Energy UK

The voice of the energy industry

OXFORD ECONOMICS

The Path to Prosperity

The dividends of clean energy investment

Part of The Clean Growth Gap – a series of reports and economic analysis from Energy UK, supported by Oxford Economics

Executive Summary

Ambitious action to achieve Net Zero will bring large economic benefits. By unlocking investment, the Government can set the UK on a path that will see the economy expand significantly, creating hundreds of thousands of additional jobs, as well as meeting our climate goals.

The UK is set to have the slowest growth in low-carbon electricity production of the world's eight largest economies over the next decade.

How we get there, and how quickly we take action will determine the outcome. "Path to Prosperity" is the third report in Energy UK's "The Clean Growth Gap" series. It provides an overview of the size of the prize under different scenarios, following research showing that initiatives put in place by the UK Government to encourage investment in clean technologies pale in comparison to the more ambitious programmes in other countries. This means that the UK is set to have the slowest growth in low-carbon electricity production of the world's eight largest economies over the next decade.

Reaching Net Zero will grow the economy

Reaching Net Zero will generate significant economic benefits in the long-term. A successful global transition to Net Zero could mean that UK gross domestic product (GDP) will be up to 6.4% higher in 2050 than in a scenario which follows the current policy trajectory (the Baseline Scenario).[1] This equates to £240 billion in today's prices, which is greater than the current contribution to UK GDP made by the whole manufacturing sector.[2]

Compared to the current trajectory a transition to Net Zero by 2050 could mean that GDP is greater by …

The cost of inaction

However, for these benefits to be realised, policymakers, businesses, and investors need to take actions now to reach Net Zero by 2050. The costs of inaction are high: under a scenario where governments delay action to tackle climate change, GDP is forecast to be 1.1% worse than the Baseline Scenario.

Investment is key to achieving our goals

To achieve a decarbonised economy, substantial investment is needed in low-carbon generation, networks, manufacturing and services. Any credible pathway to reaching Net Zero will embrace a range of technologies, both established (such as offshore wind) and emerging (such as carbon capture, use and storage (CCUS), hydrogen and small modular reactors). The majority of investment (up to 64% in the most optimistic scenario, with the OBR forecasting 70%[3]) will come from the private sector, but how much public money is required will be determined by the level of incentives that the UK Government provides and the immediacy of action. The quicker the Government acts and the more it works with the grain of the private sector, the less public investment will be required.

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Net Zero will change the shape of the economy

The transition to Net Zero creates a significant change in economic activity across many sectors, alongside an opportunity to create new value streams. The electricity generation, manufacturing, and construction sectors will all benefit from the large investment boost necessary to decarbonise the economy. For example, the gross value added (GVA)[4] of UK electricity generation could be up to 27% higher by 2050, which equates to an extra £9 billion in economic output in today's prices. This is equivalent to the size of the UK's motor vehicle sector today.

Accelerating the Net Zero transition could grow the UK's electricity generation sector by an additional…

A fair transition

Inevitably, there will be some areas of decline, most notably in the fossil fuel sector. Whilst declining sectors are expected to be relatively small compared to the number of new jobs created - with oil and gas extraction, for example, accounting for fewer than 12,000 jobs in 2021 - it is paramount the transition is managed fairly. There will be many opportunities for workers to transition to jobs in sectors with related skills such as CCUS, floating offshore wind and installing heat pumps, and industry and the public sector must work together to support workers through the transition. Declining sectors are expected to be relatively small, with oil and gas extraction, for example, accounting for fewer than 12,000 jobs in 2021.[5]

There are different pathways ahead of us.

The UK Government has legally committed to achieving Net Zero greenhouse gas emissions by 2050. There are different ways to achieve this, but current policies mean the UK is unlikely to achieve its climate goals. To understand the implications of the different routes to achieving Net Zero, this paper makes use of Oxford Economics' Global Climate Scenario Modelling.[6]

The four scenarios are designed to help users evaluate the impact of different pathways, including the impact of:

1. taking immediate rather than delayed action to limit climate change;
2. providing appropriate incentives to encourage large-scale private sector clean investment; and
3. the role of technological innovation encouraged by clean investment.

