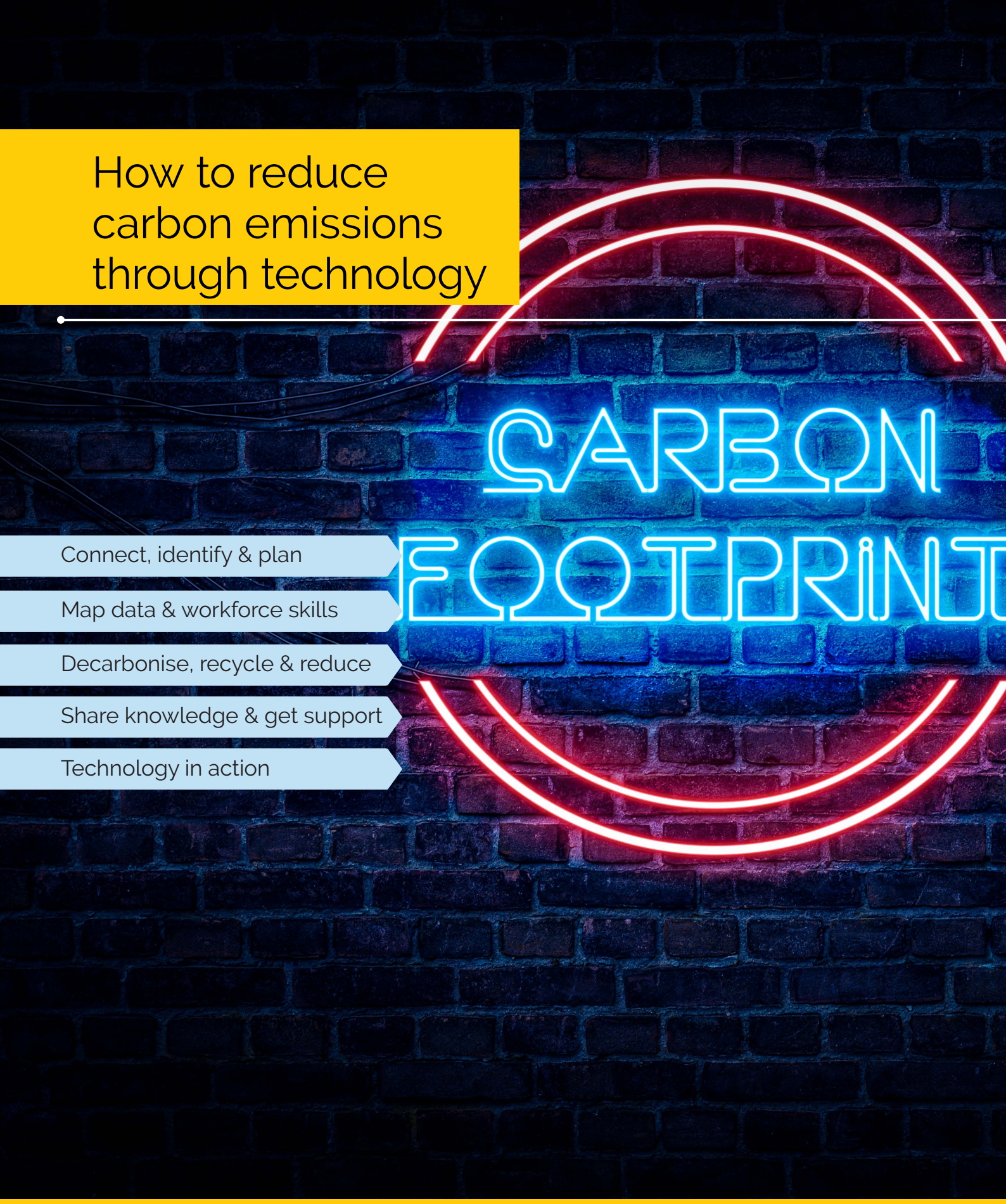
How to reduce carbon emissions through technology



- Connect, identify & plan
- Map data & workforce skills
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- Share knowledge & get support
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Connect, identify & plan SMARTER.

