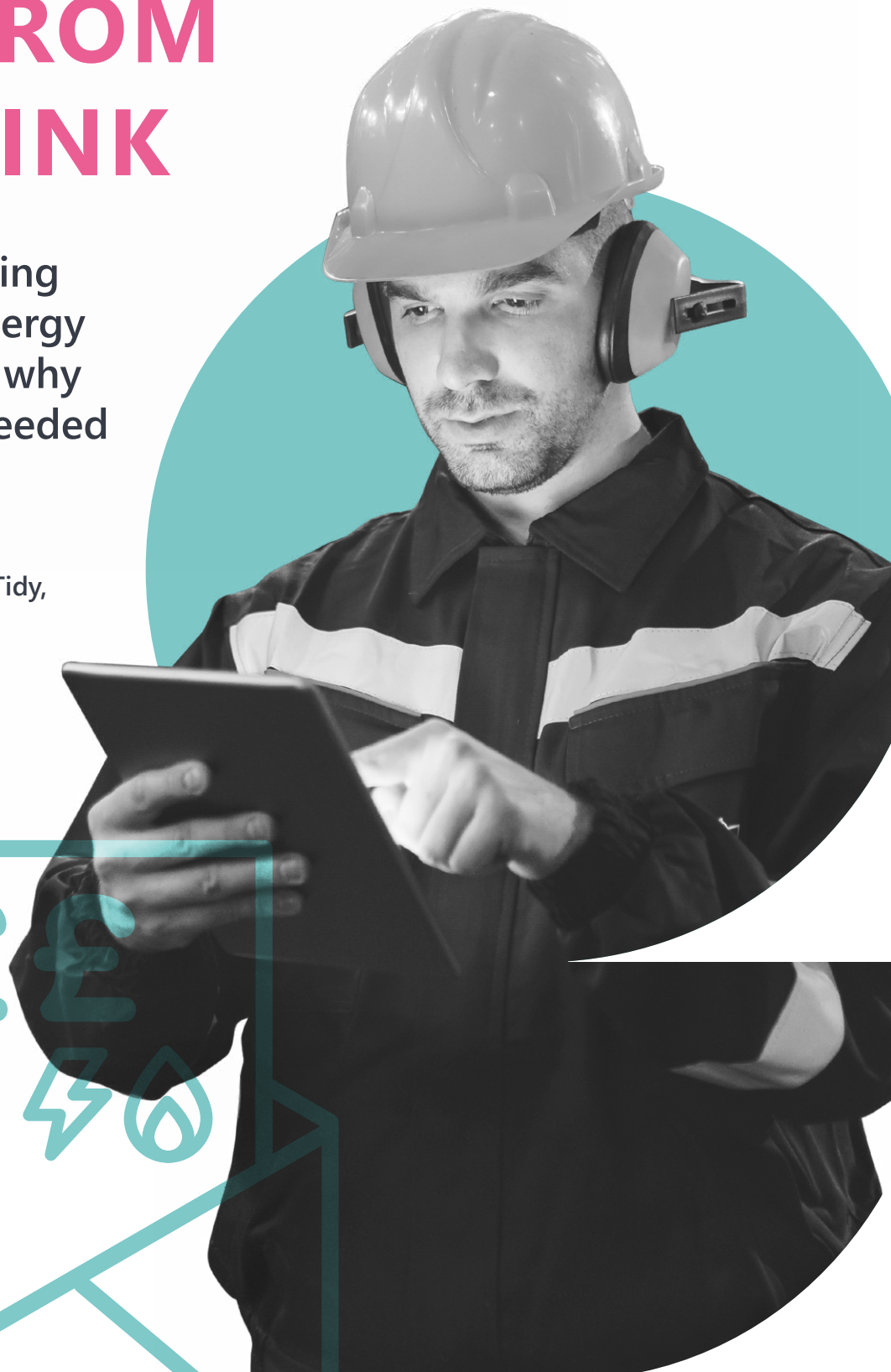


BACK FROM THE BRINK

How SMEs are taking control of their energy management and why extra support is needed

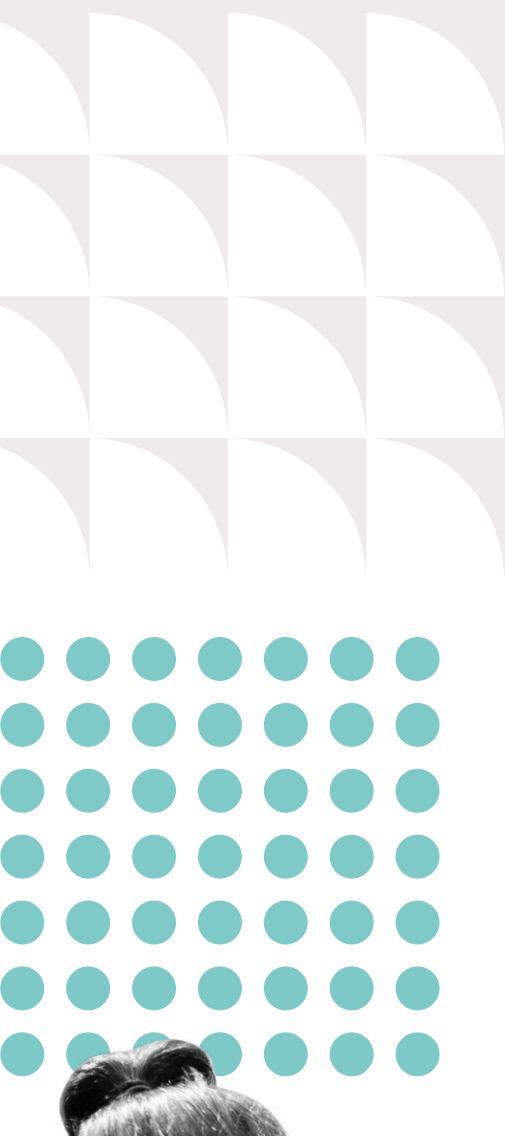
Authors
Reace Edwards and Juliette Tidy,
Energy Systems Catapult

June 2023

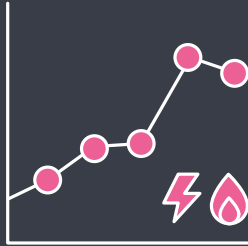


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Although wholesale gas and electricity prices have recently fallen, they're still **significantly higher** than they were prior to covid-19 and the energy crisis



100%

of SMEs interviewed felt that it was important to do their bit to combat climate change



100%

Of SMEs interviewed had taken actions to improve their energy efficiency

71%

identified cost as a barrier to combatting climate change



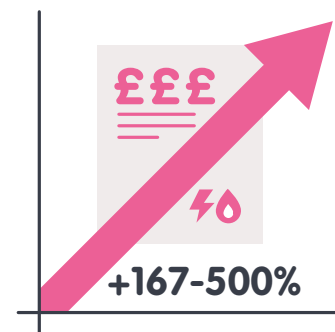
71%

Energy Bills Discount Scheme



of SMEs expressed concerns about UK government's new Energy bill support scheme (EBDS)

SMEs energy bills are now



greater than before

Executive Summary

Accounting for approximately 99.9% of the total volume of private sector businesses in the UK, small-medium enterprises (SMEs) contribute significantly to the UK's economy [1]. However, increasingly, SMEs are facing financial hardship due to rising inflation rates and unprecedented energy bills.

