindered by the absence of easily accessible carbon capture and storage sites locally.
- The economy in Cornwall and the Isles of Scilly performs poorly, based on exports per head data. But the net zero transition could provide the region with significant opportunities as it has geographic advantages, including being close to floating offshore wind sites in the Celtic Sea, and having reserves of critical raw materials and potential sites for geothermal energy.
- Areas with existing industrial clusters will also be attractive for new green industries due to the presence of relevant infrastructure and an existing skills base. Most of the UK’s largest clusters, in terms of carbon emissions, are also located near renewable energy generation and CCS sites, facilitating decarbonisation.

Developing new green industrial clusters is the most effective way for these regions to use their strengths to build new industries, both in services and manufacturing. Across developed economies there are consistent factors that help such clusters

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through industrial  
policy.”

succeed, benefiting both regional and national economies:

- **Tailoring ambition** to a region’s specific geographic and economic characteristics, such as the skills base or potential for renewable energy.
- **Long term, government funding** that derisks movement for the private sector and gives it time to establish supply chains.
- **Unwavering political commitment**, as the UK demonstrated with its decade-long political consistency in scaling up and cutting the cost of offshore wind.
- **Supportive institutions** at national and regional level.

While these are the characteristics of success, bringing them about requires a place-based industrial strategy that not only uses a variety of sector specific and cross economy policies, but also provides regions with the power and capability to act. Our analysis points to where the UK might have opportunities to take action and our policy recommendations suggest how.

The UK has the underlying characteristics of success, but now needs to demonstrate political will through industrial policy. There is no guaranteed recipe for success. Good characteristics and policies increase the likelihood but, as this is innovation, government and local leaders must recognise the risks as not all efforts will succeed.

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## Our recommendations

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**UK industrial policy needs to move to a place-based approach.”**

### Horizontal (cross economy) policy

UK industrial policy has traditionally focused on underlying factors like innovation or skills. To grow the green economy, it needs to move to a place-based approach, backed by a more responsive planning system that gives local leaders the flexibility to address constraints to green growth in their areas. This should include:

- **Energy:** for example, supporting purchase power agreements and enabling planning policy to rapidly support nature positive onsite renewable power generation and grid infrastructure for areas of high generation like east Scotland.
- **Land:** prioritising access to investment zones through clean transport infrastructure, as well as derisking commercial development to help businesses grow faster.
- **People:** better transport and housing provision in areas near new clusters can increase the size of the labour market, bringing in more skilled workers. However local areas need more power over skills, including the ability to link skills policy to local industries, job centres and other relevant institutions.

### Vertical (sector specific) policy

- **Investment and innovation:** the new trailblazer devolution deals for Manchester and the West Midlands offer some scope to influence R&D funding. But local areas need more power and autonomy to directly allocate innovation funding in a way that reflects local partnerships between

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industries to test  
and improve  
regulation in a  
particular place.”

research, catapults and businesses. Geographically concentrated investment increases R&D intensity and accelerates agglomeration.

- **Dynamic regulation:** regulatory ‘sandboxes’ allow regulators and industries to test and improve regulation in a particular place, before national rollout. This could include trialling an ‘electric vehicles as a service’ model through a combined authority or supporting the development of alternative proteins in eastern England.
- **Unlocking sectoral constraints:** local leaders need to be able to champion national policies that support the sectors in their areas. That could be via investment credits to attract renewable developers, or promoting circular principles to support recycling or the second hand retail sector.



# Introduction

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Capital is starting to flee even from the UK's most successful green industries like offshore wind.”

The UK faces strong global competition for green industries. The US Inflation Reduction Act (IRA), which provides almost \$400 billion investment in clean energy and decarbonisation projects, offers strong incentives, in the form of subsidies and tax breaks, for clean energy technologies to be produced and implemented within the US.

Green industries have noticed. The electric van start up, Arrival, shelved plans for a new UK automotive plant in favour of locating in the US.<sup>1</sup> Swedish battery manufacturer Northvolt, along with others, has been tempted stateside.<sup>2</sup> There have been reports of delegations from US states luring European clean energy businesses across the Atlantic with subsidies offered under IRA.<sup>3</sup>

The European Commission, worried about protecting its industries, has responded by proposing a Net Zero Industry Act which will attempt to compete with the US by tweaking state aid rules and seeking more funding through the European Sovereignty Fund for clean energy and technology.

The IRA and Europe's response arrived at a febrile time for the UK, when promising start up Britishvolt and its manufacturing plant in Blyth were struggling. Anecdotally, capital is starting to flee even from the UK's most successful green industries like offshore wind. Meanwhile the UK's economy continues to lag behind others and it remains the only G7 country smaller now than before the pandemic.

The government's recently commissioned independent review, *Mission zero*, emphasised the need to act quickly for the UK to remain competitive in the “international race for capital, skills, and industries of the future”.<sup>4</sup>

This report builds on our previous work with Nesta in *Climate for growth*; in that report we set out actions the UK can take to maintain its green industrial strengths and,

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importantly, where it stands in relation to the next wave of clean industries. Competition between the US and Europe will be challenging for the UK, but not impossible. As the US has said, there is plenty of decarbonisation to go round.

Below, we review the UK’s current economic outlook, and its approach to net zero, particularly in terms of place-based outcomes. We then turn to an analysis of UK regional strengths or potential in green industries, and what supporting them might mean for local economies. We end with a series of recommendations for an active place-based, green industrial policy.

# New green industries can revitalise the economy

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The UK will be the only economy in the G7 to remain smaller than it was before the coronavirus pandemic.”

The UK's economic woes can be summed up by three Ps: lack of purpose, not enough people with appropriate skills and flatlining productivity.

## **Purpose**

In January 2023, the International Monetary Fund (IMF) downgraded its forecast for the UK, predicting it to be the only major developed economy to shrink over the coming year. The UK will be the only economy in the G7 to remain smaller than it was before the coronavirus pandemic.<sup>5</sup>

While the IMF's April forecast suggested the economy would shrink less than previously believed, it confirmed the country is still on track to suffer the sharpest contraction among the G20 nations.<sup>6</sup> Despite the challenge of international competition, the UK has yet to respond to this outlook by changing the direction for its economy.

The UK has not had a formal industrial policy since Theresa May's 2017 Industrial Strategy. More recent growth plans have attempted to tackle underlying economic issues but have not looked at the make up or success of the economic sectors within it. More broadly, while the UK's sales pitch prior to Brexit was that it was Anglo-Saxon minded but at the heart of the European single market, it has still not decided what its new sales pitch is, with the result that it is now neither Singapore-on-Thames nor Global Britain.

Deciding on an economic purpose is not something that can be done alone and the design of any strategy to achieve a chosen economic goal requires several actors. The economist Dani Rodrik refers to this concept as 'embeddedness', where institutions allow for public-private sector mixing and information sharing.<sup>7</sup>

The UK does now have some institutions that can begin to serve that function, such as the UK Infrastructure Bank

with its role in blended finance, as well as aspects of the innovation system like the catapults. However, these arm's length institutions often fail to reach central and local government bodies and, thus, inform policy making. Embeddedness could also refer to democratisation, with either democratic input or local elected representatives.

