



Accelerating Change

How much of Great Britain's manufacturing industry decarbonisation targets can be achieved through Energy-as-a-service solutions?

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Key points

Real momentum is now being seen in UK manufacturing industry in terms of **initiatives to meet climate targets**, particularly reducing energy consumption in manufacturing processes.

However, major investment in energy-efficient technologies is still required – **a challenge in a time of rising costs**.

Energy-as-a-service business models are now making this possible without having to raise large amounts of capital.

These ‘as-a-service’ arrangements are **made possible by smart finance from specialist providers**.

To put these figures in context, if all manufacturers implemented energy-as-a-service, this paper also **estimates that this would meet around two thirds of energy use reduction targets to 2030** – at least for electricity and gas consumption.



Momentum in manufacturing decarbonisation

Back in 2021, the then Minister of State for Business, Energy and Clean Growth claimed that the UK was “the world’s first major economy to present a net zero Industrial Decarbonisation Strategy¹.”

The announcement also noted that, “Over the next decade we will begin the journey of switching away from fossil fuel combustion to low carbon alternatives such as hydrogen and electrification, deploying key technologies such as carbon capture, usage and storage, and supporting industrial sites to maximise their energy and resource efficiency to reduce costs for businesses. In parallel, we will continue to help industry overcome barriers... to kick-start the demand for low carbon industrial products.”

At the same time, the manufacturing industry is also under pressure to minimise carbon emissions by reducing energy use in manufacturing processes or changing the energy mix².

These regulatory and financial pressures³ are all the more urgent as shareholders are increasingly aware of how fuel costs, network costs and poor energy purchasing decisions are harming their investments. In fact, on the ethical front, shareholder groups are now starting to say that they will withdraw investment from companies which do not meet environmental, social and governance (ESG) standards⁴.

'Affording the very substantial investments in sustainability-enabling technology that are required to meet decarbonisation targets remains a challenge'

The process of decarbonisation is clearly under way. A more recent study from MakeUK, the UK's Manufacturing Association indicates that "companies are accelerating efforts to decarbonise due to rising energy costs, the need to do the right thing and the rising cost of raw materials... Nearly half (46%) of manufacturing companies are already implementing their decarbonisation plans⁵."

However, affording the very substantial investments in sustainability-enabling technologies that are required to meet decarbonisation targets remains a challenge, especially in a time of rising input costs⁶ and challenged industrial output⁷. A recent paper from the Cambridge Institute for Sustainability Leadership calls for "enabling policies that create demand for low-carbon products and materials to be introduced that encourage innovation or support the scaling up of demand for innovative technologies across the value chain."⁸

Operationally, any manufacturer's energy optimisation strategy should be based on addressing both energy supply and energy demand simultaneously, using a holistic, integrated, site-specific approach.



Manufacturers need to tackle their energy costs, ensure security of energy supply, and meet sustainability expectations at the same time. This so-called value stacking is the key to success. It helps future-proof their energy supply, drive down consumption costs, reduce exposure to unpredictable cost hikes, drive carbon reduction achievement, create new revenue streams and deliver financial benefits in the short-term.

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Choosing the right decarbonisation partner

To achieve this holistic outcome, many companies are turning to strategically knowledgeable suppliers who:

- Are prepared to take a long-term view about what energy solution best meets each industrial manufacturer's unique needs and most effectively aligns with their strategic plan.
- Have the expertise to deliver, integrate and optimise a full suite of technology solutions that reduce energy consumption in the manufacturing process.
- Are approaching each company as partners to develop a site-specific solutions-led approach, selling and guaranteeing an outcome - not trying to sell a single product or technology.
- As a dedicated energy solution provider can secure better financial and strategic outcomes, protect a manufacturer from risk, and allow them to focus on their core competencies. By partnering with an outside expert, manufacturers can optimise their energy use more rapidly and access operational cost savings more quickly.

NEG saves through Energy-as-a-service

NEG is the world's leading manufacturer of speciality glass. The key products within its glass fiber business are chopped strands and direct draw rovings for reinforcing high function composite solutions in fields such as automotive and renewable energy.