Alongside this, SMEs currently account for 44% of total non-household CO₂ emissions and are therefore expected to play a pivotal role in the UK's transition to net-zero [2].

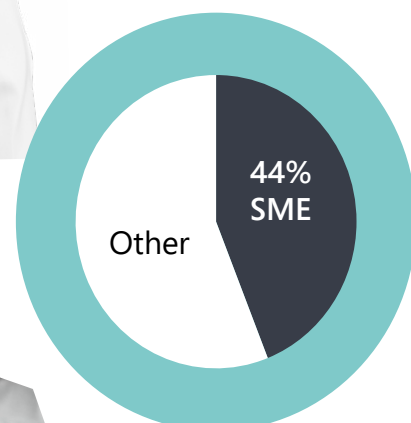
Whilst SMEs recognise the importance of 'doing their bit' to tackle climate change, the high cost of low-carbon technologies is a commonly reported barrier to decarbonisation [3, 4].

Accordingly, we reached out to SMEs to better understand the following:

- a) How difficult it has become to operate under current energy prices?
- b) What support has been made available?
- c) What actions are businesses taking to mitigate high energy bills and climate change?
- d) What extra support is required?

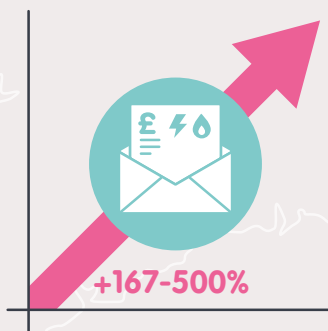


Total Non-household
CO₂ Emissions



We spoke to seven SMEs in the West Midlands from a range of manufacturing subsectors. We focused on the manufacturing sector due to its high energy intensity. Similarly, we refined our geographical focus to the West Midlands because of the high volume of manufacturing businesses in the region. It has also been identified as one of the UK's most carbon intensive industrial clusters meaning that significant decarbonisation will be required [5].

The businesses that we spoke to reported that their energy bills were now +167-500% greater than before the energy crisis. Fifty-two percent of businesses explained that high energy bills had negatively impacted their profit margins. Other reported impacts of rising energy bills included higher raw material costs, loss of customers and difficulties competing in international supply chains.

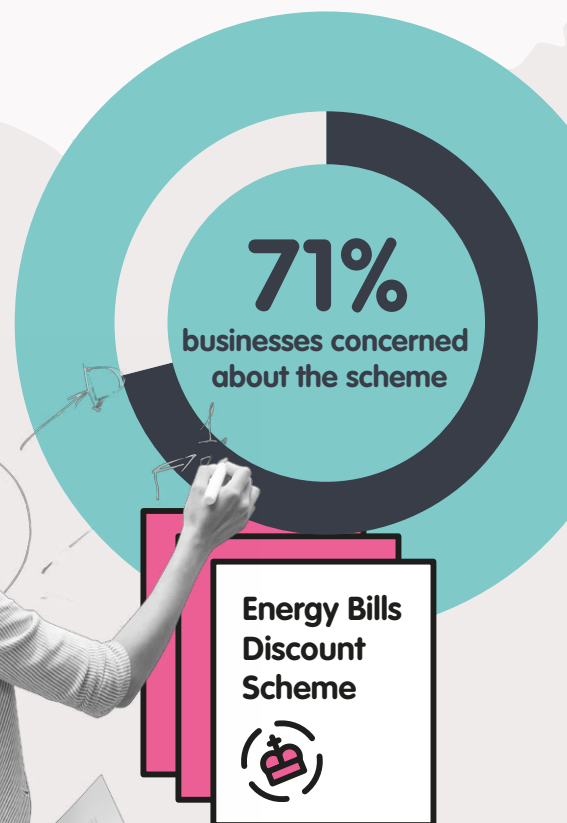


West Midlands has been identified as one of the UK's most carbon intensive industrial clusters meaning that significant decarbonisation will be required



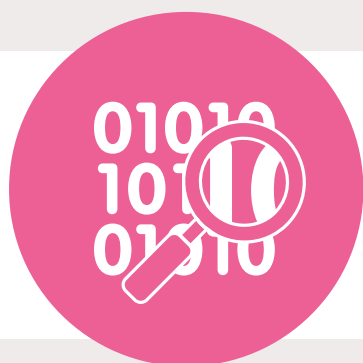
To support non-domestic energy users, in April 2023 the UK government implemented the Energy Bills Discount Scheme (EBDS), which provides discounts on energy if certain wholesale price thresholds are reached [6]. However, seventy-one percent of businesses expressed concerns about the scheme. In some cases, businesses felt that they would not benefit from the scheme due to the high thresholds proposed or that their energy bills would increase further due to the lower discounts available (in comparison to the former Energy Bill Relief Scheme).

Our research found that all businesses had taken measures to improve their energy efficiency to mitigate high energy bills and/or combat climate change. For example, seventy-one percent of businesses had conducted studies to investigate on-site energy consumption and forty-three percent of businesses had collaborated with academic institutions to explore energy efficiency improvements. Some businesses were also considering energy management dashboards, voltage optimisation equipment and battery storage.



However, even with support from government schemes as well as internal energy management initiatives, SMEs still face several challenges which suggest that extra support from policymakers may be needed:

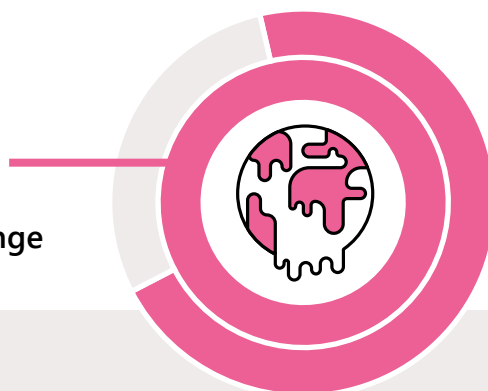
1. Recently, gas and electricity prices have fallen below the baseline thresholds set by the EBDS, meaning that businesses may not benefit from the scheme at all [7] [8]. Furthermore, despite recent decreases, wholesale energy prices are still considerably higher than they were in prior to COVID-19 and the energy crisis. As long as this remains the case, businesses will continue to feel the impact of high energy bills.



2. Despite conducting energy consumption studies, some businesses felt that they needed access to more **detailed energy consumption data** to make informed decisions relating to energy management. It was reported that this would allow them to reduce energy costs and/or cut carbon emissions.

3. Although all businesses felt that it was important to do their bit to combat climate change, seventy-one percent of businesses identified cost as a barrier. Furthermore, **fifty-seven percent of businesses felt that UK government had not provided enough financial support to help manufacturing businesses to decarbonise.** Businesses often voiced concerns relating to the long payback times of low-carbon technologies as well as the fact that it was not yet cost-effective to convert their existing assets to low-carbon alternatives.