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The UK under  
invests in skills,  
with employers  
spending half  
the EU average  
on employee  
training and  
development.”

### People

The UK's labour market is tight. As our recent report for Catch22 on green jobs sets out, over 500,000 people have left the labour market since the pandemic.<sup>8</sup> That is the same level of employment that the government's *Net zero strategy* forecasts to create by 2035. Current unfilled job vacancies are twice that figure. This is a reversal of the UK trend of a flexible labour market, with incentives for hiring over training.

There is a second layer of challenges about ensuring those who apply for jobs have the appropriate foundational and specific skills needed. The UK lags behind other countries on functional numeracy and literacy, and digital skills, and that is before considering additional skills required for new green technologies. With a tighter labour market and limited immigration, the UK may need to reconsider its approach to net zero, towards one that prioritises training, productivity and wage growth over gross job creation. Which brings us to the final challenge.

### Productivity

Flatlining productivity has a myriad of drivers. There has been a general slowdown in productivity gains across the developed world, but the UK's uniquely bad situation implies it cannot blame global forces for its outcomes. Possible UK-specific causes include:

- **Chronic under investment both from the public and private sector.** The UK has trailed behind other G7 countries in gross capital formation by between two and eight per cent.<sup>9</sup> It also under invests in skills, with employers spending half the EU average on employee training and development.<sup>10</sup> This is compounded by poorer middle management skills than other countries, the (historically) flexible labour market and an ageing workforce.<sup>11</sup>

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Any economic strategy must tackle deep rooted issues around productivity.”

- **The dominance of services over manufacturing in the UK economy, in particular finance.** Services are traditionally less productive, while the reliance on financial services left the UK more exposed than others to the 2008 financial crash. The economist Diane Coyle has also pointed to faster productivity slowdowns in areas of UK economic strengths, such as pharmaceuticals and transport, as well as oil and gas.<sup>12,13</sup>
- **The waning impact of ICT** and a poor record on digitalisation.<sup>14</sup>
- **The compounding impact of Brexit** and its associated barriers to trade.<sup>15</sup>

Our previous work with Nesta unpacks the relationship between the green transition and UK productivity in more depth, but it is clear that any economic strategy must tackle deep rooted issues around productivity. We explore here how that plays out at a regional level.<sup>16</sup>

### Regional disparities compound poor national performance

Connected to the economic challenges we have described at the national level, the UK has a long history of significant regional disparities in markers like productivity and income, both in absolute terms and in comparison with other developed economies.<sup>17</sup> According to the government’s levelling up white paper, the gap between the region with the highest productivity (London) and the lowest (Northern Ireland) is a staggering 60 per cent.<sup>18</sup> This is important because productivity closely correlates with real household disposable incomes and the education level of regional workforces, as well as other wellbeing indicators, like broadband access, life expectancy and civic engagement.<sup>19</sup> These disparities come from a range of factors, including economic and physical geography, investment attractiveness and the centralisation of power.

Regional disparities are compounded when high value service and manufacturing businesses choose to locate in areas with access to shared infrastructure, a large pool of highly skilled workers and other businesses with which they can share ideas and innovate. This is known as clustering.

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With deliberate  
policy choices,  
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transition could  
help to reverse  
the UK’s flagging  
productivity.”

Essentially, the top performing places become increasingly attractive and pull away faster from those at the bottom of the ranking. This trend of divergence has been observed elsewhere; for example, just five innovation centres in the US accounted for 90 per cent of its innovation growth. The bottom 90 per cent have all shrunk.<sup>20</sup>

UK regional disparities broadly reflect the north-south divide but there are nuances. Research by the Industrial Strategy Council found that South East England and Scotland performed best in terms of productivity and productivity growth. The west coast of England and north of England were falling behind on these economic indicators. The research also found that cities have been resurgent over the past decade while coastal areas have declined, with the latter more likely to suffer high unemployment, low pay and poor health outcomes compared with other regions.<sup>21</sup> In addition to the disparities between regions, there are significant inequalities within regions. The Royal Borough of Kensington and Chelsea is a frequently cited example. The difference in life expectancy between male residents living in the wealthiest and poorest wards of this borough, located just two miles apart, is 17 years.<sup>22</sup>

The Industrial Strategy Council’s study also found that a local area’s membership of a broader ‘regional club’ plays a significant role in determining its productivity and growth potential. And, while differences in UK regional productivity began to lessen during the mid-20th century, this trend was reversed in the 1970s, with disparities in 2001 returning to similar levels as the early 1900s.<sup>23</sup>

Green Alliance and Nesta’s work has demonstrated that, with deliberate policy choices, the net zero transition could help to reverse the UK’s flagging productivity.<sup>24</sup> The questions now are what industries could the UK succeed in, where will they be located, what might be the benefits to local areas and how should they be realised?

The debate is characterised by two opposing views: those who argue the UK cannot change the industries in which it is competitive, and others who believe it can do anything. There is, however, a third way: place-based strategy. Different regions will have different underlying or potential

advantages, which can help to guide where to apply government support to reap local and, therefore, aggregate national benefits.

### Multiple studies support a place-based approach

As we have said, productivity growth should be a major outcome of the transition to net zero and, in particular, better regional productivity. Effective net zero strategy needs to be place-based to take account of the different strengths and weaknesses of regions.

The ‘UK green growth index’, produced by Lloyds and Oxford Economics, has found that, while the net zero transition provides many growth and innovation opportunities, it will also create challenges due to the need to adapt products, processes and skills. These will vary across the UK, determined by regional differences in industrial sectors, skills and innovation. It suggests that Scotland is best placed to benefit from the net zero transition, while Northern Ireland and Yorkshire and the Humber could experience fewer opportunities and more challenges.<sup>25</sup>

Onward has found that many areas in need of levelling up are home to a higher proportion of jobs in carbon intensive industries. While these places could be disrupted by the move to decarbonise the economy, they are also likely to attract green industries due to locational and competitive advantages (like access to ports, sources of renewable energy generation and skilled workers). However, Onward also found that certain industrial areas, such as the West Midlands, will not be naturally suited to major green industries and will require government intervention to benefit.<sup>26</sup>

The Productivity Institute has gone some way towards identifying industrial strengths across the country in its regional insight papers.<sup>27</sup> However, more work is needed to determine how green industry maps onto this picture. In terms of regional innovation potential, work by the Centre for Cities and McKinsey has identified potential growth centres across the UK, based on strengths in patents, trademarks, university innovation, business innovation, skills, spillover and infrastructure.<sup>28</sup>

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Many areas in need of levelling up are likely to attract green industries due to location and competitive advantages.”

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The place-based approach created twice the level of social benefits, such as better health.”

