

# **Exploring External Finance links to *Build Back Better* a Green UK SME Economy**

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## **Exploring External Finance links to *Build Back Better* a Green UK SME Economy**

**Small Grant Longitudinal Small Business Survey (LSBS) Report to Enterprise  
Research Centre (ESRC)**

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## EXECUTIVE SUMMARY

### Research Questions

This study's main research question is:

- How does external finance, including different amounts and types (public supported schemes and grants, or private debt, equity) of finance, impact on the low carbon (energy efficiency), green growth of UK SMEs?

Additionally, the following sub questions are investigated:

- How is SME green external financing related to SME skills and capabilities and use of external assistance?
- How is SME green financing related to sectors and location?
- How is SME green financing related to future business intentions (e.g. growth)?

### Methodology

We focus initially on descriptive univariate analysis of the most recent 2019 (n=11,002) and 2020 (n= 7,619) LSBS Waves where there is sufficient SME cross-sectional case data of the two waves alongside the self-reported environmental 'green mission' (2019 section D) and the adoption of energy efficiency practices during the 12 months prior to interview wave (section E 2019 and 2020, represented in each wave by a one third of survey cohort). We also track performance and innovation changes (noting these may be lagged) for energy efficiency adoption longitudinally for cases spanning 2019 and 2020 (n=5364).

Econometric analysis was then undertaken by pooling data, from 2017 and 2019 for green mission and from 2019 and 2020 on the adoption of energy efficiency practices, to increase the size and robustness of the data sample. A series of probit estimations assess the business characteristics associated with being green (the extent of having green mission priorities) and becoming greener (by increasing green priorities, or taking green energy efficiency actions), within the survey wave timeframe, and whether green SMEs perform better over time.

## Key Findings

### ***Paucity of useful data***

There is a paucity of useful UK green SME data provided by the LSBS (and other UK SME surveys). Findings are constrained by inability to gain sufficient baseline of data for green investment taking place prior to the LSBS waves examined. The LSBS is limited to defining green SMEs by their green mission status, which is only captured biennially since 2017. Furthermore, the LSBS, limits the assessment of SMEs going green to a one third survey cohort for energy efficiency government programme awareness and adoption measures. Such limited data thus renders it impossible to undertake meaningful analysis of the different financing needs and activities of these businesses. This survey design seems at odds with such a high government policy priority!

### ***Developing a Green Taxonomy of SMEs***

Descriptive (univariate) analysis and supporting regression models highlight key differences between the proactive green mission enterprises that are more likely to invest in going green or becoming greener (the already converted) and the non-green mission laggards.

**Green mission companies** significantly ( $<.001$  significance level) tend to be larger SMEs (with 10 or more employees) and those established at least 6 years with ability to self, or part fund green investments and absorb the lag in green efficiency payback. They are significantly ( $<.001$ ) more likely to be high priority green mission businesses making changes for Net Zero impact, rather than (at least initially) to improve their bottom-line profit margins. They are more likely to introduce new products and services, but (perhaps due to lagged performance efficiencies, not yet recorded) do not perform any better than their counterparts (in terms of turnover and profits). Green SMEs are also significantly more likely ( $<.05$ ) to be rural, in devolved nations and regions with higher ratios of installed renewable capacity to GVA, from sectors which are either more heavily environmentally regulated (e.g. primary, construction, manufacturing, retail) or from cultural backgrounds which are more sympathetic with the environment.

**Green laggards**, the majority of UK SMEs (circa three quarters) are profit driven. They are more likely be motivated to make changes when they can see a clearer financial imperative for getting on board with 'green growth'. Our evidence suggests that tightening of the UK economy due to the onset of the Pandemic was leading to both raised awareness of the

need to go green, but a reduction in appetite and available (internal or external) finance for the laggard SMEs to invest in going green. These businesses may have reduced their appetite for investment, or switched to more immediate marketing requirements (such as increasing online services).

### ***Barriers to going green***

Businesses in rented premises are less likely to undertake green energy efficiency measures, probably because this is under the control of their landlords.