100%
of SMEs interviewed
recognised the
importance of
combatting climate change

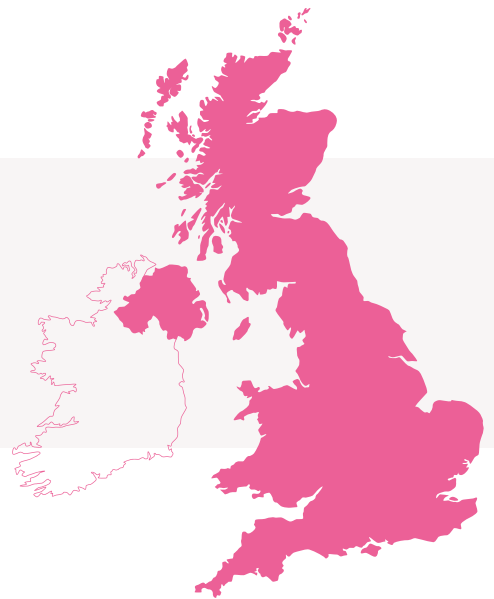


71%
of SMEs identified cost as
a barrier to
combatting climate
change.

1. Challenges Faced by SMEs

A small or medium sized enterprise (SME) is defined as an organisation that has fewer than 250 employees or has a turnover of less than €50m.

In the UK, there are over **5.5 million private sector businesses;** of which **SMEs account for roughly 99.9%** (5,501,260 businesses) [1].



SMEs contribute significantly to the UK's economy. In 2022, they accounted for 61% of total employment and 51% of total turnover in the private sector (see Figure 1).

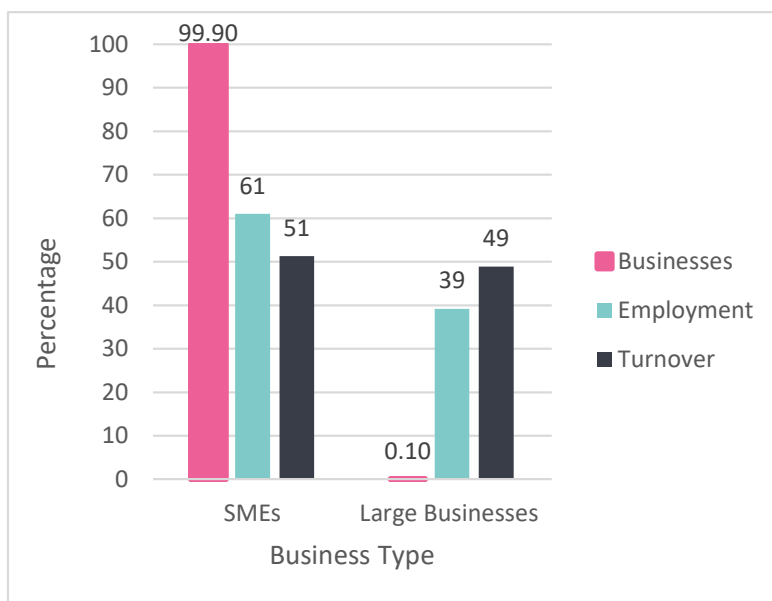


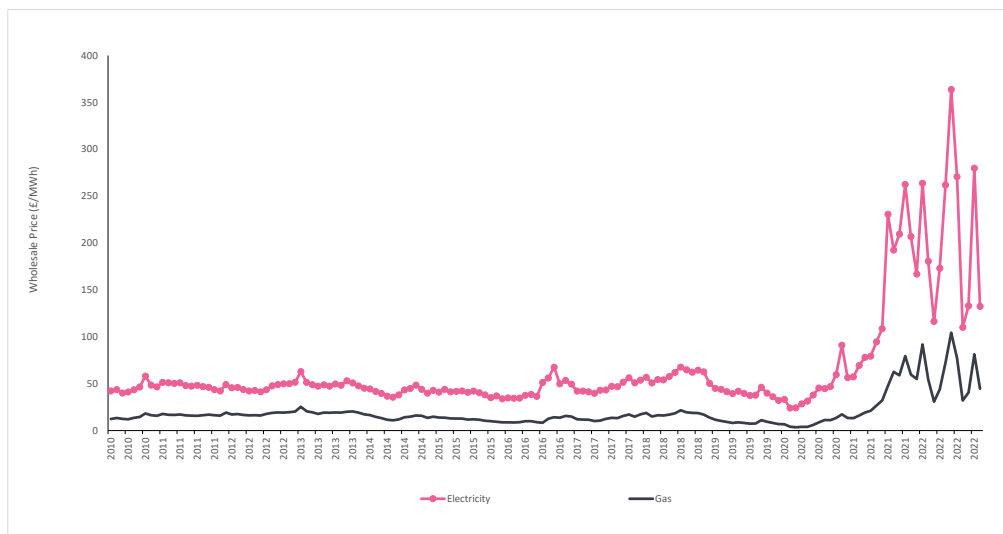
Figure 1. Comparison of SMEs and Large Businesses' Contribution to the UK's Private Sector Businesses, Employment and Turnover [1].

However, increasingly, SMEs are facing financial hardship due to rising inflation rates. One study found that 4% of small businesses needed to temporarily close due to rising costs [9]. To bring this statistic to life, if we were to apply 4% to the total number of SMEs in the UK's private sector, it would equate to the **temporary closure of roughly 220,000 businesses.**



1.1. Rising Energy Bills

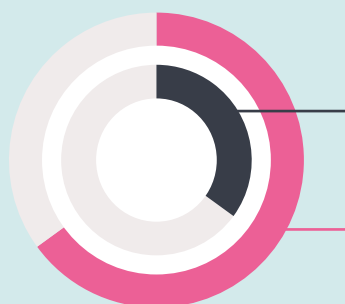
During 2022, UK electricity and gas prices rose to unprecedented levels (see Figure 2).



Some small businesses across the UK have had to close due to high energy bills [10].

Figure 2 Overview of GB Wholesale Gas and Electricity Prices (£/MWh) [21].

A recent study [22] identified that:



35% of businesses were struggling to keep up with energy bill payments.



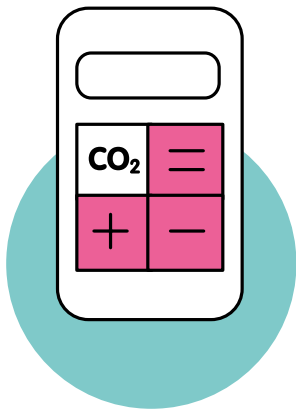
65% of businesses had experienced reduced profit margins because of rising energy bills

1.2. Challenges Faced in the Transition to Net-Zero

UK Government have committed to reducing greenhouse gas emissions by at least 100% in comparison to 1990 levels by 2050 [11]. SMEs currently account for **44% of total non-household** CO₂ emissions (~160 million tonnes) and will therefore play a pivotal role in the UK's journey to net-zero [2].

Studies have shown that SMEs recognise the importance of doing their bit to tackle climate change [3] [12] [2]. In fact, one study found that **94% of smaller businesses had taken at least one action to reduce their emissions** [3]. However, research also shows that SMEs face specific challenges when it comes to decarbonisation and will likely require support. One of the most significant challenges identified by SMEs relates

to cost; both in terms of the high upfront costs of low-carbon technologies as well as scarce access to financial resources to fund investments [4] [3].



SMEs have also encountered difficulties when trying to measure their carbon footprint due to the absence of data and/or monitoring systems [2]. Unlike large businesses, SMEs do not legally have to disclose their annual energy usage and greenhouse gas emissions [13]. However, they may be required to do so if they supply to large business customers [14]. This could become a more pressing issue in future if carbon reporting requirements are mandated for SMEs. Having limited access to data also means that SMEs may find it difficult to track their progress towards sustainability targets.