UKRI research shows that a net zero strategy tailored to local needs requires £58 billion of investment to meet the sixth carbon budget. Costs increased almost four fold to £195 billion for a ‘place agnostic’ pathway. The place-based approach also created twice the level of social benefits, such as better health due to decreased air pollution and warmer housing, compared to a ‘one size fits all’ approach.<sup>29</sup>

Locally targeted actions allow regions to prioritise the most impactful and cost effective policies and technologies, develop skills where these are needed, and enable projects to scale to the right size for infrastructure investors.<sup>30</sup> Place-based approaches also have the benefit of greater community buy-in to the changes needed to be successful, as they tend to better reflect local concerns and motivations.<sup>31</sup>

Research suggests devolution can help to improve regional productivity. First, through effective local governance structures underpinning innovation, which can otherwise poorly reflect local economies. Second, powerful local political figures can have a pull effect on private enterprise, as well as effectively brokering local partnerships to act on them. Finally, local knowledge, and the power to use it to influence economic projects, can mean they are more successful.<sup>32,33</sup> It is also worth adding that the recognition and ability to unblock local constraints to growth, such as housing, transport or skills, can also enhance productivity.

The government has recognised the benefits of a place-based approach in its *Net zero strategy* and the levelling up white paper. The latter notes that “the Net Zero transition could create opportunities for many of the UK’s left behind places”, boosting living standards, supporting highly skilled jobs and attracting investment into future green industries.<sup>34</sup> However, the government has done little to target net zero specifically as a way to address flatlined productivity and its regional disparities.



# Why place matters

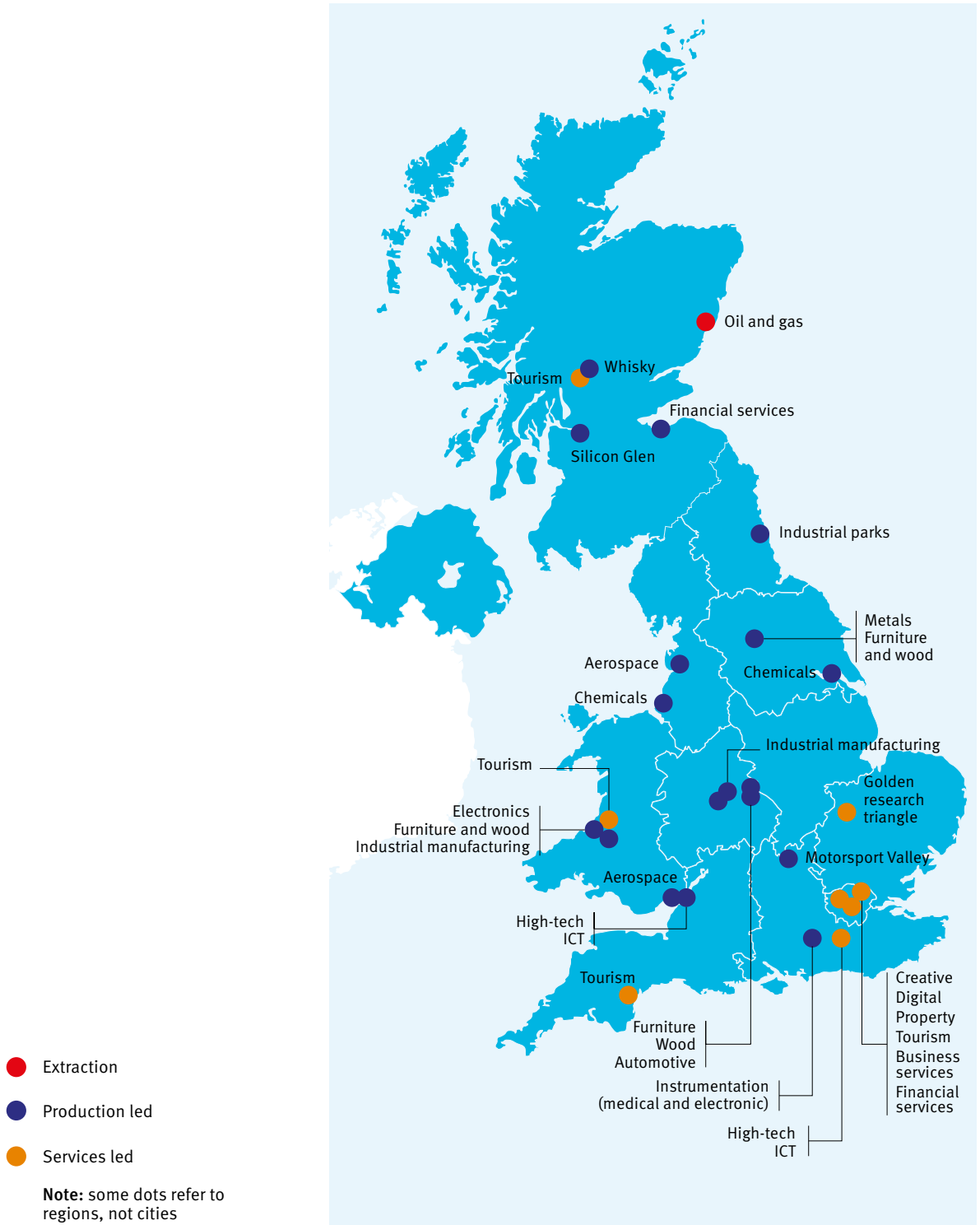
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**Some regions are likely to benefit more from net zero.”**















As all the research we examined reveals, some regions are likely to benefit more from net zero while others may face challenges. Drawing on a detailed analysis of current geographic and industry strengths of regions, we have mapped where future green industrial clusters might be located for maximum economic benefit.

The map on page 16, based on one first created by the Centre for Cities, shows a set of longstanding and relatively unchanged clusters where the UK has economic significance. The map on page 17 is our analysis of areas outside London where future net zero industrial and service clusters could be located, based on comparative advantages of regions.