Climate change can no longer be ignored

Climate change can no longer be ignored, especially in the UK. Britain is the largest net importer of emissions per capita worldwide. This is because we import products – and therefore emissions – from abroad.[1] As a result, the government are committed to ensuring the UK becomes the first major economy to reach 'net zero'.

Reaching net zero means taking the necessary steps to reduce emissions in the first instance, and then offsetting those that remain.

But the manufacturing industry (together with the transport and storage industries) is the third-largest direct (scope 1) greenhouse gas-emitting sector of the UK economy, at a 15% contribution.[2] So, how can we achieve net zero? Technology could play an incredibly important part...

The goal is to reach net-zero greenhouse gases by 2050.[3] And this isn't just a target – it's an Act of Parliament, legally binding the UK to this commitment. The findings of the 'Net Zero – The UK's contribution to stopping global warming' report by the Committee on Climate Change called it "necessary, feasible and cost-effective".[4] This viability is largely thanks to available technologies and approaches.

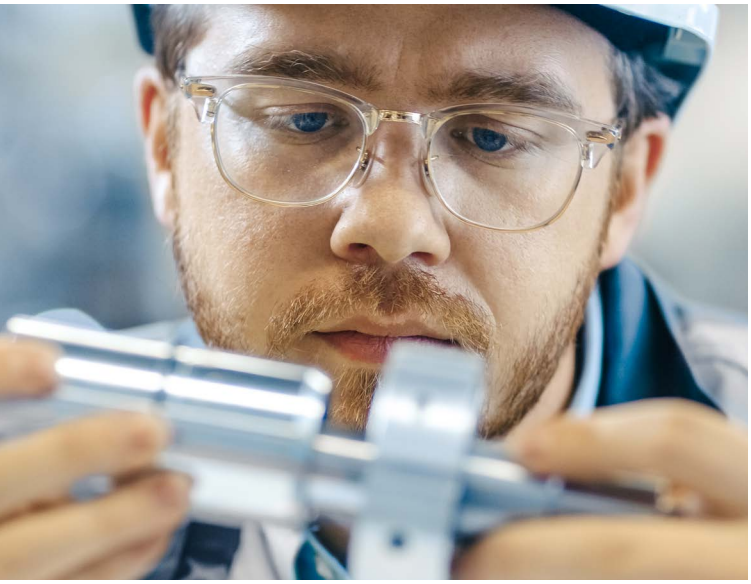
Here, we explore how digital tools can play a role in your manufacturing SME to help accomplish this aim.

Connect, identify & plan

Connect with others

If you're not sure where to get started, looking to others to see what they're doing to reduce carbon emissions is a great first step to take. It's therefore essential to make the link between your own business and the businesses of those you've not previously associated with. The borders between industries – and countries [5] – is less clear when technology is involved and sharing knowledge across sectors helps everyone reap its rewards.

Traditionally, exclusivity has been pursued above all else. However, it's incredibly important to promote intelligence-sharing in order to benefit not just the economy, but the environment too. [6]



So, seek advice from experts and discuss your concerns with others that are in a similar position along the digital journey as you. By doing so, you'll help achieve net zero-related objectives more easily, as well as boost operational efficiencies and reach more consumers.

Map data & workforce skills

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Look for efficiencies

There are a number of key ways in which you can act on efficiencies to help reach net zero. Reducing waste through Digital Twin technology (which creates a digital replica of physical assets)[7] and additive manufacturing (3D printing) are two such examples.

Additive manufacturing boosts digital flexibility and efficiency. This is through tools that direct hardware to deposit material, one layer on top of each other, in incredibly precise geometric shapes. The result is lighter and stronger parts and systems.[8] It reduces lead times and generates opportunities that extend a product's life cycle, and so lends itself to the circular economy.[9]

You can also look at the opportunities to generate your own energy on-site – this can then be stored with battery technology and result in significant CO2 savings.

Predictive analysis, gained through artificial intelligence, allows you to have a better understanding of demand. Additionally, it can pinpoint any inconsistencies and optimise production. For instance, you may use it to automate flexible dosage inputs and quality checks. You also have the option to control production systems in real time, enabling you to reduce the chance of breakdowns and optimise machine idle and start-up times.