Baseline Scenario

This reflects the current state of play. If governments around the world only implement their stated policies, this would not be sufficient to transition to Net Zero by 2050. The Baseline Scenario assumes global governments implement further policies consistent with stated commitments but excludes policies that are not sufficiently backed up with detailed measures. For example, although the UK has stated its intention to achieve carbon neutrality by mid-century, these ambitions are not sufficiently backed up by policies such as carbon pricing and investment. As such, in this scenario, the UK remains significantly reliant on carbon-intensive energy sources such as oil, and unabated gas.

Net Zero Scenario

Net Zero is reached by 2050 through early policy action and technological advances. Policymakers induce a transition to low-carbon energy by increasing the price of carbon and facilitating increased investment. As per the International Energy Agency's assumptions, 50% of energy investment initially comes from the private sector with this share increasing over time. Any innovation benefits associated with future investment are not quantified.

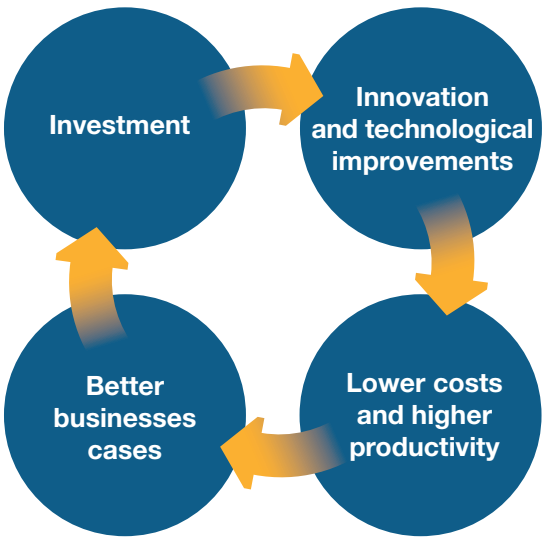
Net Zero Transformation Scenario

The Net Zero Transformation Scenario is like the Net Zero Scenario but with variations in assumptions around investment, technological advancements, and innovation:

Although carbon pricing continues to be implemented by policymakers, **technological advancements** are assumed to reduce the costs of carbon abatement;

Relative to the Net Zero Scenario, private investors grow more confident that they can generate profits from **green investment**. This is due to technological advances lowering the costs of low-carbon technologies and also because government policies have been successful in incentivising large scale green investment in the private sector. More competitive technologies and compelling government support derisk investments, lowering the cost of capital; and

The boost to investment creates a stimulus in demand which is then assumed to create incentives for **innovation**. This creates a virtuous cycle whereby more innovation and technological progress lowers the cost of low carbon technologies. Increased innovation will increase long run productivity.