NEG is dedicated to practicing sustainable manufacturing and wanted to invest in its Wigan facility to become more energy efficient and improve operational efficiencies in incumbent processes and equipment.

The company was also keen to reduce energy costs so that funds could be channelled into further environmentally-focused projects.

After a full assessment of the Wigan facility, Siemens identified elements where more energy and operationally efficient processes and equipment could be implemented. This included installing new Siemens motors and controllers, new water pumps, flow meters and replacement of nearly 3000 LED light fittings.

Working with expert financier Siemens Financial Services (SFS), Siemens guaranteed the expected savings over the course of the 5 year contract.

Under the energy performance contracting agreement (energy-as-a-service), SFS was able to spread NEG's payments over the term to align with the guaranteed savings, effectively making the investment net zero cost.

The financing arrangement delivered a number of benefits:-

- With the installation of the technology, NEG is now seeing significant reductions in operating costs, totalling around 3 million EUR and carbon emissions of 2,000 tons across the financing period.
- Thanks to the smart solutions from Siemens and SFS, these savings reliably match repayments and ensure energy efficiency while increasing productivity.



Energy-as-a-Service: harnessing future savings to fund today's transformation

With substantial operational cost savings to be made in manufacturing processes, as well as increasing shareholder pressure and stringent regulatory drivers, what is preventing the majority of manufacturers from immediately securing these benefits?

First, an expert partner is needed to identify energy-saving solutions. As one industry commentator notes⁹, "Many manufacturers don't have an asset-level understanding of energy consumption – this means they might have a view of total energy usage for a facility, but won't know how much of this is lighting, heating or production equipment usage. But by understanding energy consumption at a more granular level, it's possible to identify inefficiencies and make changes – almost instantly."

Yet, even after a trusted partner has undertaken the necessary analysis to find an attractive, cost-effective solution for a manufacturing site, the ability to access that integrated energy solution – whether decentralised power generation, energy-efficient plant and buildings technologies, renewable technologies, digital analytic tools or a combination - can often face a hesitation to risk capital on what has traditionally been viewed as a "non-core" investment priority.

However, new business models, known as Energy-as-a-Service arrangements or energy performance contracting, can secure these operational cost reductions without putting pressure on capital resources, avoiding putting capital at risk, and ensuring expected savings are realised.

The supplier is delivering a service – meeting energy optimization targets – and is being authorized by the manufacturer to use the cost savings to fund the infrastructure required. This Energy-as-a-Service approach allows a manufacturer to rely on an expert energy solutions provider to deliver a specific outcome, and removes any need for the manufacturer to deploy any of its own (scarce) capital.

Instead, the manufacturer is charged a monthly fee against the delivered cost savings, sometimes producing a net operational benefit, but in all cases supporting the monthly fee. Moreover, an Energy-as-a-Service provider covers all aspect of transformation, including installation, operation, performance management and maintenance.

Energy-as-a-Service providers have to offer two core areas of expertise: first, the energy optimisation analytics, technology and deployment; second, a strong capability in smart finance.

The finance people will have an in-depth knowledge of how the technology will deliver in practice, and will be able to flex the financing arrangements to deliver an affordable solution – sometimes even cost-neutral. In simple terms, no capital needs to be spent as the future savings pay in whole or in part for the energy-efficiency conversion.



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The size of the prize – region by region

Siemens Financial Services' (SFS) modelling¹⁰, based on real-world examples, has estimated the level of energy savings that could be achieved by the manufacturing industry in different regions of the UK, by deploying Energy-as-a-Service financing structures.

The SFS model assumes that energy saving initiatives have already achieved a penetration level of around 30% of available potential in UK manufacturing, in line with recent available research in this area¹¹. It also positions typical energy savings for a UK manufacturer being around 20% of current consumption.