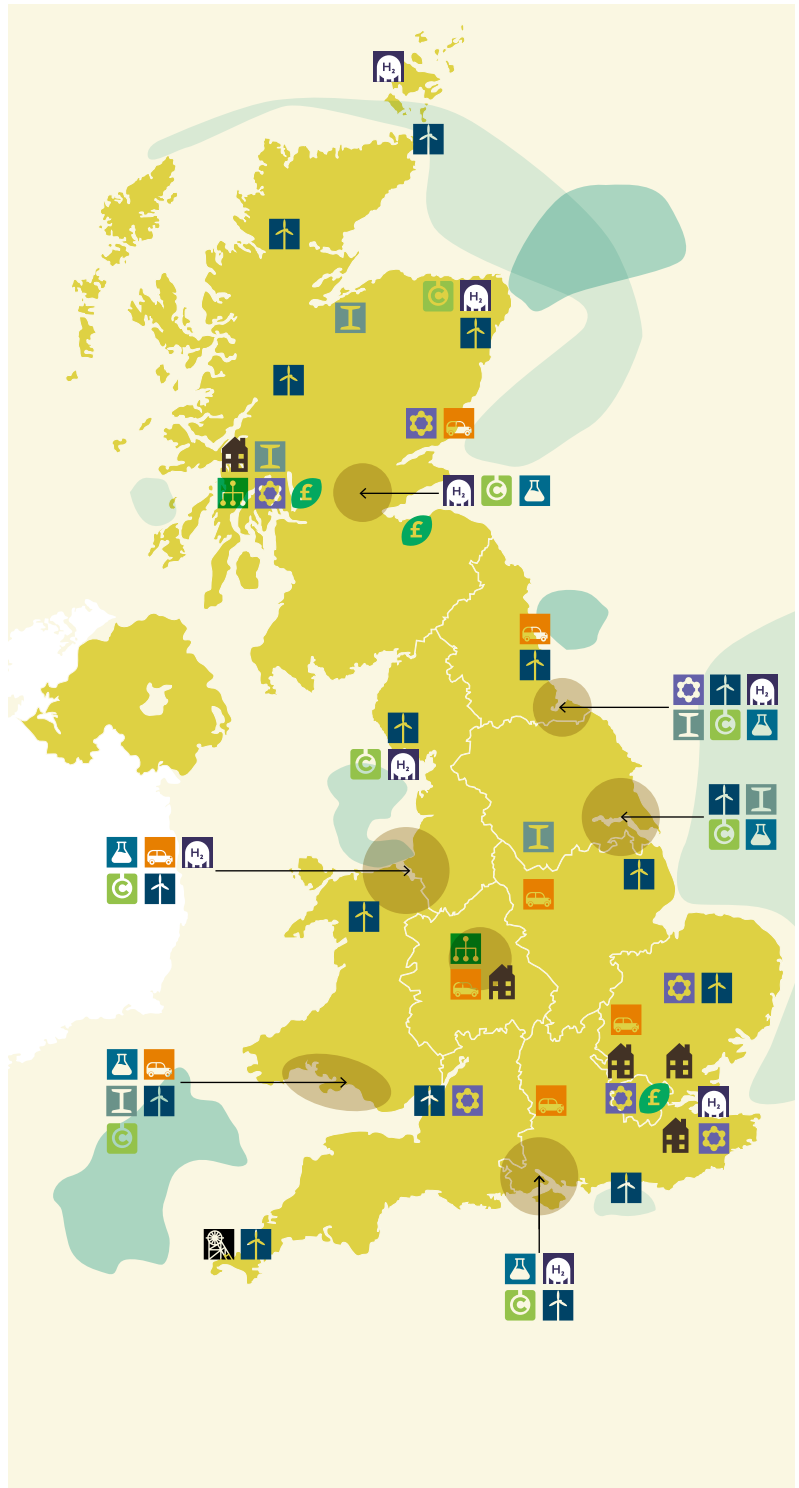
Our methodology at <https://bit.ly/3MYT83p> includes further details of our analysis, including a table which lists each region's sectoral strengths, based on exports per capita, and other important features.



## Potential net zero industrial and service clusters

-  Electric vehicle (EV) and battery manufacturing
-  Hydrogen production
-  Electricity generation from renewables
-  Carbon capture and storage (CCS) or bioenergy with carbon capture and storage (BECCS)
-  Green chemicals, sustainable aviation and shipping fuel
-  Green steel
-  Circular construction
-  Green finance
-  Agri-tech and alternative proteins
-  Critical raw materials mining
-  Energy system design
-  Existing major industrial clusters
-  Fixed offshore wind
-  Floating offshore wind

**Note:** Locations are approximate. Some icons refer to regions rather than specific locations.



# Spotlight on regions

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**Scotland is widely recognised as one of the UK’s net zero hotspots.”**

In the following examples, we examine four economic regions in more depth: North East and West Central Scotland, Hampshire and the Isle of Wight, and East Anglia. We chose them not because they will necessarily benefit most from net zero, but because they serve to illustrate how a net zero strategy could be tailored to a region’s strengths to produce the best economic outcomes, both for the region and the UK as a whole.

## North East Scotland

Scotland is widely recognised as one of the UK’s net zero hotspots, with strengths in renewable energy generation due to its proximity to offshore wind sites in the North Sea. North East Scotland in particular benefits from high productivity and wages relative to the rest of the UK, largely due to the oil industry in Aberdeen. Per head, it exports more services from this sector than any other region in the country. It also ranks very highly for exports of professional and scientific services, transportation and storage services, and trade in wholesale goods.

While the transition away from fossil fuel extraction may pose an economic challenge, North East Scotland is well placed to benefit from the net zero transition, thanks to its geographical advantages and sectoral specialisations. Three areas of specialism stand out: renewable electricity generation, hydrogen and carbon capture and storage (CCS).

### **Electricity generation from renewables**

North East Scotland is close to current and potential sites for fixed and floating offshore wind (FLOW) power generation. These include the Aberdeen Offshore Wind farm, which received £9.3 million in 2022 in innovation funding from the then Department of Energy, Business and Industrial Strategy (BEIS) to develop the world’s first hydrogen producing

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Energy Networks  
have identified  
Aberdeen as a  
strong contender  
for a potential  
hydrogen cluster.”

offshore wind turbine, and a site for the integration, assembly and manufacturing of FLOW turbines, currently under development in the city.<sup>36</sup> The University of Aberdeen is working with the National Decommissioning Centre and Offshore Renewable Energy (ORE) Catapult on new offshore wind technologies. The Scottish government has also invested £25 million to develop an Energy Transition Zone (ETZ), adjacent to Aberdeen’s South Harbour, which aims to become a hotspot for the manufacturing, R&D and deployment of low carbon technologies.

### **Hydrogen and CCS**

Aberdeen is a strong contender for a potential hydrogen cluster, thanks to the area's strengths in electricity generation from renewables, existing oil and gas infrastructure and easy access to geological carbon storage in the North Sea. The ETZ has announced that it will support research into, the development and delivery of future green hydrogen projects. The Acorn project aims to build a carbon capture plant near the St Fergus gas terminal and a hydrogen plant producing blue hydrogen from North Sea natural gas. The project is also exploring different ways of using pipelines and shipping infrastructure to transport the carbon captured from these and other UK projects for permanent storage under the North Sea.

Green hydrogen, produced by the electrolysis of water powered by renewable energy, is widely considered to be the cleanest and safest way to produce hydrogen. But blue hydrogen, created from natural gas using carbon capture and storage, may be needed in the short term to meet growing demand, before green hydrogen production can scale up. However it is made, hydrogen should only be used in the absence of alternatives as there are challenges with hard to manage leakage. It should be centralised in heavy industry, where it can be carefully managed, rather than distributed widely in vehicles and homes.<sup>37</sup>

### **West Central Scotland**

West Central Scotland is a good example of how the net zero transition might benefit a region with a service based economy. It has strengths in financial and insurance services and non-manufacturing services, notably

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The Solent cluster has announced its intention to become a UK leader in sustainable aviation fuel.”

construction. It is also known for its strong research universities, life sciences and technology sectors. More broadly, Glasgow City Region’s relatively central location in Scotland and good transport links allow it to export services associated with goods from other regions, such as agricultural products and renewable energy. Glasgow City Region is one of three Innovation Accelerators, announced after the levelling up white paper was published, designed to combine excellence in research with local industries.

West Central Scotland is a strong contender for:

- **Green financial services.** Notably this is in relation to financing renewables projects in other areas of Scotland.
- **Alternative proteins.** This draws on expertise in the life sciences sector and the potential to access cheap, renewable energy.
- **Renewable energy services.** Glasgow is home to the Offshore Renewable Energy Catapult, the UK’s leading technology research and innovation centre for the sector. Energy system design, feasibility assessments, project design and environmental services all support the sector.
- **Construction.** As home to Scotland’s largest city, Dalzell steel works and a strong construction sector, the region could become a leader in circular construction and the manufacture of modular homes.