Robotics are incredibly valuable too – this technology can automate numerous parts of production to improve your business' productivity and the use of assets. Then there are industrial digital technologies which effectively sort waste into fractions before processing and treatment. Whichever way you want to make your business more efficient, always conduct ideas testing in a safe environment first.

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Map data & workforce skills

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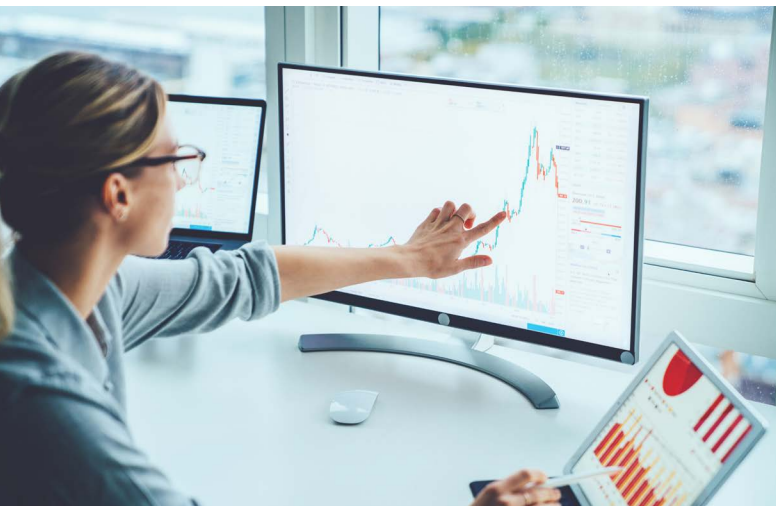
Use Big Data

Many businesses have found that the data provided by the tools is just as valuable as the technologies themselves. Through implementation, they can discover ways to further improve processes and increase efficiencies.

Makers can input as much information as they'd like – and the more data, the better quality the analysis. They can pinpoint exactly where emissions are produced, and the actions they can take to lower or eliminate them.



This data can also be benchmarked and shared with others. Through these analytics, you can even retrofit your existing manufacturing processes.

Digital technologies can give enterprises a better understanding of their energy usage, plus make intelligent moves to increase efficiencies.

These technologies include AI, IoT and blockchain. The latter can be used for enhanced transparency, as well as making it easier to track carbon emissions.