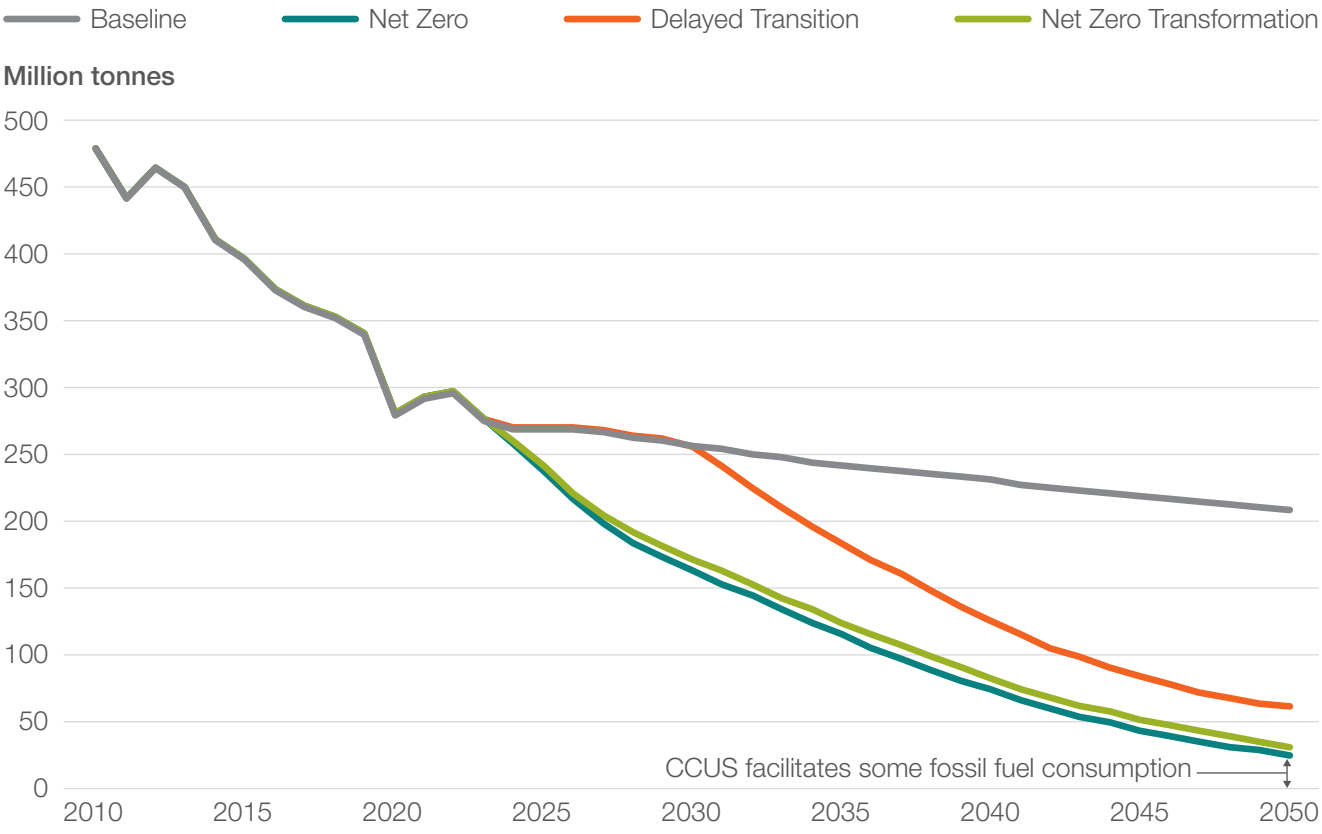


Delayed Transition Scenario

Governments around the world do not ramp up efforts to limit global warming until 2030. Therefore, more stringent policies such as aggressive carbon taxes are required to achieve similar climate outcomes by 2050. This causes substantial inflationary pressures and greater financial instability which result in greater negative economic impacts.

The reduction in UK CO_2 emissions varies under the different scenarios, as shown in Fig. 1. Emissions are not zero in 2050 under any scenario as some availability of CCUS technology is assumed. As this technology captures the CO_2, it means some level of fossil fuel consumption can occur, whilst the overall *net* carbon emissions remains zero.

Fig. 1: UK CO_2 emissions over time under the different scenarios



Source: Oxford Economics

Private sector investment is critical

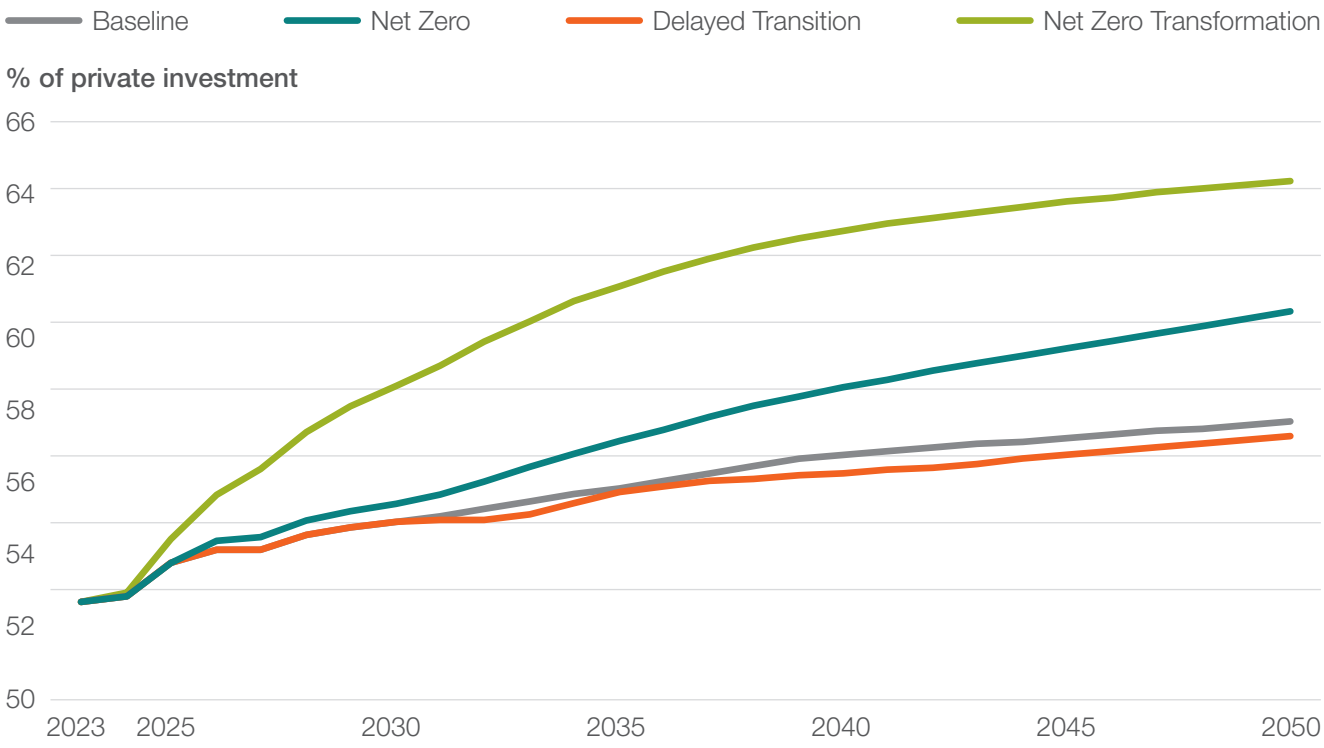
To reach Net Zero by 2050, there must be a considerable expansion in private investment in a range of technologies including low-carbon electricity, networks, smart and flexible systems and building retrofit. This will be underpinned by investment in the supply chains of these sectors, including manufacturing and construction.