1.3. Purpose of this Research

In recognition of these challenges, we reached out to several SMEs to better understand the following:

- a) How difficult it has become to operate under current energy prices?
- b) What support has been made available?
- c) What actions are businesses taking to mitigate high energy bills and climate change?
- d) What extra support is required?

Throughout this report, we shed light on what SMEs had to say about each of these topics. We use these findings to inform key points for policymakers.



2. Who did we speak to and why?

From February 2023 until the end of March 2023, we interviewed **seven manufacturing SMEs** in the West Midlands (see Figure 3)¹. The businesses we spoke to encompass a range of subsectors such as the manufacture of metal products, rubber and plastic products, pharmaceutical products, and non-metallic mineral products². All employees that we spoke to had experience of energy procurement and/or energy management activities in their respective businesses.

¹ Verbal consent was obtained at the start of each interview for the inclusion of information presented throughout this report. Additional consent was obtained for the use of direct quotations after the interview period.

² To diversify the range of manufacturing subsectors represented in the total dataset, efforts were made to reach out to two food manufacturers, two clothing manufacturers and a chemical manufacturer in the West Midlands. However, despite several attempts of communication, no interviews were secured.

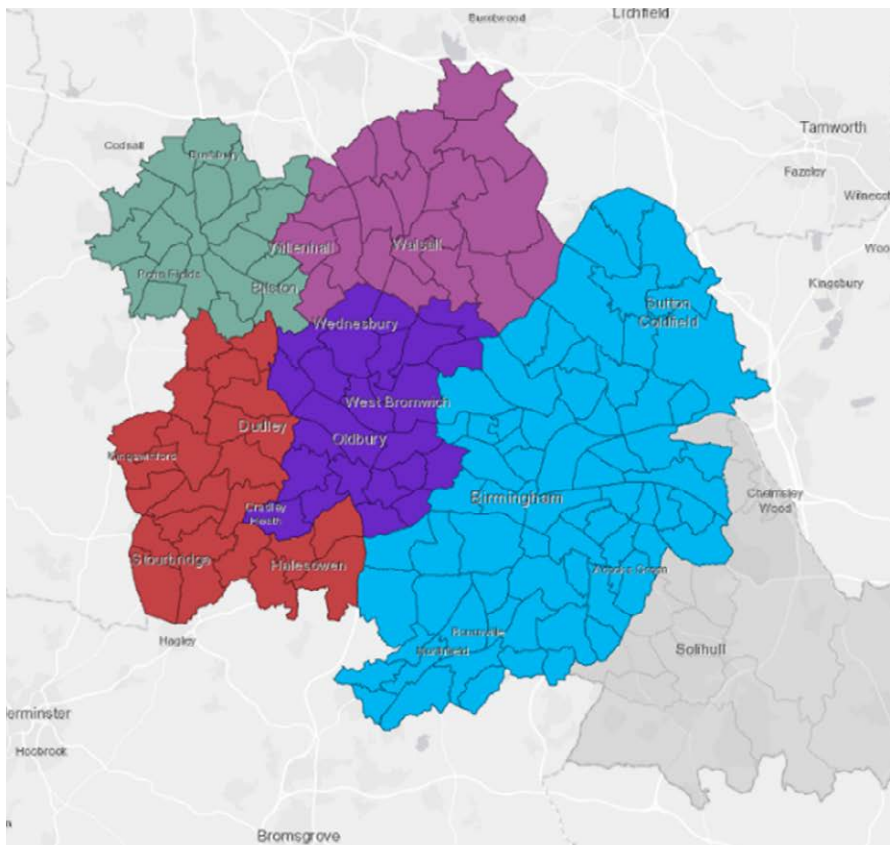


Figure 3. Regions of the Businesses Interviewed [23].

2.1. Why Manufacturing SMEs?

The manufacturing sector contributes significantly to the UK's economy. In 2022, the sector accounted for £183 billion in output, 2.5 million jobs and represented over half of UK exports [15]. The manufacturing sector is also highly energy intensive [16]. As illustrated in Figure 4, five of the UK's top ten energy consumers by business type are from the manufacturing sector. Therefore, it is not surprising that manufacturers are facing significant challenges relating to the cost of energy. Nearly half of Britain's manufacturers have reported that their electricity bills have increased by 100% in the last year [17]. This has had

a significant impact on manufacturing businesses with 60% reporting that energy costs are threatening the existence of their business [17].

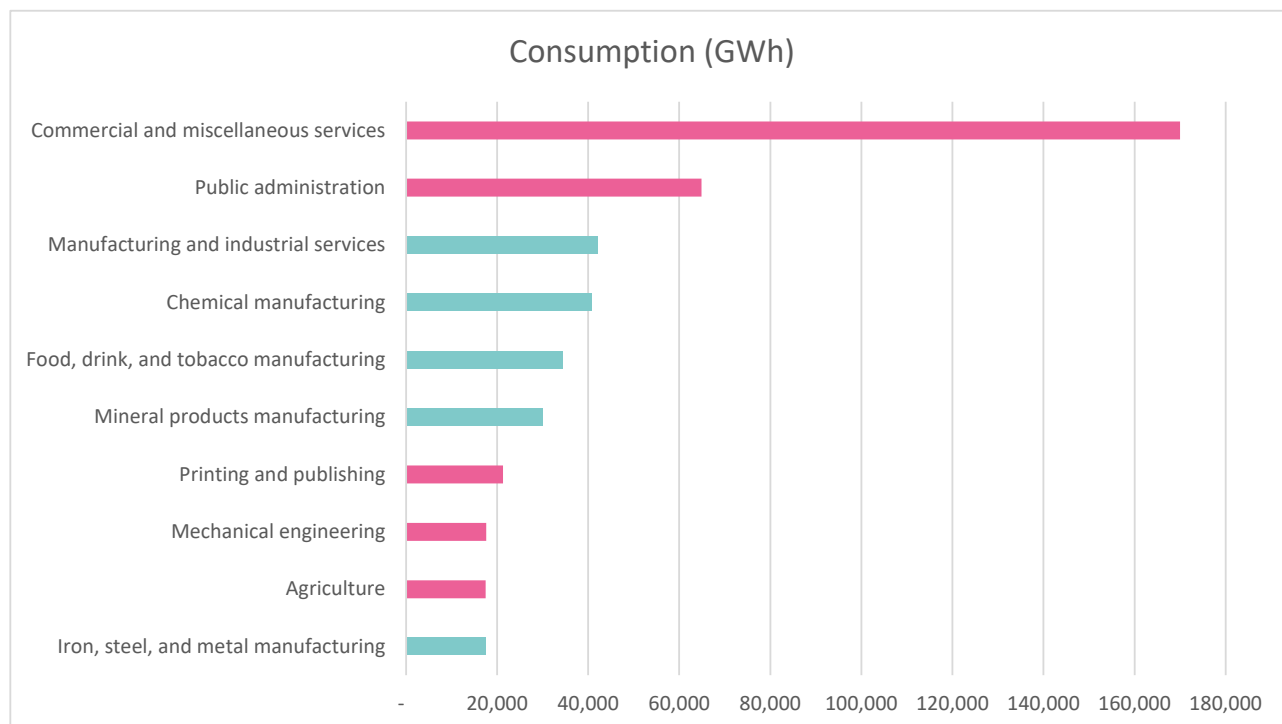


Figure 4. UK's Largest Energy Consumers by Business Type (combined GWh per annum) [16]. Manufacturing Businesses Highlighted in Blue.