## Hampshire and the Isle of Wight

Hampshire and the Isle of Wight is known for its strong maritime and trade industries, around the ports of Portsmouth and Southampton. It also hosts the Solent industrial cluster, which stretches 50 miles along the coast and includes Heathrow, Bournemouth and the Isle of Wight. The Solent industrial cluster has strengths in advanced manufacturing and includes the Fawley oil refinery. It was also identified as one of the UK’s six highest carbon dioxide emitting clusters in the government’s Industrial Cluster mission and aims to become low carbon by 2030.

Hampshire and the Isle of Wight is a strong exporter of services related to transport and storage, ranked second in the country for export value per capita. Export data also reveals a comparative advantage in trade in wholesale

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East Anglia has the  
potential to become  
a world leader in  
renewable energy.”

goods and motors. The region also ranked highly on professional, scientific and technical services, reflecting its innovation and R&D potential, driven by the presence of three universities.

Drawing on these strengths and the proximity of Heathrow and Gatwick airports, the Solent cluster has announced its intention to become a UK leader in sustainable aviation fuel (SAF). This includes the production of SAF from waste and green hydrogen. A caveat is that the area has no access to any identified geological carbon storage, limiting it to ‘green’ hydrogen based SAF. The industry has suggested there is a possibility of shipping carbon captured from industrial processes, but there are technical and cost challenges related to this.

The Solent is located close to offshore wind farms and potential tidal energy sites and already has several companies in the renewable energy sector.

## East Anglia

East Anglia has an advantage in professional, scientific and technical services, thanks to prestigious universities such as Cambridge and a high concentration of science and business clusters along the Cambridge-Norwich corridor. It is located near England’s ‘energy coast’ with abundant offshore wind and high grade agricultural land. Three areas of comparative advantage stand out:

- **Renewable energy generation.** It is home to the proposed offshore wind East Anglia hub and, according to the Productivity Institute, it has the potential to become a world leader in renewable energy.
- **Agri-tech.** It is close to vast tracts of high quality agricultural land and is near the Rothamsted Research Centre and the John Innes Centre, offering potential to become a leader in precision agriculture, using remote sensing and autonomous machines.
- **Alternative proteins.** It is near the research ‘golden triangle’ of London, Oxford and Cambridge where R&D intensity is particularly high in biotechnology and life sciences. But lack of laboratory space may limit growth and force young companies to move to other UK regions or abroad.<sup>38</sup>

# Agglomeration supports productivity and growth

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**Significant advantages come from locating industries in the same places.”**

Locating industries according to a region’s comparative advantage has local and national economic benefits. Significant advantages come from locating industries in the same places. To explain this, we explore factors behind industry clusters and economic agglomeration.

‘Industry clusters’ are geographic concentrations of interconnected companies and institutions. They can extend horizontally, to encompass companies in related industries or manufacturers of complementary products, and vertically, co-locating with suppliers and customers. Successful clusters include other institutions – universities, government bodies, standards setting agencies, think tanks, vocational training providers or trade associations – that provide targeted training and support for businesses within the cluster.<sup>39</sup> As the levelling up white paper notes, industry clusters generally play an important role in driving up both local productivity growth and, therefore, wages.<sup>40</sup>



## Local economic success: Aberdeen's oil industry

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The Scottish government has invested £26 million in an Energy Transition Zone.”



The discovery of the Forties Oil Field off the coast of Aberdeenshire in 1970 is a good example of the economic benefits that come from locating industries according to a region's comparative advantage.

Like the rest of the UK, Aberdeen was hit hard by the decline of traditional industries and the oil crisis of the 1970s. But the discovery of the oil field led to significant domestic and foreign investment in local infrastructure, including upgrades to the harbour and thousands of people moving to the area. Locals had access to high skill, high wage jobs in sectors such as engineering and pipeline design, and there were opportunities for commercial staff and workers at the heliport and port supplying North Sea oil and gas. By 1981, Aberdeenshire's population had risen by more than 40,000 and incomes and property prices rose significantly.<sup>41</sup>

Today, oil and gas production accounts for at least a third of the local economy.<sup>42</sup> Thanks to the highly productive oil and gas sector, Aberdeenshire has the largest proportion of workers with a gross value added (GVA) contribution over £100,000 compared to other UK regions, and a very high employment rate, compared to both the rest of Scotland and the UK.<sup>43</sup>

The challenge now is to move the region away from its dependence on fossil fuel extraction. Already, oil companies, such as the Wood Group, want to make the most of the region's comparative advantage for offshore wind generation and pre-existing industries, to become a leader in green energy production.<sup>44</sup>

The Scottish government has invested £26 million in an Energy Transition Zone, adjacent to Aberdeen's South Harbour development, which is expected to support 2,500 green jobs and a further 10,000 related jobs by 2030.

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**Agglomeration  
also has non-  
economic  
benefits, such as  
stronger social  
networks.”**

Cluster viability comes from agglomeration, ie the economic benefits of proximity. This is typically driven by localisation or urbanisation.<sup>45</sup> The former refers to when companies choose to co-locate in an area due to its geographic advantages. For example, offshore wind companies cluster in coastal areas with strong winds and large ports. However, for other industries, such as technology companies, physical geography may be less important. Instead, locating in or near a big city can be an advantage. For these, a larger pool of skilled workers is often more important than capital, while there are more companies whose services they require or to sell to.

As concentrated areas of interconnected companies, industrial clusters reap many benefits, including:

- access to inputs, technology, suppliers, related institutions and channels for spreading innovation and information;
- a pool of specialised and experienced employees, and the possibility to attract talent from elsewhere;
- better market and competitive information;
- complementarities, eg complementary products meeting customers' needs;
- more investment;
- better employee motivation and performance from greater competition.<sup>46</sup>

Agglomeration also has non-economic benefits, such as stronger social networks and communities with good civic engagement, often referred to by the government as 'pride of place', since workers choose to stay in the area for longer and are bound by a common purpose.<sup>47</sup>

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The zones would help existing smaller businesses enter the market and attract jobs and investment.”

## Testing Energy Innovation Zones in the West Midlands

The West Midlands is at risk of disruption from the net zero transition due to the concentration of high carbon industries, including the automotive industry and the Black Country Industrial Cluster, as well as a lack of significant geographic advantages, making it a challenging place for green industries to locate.<sup>48</sup> Policy is needed to help the region pivot towards green economic activity.

Energy Innovation Zones, such as those trialled by the Greater Birmingham and Solihull Local Enterprise Partnership, could help address this challenge. These are specific geographic areas where companies and individuals could come together to create innovative solutions to an energy challenge, such as how to improve electric vehicle charging infrastructure in a highly polluted area.

