Industry, innovation and infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Prepared by
There is great scope for improving the UK’s performance on SDG9. This was the world’s first nation to industrialise, starting some 250 years ago. Another economic transformation is now required, to maintain the UK’s prosperity and wellbeing whilst rapidly reducing its greenhouse gas emissions and other damaging impacts on the global environment. Ageing infrastructure must be restored or replaced, additional greener infrastructure is required and the ways in which we produce and consume goods and services must change in order to move towards a circular and zero waste economy. This, in turn, requires continual innovation from public and private-sector funded research and development.

**Performance rating**

<table>
<thead>
<tr>
<th>Sustainable Development Goal Target</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all</td>
<td>🟢</td>
</tr>
<tr>
<td>9.2 Promote inclusive and sustainable industrialisation and, by 2030, significantly raise industry’s share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries</td>
<td>🟢</td>
</tr>
<tr>
<td>9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets</td>
<td>🟢</td>
</tr>
<tr>
<td>9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities</td>
<td>🟢</td>
</tr>
<tr>
<td>9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending</td>
<td>🟢</td>
</tr>
<tr>
<td>9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States</td>
<td>🟢</td>
</tr>
<tr>
<td>9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities</td>
<td>🟢</td>
</tr>
<tr>
<td>9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020</td>
<td>🟢</td>
</tr>
</tbody>
</table>
Key findings

1. The UK’s infrastructure must be transformed if it is to meet the great challenges posed by SDGs and climate change

2. Large scale, sustained investment in replacing ageing infrastructure and creating additional resilient and low carbon infrastructure of all kinds is required. Even in a sector like electricity generation, where a good start has already been made, there is still far to go

3. Similarly, an industrial transformation is required to make the UK economy more circular with much higher levels of reuse, repair, recycling and energy recovery and major improvements in resource productivity

4. Small and medium sized enterprises can play an important role in this transformation, and should be supported to do so

5. Digital technologies are, and will continue to, make an important contribution

Performance and progress

As a wealthy, long industrialised nation, the UK is rich in infrastructure (Target 9.1). Achieving sustainability and radical reductions in greenhouse gas emissions requires this to be renewed or replaced and additional infrastructure created using public and private-sector investment. This transformation is well under way for electricity generation, but decarbonising the grid requires much further progress in developing renewable energy generators, energy storage and flexible, decentralised systems (SDG7).

The UK’s water supply network is an ageing infrastructure requiring both renewal and new functions. This includes increased interconnectivity, efficiency and behaviour change, and recycling. In addition to an average of 121 litres per property served leaks from supply pipes,1 drainage and flood defences require extensive maintenance and additional investment to cope with changing rainfall patterns and rising sea levels in light of climate change (SDG13). The Environment Agency’s £2.3bn 2015-2021 flood defence programme for England is based on a partnership funding model which encourages private investment.

Waste management and transport infrastructure also need transforming – and large-scale investment – to make their due contribution towards sustainable development. Infrastructure investment should be integrated; for example, the growing number of electrically powered vehicles could provide electricity storage in flexible local grids, helping accommodate high levels of intermittent generation from renewable power.2

At the same time, public infrastructure of all kinds – such as new or refurbished hospitals and schools – has to become more energy, water and raw materials efficient in construction, maintenance and day-to-day use (Target 9.4). The Low Carbon Routemap3 for the Built Environment is a tool helping the construction sector understand the policies, actions and key decision points to achieve an 80% reduction in greenhouse gas emissions between 1990 and 2050, the UK’s legal target. Although reduction specific to the built environment is quite new, driven by the Construction 2025 strategy,4 the global
green and sustainable building industry was recently forecast to grow at 22.8% per annum. With the increase comes a need for greater low-carbon regulatory requirements and greater social demand for greener products.

The concept of green infrastructure is increasingly recognised in the UK – areas covered by vegetation and habitat contributing to water storage and flood defence while reducing air pollution levels and high temperature extremes. Green infrastructure contributes to human wellbeing and prosperity and can also help maintain and increase biodiversity.

Regarding Target 9.2 on ‘inclusive and sustainable industrialisation’, the challenge facing one of the most industrialised and wealthy nations is for its economy to become socially and environmentally sustainable from a global perspective while maintaining high living standards. The UK economy has to become more circular, with much higher levels of reuse, repair, recycling and energy recovery, for products of all kinds along their supply chains. That implies large improvements in resource productivity, with production of goods and services requiring less energy, water and raw materials. The ideal is a zero-waste economy. Several studies have claimed there is great growth and export potential for green and low carbon products and services. The ONS’s latest estimates for the UK’s low carbon and renewable energy sector (covering most of this green economy) puts its turnover in 2016 at £42.6 billion, with 208,000 employees, 84,500 businesses, and exports worth £3.7bn (but imports of £6bn).

Two recently published Government strategies, The Clean Growth Strategy and the 25 Year Environment Plan, support this vision of an economic transformation (Target 9.2). But this journey has only just begun, illustrated by the UK’s late start and slow progress in dealing with plastic waste and the fact that the low carbon and renewable sector was equivalent to 2.2% of UK GDP in 2016. Much further policy support and public and private sector investment is required. A government resources and waste strategy promised for later this year is an opportunity to step up the pace.