2.2. Why the West Midlands?

The West Midlands' manufacturing sector accounts for £22 billion in output and provides 304,000 jobs to the region [18]. The Black Country sits within this region and comprises 3,500 energy intensive manufacturing businesses that are spread across the following metropolitan areas: Wolverhampton, Walsall, Sandwell and Dudley [5]. The area has been identified as one of the UK's most carbon intensive industrial clusters and emits approximately 1.3MtCO₂e annually [5]. Within the next ten years, the cluster plans to reduce these emissions which means that significant decarbonisation will be required [5].

3. What did the Businesses Say?

3.1. How Much Have Energy Bills Increased?

Seventy one percent of the businesses we spoke to are currently on variable or flexible basket tariffs. Businesses on variable energy tariffs are subject to fluctuations in wholesale energy prices. Likewise, businesses on flexible basket tariffs are also exposed to wholesale markets and must carefully consider when it is the right time to purchase energy. Businesses participating in pooled baskets (managed by third parties) have no control over the price at which energy is procured. Therefore, it is not surprising that the businesses we spoke to reported that their energy bills were now 167-500% greater than before (see Table 3 1). One business provided us with figures from their most recent electricity bill to illustrate just how much prices had increased (see Figure 5). In the space of only a few months, they were paying 352% and 388% more for electricity day rates and night rates respectively.

When asked how much they currently pay for energy

It's been an utter shock. Any business cost that more than doubles overnight without negotiation is always going to be difficult to swallow.

Managing Director,
JCM Fine Joinery



Two of the businesses that we spoke to are currently on fixed rate energy tariffs³. Despite securing a fixed rate tariff, one of these businesses had still experienced an increase in their energy bills and is currently paying 200% more than usual. Only one business had not experienced an increase in their energy bills.

³ Both tariffs are due to end later in 2023.

Business	Current Energy Price Relative to Former Price (%)
1	17% lower (due to retrofit and existing fixed rate contract secured pre-energy crisis)
2	500% greater (electricity and gas combined)
3	167% greater (electricity) 350% greater (gas)
4	400% greater (electricity only fuel source)
5	200% greater (electricity only fuel source)
6	352% greater (electricity day rate) 388% greater (electricity night rate) 200% greater (gas)
7	250% greater (electricity and gas combined)

Table 3 1. Reported Changes to Energy Bills – Data Provided by Businesses.

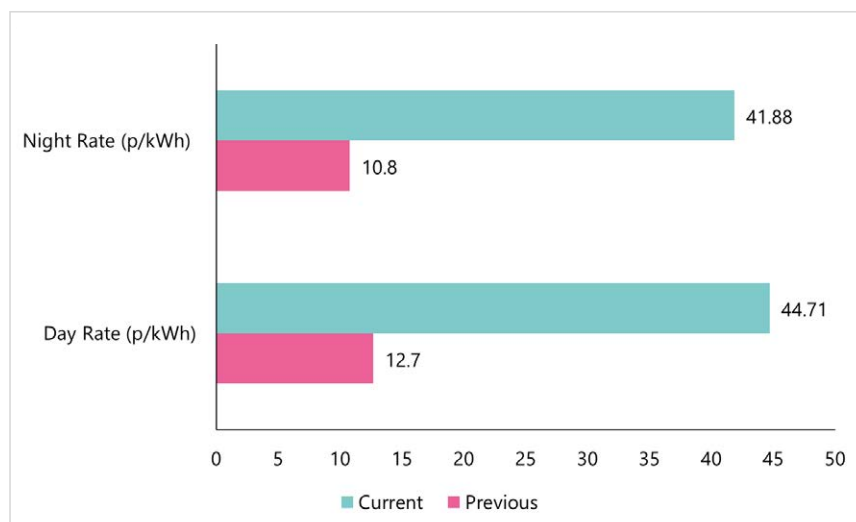


Figure 5. Electricity Day Rate and Night Rate Changes - Provided by Business (Anonymous).

When discussing the impact of rising energy bills

The volatility that is present in the energy market, at the moment, makes it very difficult to know when to purchase and how to purchase [energy].

Managing Director, Hinton Perry & Davenhill Ltd

3.2. What's (Happened to) the Bottom Line?

The reported impact of rising energy bills differed amongst businesses. One business explained that higher energy bills had not had a major impact because they only account for roughly 2% of their overall processing costs. However, they did explain that they had encountered other price increases due to energy costs being passed through the supply chain.



They reported that their raw material costs had doubled. In stark contrast, **fifty-two percent of businesses explained that high energy bills had negatively impacted their profit margins.** Accordingly, businesses often explained that, where possible, they were having to increase their own prices as a mitigation measure. The challenges associated with this were discussed in several ways.

One business explained that they were still honouring contracts that were agreed before the energy crisis. This meant that they were unable to claw back energy costs unless they could prove that they were operating at a loss. Accordingly, when pricing long-term contracts, they now factor in premium gas and electricity prices. However, they explained that they may struggle to compete in European supply chains as a result. The business reported that European competitors were paying less for energy and therefore had the ability to offer lower-cost products. Historically, Great Britain's electricity prices have been higher than the European average. However, a significant cost differential was observed during late 2022 [19]. With an estimated **34% of small UK businesses exporting exclusively to EU countries, this could pose a considerable threat to SMEs** [20].

Another business reported that they had already lost some customers due to increasing the price of their products. They explained that if they were to lose out on further business, they may have to "shut the doors" due to their energy bills being that "phenomenal".

When asked about the impact of rising energy bills

"We've had to become very focused on energy rather than what we actually do to make money. In effect, we've all become energy brokers."

Managing Director,
JCM Fine Joinery

"Well, it impacts heavily on profitability. It impacts also on the prices that we need to charge."