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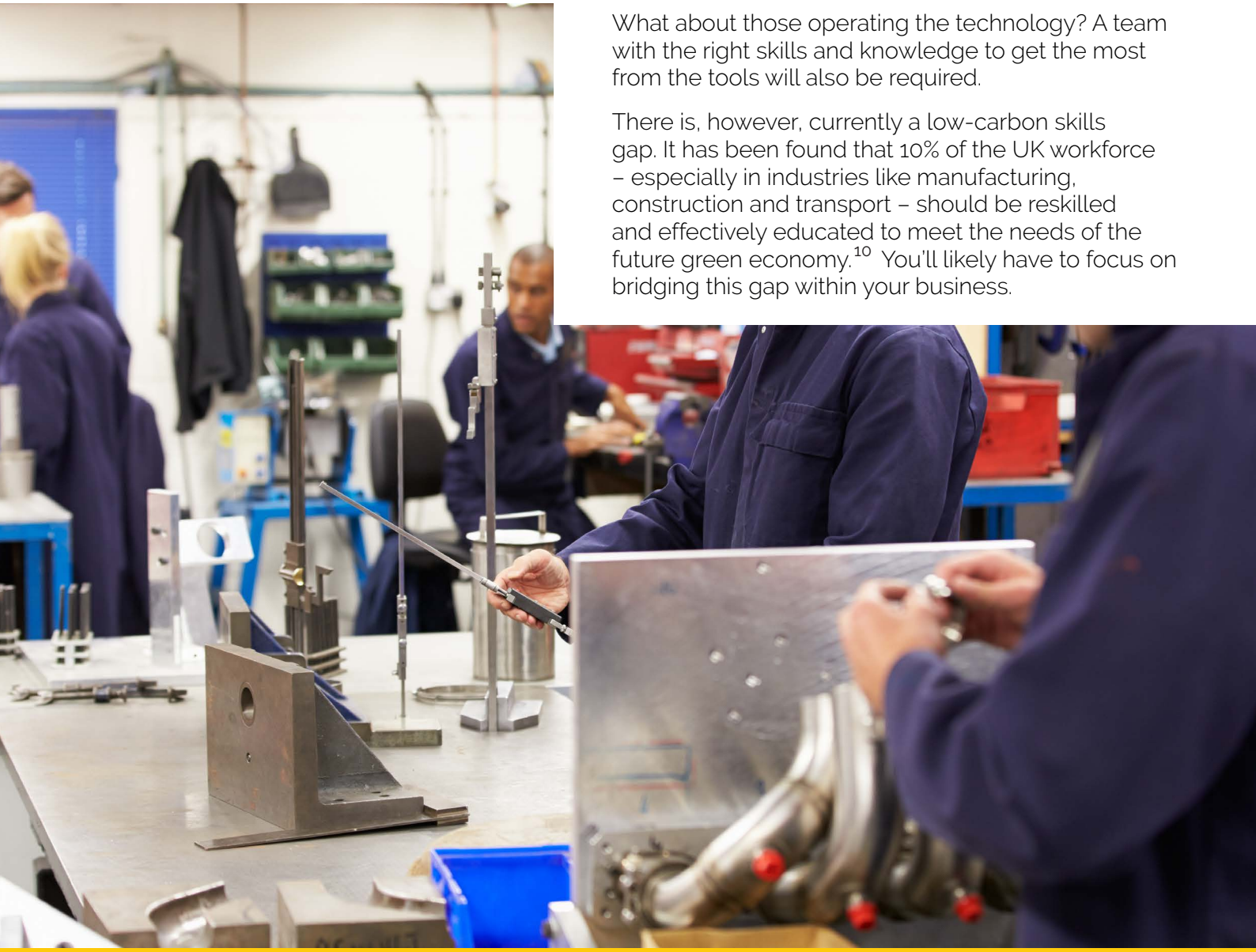
Upskill and educate your workforce

What about those operating the technology? A team with the right skills and knowledge to get the most from the tools will also be required.

There is, however, currently a low-carbon skills gap. It has been found that 10% of the UK workforce – especially in industries like manufacturing, construction and transport – should be reskilled and effectively educated to meet the needs of the future green economy.[10] You'll likely have to focus on bridging this gap within your business.



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Decarbonise, recycle & reduce

Decarbonise heat and power

There are a few different pilot schemes that are reducing or removing carbon emissions from the generation of heat and energy. These fall under the categories of alternative energy sources, more efficient uses of energy, and negative-emission methods.

They include:

- Replacing natural gas with hydrogen (which doesn't produce any greenhouse gas emissions)
- Carrying out the electrolysis of water
- Generating and sourcing renewable energy, such as solar PV and wind
- Electrification (switching from gas, petrol or diesel to electric – this is suitable if the electricity mix on the grid is generated from renewables)
- Combined heat and power (CHP)
- Installing heat pumps to lessen the emissions from heat-demanding processes
- The reforming of natural gas, and capturing the remaining CO2 (carbon capture storage is itself a method to help climate change, though at the moment it's only being used on a small scale, and some argue it's a last resort)

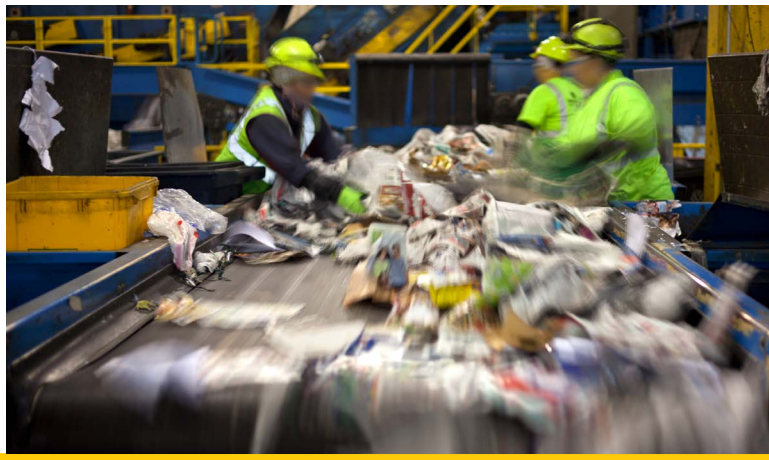
The use of green technologies in these methods are carried out by the green technology and services sector, which has hundreds of contributing businesses in the North West alone.[11]

Consider recycling options

Digital tools can enhance your recycling approach, and simultaneously benefit your business. Advanced technology is available to effectively recycle chemical content – proving particularly helpful for fashion manufacturers.