**SME green finance policy is crucial:** Strong regression evidence suggests that government grants and loans are associated with going green and can tip the balance. Despite the availability of relatively 'cheap' business loan finance (interest rates may be below inflation rates), going green or becoming green appears to involve a wide range of external financing and less so private bank lending. The evidence here is of a search for cheaper funding that might tip the balance in favour of green investing – given the perceived and actual lag in performance and payback.

### ***Improved UK SME Going Green Awareness***

Awareness of government programmes is increasing. More than half (55%) of UK SMEs know about UK SME energy efficiency related programmes and there is take up of these services. Going green is becoming more attractive, and the current rise in energy prices will only underline the strength of this message.

However, there is clearly a lot more required from UK government policy to engage with SMEs. Many remain green laggard businesses. SMEs do not have any mandatory environmental (or social or governance – 'ESG') reporting - to develop their awareness and actions to develop a Net Zero green and sustainable economy. Thus, whilst we find that high priority green mission businesses are not seeking external advice - they are already the converted, but are also more likely to be receptive to using external training – the overall evidence (univariate and probit) suggests that **advice and support are required for the remainder of** (often less receptive) **laggard SMEs**.

## Key Recommendations

**Recommendation 1:** Increase the size of LSBS survey and questions in relation to SME green missions, intentions and financing options to fully explore their motivations and what can lead to more effective take-up of SME green activity – widening this to include innovative green business models and approaches and not just energy efficiency.

**Recommendation 2:** The UK government needs to develop appropriate incentivising financial support mechanisms to encourage going green, particularly for laggard SMEs. This may come in the form of grants, soft loans with low interest and repayment holidays, or other forms of inducement such as improved energy feeder tariffs, green R&D tax credits etc.

**Recommendation 3:** To address the *prisoner* effect of SMEs in rented accommodation, government should give greater attention to landlord incentives and aggregating schemes to incentivise landlords and SMEs to work together to achieve green solutions.

**Recommendation 4:** An improved, coherent, national programme of SME Net Zero awareness, with support and advice for SMEs to becoming Net Zero are required. The small number of SMEs (c. 3,000) that have signed up for the BEIS SME Climate Hub and its lack of connectivity with DEFRA's Handbook on Nature Impact and the relationship between Net Zero and preservation of natural capital and biodiversity (see Central Bankers Biodiversity report, 2022<sup>1</sup>) clearly demonstrates a big gap in the UK's green growth strategy aims and its implementation. Development and provision of widely accessible universal online support tools to nudge and assist SMEs to become greener are urgently required. This could be supported by SME Net Zero champions who offer role models and mentoring to the SME sector, acting as beacons for the way forward and to ensure that this coverage goes beyond the rural and more advanced regions and sectors which are already more aware of environmental matters and the value of going green.

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<sup>1</sup> <https://www.ngfs.net/en/central-banking-and-supervision-biosphere-agenda-action-biodiversity-loss-financial-risk-and-system>

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## 1. INTRODUCTION

The UK economy faces many competing challenges to *build back better* in the aftermath of the COVID-19 Pandemic and Brexit. However, COP26 in Glasgow (November, 2021) has demonstrated that a low carbon, so called '*green growth*' (HM Government Clean Growth Strategy, 2017; HM Government Green Finance Strategy, 2019) UK economy should be at the top of the UK Government's policy agenda (Owen, 2021).

A major criticism made by Owen et al (2018, 2020) is that a great deal of current UK government green finance policy – whether through the Green Investment Bank (2012-2017), or more latterly under the auspices of the Green Finance Institute (established, 2019) - has, understandably, been directed at funding large infrastructure projects such as offshore windfarms, electric vehicle infrastructure and carbon capture projects. Far less attention has been given to SMEs (independent companies with under 250 employees), which a recent British Business Bank report (BBB, 2021) indicated are responsible for over half of all UK private company greenhouse gas (GHG) pollution.

Furthermore, the lack of mandatory Climate Change reporting by UK SMEs (or any UK companies with under 500 employees) means that, with the exception of a handful of B Corp SMEs that self-certificate their environment social governance (ESG) and voluntarily report climate impact to their investors and customers, the vast majority of established SMEs have little awareness of the potential advantages of climate future-proofing on their business activities (Owen et al, 2020, 2020a; ERC 2020; BBB, 2021).