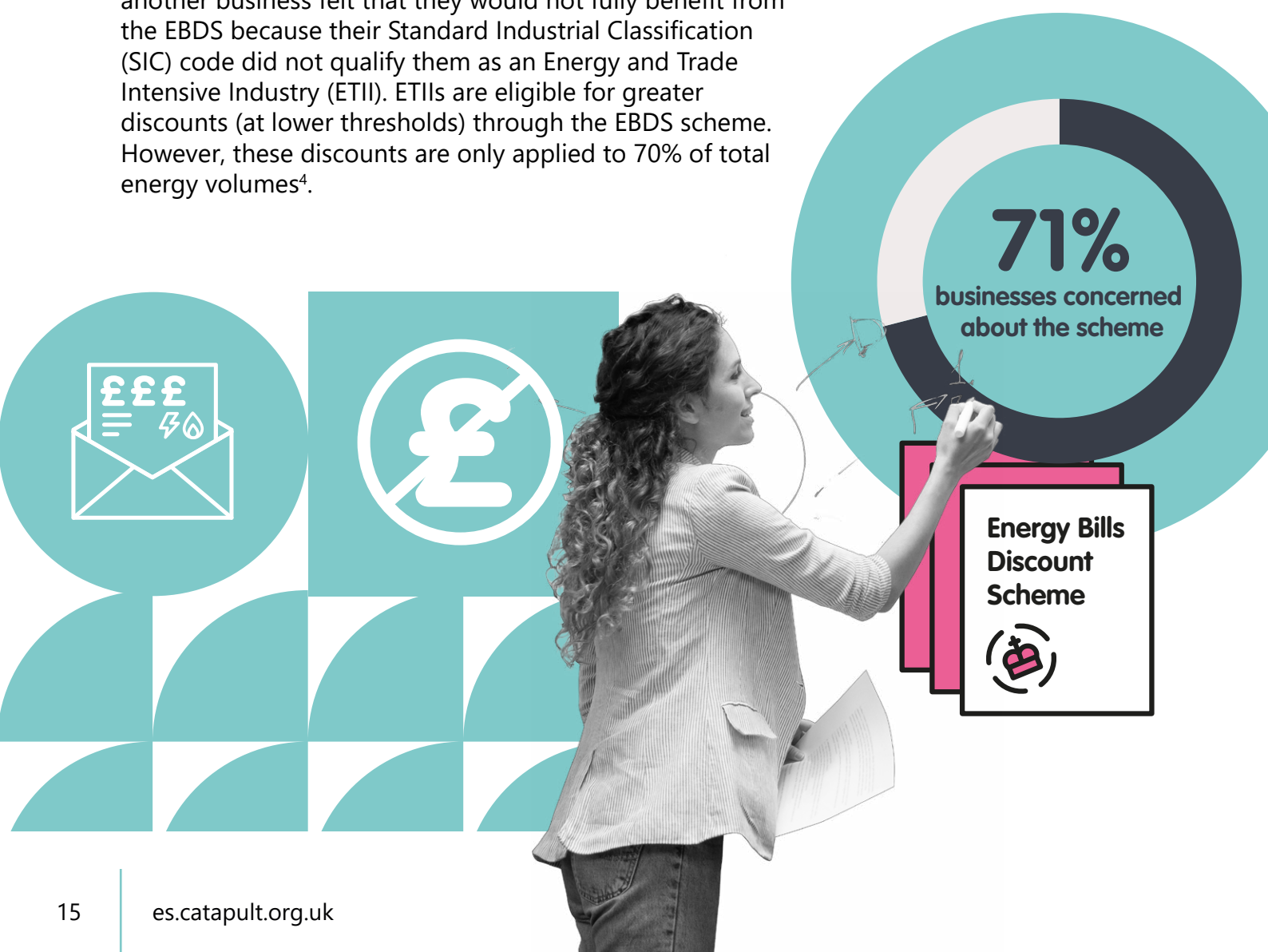
Managing Director, Hinton
Perry & Davenhill Ltd

3.3. What Support is Available?

During the interview period, six businesses were receiving financial support through UK Government's Energy Bill Relief Scheme (EBRS) [24]. Generally, support received through the EBRS was welcomed by businesses. For example, one business explained that without the EBRS, their electricity bill would have increased from c.£6,600-8,000 a month to c.£15,000 a month. However, even with support from the scheme, the business anticipated that their electricity bill would still be significantly higher than usual (c.£12,000 a month). Accordingly, some businesses questioned whether support received through the EBRS was 'enough'.

In comparison, businesses were less supportive of the Energy Bill Discount Scheme (EBDS) [6]. Seventy-one percent of businesses expressed concerns about the new scheme. One business explained that they didn't think they'd receive any financial support due to the high thresholds proposed. Similarly, another business anticipated that their energy bills would increase by a further 33% once the scheme came into place due to the lower discounts available. Despite considering their operations as highly energy intensive, another business felt that they would not fully benefit from the EBDS because their Standard Industrial Classification (SIC) code did not qualify them as an Energy and Trade Intensive Industry (ETII). ETIIs are eligible for greater discounts (at lower thresholds) through the EBDS scheme. However, these discounts are only applied to 70% of total energy volumes⁴.

⁴ The baseline level of EBDS support applies to the remaining 30% of energy volumes.

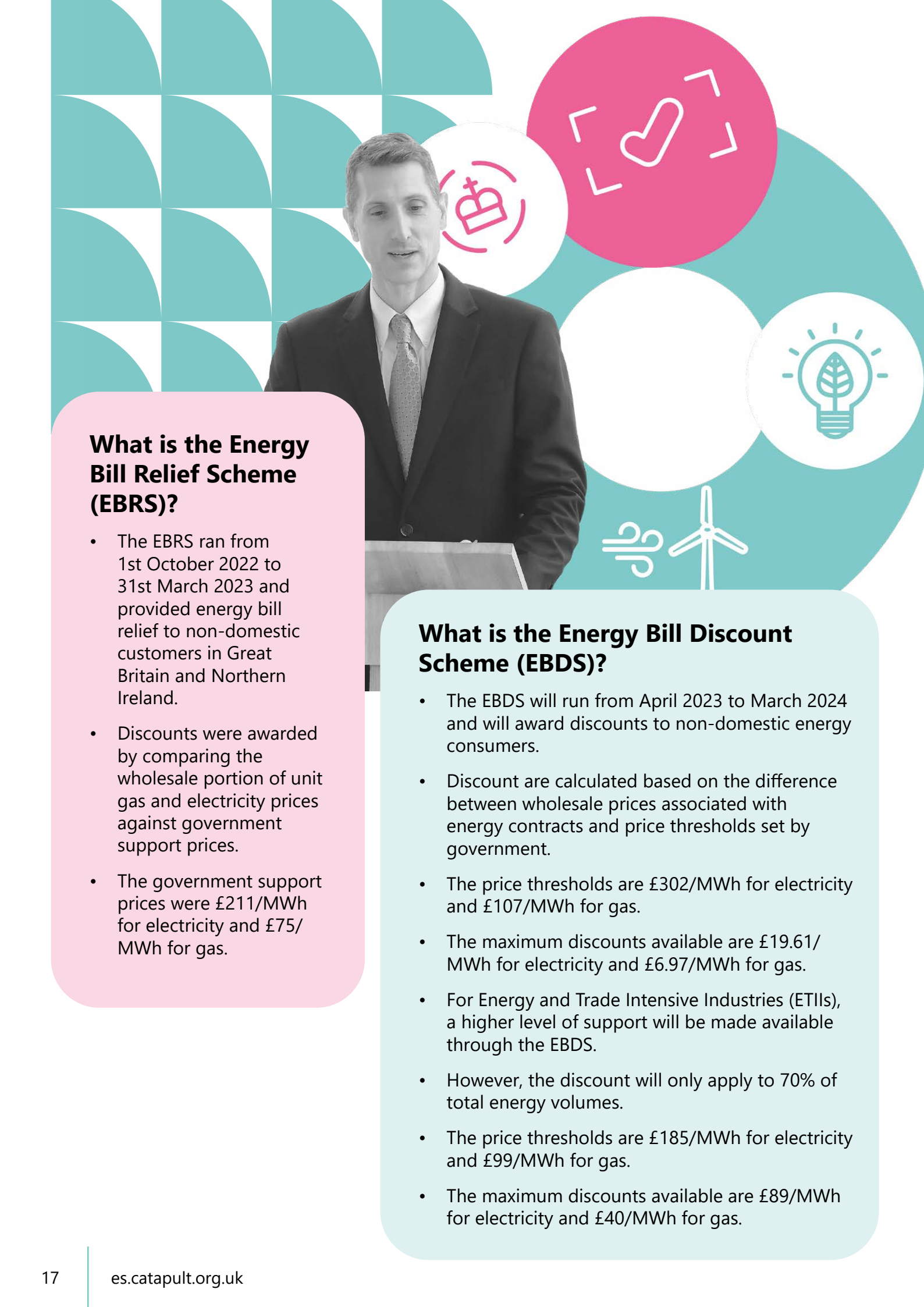




Recently, gas and electricity prices have fallen below the baseline thresholds posed by the EBDS [7] [8]. If wholesale prices continue to fall, businesses may not benefit from the scheme at all. Furthermore, despite recent decreases, wholesale energy prices are still considerably higher than what they were before COVID-19 and the energy crisis (see Table 3 2). Therefore, even with the EBDS, businesses will likely continue to feel the impact of rising energy bills. As discussed in Section 3.2, this could have devastating effects for UK SMEs.

