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All-Party Parliamentary manufacturing Group

DELIVERING NET ZERO THROUGH DIGITAL

The Institution of Engineering and Technology

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THE GOVERNMENT'S NET ZERO AMBITION: WHAT IT MEANS FOR MANUFACTURING

In its March 2021 Industrial Decarbonisation Strategy, the government announced rightly ambitious net zero goals for the UK: to reduce greenhouse gas emissions from heavy industrial emissions by 78% in 2035 compared to 1990 and achieve carbon neutrality by 2050[1]. The October Net Zero Strategy built on this target and outlined a clear roadmap to success. Now industry must mobilise and act on these plans, using all tools at their disposal to ensure the future of our planet.

The All-Party Parliamentary Manufacturing Group (APMG) welcomes this ambition for the manufacturing sector. The Group is pleased that several manufacturers are well on their way to achieving carbon neutrality in the current decade, with a third of the UK FTSE 100 committing to net zero[2]. However, the challenge to get onto the right trajectory before 2030 means the whole sector must accelerate action from now on.

In its journey to net zero 2050 the sector must take account of – and indeed can benefit from – two other drivers: the economy shifting to digital (or as we refer to it, digitalisation), which accelerated during the Covid crisis,[3] and the importance of resilience to future shocks highlighted by the pandemic.

In this report, we examine how digitalisation and decarbonisation can be taken forward as a single agenda in the manufacturing sector to achieve sustainability, resilience, and net zero targets. We examine the relationship between industrial digital technologies and sustainability and recommend key actions that must be taken to support the sector and ensure net zero targets are achieved. In our sector we need to build greater confidence in using digital solutions and learn from organisations that have already made significant progress.

The Institution of Engineering and Technology's Manufacturing Policy Panel has for some time advocated a collaborative approach to applying digital technologies, sustainability and business goals within manufacturing. Its advice to manufacturers and policymakers is that digital and sustainability should not be viewed as separate or standalone exercises and should, instead, be worked on at the same time. Delivered with concurrent investment and enthusiasm across the factory floor, they have potential to secure significant benefits through reduced waste, improved processes and increased productivity. Engineers have a major role to play in delivering manufacturing net zero by applying and embedding industrial digital technologies.

THE SIZE OF THE PRIZE

Where sustainable manufacturing may have seemed worlds away just a few years ago, it's now become the front running agenda. The sector has the ambition of being resource efficient, resilient, profitable and competitive, and understands that global net zero cannot be achieved using our current manufacturing methods.

In the UK, the levels of 'readiness' to tackle this challenge vary - there are organisations that are already carbon neutral and others who haven't even woken up to the reality of the task yet. The same is true for companies' digital readiness. Irrespective of where a company is on that spectrum, sustainability and digitalisation can provide mutually reinforcing benefits, giving manufacturers a wider range of techniques to optimise processes.

Digital processes and ICT themselves can have a considerable carbon footprint[4]. It's not as simple as just increasing computational processing; technological breakthroughs can help a company's efforts to become carbon neutral, but can also hinder them if consumption of technology and equipment is greater than the efficiency gains made. In working towards carbon neutrality, companies do have to assess their overall carbon footprint, including for new technology and equipment. The implementation of digitalisation

has various nuances across factory operations and business leaders must think critically about the problems that need to be solved.

So how does digitalisation help us on the path to sustainability? Digitalisation can help with collecting and organising data on energy and material flows. Historically, companies have mainly used data to improve labour productivity, but digitalisation can now be used to drive out energy inefficiency in production. Such new analyses can feed into traditional process improvement activities, allowing engineers and technicians to better question and adapt existing processes, practices and infrastructure.

As we have learnt from the lean revolution, knowledge exchange and upskilling are at the heart of process improvement; it doesn't need big capital expenditure, but rather creative ways of using technology within the constraints of standard business operations. We need to bridge the gap between finance, sustainability and digital teams to exploit the benefits of net zero. This means a culture shift – encouraging cross working across digitalisation and sustainability teams.

MANUFACTURING NET ZERO: HOW DO WE ACHIEVE IT?

RECOMMENDATION 1

The government should ensure that support packages for manufacturers are promoted and delivered, at scale, across the UK. Such support and training should lead to all businesses working to decarbonise consistently.

Rationale

This recommendation addresses the fact that there are many support packages, funding competitions and training programmes available to businesses. Each has its place; however, in a busy landscape it can become difficult for manufacturers to know where to start on their sustainability journey.

The problem of the knowledge gap is twofold; first, businesses not knowing how to harness digitalisation; and second, not having the skills required within their workforce. The UK is well placed to become a thought leader in the space of digitalisation: throughout Covid-19 it has become very clear that early adopters of the digital economy benefit greatly during times of uncertainty and shocks, as they are better able to pivot. However, the knowledge must be shared throughout organisations from business leaders to technicians and engineers.