As Owen et al (2020) suggest, this will need to change as the increasing pressures of related environmental regulations (such as planning law, incorporating Net Gain Biodiversity by Autumn, 2023) and private market pressures of customer credibility and supply chain reporting to larger business customers increases. As SQW (2021) report, SMEs fall into two dynamic green change categories: (i) highly innovative market leaders, such as cleantech that are undertaking R&D to commercialise low carbon/GHG market solutions; (ii) green adopters which represent the companies that are making adjustments via green equipment and practices. As the BBB (2021) study reveals, a substantial third group of laggard SMEs exists where there is not yet any economic imperative for change, because these businesses are small and not in sectors which are under current green scrutiny (such as rural agri-food, forestry, mining, as well as construction, manufacturing and transport activities).



Broadly, a ‘green business’ can be defined as one which follows practices that limit environmental impact and ideally acts in a sustainable way by putting purpose before profit (The Guardian, 24/11/2019). In practice, Cooney (2009) states that this includes four principles: (i) considering sustainability in all business decisions; (ii) supplying environmentally friendly ‘green’ products and services; (iii) strives to undertake greener practices than competitors; (iv) has enduring commitment to the environment. This latter category should incorporate circular economic practices that relate to company products and services that offer longevity, repair, repurposing and recycling (Owen et al, 2020).

Cowling and Lui (2021) used 2007-2012 Small business Survey (the forerunner to the Longitudinal Small Business Survey) data to examine the relationship between external finance and green SMEs. Due to the limitations of the LSBS data (which vary over time with different waves), they define businesses as ‘*going green*’ through their adoption of energy efficiency processes. The study reported that these green efficiency adopters experienced increased demand levels for external financing (from outside of the company’s own internal financing resources such as redeployed surplus income and founder investment), which were not being fully met by traditional finance providers. Whilst they suggest that some smaller grant schemes might actually displace private bank lending, they also argue that for the more innovative companies there was a UK public and private investment funding gap. This is concerning, first because public policy should not crowd out private finance and second, because **higher level innovation and adoption should be a priority for UK government policy to ensure improved SME performance towards UK Net Zero GHG emissions targets.**

This study updates and develops Cowling and Lui’s (2021) research by exploring the link between external finance and both ‘*green mission*’ (a category not available in the LSBS prior to 2017) and energy efficiency ‘*green adopter*’ UK SMEs. The study also makes a broader examination of the SME resource-based issues around management, skills, training and business support, and requirements for locational levelling up, which are currently at the heart of many local authority and Local Enterprise Partnership (LEP) *green deal* impact policies in England (cf Hounslow Green Economy Action Plan, 2022 as lead authority for the London Boroughs).

In this study we examine the BEIS Longitudinal Small Business Survey (LSBS), the largest UK-wide annual survey of SMEs. LSBS has operated as a topped-up panel survey since the baseline survey of 15,502 SMEs in 2015. The most recent data wave is for 2020, containing 7,619 SMEs, of which 2,255 are top-ups for sampling purposes. The survey offers the most robust survey evidence for SME trends and is weighted to broadly reflect

UK annual Business Population Estimates to account for broad sector, employment size and national locations. Full details of the LSBS 2020 can be found in the technical report (BEIS LSBS, 2021).

This study's main research question is:

- How does external finance, including different amounts and types (public supported schemes and grants, or private debt, equity) of finance, impact on the low carbon (energy efficiency), green growth of UK SMEs?

Additionally, the following sub questions are investigated:

- How is SME green external financing related to SME skills and capabilities and use of external assistance?
- How is SME green financing related to sectors and location?
- How is SME green financing related to future business intentions (e.g. growth)?