	Wholesale Gas Price (£/MWh)	Price Relative to March 2019	Wholesale Electricity Price (£/MWh)	Price Relative to March 2019
March 2019	10.12		44.30	
March 2020	4.22	58% smaller	31.69	28% smaller
March 2021	13.92	138% greater	57.04	129% greater
March 2022	87.27	862% greater	250.41	565% greater
March 2023	20.24	200% greater	115.40	260% greater

Table 3 2. Comparison of GB Wholesale Energy Prices between March 2019-2023 [7] [8].



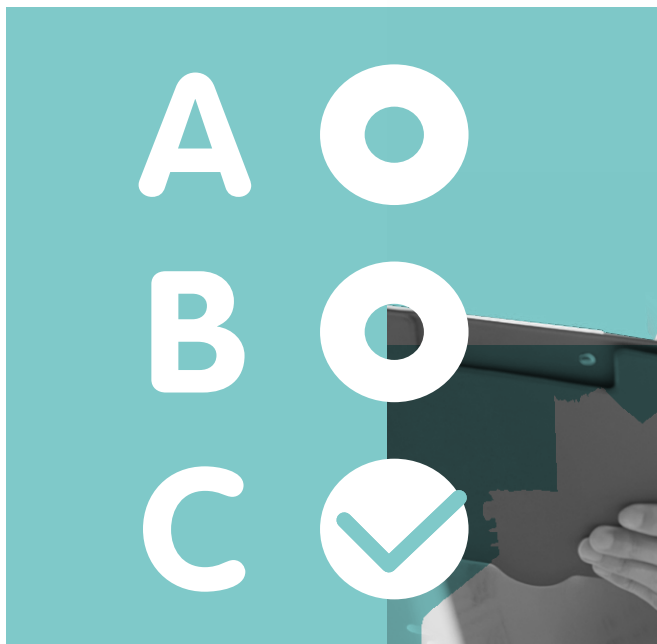
What is the Energy Bill Relief Scheme (EBRS)?

- The EBRS ran from 1st October 2022 to 31st March 2023 and provided energy bill relief to non-domestic customers in Great Britain and Northern Ireland.
- Discounts were awarded by comparing the wholesale portion of unit gas and electricity prices against government support prices.
- The government support prices were £211/MWh for electricity and £75/MWh for gas.

What is the Energy Bill Discount Scheme (EBDS)?

- The EBDS will run from April 2023 to March 2024 and will award discounts to non-domestic energy consumers.
- Discounts are calculated based on the difference between wholesale prices associated with energy contracts and price thresholds set by government.
- The price thresholds are £302/MWh for electricity and £107/MWh for gas.
- The maximum discounts available are £19.61/MWh for electricity and £6.97/MWh for gas.
- For Energy and Trade Intensive Industries (ETIIs), a higher level of support will be made available through the EBDS.
- However, the discount will only apply to 70% of total energy volumes.
- The price thresholds are £185/MWh for electricity and £99/MWh for gas.
- The maximum discounts available are £89/MWh for electricity and £40/MWh for gas.

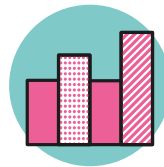
4. How Businesses are Taking Matters Into their Own Hands



All businesses had taken measures to improve their energy efficiency to mitigate high energy bills and/or combat climate change. Most businesses have implemented internal energy management policies. These

included actions such as switching off lights, heating sources, appliances and/or equipment when they weren't in use. However, some businesses explained that this was not a suitable option for them because certain items of machinery had to operate continuously.

Seventy-one percent of businesses had conducted studies to investigate on-site energy consumption. Three of these studies were conducted internally by analysing half-hourly meter data. Two analyses were conducted by connecting production meters to individual items of machinery.



Forty-three percent of businesses had collaborated with academic institutions to explore efficiency improvements. Two of these businesses had secured funding to undergo waste heat recovery feasibility studies. Another business had collaborated with a local university to analyse the energy consumption of individual items of machinery.

When discussing actions taken to mitigate energy bills and climate change

“We have become hypersensitive to every switch, plug and piece of kit that uses energy”

Managing Director,
JCM Fine Joinery

One business had installed renewable generation assets (roof mounted solar). As well as solar, they had recently installed retrofit measures including LED lighting and loft insulation. As a result, their energy bills for January 2022 and January 2023 were less than January 2021 (see Figure 6). However, it is important to note that they are currently on a fixed rate energy tariff that was secured before wholesale energy prices increased significantly.

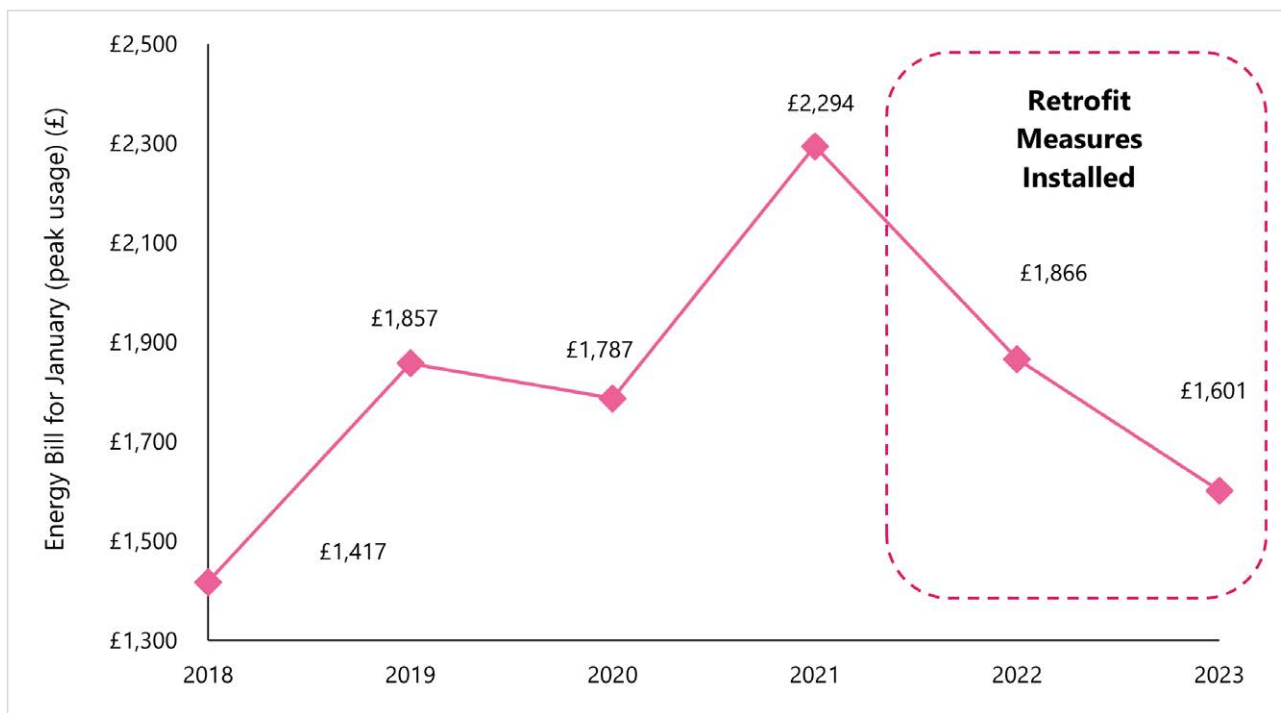


Figure 6. Historical Energy Bill Data from January 2018 - January 2023 - Provided by Business (Anonymous).