Local authorities, with government permission and the agreement of local voters, would be able to flex often constraining energy market rules, allowing effective deployment of energy solutions.<sup>49</sup> The zones would help existing smaller businesses enter the market and attract jobs and investment. Research from BEIS has concluded that, when an incubator is established in a region, within five years the target sector sees a 243 per cent rise in economic activity compared to untargeted sectors.<sup>50</sup>

To maximise the benefits of clustering, small and medium sized businesses in the energy incubator would be housed in a single building with access to a range of services required by innovative energy start ups, which are often hard to access otherwise.<sup>51</sup>

## UK clusters are heavily industry based

The UK's existing industrial clusters are, by name and nature, primarily industry based. Only ten out of the 31 economically significant clusters mapped by the Centre for Cities and McKinsey in 2014 (see page 16) were service based, and the majority of these were located in London or the South East.<sup>52</sup> More recent analysis in the levelling up white paper identifies 20 regions or clusters with specific sectoral strengths.<sup>53</sup> While these include a broader range of services, they are still biased towards industry.

The net zero locations identified in the white paper tend to favour industries such as nuclear, electric vehicle manufacturing, offshore wind and CCS over services, with the only service based industry represented being green

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lacks a broader  
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policy that takes  
services into  
account.”**

finance. While the government has put forward an industrial decarbonisation strategy, focusing on the country’s six largest industrial clusters, it lacks a broader net zero industrial policy that takes services into account as well as, or colocated with, industry.<sup>54</sup>

Given that the UK is a service based economy, we propose that industrial strategy should concentrate both on the decarbonisation of current industrial clusters and the creation of new hubs focused on services necessary for the net zero transition.

Design is an example of a service industry critical to this and one in which the UK has strengths and traditions. As well as designing products like wind turbines, specialists in systems, processes and user centred design will be needed to support other priorities, such as the rollout of heat pumps and service models for the circular economy. Design industries are already somewhat clustered, with the North East England and Wales having a good presence of product and industrial design businesses. However, employees with design skills may be more evenly spread across the country and embedded within other industries.<sup>55</sup>

# Industrial policy works

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**Government policies can be important in supporting the growth and longevity of clusters.”**

Industrial clusters can be found in almost every country around the world. While most economists agree they can form independently of government action, government policies can be important in supporting the growth and longevity of clusters. For example, research from the US Brookings Institution highlights that targeted government support aided the formation of numerous US ‘innovation stars’, including Boston and the Silicon Valley.<sup>56</sup> Similarly, the German government’s cluster policy helped to catalyse the rapid emergence of science and innovation clusters in Eastern Germany in the 1990s and early 2000s. This has helped the region to grow faster than all other economies in Central and Eastern Europe since 1990.<sup>57</sup>

## The US Office for Scientific Research and Development (OSRD)

The US Office for Scientific Research and Development (OSRD) catalysed the development of technology clusters throughout the US in the post war period. It was established in June 1940, to mobilise and co-ordinate scientific research in the development of warfare technology. The first federal agency of this kind, over the course of the Second World War, it awarded over 2,000 R&D contracts and spent the equivalent of roughly \$7.4 billion at current value, which was over double the government’s previous spending on scientific research.<sup>58</sup>

Growth was strongest in places where OSRD funding was most concentrated, and where patenting was already strong in a specific technology.<sup>59</sup> Therefore, while funding was not wholly responsible for the emergence of technology clusters, it helped to set in motion an agglomeration effect, the legacy of which was to widen differences in innovation throughout the country. Although investment was mission

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By the end of the war, Boston had an intellectual and technical labour pool unsurpassed in much of the country.”

focused, concentrating on research relevant to the war effort, funding helped to build local scientific and technological capabilities, generating positive spillovers for associated industries like electronics and communications.

Boston is one of the 'innovation stars' whose success can largely be attributed to this funding. Massachusetts had a long history of innovation prior to the Second World War and, in the 19th and early 20th centuries, was home to companies pioneering manufacturing techniques and equipment in the textiles, armaments and machine tools industries. The city was also an important hotspot for automobile and electricity manufacturing. However, it went through a period of industrial decline during the early to mid-20<sup>th</sup> century as companies moved south to reduce costs.

During the Second World War, Boston benefited from an influx of federal funding to support the development of military electronics, thanks to the presence of strong research institutions like the Massachusetts Institute of Technology (MIT). MIT received a third of the \$330 million in contracts awarded by the OSRD in the 1940s and 50s, with nearby universities Harvard and Tufts and local businesses also receiving significant sums. OSRD contracts also established the MIT Radiation Lab to help develop radar and navigation systems. This funding attracted scientists and engineers from across the country. By the end of the war, Boston had an intellectual and technical labour pool unsurpassed in much of the country.

During the Cold War, government funding was expanded and formalised. MIT was commissioned to take a leading role in addressing the threat from the Soviet nuclear arsenal, with the Lincoln Laboratory established for this purpose in 1951. The first section of the Route 128 highway was also completed in the same year, linking over 20 towns in the greater Boston area and providing connections to research universities and suburban communities, making it an attractive location for tech firms to locate.<sup>60</sup>

## German cluster policy since the 1990s

A government programme of investment in industry also played an important role in supporting the East German economy following reunification in the 1990s. The government focused on the creation of industry clusters through national and federal support programmes aimed at enhancing productivity and innovation. This helped to transform the region into one with strong knowledge based industries. Today, Germany is a major global innovation player, responsible for nine per cent of the OECD's total R&D expenditure.<sup>61</sup>

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Germany is pursuing active cluster policy as a way of mitigating the economic impacts of coal phase out”

German cluster policy has involved several federal and regional initiatives since the 1990s, and includes the following measures:

- competition to promote exchange processes between universities and companies;
- region specific measures to foster cluster development;
- measures to foster cluster development in individual fields of technology;
- cross industry competence creation;
- cutting edge cluster competition.

For example, in 2007, the German government launched the Leading Edge Cluster Competition, with a budget of €600 million. Fifteen cluster initiatives were selected through a three part competition and given funding to help them to become world leaders in their sector.

Germany is now pursuing active cluster policy as a way of mitigating the economic impacts of coal phase out. The former heart of eastern Germany's coal mining industry, Brandenburg, is emerging as the centre of a new green mobility cluster. The establishment of a \$6 billion Tesla gigafactory in Gruenheide in 2019 helped to catalyse this. Since then, BASF, Microvast and Rock Tech have set up plants in the region, respectively producing cathodes, electric vehicle battery systems and processing imported lithium. The region's strengths in renewable energy production and the green grid have played an important role in attracting new businesses.<sup>62</sup>

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German regions  
can also count on  
the support of  
regional banks  
and a national  
development  
bank.”

## Factors in industrial cluster success

The following factors contribute to the success of clusters, as the US and German examples we have described show.

### **Comparative advantage**

Boston’s industrial base, history of industrial innovation, concentration of technology and skills, and highly regarded research universities, all helped to attract OSRD funding during the war. And the funding further helped to develop these capabilities, starting a positive feedback loop.

Brandenburg was seen as a desirable location for green mobility industries due to the region’s good road and rail projects, vacant industrial space, well developed renewable energy production sector and green grid.