Oxford Economics estimates that to meet Net Zero by 2050, total annual UK investment needs to increase by over two thirds from today. Relative to the Baseline Scenario, scenarios that achieve Net Zero will see between £32-£174 billion more investment per year in 2050. The level of incentives that Government provides - as well as the urgency with which it acts – will determine the amount of investment that is borne by the private sector. Providing incentives for investment now means Government is likely to have more money in the long run. For example, Oxford Economics analysis for the CBI found that introducing permanent full-expensing capital allowances would have a positive effect on the Government's balance sheet overall.[7] The upfront cost of the policies was found to be offset by a boost to incomes, expenditures and profits which increase tax receipts.

Fig. 2 illustrates how the proportion of private investment differs between the scenarios.

- Under the Net Zero Transformation Scenario, in 2050, private investment in UK clean technology is £165 billion greater than the Baseline Scenario.
- In 2050, there is a £95 billion difference between investment in the Net Zero Scenario and the Net Zero Transformation Scenario which arises from the latter having greater long-run returns to investment. Although returns to investment hinge on assumptions about the future costs of low carbon technologies, government policies also play a crucial part.
- Under the Delayed Transition Scenario, a smaller share of investment comes from the private sector. In 2050, private sector investment is only £15 billion larger than the Baseline Scenario. If this happened, the Government would have to fill the gap, leaving less money for other priorities.

Fig. 2: Proportion of UK investment from the private sector over time under the different scenarios