Eighty-six percent of businesses had investigated the potential of installing solar assets on-site; the outcomes of which differed considerably. Two businesses that occupied leased premises had discussed the potential of installing solar with their landlords - with one business securing an Agreement in Principle. However, both explained that they did not have the budget available to invest in solar technology and were concerned about payback time. Similarly, another business had explored the possibility of a third-party licensing arrangement for solar but was unable to commit to the 20-year contractual arrangement proposed. One business reported that they had investigated solar in the past but had been told by their distribution network operator (DNO) that they were not allowing new installations due to faults on the network.

Other energy management/ efficiency technologies considered by the businesses include energy dashboards, voltage optimization equipment, and battery storage. However, businesses explained that they were still exploring whether these technologies would be a suitable fit.

4.1. Why Extra Support is Needed

Access to Data

Despite seventy-one percent of businesses having smart meters installed, there were mixed views over whether businesses believed they had enough information to make informed energy management decisions. Some businesses had used smart meter data to better understand their energy consumption but still felt that the data was not detailed enough (i.e., they weren't aware of energy consumption at an individual asset level). Businesses explained that having access to more granular energy consumption data would allow them to:

- Track progress towards existing carbon and sustainability targets.
- Reduce energy costs and carbon emissions by identifying opportunities to reduce energy consumption on-site.
- Identify whether any assets need upgrading or replacing.



Cost of Low Carbon Technologies

All businesses felt that it was important to do their bit to combat climate change. When asked what benefits this may have for their business, three businesses stated that it would be financially beneficial to reduce energy consumption as it would lead to lower energy bills. However, it was frequently brought into question whether businesses could take on the costs of new, low-carbon technology in addition to rising energy and raw material costs. Accordingly, seventy-one percent of businesses identified cost as a barrier to combatting climate change.

One of the most frequently reported challenges relating to cost centred around the long payback times of energy efficiency and/or low-carbon technologies. Although businesses recognised the environmental benefits of such technologies, they reported that payback times often stretched beyond their typical investment horizons. For example, one business had recently researched an energy dashboard that had a twelve-

71% of businesses identified cost as a barrier to combatting climate change.

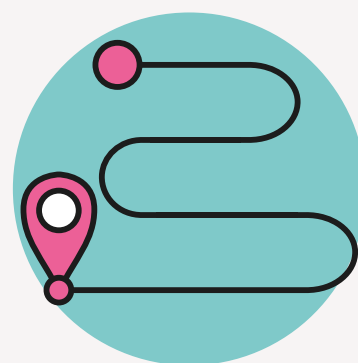
year payback; more than double what they would consider a suitable payback time (5 years).

Another challenge flagged by businesses was the high-cost of converting existing assets to low-carbon alternatives with little to no incentive to do so. One business reported that it would cost them approximately £17m to convert their gas furnaces to electric alternatives. They then explained that adapting electrical furnaces to perform to the standard of their existing assets would be incredibly difficult in their industry. Another business reported that, at present, it would not be cost-effective to decarbonise their industry. They reported that it would require billions of pounds to fundamentally change operations and that not all customers would be willing to pay for a lower emission product.

Lack of Government Support

Fifty-seven percent of businesses identified limited government support as a challenge to combatting climate change. Some of these businesses felt that the UK government had mandated net-zero without supporting the manufacturing sector in achieving this target. This barrier was discussed in two different ways. First, twenty-nine percent of businesses felt that the transition to net-zero had not been clearly defined by the UK government and that there were no “clear” policies to “motivate” businesses to change.

Secondly, fifty-seven percent of businesses reported that the UK government had not provided enough financial support to help decarbonise the manufacturing sector. On this topic, one business felt that grant funding for decarbonisation initiatives was often awarded to larger companies and believed that there should be more support made available to SMEs running ‘traditional businesses.’



5. Key Points for Policy Makers

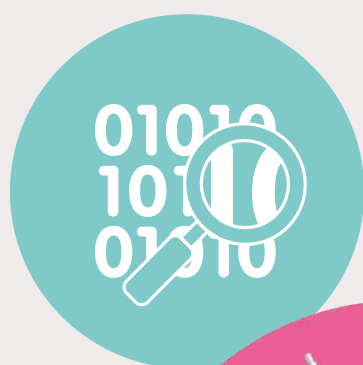
Why Current Support for Energy Bills may not be Enough.

Wholesale energy prices have fallen in recent months. If market prices continue to drop, it is unlikely that businesses will benefit from the EBDS due to the thresholds proposed. Despite a recent declining trend, wholesale prices are still considerably higher than what they were prior to the energy crisis. As long as this remains the case, businesses will continue to face higher energy bills. Our research highlights some of the impacts of rising energy bills for businesses such as **lower profit margins, loss of customers and difficulties competing in international supply chains**. This suggests that additional mechanisms may be required to support businesses with high energy costs.



The Benefits of Accessing Detailed Energy Consumption Data

Forty-three percent of businesses stated that it would be financially beneficial to reduce energy consumption as it could lead to lower energy bills. Our research found that most businesses have implemented energy management policies and that seventy-one percent of businesses have conducted studies to investigate energy consumption. However, despite taking such measures, some businesses felt that they needed access to more detailed energy consumption data to make informed decisions about energy management. It was reported that this would allow them to reduce energy costs and/or cut carbon emissions. Improving access to energy data could therefore be a key focus area for policymakers when providing support to businesses.



Cost is a Barrier to Decarbonisation

All businesses felt that it was important to 'do their bit' to combat climate change and, already, most have taken actions to decarbonise. To elaborate, our research found that: eighty-six percent of businesses had investigated the potential of installing solar assets on-site, forty-three percent of businesses had collaborated with academic institutions to explore energy efficiency improvements and fifty-seven percent of organisations had implemented retrofit measures such as LED lighting and/ or loft insulation.

However, seventy-one percent of businesses identified cost as a barrier to combatting climate change. Furthermore, fifty-seven percent of businesses felt that UK government had not provided enough financial support to help manufacturing businesses to decarbonise. Businesses often voiced concerns relating to long payback times of low-carbon technologies which span beyond their typical investment horizons. Some businesses also felt that it was not yet cost-effective to convert their existing assets to low-carbon alternatives.



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carbonTRACK are a world leading technology solution provider who are disrupting the global energy sector. carbonTRACK have developed an intelligent Energy Trading and Net Zero reporting platform that enables the automated dispatch of energy to the grid in response to real-time network constraints. The platform provides the link between Distributed Energy Resources (DERs) and the UK flexibility trading markets, allowing for energy to be dispatched into specific energy constraint zones. carbonTRACK supplements this with comprehensive Net Zero emissions reporting capabilities through the creation of accurate SECR compliant reports.

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