In undertaking this study, we note the limitations of LSBS analysis in terms of the limited data available on environmental Climate Change orientation and related business practices adopted by SMEs and their likely lagged impacts on business performance (Owen et al, 2019). We therefore focus on the relationship between external financing and green growth impact in terms of (i) adopting energy efficiencies, and (ii) having a green mission, but also seek to examine the sectoral and green innovation locations and related internal resource bases (Barney, 1991) of management (Henley and Song, 2018), skills, and related external inputs of business support (Mole et al, 2017) and training. We then examine the future growth plans of surveyed green investing SMEs versus other SMEs to gain an understanding of the potential impact that green external financing can make on *Building Back Better* the UK economy post Pandemic. Additionally, we will consider a critique of Cowling and Lui's (2021) necessarily limited *green growth* approach in using LSBS data and consider additional LSBS questions that might enhance future surveys in understanding SME low carbon and environmental investment impacts.

## 2. METHODOLOGY

The analysis will focus on the most recent 2019 (n=11,002) and 2020 (n= 7,619) LSBS Waves where there is sufficient case data collected for cross-sectional analysis of the two waves alongside environmental mission (2019 section D) and predominantly energy efficiency adoption (section E 2019, 2020 Cohort – one third data). Additionally, given the lagged performance impact of energy adoption we note that there are sufficient longitudinal cases spanning 2019 and 2020 (n=5364) to track performance and innovation changes (even within a one third cohort).

We will start with undertaking a descriptive (univariate) analysis of the 2019 and 2020 LSBS data sets, using all cases, including self-employed. We will apply (appropriate LSBS cross-sectional and cohort) weightings to the descriptive data analysis in order to gain an impression of the UK-wide representation of findings (LSBS Technical Reports 2020, 2021 for 2019 and 2020 surveys). Focus will be on the relationship between the use of external finance, including the different types on offer – ranging from specialist green loans and grants to mainstream debt finance and alternative sources of equity - and having an environmental mission and take-up of environmental energy efficiency improvements. Here we are interested in drawing out the differences between green SMEs and their counterpart mainstream SMEs (using chi-square significance testing). Additionally, we will explore the characteristics of the SMEs in terms of their employment size, regional location, management and skills (internal business) resource base and use of external training and business support, degree of innovation, performance characteristics in terms of changes in employment, turnover and profit and forecast performance expectations. We will also investigate any regional patterns that may be present in green indicators (energy efficient adoption, environmental mission, green loans) related to regional focus on production and use of renewable energy (based on Regional Renewables Statistics from ONS).<sup>2</sup>

We will then perform a series of binary regression analyses (see Owen et al. 2017, 2019), using a sifting technique to fit several probit models and test the relationships between external finance – the amount, success rate and different types thereof – and the dependent variable of green mission and green energy adopting SME (building on Cowling and Lui, 2021). The exact definition of the dependent variable will be informed by descriptive analyses described above and will be based on a combination of responses to

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<sup>2</sup> [Regional Renewable Statistics - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/regional-renewable-statistics)

questions about adoption of energy efficient measures (section E, 2020 LSBS), environmental mission (section D, 2019 LSBS). This regression model will be augmented with various independent and control variables to explore the relationships between external finance, green business and business performance (over time) in relation to management and skills, business support use, SME size, regional location. We recognize that endogeneity is a potential challenge for econometric analysis, specifically the issue of possible reverse causality. One could argue that adoption of green technologies as well as having an environmental mission may influence the decision to seek certain types of external finance (or affect the success rate in securing the funding). In our opinion, the ‘reverse link’ is likely to be weak or non-existent, due to the ‘operational’ rather than strategic nature of the majority of relevant questions in LSBS. However, to ensure robustness of our results, we will seek to address this issue by undertaking additional analysis on a reduced sample, filtered by the reasons for installing energy efficient measures i.e. excluding those businesses that choose the greener path to comply with regulations or to meet audit targets. We will also investigate the link between improving energy efficiency and using various types of finance rather than applying for them (this would partially break the potential ‘reverse’) link through timing of the events – first the funding is secured, then energy efficiency measures follow.<sup>3</sup>

### 3. DESCRIPTIVE ANALYSIS

Initial descriptive analysis of the LSBS is necessarily restricted to the suitability of questions contained in the annual waves since the 2015 baseline survey. To this effect, the two most important determinants we have of green business are (i) green mission, which was captured in question ‘D1F’ in waves 2017 and 2019 and (ii) the dynamics of *going green*, or *becoming greener* which are captured more recently in detail in ‘Section E’ of the 2019 and 2020 waves (noting that this only contains a one third sample cohort and may therefore have less statistical validity and explanatory power). We begin by exploring these two sets of green business data and their relationships to key business characteristics, resources and external financing. The descriptive, univariate data presented is for all SMEs surveyed (with less than 250 employees), including self-employed.