Source: Oxford Economics

The right kind of transition will reap economic rewards

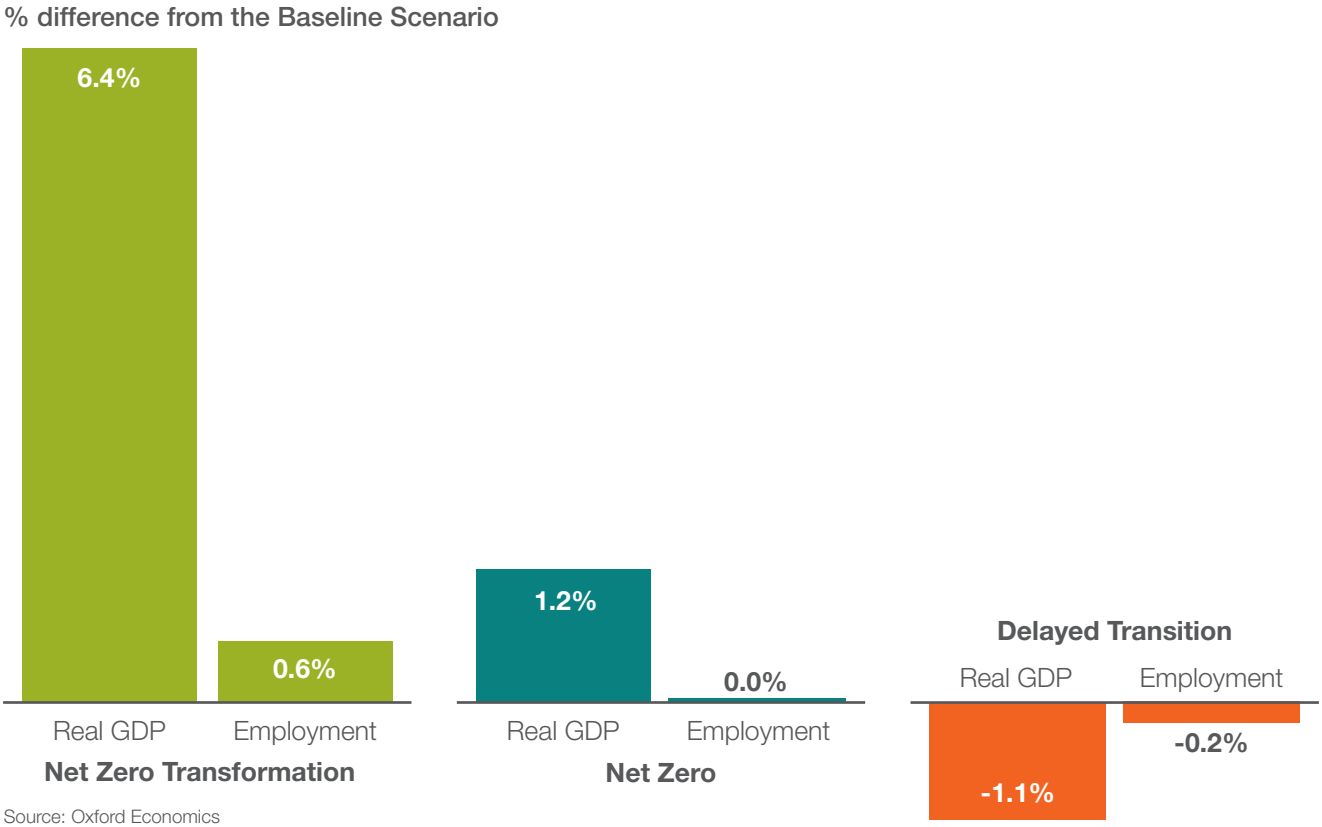
If the UK reaches Net Zero by 2050, under the most optimistic Net Zero Transformation Scenario the UK economy could be up to 6.4% or £240 billion bigger than the Baseline Scenario, in today's prices. This is equivalent to the size of the whole UK manufacturing sector today. Equally, scenarios that achieve Net Zero see up to 226,000 more jobs in the UK in 2050 than would be created under the current trajectory (Baseline Scenario). This is approximately the same number of people who are currently employed in Bristol. This is driven by greater investment – mostly from the private sector – which in turn encourages greater innovation and productivity. In the Net Zero Transformation Scenario (as in the Net Zero Scenario), economic growth and employment pick up towards the latter half of the forecast.

Relative to the Net Zero Transformation Scenario, the Net Zero Scenario has more conservative assumptions about future investment and technological advancements.

Under this scenario, the UK economy is estimated to be 1.2% larger than the Baseline Scenario by 2050. This equates to an additional £48 billion of economic output in today's prices, equivalent to size of the UK hospitality sector today. Employment is expected to be 18,000 higher than the Baseline Scenario.

Under a Delayed Transition Scenario, the more stringent policy required to achieve similar climate outcomes by 2050 means that economic output is expected to be 1.1% *lower* than the Baseline Scenario in 2050. Expected employment also reduces, at 0.2% lower. This is equivalent to losing the number of people who are currently employed in Newport, Wales. This scenario illustrates how delayed action increases the economic costs of the climate transition.

Fig. 3: Employment and GDP (in real terms) in the UK in 2050



Source: Oxford Economics

There are more winners than losers

Oxford Economics modelling examines the industry-level impacts of different scenarios, taking into account (i) demand and supply chain impacts, and (ii) relative movements in sectoral costs. The transition unsurprisingly creates significant movement in economic activity across sectors.[8]

Expanding sectors

Electricity generation, transmission, and distribution

The demand for electricity will increase significantly as electrification (along with CCUS and hydrogen) is used to decarbonise the economy, incentivised through policies such as carbon prices. By 2050, the economic contribution (GVA) of the electricity sector is forecast to be 26.7% higher in the Net Zero Transformation Scenario and 22.9% higher in the Net Zero Scenario than in the Baseline (Fig. 4).