Mechanical and novel chemical recycling techniques can also be utilised to reduce primary plastic production, as well as cut down on your enterprise's manufacturing waste. Electric arc furnace technology can be scaled for greater scrap steel reuse, providing a clean substitute for emissive blast furnaces.

Recycling is key to creating a circular economy – but it should be noted that it only makes up a part of it. You'll need to also think about how waste can be either designed out of products or processes, or re-used to help build a new item.



Remember: it's never too late to change

Reduce transport emissions
If your manufacturing involves transportation, lowering emissions could be as simple as opting for electric vehicles (EVs). Technological advancements have resulted in more cost-effective batteries, and drivers can now use any ~public charger. Businesses can even access Office of Low Emission Vehicles (OLEV) grants to invest in EV charge points.

There is also the option of hydrogen fuel cells for heavy goods vehicles and buses. This allows for more rapid refuelling, a long range, and the possibility of cutting infrastructure costs.

Additionally, you could consider the use of augmented reality (AR) and virtual reality (VR). These advanced technologies mean that transportation from one location to another may not even be necessary. In many situations, you can gain what you need without having to travel at all.

Share knowledge
Don't keep your learnings to yourself. Remember the very first point made in this guide - impart what you've found out through the use of technology with others in the industry too – whether that's a specific tool, a particularly good practice, or an outcome of data analysis.

Additionally, share knowledge with those in the supply chain and customers. This will ultimately lead to other businesses being able to reach their own net-zero goals, and economic prosperity for the UK as a result.

Get support
It's one thing to consider using new technologies, but it's another thing entirely to actually have the resources to do so. If you've hit a stumbling block when it comes to determining (or financing) the best tools for your particular business, turn to Made Smarter.

Our programme has been specifically developed to help manufacturing enterprises just like yours embrace technologies. We spend the time to understand your business' needs before providing independent, impartial advice on the most suitable tools. We also deliver tailored funding and support. A number of SMEs we've helped are already on their way to reaching their net-zero emissions goals.

We help in other ways too, from fully-funded digital internships to our Leadership Development Programme. This programme is developed in partnership with Lancaster University Management School, and gives you access to expert academics and like-minded leaders. You'll be able to lead your own enterprise to success through digital technologies.

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Technology in action: A local success

If you'd like to boost the efficiencies in your SME by maximising on these new technologies, get in touch. Simply fill out our contact form.

You can also discover how we've helped many businesses in the industry already by browsing our case studies. One such example is Blends Holding who, with our support, are forecasting improved efficiency and a packaging reduction of 25%.

A case study for success: Blends Holdings

Family-owned Blends Holdings were using outdated, paper-based systems, along with a mix of software which didn't communicate to one another. So, they looked into cloud-based technologies.

Today, they have a food manufacturing-specific ERP software system, which brings together the different parts of their business, and enables live and remote analytics and monitoring.

This will lead them to improve efficiency by 50%. Additionally, as the new software gives them greater access to data, they're predicting a 25% reduction in packaging. On top of this, they are able to speed up processes and increase the region's GVA by £1.5m over the next three years. You can read their case study in full here.

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Sources

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2 Accenture analysis available upon request. Based on 2018 data from the Office of National Statistics. About Accenture's 'Aligning with the UK's Net-Zero Ambition' report. Manufacturing is a major contributor to UK greenhouse gas emissions (15%). A clear roadmap for the sector will be critical in meeting the UK government's net zero commitment. The report provides analysis, findings and recommendations for UK Manufacturers and Government. Please contact Gemma Baker, Sustainability Director at Accenture Strategy, to find out more: gemma.l.baker@accenture.com.
3 https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8590
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