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<sup>3</sup> Of course those actions may be a result of conditions attached to previously secured funding.

## Green Mission

**Table 1: Classification of Social or Green Mission by Year** (D3<sup>4</sup> weighted 2017 and 2019 data)

Year Row %	<b>Major</b> only concern or major priority	<b>Minor</b> Equal or lesser goal	<b>None</b> Not a concern	Unweighted Base (UB n=)
2017	11.1	58.5	30.4	5423
2019	12.2	65.3	22.5	9178

Note: Data exclude panel businesses exceeding SME 249 employee restriction in wave year

In LSBS waves 2017 and 2019 businesses were asked whether they had social or environmental goals as their only or primary concern (defined as ‘major’ in Table 1), an equal or secondary concern to financial or other goals (i.e. defined as a ‘minor’ green or social mission in Table 1), or non-existent (i.e. no green or social mission, defined as ‘none’ in Table 1).

Table 1 demonstrates that around one in eight SMEs (including self-employed) have major green or social sustainable missions, whilst conversely around a quarter have no such concern. Social and environmental concerns rise in 2019 across all dimensions of social concern and particularly for environmental issues (see Table 2). In Table 2 social and environmental, along with financial goals (e.g. profit and turnover goals) are measured as high, medium, low or not relevant for the past five years.

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<sup>4</sup> LSBS question D3: To help understand the importance of the different goals, can you tell me, are these social or environmental goals: only concern; primary concern; equal to financial or other goals; secondary to financial or other goals; non-existent.

**Table 2: Environmental and Other Business Priorities by Year** (D1<sup>5</sup> weighted 2017, 2019)

<b>2017 Row %</b>	High	Medium	Low	No	UB
<b>Environment</b>	14	18.9	16.5	50.3	6574
Health	13.9	16.8	15.4	53.7	6564
Social Exclusion	12.8	19.9	17.5	49.5	6571
Civic	14.7	23.1	20.5	41.6	6569
Sport & Social club	8.3	12.4	18.1	61	6559
Financial turnover/profit	48.3	30.3	7.6	13.4	6575
<b>2019 Row %</b>					
<b>Environment</b>	20.9	22.8	12.9	43.4	10883
Health	18.2	17	14.2	50.6	10853
Social Exclusion	15.5	20.6	16.2	47.7	10853
Civic	17	25.4	17	40.6	10865
Sport & Social club	9.5	11.6	14.4	64.5	10854
Financial turnover/profit	46.3	30.8	9.4	13.5	10859

Note: Data exclude panel businesses exceeding SME 249 employee restriction in wave year

Table 2 demonstrates that by 2019 environment had become the top social/environmental priority for surveyed SMEs, rising as a high or medium priority from one third (32.9%) of weighted 2017 cases to more than two fifths (43.7%) in 2019. It is notably that the vast majority (over three quarters) of SMEs state financial profitability as a high or medium priority, although this fell slightly to 77.1% in 2019 (from 78.6% in 2017). This is indicative of the continuing commercial, profit first, motivations of most UK SMEs to which the UK government's green growth strategy aims to appeal. It suggests that for most SMEs going green will require a profit incentive (Owen et al, 2020).

Focusing on the largest most robust 2019 data we now explore the characteristics of the environmental 'green mission' SMEs to see how they differ by the degree of their stated green, environmental priority.

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<sup>5</sup> LSBS question D1: For each of these goals that I read out [solutions to environmental problems; solutions to problems of health; fighting social and/or economic exclusion; working to enhance civic and community engagement; serving members e.g. in sports or social club; financial goals e.g. turnover or profit] please tell me whether it has been of high, medium or little importance to you, over the past five years, or whether it is not relevant.