Manufacturing

Increasing investment will boost demand for clean technologies, benefiting sectors in the supply chain such as manufacturing. Under both the Net Zero and Net Zero Transformation scenarios, the manufacturing sector expands (10.3% and 2.3%, respectively) with manufacturing GVA expected to be up to £30 billion higher in 2050 than the Baseline Scenario in today's prices.[9]

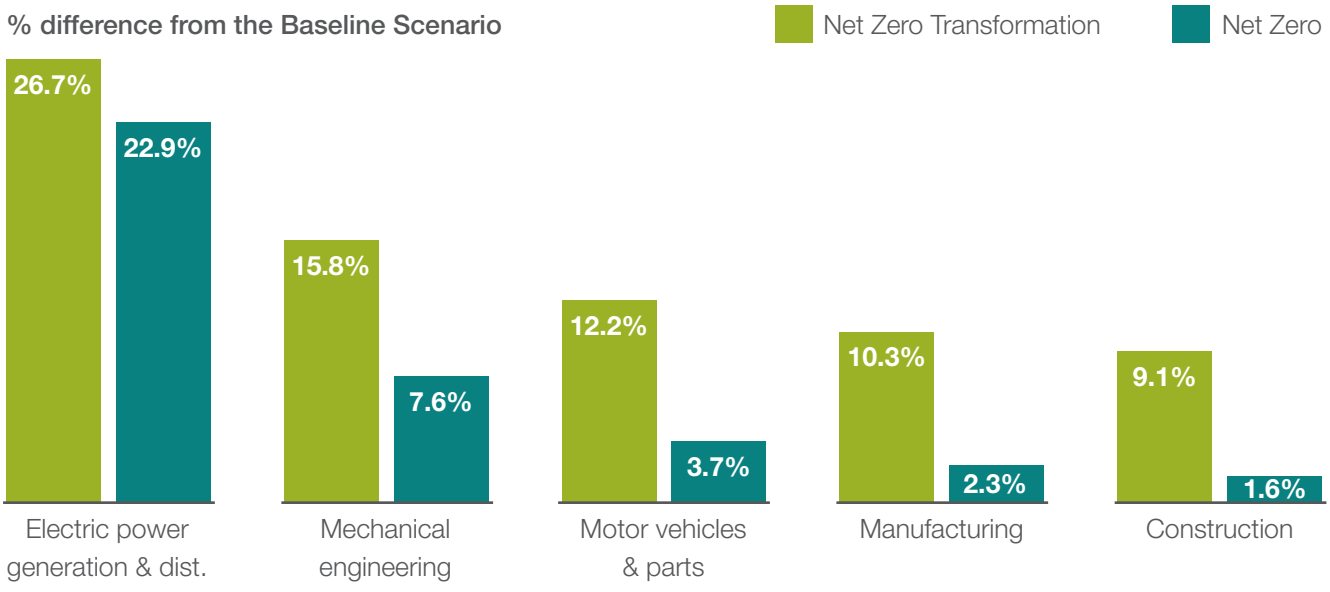
Automotive vehicle manufacturing and parts

Within the UK manufacturing sector, motor vehicle GVA is forecast to be up to £1.4 billion larger in the Net Zero Transformation Scenario than than in the Baseline Scenario in 2050, representing a 12% increase. This is predominantly driven by an increase in the sector's competitiveness versus its international peers.

Sectors within the supply chain of low carbon technologies

Mechanical engineering, basic metals, and non-metallic minerals are all manufacturing sectors that are expected to be amongst the biggest winners from the Net Zero transition. Collectively, the transition to Net Zero could make these sectors' contribution to UK GDP up to £6 billion larger by 2050 in today's prices. This is because these sectors make up a large part of the supply chain of products such as wind turbines, transmission infrastructure, and equipment needed to power increased electrification.

Fig. 4: Expanding sectors' gross value added contribution to UK GDP in 2050



Source: Oxford Economics

Construction

The construction sector's GVA contribution to UK GDP is forecast to increase by up to 9% (or £17 billion) by 2050 compared to the Baseline Scenario. This is in part due to the need to build new low carbon electricity generating capacity, including large investments in transmission and grid infrastructure. Renovation of existing buildings to improve their energy efficiency and the installation of heat pumps will also boost the construction sector's output.