Nationwide comparative advantages can also help smaller nations. Finland’s strong education system allowed for easy recruitment of engineers which was critical to Nokia’s success and that of its mobile technology cluster.<sup>63</sup>

### **Long term government funding**

The OSRD committed significant funds to support R&D in military technology in Boston during the Second World War and the following Cold War period and awarded numerous contracts to research institutions and businesses in the area. As well as direct federal funding, German regions can also count on the support of regional banks and a national development bank for ongoing finance for infrastructure and local economic growth. Tekes, the Finnish public innovation agency financed 26 per cent of Nokia’s costs in the 1990s.<sup>64</sup>

### **Political commitment**

The Brandenburg state government’s commitment to phase out coal by 2030 and support the renewable energy sector has been important in attracting green businesses to the area. Germany’s strong ‘open for business’ stance has further helped this. The government successfully negotiated with Tesla to establish the first gigafactory in the region, which helped to kickstart a green mobility cluster.

The UK demonstrated similar political commitment with its long term ambition to reduce the price of offshore wind.



But it did not commit in the same way to secure domestic manufacturing of turbines, choosing to optimise only on price.

### **Relevant institutions**

MIT's location in Boston was an important factor in attracting federal funding to the city, fostering innovation and developing the skills base needed to develop into a world leading cluster. In Israel, the independent office for the chief scientist was given powerful tools, away from day to day government interference, which have since helped to support the country's successful innovation sector.<sup>65</sup>

“

**In Israel, the independent office for the chief scientist was given powerful tools to support the country's successful innovation sector.”**

# Place-based strategy to grow green industries

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**Effective targeting drives resource reallocation between sectors to encourage growth.”**

The net zero transition will require an industrial strategy with emissions reduction and improving productivity as clear national missions at its heart. As we have demonstrated, a place-based strategy is a more efficient way to address the three Ps we outlined at the start of this report: purpose, people and productivity, which are the main issues behind UK economic stagnation. We have shown that targeting specific clusters or places can be a successful strategy. Defining it in this way helps to refine the policy tools to achieve it. Complementary policies in a carefully designed package of measures should reap the best results.

## Policy tools for place-based strategies

Industrial policies are traditionally distinguished by whether they are horizontal (cross economy) or vertical and targeted (sector specific).

Horizontal policies are available to all businesses, regardless of their location or sector, for example R&D tax incentives. Targeted policies may only be available to businesses in certain locations, or those that make specific technologies, for example the public procurement of green steel. Effective targeting drives resource reallocation between sectors to encourage growth; for instance, the expansion of renewables at the expense of fossil fuels. In short, industrial policy means choosing and giving clear direction.

Place-based strategies draw more heavily on targeted policies; for instance, they identify pockets for high productivity and high growth industries in areas of low growth and investment, and support their development with long term public investment to crowd in private investment.<sup>66</sup>

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**Mayoral combined authorities could be given responsibility for spatial planning and transport policy.”**

Policies can also be split into those that address demand, such as grants for buying electric cars, or those that address supply. Supply side policies improve competitive relationships between businesses, by lowering barriers to entry and promoting healthy competition, or they can enhance business performance by improving access to inputs like land and energy, or by providing tax credits for R&D. These are the primary constraints for nascent UK green businesses.

High energy prices dissuade investment in the greening of heavy industry and potential providers of cheap renewable energy face a bottleneck when they attempt to secure a connection to the electricity grid. Some have received connection dates in the 2040s.<sup>67</sup>

Energy users are also hampered by grid access. Ceres Power, a fuel cell company that started at Imperial College London, has scaled back its plans after receiving quotes of between £5 million and £15 million for grid connection and connection delays of between four and seven years. Decentralised on-site power systems, such as wind turbines, with accompanying Purchase Power Agreements, allowing generators to sell directly to consumers, could provide some respite. But amendments made to the National Planning Policy Framework in 2015 have obstructed the development of onshore wind, with only 11 planning applications for onshore wind turbines approved in England between 2016 and 2021.<sup>68</sup>

Constraints on land in some parts of the country prevent businesses from growing, either by limiting available floorspace or preventing skilled potential employees from moving to the area because of high house prices. Targeted planning reform may be one way of increasing the supply of energy, floorspace and skills where other ingredients for success already exist.

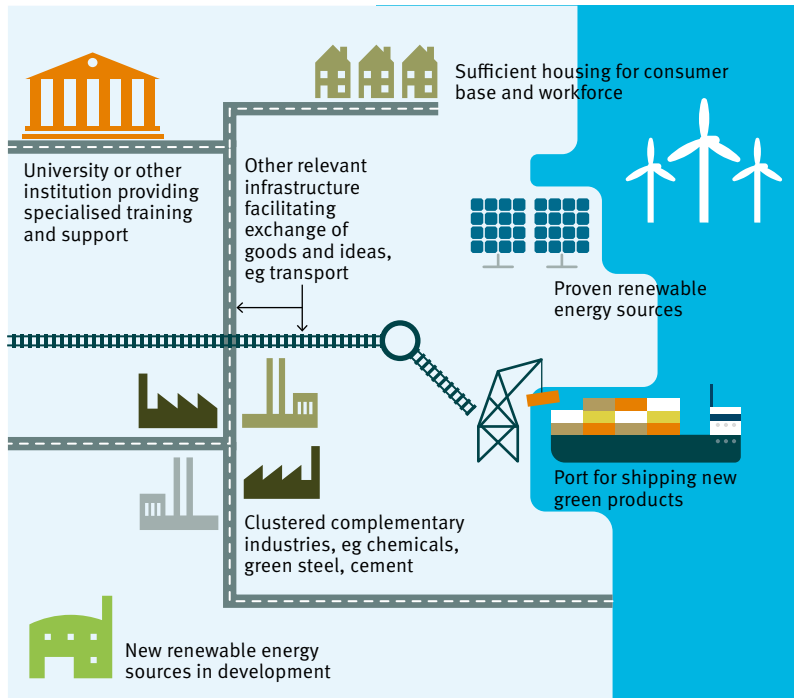
Alongside horizontal and vertical measures, devolution may be a factor. The UK is an unusually centralised country and place-based strategies can include enabling policies that devolve power, resources and tax raising abilities.<sup>69</sup> Some argue that clusters should be co-ordinated by mayoral combined authorities (MCAs) rather than central

government. To support this, MCAs could be given responsibility for spatial planning and transport policy, as well as for potentially sector specific regulations within their cities, and they could be given powers to align further education college courses with the needs of local industries.<sup>70</sup> This would build on the trailblazer devolution deals announced by the chancellor in the 2023 budget.