'Energy-as-a-service can help Great Britain generate efficiency savings of over 3.5 million tonnes of electricity and gas per annum'

While this will vary considerably according to the exact nature of a manufacturing plant, its logistics operations and its patterns of energy usage, the estimation model remains robust at the regional level. The range of possible energy cost saving levels in different parts of a plant – across lighting, heating, motors and drives, process technologies, production controls, materials handling, packaging, warehousing and much more – is ably summarised by the Carbon Trust¹².

Once this model is applied to manufacturing industry across Great Britain, the following figures emerge for annual power savings and their carbon footprint equivalent. (See table 1)

To put this into context, these annual energy efficiency estimates achievable through Energy-as-a-service arrangements comes close to meeting around two thirds of official climate targets. The new Energy Efficiency Taskforce has a clear target to support **cutting energy use in the UK down by 15 per cent** by 2030, from 2021 levels¹³. Taking into account existing levels of energy efficiency in the UK manufacturing industry, and assuming all remaining manufacturers implement energy-efficiency initiatives, then Energy-as-a-service could help implement a reduction in manufacturing electricity and gas use of around two thirds of these targets.

Table 1 - Manufacturing Industry – Annual energy efficiency achievable through Energy-as-a-service

	Gas	Electricity	Gas	Electricity
Country or region	Efficiency Savings (GWh/annum)	Efficiency Savings (GWh/annum)	Efficiency Savings (Tonnes/annum)	Efficiency Savings (Tonnes/annum)
Great Britain	9,220.8	8,788.8	1,686,754	1,819,894
England				
North East	434.7	350.8	79,514	72,643
North West	1,175.3	961.2	214,999	199,041
Yorkshire/The Humber	910.3	728.6	166,520	150,867
East Midlands	754.2	660.5	137,970	136,763
West Midlands	836.8	751.6	153,075	155,624
East	799.8	832.2	146,300	172,322
London	1,139.7	1,211.2	208,485	250,796
South East	1,155.7	1,213.9	211,409	251,363
South West	627.1	738.6	114,719	152,948
Wales	433.9	462.4	79,371	95,752
Scotland	898.1	774.8	164,297	160,431

Relative sizing of gas and electricity in GWh to CO2e conversions may invert because the conversion factor for electricity is higher than that of natural gas. Conversions performed using Carbon Trust data: [carbontrust.com/our-work-and-impact/guides-reports-and-tools/energy-and-carbon-conversion-guide-for-reporting](https://www.carbontrust.com/our-work-and-impact/guides-reports-and-tools/energy-and-carbon-conversion-guide-for-reporting)



Next Steps

This short research note reveals how great a proportion of official decarbonisation targets – at least those related to electricity and gas consumption – could be achieved through the widespread implementation of energy-as-a-service solutions.

While any policy encouragements, subsidies and tax incentives from government are very welcome, we suggest that harnessing private sector capital – through these ‘as-a-service’ arrangements - will truly move the dial and help accelerate UK manufacturing industry towards its energy efficiency and climate goals.

If you would like to discuss Energy-as-a-service options for your manufacturing company, please contact Carolyn Newsham, Siemens Financial Services, at carolyn.newsham@siemens.com

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9. <https://www.themanufacturer.com/articles/start-small-dream-big-the-future-of-energy-efficiency-for-uk-manufacturers/>
10. The Siemens Financial services methodology takes the lowest level of energy optimisation savings experienced in its research base of real-life examples, even though these can be as high as 50%+ in high energy consumption sectors. In addition, the methodology only scales the volumes of energy savings across 50% of the available manufacturing estate. This helps manufacturing CFOs be confident that the estimates in this paper are a reliable starting point for their business cases regarding the level of benefit to be gained, and that real-life savings are likely to be considerably higher. Estimates of energy optimisation savings across a typical financing period of 5 years are noted in the table – covering both the manufacturing sector as a whole, along with a range of higher energy consumption subsectors. In each case, Standard Industry Classification (SIC) codes are used, so that readers can define precisely the subsectors of manufacturing industry covered. These financial volumes effectively represent the scale of self-funding finance for energy optimisation conversions which smart financiers and solutions providers can help manufacturing industry deploy.
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