The Net Zero Transition provides increased opportunities for well-paid jobs

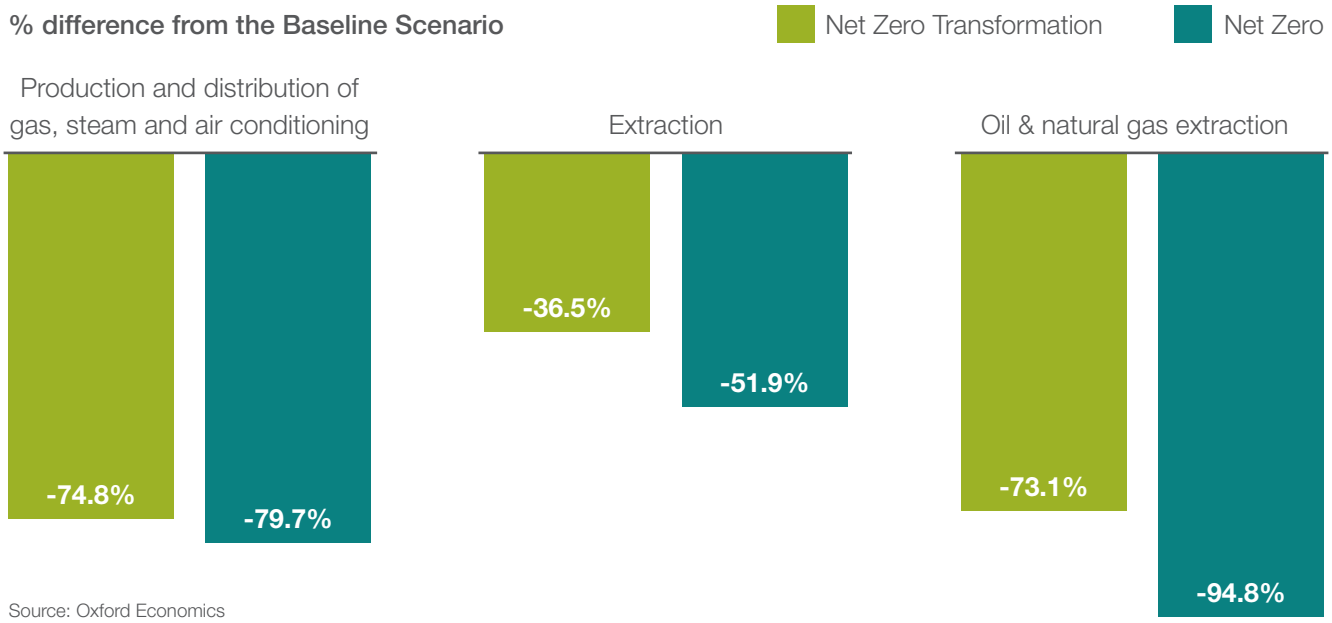
The sectors that are expected to benefit as a result of the transition to Net Zero are typically highly skilled and thus well paid. Respectively, the median wage of construction and manufacturing sectors are 17% and 22% higher than the average median wage in the UK.[10]

Contracting sectors

As the global economy decarbonises, the manufacture and distribution of gas is predicted to contract sharply as residential and commercial heating electrifies. Moreover, sectors involved in the extraction of fossil fuels are forecast to experience a steep decline in demand, which will reduce sectoral output. Within mining, oil and natural gas extraction is forecast to decline by up to 95% by 2050 (Fig. 5).

The sectors that are predicted to experience a steep decline in output currently employ relatively small numbers of people within the UK, with oil and gas extraction, for example, accounting for fewer than 12,000 jobs in 2021.[11] In contrast, the manufacturing sector, which is expected to expand under a Net Zero or Net Zero Transformation Scenario accounts for 8%, more than 2.5 million people.[12] Fortunately, there is considerable potential for transfer of expertise from the oil and gas industry to carbon capture technologies as well as emerging offshore technologies such as tidal and floating wind.[13,14] This means many people employed in contracting sectors are likely to be well placed to move into related, expanding sectors. Equally, some sectors will move directly from fossil-fuel led work to activity that will contribute to the transition, such as heating engineers switching from gas boilers to heat pumps. However, Government and industry will still need to make considerable efforts such as investing in training and skill development opportunities for these workers to ensure that people displaced from contracting sectors are easily able to transition to other sectors.