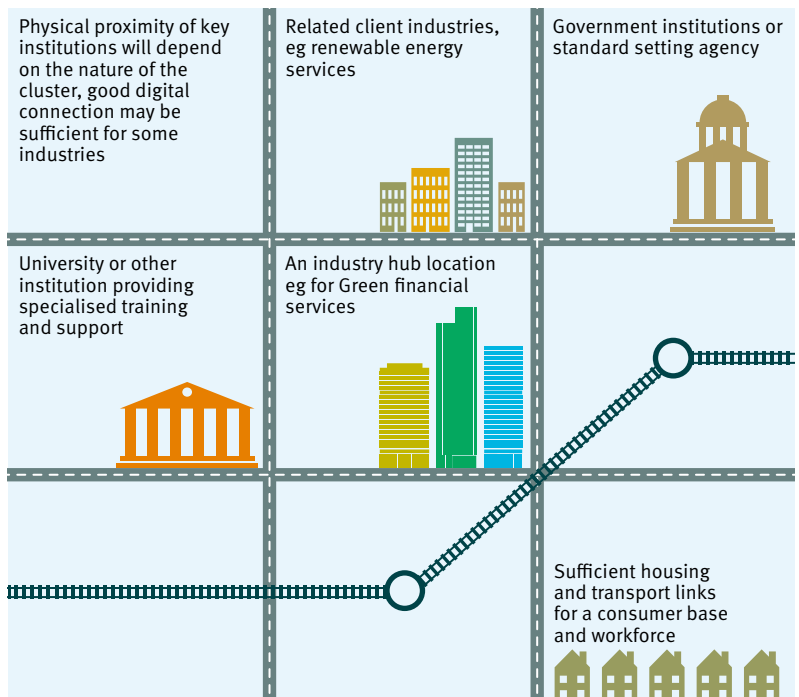
How place-based strategy fits into the industrial policy toolbox

		Horizontal policy	Vertical policy	Place-based policies
Demand		Renewable energy purchase tariffs	Public procurement, eg for green steel	
		Taxes on social harms, eg carbon prices	Consumer facing, government backed loans, eg green mortgages	
Supply	Improve business performance	Product standards, eg ecodesign	Supported purchase power agreements for industrial clusters	
		Ban on the sale of petrol and diesel vehicles		
	Improve dynamics between businesses	R&D tax incentives	Bounded planning reform	
		Education investment	Skills bootcamps	
	Energy cost reduction	Regulatory sandboxes for urban transport		
		Transport investment		
		Regionally targeted innovation grants		
		Cheap energy for energy intensive industries		
		Labour mobility		
		Trade and competition policy		
		Lowering barriers to entry		
		Technical standardisation		

## Characteristics of a successful industrial cluster



## Characteristics of a successful service industry cluster



# What should happen now

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**An effective place-based industrial strategy should include targeted action to meet the needs of new green industries.”**

As we have highlighted, an effective place-based industrial strategy needs a package of the right tools. This should aim to remove the specific and shared constraints that can hold regions back, like inadequate infrastructure. But it should also include targeted action to meet the needs of new green industries, allowing them to grow.

We recommend government action on the following three fronts, encompassing both horizontal and vertical policy. It is also important to acknowledge the link between devolution and local productivity. We point to where increasing the regional decision making powers can address the factors that constrain productivity and attract productivity enhancing projects.

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## Horizontal (cross economy) policy

President Biden’s industrial policy, such as IRA and the CHIPS and Science Act, is demonstrating that strategic horizontal policies produce an enabling environment for growth, and that targeting these at regions which already contain the seeds for comparative advantage creates hubs of innovation. A place-based approach allows for flexibility in the type of horizontal policy selected, depending on local constraints. Tools should include:

### – Energy

Purchase Power Agreements and planning positively for renewables, such as solar or wind turbines in ways that also benefit nature, and accelerating investment in updating grid infrastructure, will help to connect areas of high generation, such as the east coast of Scotland, with areas of high demand in England.

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North Tyneside council has shown the advantages of linking local skills policy to its industry base.”

#### – Land

Where commercial floorspace is in short supply, targeted local development orders allow local authorities to specify types of, or reasons for, development to meet local needs, such as life sciences and biotechnology hubs in Oxford, Cambridge and Milton Keynes. Where possible, locations should be prioritised that can be accessed by public transport, walking or cycling, or where rail freight transport is possible. The National Infrastructure Commission has highlighted the need to move away from competitive bids for transport infrastructure, giving local areas more responsibility for their transport budgets.<sup>71</sup>

#### – People

Improved transport connections and housebuilding can increase the size of the labour market, allowing skilled workers to move or travel to regions of high growth. This is important for services which benefit most from agglomeration and tend to locate in cities. North Tyneside council has shown the advantages of linking local skills policy to its industry base. Increased local authority control over skills policy would help to expand this across the country.<sup>72</sup> Essential to this will be central government granting local access to national skills data, as well as empowering local authorities to support the gathering of UK labour market intelligence.

A responsive planning system, able to support new infrastructure, while building on existing levels of environmental protection, is crucial to support development in these three areas. There has been movement in the EU, through its Net Zero Industry Act, to simplify environmental impact assessments and similar rules, so they apply to spaces or areas rather than individual projects.<sup>73</sup> It is too early to tell whether the EU’s approach will improve protection while increasing clean infrastructure deployment. However, if done well, strategic spatial environmental assessments can be more effective at protecting the environment, while enabling suitable development, than individual project assessments. A good example is the Desert Renewable Energy and Conservation Plan in Southern California, which created

new protections for desert wildlife and habitats while fast tracking solar parks.<sup>74</sup> Giving local government the power to manage this process, potentially alongside investment zones, could improve nature and energy infrastructure through a place-based approach.

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## Vertical (sector specific) policy

### Innovation and investment support

Policy targeted at specific sectors will be required for them to grow. This could include, for example, investment in R&D, in partnership with research institutions, catapults and universities. These should be geographically concentrated, building on existing capabilities, to generate a critical mass of R&D intensity and associated agglomeration effects. Innovation tax credits will help to crowd in private finance.

New devolution deals for Greater Manchester and the West Midlands offer scope to influence R&D funding to suit their economies and, therefore, the industries most concentrated locally. As Tom Forth and Richard Jones at Nesta argue, this should include the ability to allocate innovation funding directly.<sup>75</sup>

### Experimental regulation

Regulatory sandboxes allow experimentation in the real world without the need for immediate national reform. As an example, Milton Keynes City Council facilitates a testbed for transport technologies, such as autonomous delivery robots. Implementing new regulatory sandboxes could overlap with a recommendation from the *Mission zero* review to back at least “one trailblazer net zero city, local authority and community”, for example by allowing a local authority to trial electric vehicle servitisation, creating car clubs or rentals for second and third hand vehicles. Experimental regulation could also support the development of alternative proteins, building on the UK’s existing comparative advantage in the life sciences.



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### Overcoming sector specific constraints

Once industries and locations are identified, sector specific challenges need to be tackled. Returning to the concept of ‘embeddedness’ we have referred to, government institutions and businesses need to work together to understand what is required for a sector to succeed. For instance:

- **Electric vehicles** require policy certainty with an ambitious zero emissions vehicle mandate, and government support for the development of gigafactories and charging infrastructure.
- **Alternative proteins development** is a young industry that needs both infrastructure for R&D (and particularly scaling up), as well as regulatory support at early development stages, with robust standards to ensure consumer trust.
- **Renewable energy projects** need investment credits to attract developers to the UK in the face of competition from abroad.
- **Improving the resource efficiency of sectors** and the adoption of circular principles, which requires co-ordination between buyers and sellers of used goods and components, storage facilities and new testing and standards for second hand materials.

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