There is a wide range of services available to help: The Catapults, The Knowledge Transfer Networks, training providers, and Trade bodies, Institutes of Technology, producers and sellers of green technologies and the Manufacturing Advisory Service. This wealth of knowledge is an asset to the UK manufacturing sector, and yet the 2020 Garner Smart Manufacturing Survey found that 57% of manufacturers felt that their organisation lacks skilled workers to support smart manufacturing digitalisation plans[5]. If this is to change, government needs to make these support services accessible to all businesses in the UK, raise awareness of their availability, and support industry role models to show the benefits. During our evidence sessions, several stakeholders suggested that role models in the sector – or 'Digitalisation heroes' – could be used to showcase the success of these services in a form that is accessible to all sectors and business leaders.

Our evidence showed there is no lack of enthusiasm or motivation. On the contrary, across the sector there is pent-up demand to upskill and reskill all parts of the business to start on their decarbonisation journey. Robust knowledge exchange and upskilling will ensure that there is a strengthened and expert advisory service to engage with SMEs, providing mentoring, support and improved university connections. But it is critical that all these offers are in harmony and help to drive the twin goals of digitalisation and net zero. The government needs to review the objectives of all these support services to ensure they are mutually reinforcing and not clashing with ambitions.

Government should ensure that, whatever access point a company uses, this takes them to consistent, net zero focussed training and knowledge exchange programmes that support digitalisation and decarbonisation, and fit with the ambitions of the Net Zero and Innovation Strategies.

For our part, the APMG will be continuing to explore this debate in greater depth as part of our examination of manufacturing skills post Covid-19.

RECOMMENDATION 2

The government should use Capital Allowances in their various forms as a means to ensure that businesses are investing in green technologies.

Rationale

The government has several existing tools that can be targeted to help businesses embed net zero practices and support investment in green technology. These include the power of procurement of sustainable products and using the green investment bank. Good examples of targeted investment are the Super Deduction announced in the Spring Budget as well as the £147 million in funding for the Manufacturing Made Smarter Innovation challenge.

Since 2008, capital allowances in the UK have been well below the OECD weighted average of 69.9%, ranking the UK 28th at 61.8[6]. Super Deduction, R&D Tax Credits and other existing incentives offer great opportunities to manufacturers to revitalise their assets and plants in the coming years, but without the right targeting, the UK will miss a once-in-a-lifetime opportunity to ensure that any new capital investment is low-carbon.

In this recommendation, we call for the government to align capital investment with decarbonisation targets, in two ways. By increasing the lifespan of existing tax relief, Treasury gives businesses time to use this capital allowance strategically to meet the potentially higher initial cost of greener technologies. Therefore, given how critical this decade is to meet the UK's 2035 and 2050 carbon reduction targets, the Super Deduction must be continued past the current 2023 deadline and ideally be extended to 2030. Secondly, to be eligible, all investments in capital expenditure, R&D and so forth must help achieve decarbonisation targets. This will help drive the shift in attitude and culture needed within the sector to ensure carbon neutrality, as well as address the unaffordability of up-front capital investment.

The current allowance allows businesses to purchase, amongst other things, various assets within a plant: solar panels; computer equipment and servers; tractors, lorries, vans; ladders, drills, cranes; office chairs and desks; electric vehicle charge points; refrigeration units; compressors; and foundry equipment. In broad terms, many of these have low carbon ready or carbon neutral alternatives that could be adapted to a manufacturer's process. The Super Deduction tax relief needs a low-carbon eligibility criterion to force businesses to consider digitalisation to improve resource efficiency. As digital technologies fall under the definition of capital assets and machinery, there is scope for considerable investment to be made into Industrial Decarbonisation Technologies.

Looking at plant machinery and assets, these can have a lifespan of up to 25 years depending on usage, maintenance and machine quality. With the lifetime of this equipment eating into the 13 years we have to reach a 78% reduction in carbon consumption, there is no time to lose. Driving investment in low carbon or green technologies is crucial. With 2050 targets in mind, this is a key opportunity to get businesses back on track and align their processes with net zero ambitions. Implementing a 'green' eligibility criterion for capital allowances will create the know-how and culture to introduce and exploit low-carbon/zero-carbon technologies. The return on investment in this case is not just the income that is generated, but the sector preparing well in advance for the net zero targets.

Given the government's commitment in law to its rightly ambitious decarbonisation goals, every policy lever will need to be aligned and supporting manufacturing as it tackles the net zero challenge

RECOMMENDATION 3

All UK businesses should commit to creating and delivering their net zero plan. Government must ensure that businesses setting key net zero deliverables are supported so that their net zero plans align with the government's net zero strategy.

Rationale

As the first economy of its kind to write an Industrial Decarbonisation Strategy and pass its carbon budget into law, the UK is in a unique position to leverage its domestic brand to be centred around digitalisation and sustainability.

National strategies provide an overarching framework for change, and industry leaders must have the agency to make the necessary changes at a business, sub-sector and sector level – aligning their changes with that framework. A key part of this transformation will be plans for action that are measurable and achievable, aligning ambitions for the business with the emissions reduction trajectory set by government. We suggest that businesses should be encouraged to have written net zero plans in place by 2027 in line with the Department for Business, Energy and Industrial Strategy's (BEIS) indicative delivery pathway.