Fig. 5: Contracting sectors' gross value added contribution to UK GDP in 2050



Source: Oxford Economics

Conclusion

The UK – and the world in general – is transitioning to a decarbonised economy. The path we choose towards Net Zero determines how much we will benefit; embracing the challenge and taking bold steps today will reap economic rewards in the future, but inaction will cost both the planet and our pockets dearly.

The questions we now face are how quickly this transition happens and who pays. The more quickly policies and frameworks to decarbonise the economy are put in place, the more significant a role the private sector will play in investing in the future. This could mean £32-£137 billion more private investment annually by 2050 depending on how quickly action is taken, and will not only grow the economy, but free up public money in the future to spend on other priorities.

In a future where we accelerate towards Net Zero compared to the current trajectory, the UK economy could be £240 billion larger in 2050, which is additional growth equivalent to the entire manufacturing sector today. The benefits will be spread across the country in sectors including electricity, manufacturing and construction, providing new jobs for hundreds of thousands of workers.

If we move quickly, this clean investment will also bolster the UK's global competitiveness through a virtuous circle of increased investor confidence, lower cost of capital and cheaper technologies. But as shown by *Funding the Future* – the previous report in Energy UK's Clean Growth Gap series – the UK is falling far behind compared to competitors such as the United States and the European Union. Failing to provide sufficient initiatives to encourage private sector investment will have stark consequences. As it stands, the UK is set to have the slowest growth in low carbon electricity production of the world's eight largest economies, so urgent action must be taken.

The transition to Net Zero is not just about the headline figures, but also how it will affect people on the ground. For most people, it will mean easier ways to manage their energy use, and more affordable bills overall. For those working in the transformation of our energy supply, it will mean job creation across a range of technologies and supporting services, with opportunities for people to use the skills they have gained in other industries to support this green transition. For the communities located near clean energy infrastructure, whilst there may be temporary disruption, the lasting benefits in terms of employment, supply chain and educational opportunities – alongside community funds and grants – will have a longer impact.

Community Capital, the next report in the Clean Growth Gap series, will drill down into the granular details of the transition further, showing how investment in Net Zero will bring regional benefits across the country.

Read the full series of reports here:
https://bit.ly/CleanGrowthGap

Endnotes

1. Net Zero Transformation Scenario. The Baseline Scenario assumes government implements further policies consistent with stated commitments. See Oxford Economics, Industry Climate Service for more details.

2. ONS. "Non-financial business economy, UK: Sections A to S", May 2023. Accessed August 2023.

3. Offshore Energies UK, "Business outlook 2023: The comprehensive outlook for the UK›s offshore energy resources", 2023, accessed July 2023.

4. Gross value added is an industry's contribution to UK GDP, which is the total size of the economy. It is easiest thought of as the value an industry sells its output for, minus the cost of bought-in goods and services used up in its production.

5. Business Register and Employment Survey, 2021

6. Oxford Economics, Industry Climate Service.

7. CBI, "The case for a permanent investment deduction", March 2023.

8. Oxford Economics, Industry Climate Service.

9. Under the Net Zero Transformation Scenario. 2019 prices.

10. ONS, "Earnings and hours worked: industry by four-digit SIC: ASHE Table 16", October 2022. Accessed August 2023.

11. Business Register and Employment Survey, 2021

12. House of Commons Library, Manufacturing: Key Economic Indicators, August 2023

13. Resolution Foundation, "Growing clean", 23 May 2022.

14. Independent report of the offshore wind champion, March 2023.

Energy UK is the trade association for the energy industry with over 100 members - from established FTSE 100 companies right through to new, growing suppliers, generators and service providers across energy, transport, heat and technology.

Our members deliver nearly 80% of the UK's power generation and over 95% of the energy supply for 28 million UK homes as well as businesses.

The sector invests £13 billion annually and delivers nearly £30 billion in gross value - on top of the nearly £100 billion in economic activity through its supply chain and interaction with other sectors. The energy industry is key to delivering growth and plans to invest £100 billion over the course of this decade in new energy sources.

The energy sector supports 700,000 jobs in every corner of the country. Energy UK plays a key role in ensuring we attract and retain a diverse workforce. In addition to our Young Energy Professionals Forum, we are a founding member of TIDE, an industry-wide taskforce to tackle Inclusion and Diversity across energy.

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