Small and medium sized businesses (SMEs) have an important part to play (Target 9.5) as innovators of new products and services which can then be scaled up. There are over 5.7 million SMEs in the UK, representing 99% of all businesses. The ONS analysis of the UK’s low carbon and renewable sector found the average business within it employed fewer than three people.

The UK Government has targeted increasing total research and development expenditure (Target 9.5) from a low base of 1.67% of GDP in 2015 to 2.47% by 2027, with £2.5 billion of public sector investment in low carbon innovation in 2015-2021. However the nature of SMEs makes monitoring the outcomes of policy on this part of the UK economy difficult. An increase in support to Catapult Centres to promote much stronger involvement of SMEs, including university spin-outs, in their centres would be beneficial.

Manufacturing played the major historical role in the development of the UK’s economy but its share of economic output declined to a low of 10% in 2017. Despite this representing a real term increase in output since the 1990s, the sector has declined significantly since the 1970s – particularly compared to the steady increase in the service industries. Regionally there are significant differences in employment levels in manufacturing, accounting for 12% of jobs in the East Midlands compared to 2% in London. Innovation can play an important part in realising more added value for manufactured products while increasing the future economic, social and environmental
importance of UK manufacturing. Current digital technological changes (internet penetration, artificial Intelligence, data analytics), closer long-term relationships with consumers and increasing resource constraints could provide many new opportunities for manufacturing and industrial innovation. Examples are: coupling of services with products; data analytics based on embedded sensors and open data; and ‘collaborative consumption’ with no one customer owning a product outright.

Synergies and coherence

Sustainable industrialisation is the backbone for achieving a range of other SDGs in the UK, particularly SDG12 for sustainable consumption and production, and SDG13 for climate change. Links can be drawn between SDG9 and all 16 of the other goals but some of the strongest and closest of these are with SDG7 on energy, SDG8 on decent work and economic growth, SDG10 on reduced inequalities and SDG11 on sustainable cities and communities. Sustainable industrialisation and infrastructure are also key to protecting habitats and biodiversity (SDGs 14 and 15), not just in the UK and its surrounding seas but across the globe.

Local to international dimension

Approximately $3.3tn needs to be invested in infrastructure globally by 2030, equivalent to the size of the existing global infrastructure stock. Most of this will be in low-income or emerging economies where capacity to ensure that this is done in a safe and sustainable way is lacking. This risks locking these nations into high-carbon or unsustainable lifestyles in the future. The UK has world-class design and construction expertise and could have a valuable impact on the development of infrastructure across the world. This is both an economic opportunity for these organisations and the UK economy, and could also make a valuable contribution to social and environmental development globally.
Recommended actions

1. Renew existing infrastructure, and create new infrastructure, in ways that make a full contribution to rapidly decarbonising the UK economy. Public and private investments in infrastructure should aim to achieve large gains in energy, water and raw materials efficiency.

2. Encourage the development of alternative low-carbon fuels such as hydrogen, increased energy efficiency, and carbon capture, usage and storage, and the application of all these to greenhouse gas intensive industries.

3. Ensure that the current R&D target (2.47% of GDP by 2027) is maintained and met throughout all sectors of UK manufacturing and construction.

4. Implement policies that encourage innovation by SMEs specifically, taking account of the fragmented nature of this sector and the high-proportion of non-employing firms. These policies should include, but not be limited to, increased support for Catapult Centres to work with SMEs and university spin-outs.

5. Increase investment in STEM education to address the shortage of skills in engineering, maths and science.

Case study

Manufacture 2030

SDG TARGETS: 6.4, 7.3, 9.4, 12.2

Manufacture 2030 is a digital platform with a global reach. It is on a mission to halve the resources used in global manufacturing by 2030, bringing retailers, brands and their manufacturing suppliers together to cut costs, risks and environmental impacts. To make this happen, it believes resource efficiency needs to be made easier and simpler, because using less resources is good for business, and for our planet too. This centres around the innovative M2030 bee tool, a unique, cloud-based service that makes it simpler for manufacturers to improve the resource efficiency of their operations. The M2030 bee is packed with hundreds of efficiency gains, tips, advice and case studies, all validated by industry experts, so operational teams can act quickly, and with greater confidence. Because it sits in the cloud, there’s no need for integration with enterprise systems and it’s been co-designed with engineers... which means more impact, with less fuss.

The platform also hosts an online community that brings manufacturing practitioners together in a non-competitive space to explore the latest trends in resource efficient manufacturing. Partners include Interface, Mars, Johnson & Johnson, Coop, House of Fraser, US Department of Energy and University of Cambridge. The Manufacture 2030 platform and its tools are powered by 2degrees, a technology company specialising in resource efficiency software solutions, with a mission is to make sustainable business happen at scale.

www.manufacture2030.com
Endnotes


5 MHCLG. (2012). The national planning policy framework.


13 Ibid.