Across manufacturing, the challenge of emission reduction is complex and highlights the interconnectedness of the sector and wider supply chains. For example, within the businesses net zero plans, there will have to be considerations for how carbon consumption is carried across supply chains as businesses interact with each other and purchase product. The same is true about energy consumption: it's more complex than the efficiency of each process individually. These examples just scratch the surface of the challenges that face manufacturers in the coming decade. Our industrial case studies during this inquiry highlighted how these supply-chain wide challenges reinforce the need for actionable plans and measurable performance indicators.

We also benefit from a vast network of experts (Made Smarter, Innovate UK, Knowledge Transfer Networks (KTN) to name a few) who can share their insight and provide a blueprint to help businesses wanting to establish their net zero plans. According to the Made Smarter Pilot review, over 80% of SMEs working with Made Smarter have seen a boost in productivity with more than 25% reducing their carbon emissions – and achieving this without a specific net zero target. The latest funding round for Made Smarter innovation is an opportunity to drive targeted reduction in carbon consumption and emissions, with the InterAct network providing an important forum for collaboration.

As we come out of the pandemic, sustainable economic recovery is key as manufacturers 'Build Back Better' and feed into the economic health of its region. Those involved in this inquiry agreed that the programme could be better focussed on targeting SMEs that aren't directly engaged through the various networks managed by KTN.

The APMG and IET will continue to engage in this policy area to develop recommendations for delivery and planning, and we invite stakeholders to join us in this mission.

Alongside recommendation 1 - implementation of made smarter outside the Northwest – a robust knowledge exchange and upskilling programme will ensure that there is a strengthened and expert advisory service to engage with SMEs, providing mentoring, support and improved university connections. The APMG will be continuing to explore this debate in greater depth as part of our manufacturing skills post covid-19 programme.

[1] Industrial Decarbonisation Strategy, March 2021 , Secretary of State for Business, Energy & Industrial Strategy.

[2] United Nations Climate Change Race to Zero https://unfccc.int/climate-action/race-to-zero-campaign.

[3] Industry 4.0: coherent definition framework with technological and organizational interdependencies, November 2019 , Katarzyna Nosalska, https://www.emerald.com/insight/content/doi/10.1108/JMTM-08-2018-0238/full/html.

[4] See Policy Connect's 2018 report *Is Staying on Line Costing the Earth.*

[5] Gartner Smart Manufacturing Strategy and Implementation Trends Survey, 2020, https://www.gartner.com/en/newsroom/press-releases/2021-05-11-gartner-survey-shows-57-percent-of-manufacturing-leaders-feel-their-organization-lacks-skilled-workers-to-support-smart-manufacturing-digitization-plans.

[6] Capital Cost Recovery across the OECD report, Elke Asen, Tax Foundation March 2021 https://files.taxfoundation.org/20210330132504/Capital-Cost-Recovery-across-the-OECD-2021.pdf.

ABOUT APMG

The APMG is at the forefront of the policy debate, parliamentary engagement and research related to manufacturing and industry. By holding regular events and seminars in Parliament the APMG seeks to bring parliamentarians together with industry and the commercial sector to better understand the sector challenges. The APMG publish a monthly newsletter to Parliament and its members, with summaries of manufacturing policy stories, industry news, and other political developments, along with research-based briefing papers on topical legislation. The arms-length Manufacturing Commission produces research reports with evidence-based recommendations for government informed by our members.

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ABOUT POLICY CONNECT

Policy Connect is a cross-party think tank. We specialise in supporting parliamentary groups, forums and commissions, delivering impactful policy research and event programmes and bringing together parliamentarians and government in collaboration with academia, business and civil society to help shape public policy in Westminster and Whitehall, so as to improve people's lives.

Our work focusses on five key policy areas which are: Education & Skills; Industry, Technology & Innovation; Sustainability; Health; and Assistive & Accessible Technology.

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ABOUT IET

The Institution of Engineering and Technology (IET), who kindly sponsored this report, is a professional engineering institution and registered charity. With more than 158,000 members in 150 countries, the IET celebrated its 150th anniversary in 2021. As part of the IET Strategy 2030, its Board of Trustees set out five societal challenges which provide focus for the charity, its members and supporters. These include Sustainability and Climate Change and also Digital Futures. Find out by visiting the IET's website www.theiet.org

METHODOLOGY

This report was produced by Policy Connect for the All-Party Parliamentary Manufacturing Group (APMG) in partnership with the Institution for Engineering and Technology (IET) to highlight the importance of intersectionality between digitalisation and sustainability and identify key recommendations to ensure all of manufacturing are able to harness the power of Industry 4.0. It builds on 2 evidence gathering sessions, held in April 2021, one focussed on building context and relatable case studies whilst the other gathered members of the APMG and its wider network to focus on the design of policy. Both events brought together leading figures in the manufacturing sector as well as parliamentarians, civil servants as well as academics. The views and opinions presented in this report do not necessarily represent those of the supporters.