## *Characteristics of Green Mission SMEs*

Table 3 presents the broad sector, location, size, establishment age and management characteristics according to their green mission status (whether high, medium, low, or no priority) of the UK-weighted surveyed SMEs in 2019.

Significant differences ( $<.001$  significance level) are recorded by sector, where primary production and construction activities along with transport – sectors which are more under the spotlight of environmental climate change requirements – exhibit lower proportions with no environmental priorities. Larger SMEs (in the small 10-49 employee and medium 50-249 employee categories) are significantly ( $<.001$ ) more likely to have high or medium green priorities. Intriguingly SMEs in the established and potentially expansionary 6-10 years age group are significantly ( $<.001$ ) more likely to have a green mission. This may be because once established these SMEs have more time and resources to adopt green missions, or that their expansion meets with more supply chain or regulatory (e.g. planning) environmental requirements.

It is also notable that SMEs in the devolved nations were significantly ( $<.001$ ) more likely to have high environmental priorities, which might result from more effective national policies or from a more rural location – since rural enterprises which undoubtedly relates to their land-based sectoral activities (e.g. farming, forestry, mining) were significantly ( $<.001$ ) more likely to have high green priorities - or mix of sectors. Notably, women-led SMEs were less likely ( $<.01$ ) to have green missions – perhaps because they are typically smaller in size, whilst MEG-led SMEs were more likely to have high priority green missions ( $<.001$ , but small data sample).

**Table 3: SME Characteristics by Green Mission, 2019** (weighted row %)

	High	Medium	Low	No	UB
<b>Broad sector</b>					
Production, construction	23.3	26	12.6	38.1***	2546
Transport, retail	22.6	26.3	12.5	38.6***	3052
Business Services	19.6	20.2	13.4	46.7	3496
Other services	18.9	20.2	12.8	48.1	1789
<b>Employment Size</b>					
Zero	19.9	21.3	12.2	46.7	2552
1 to 9	23.8	26.5	14.4	35.3	3753
10 to 49	26.4***	33.2***	18.1	22.4	2960
50 to 249	27.7***	33.8***	18.5	20	1618
<b>Age Established</b>					
0 to 5 years	24.6	20	10	45.4	1170
6 to 10 years	23.1	24.9	14.8	37.2***	1690
11 to 20 years	19.4	23	12.5	45.2	2733
Over 20 years	19.6	22.7	13.5	44.3	5253
<b>Location</b>					
England	20	22.6	13	44.4	8924
Scotland	28.2***	25.3	9.8	36.7	1088
Wales	25.2***	27	11.9	35.9	389
Northern Ireland	30***	19.6	16	34.4	482
Rural	23.5***	22.8	12.5	41.1	3295
Urban	19.7	22.6	13.1	44.5	7562
<b>Management</b>					
Women-Led	21.8	18.5	11.1	48.7**	1585
Not women-led	20.9	23.5	13.1	42.5	8793
MEG-led	24.5**	24.3	11.7	39.6	490
Not Meg-led	21.2	22.8	12.8	43.2	9339
Family owned	20.9	22.7	12.8	43.6	7610
<b>Total</b>	20.9	22.8	12.9	43.4	10883

Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$ ; data for MEG-led are small numbers

### *Growth Orientation*

Table 4 presents turnover performance reported for the year prior to survey in 2019 and also the predictions for turnover growth performance for the next year and the actual performance of the panel survey during the following year (2020). Table 4 demonstrates that the SMEs with high and medium green priorities performed significantly ( $<.001$ ) better in terms of increased annual turnover to 2019 than their counterparts with lower level or no green priorities. The high priority green mission SMEs also demonstrated a significantly ( $<.001$ ) higher proportion expecting turnover growth in the next year. However, there was not significant difference in their actual performance during the year to the 2020 survey,



perhaps indicating that they were no more resilient to the pandemic's impacts on SME performance.

Employment size is typically very small across the weighted sample (average 2.06 employees) with the average number of employees slightly higher in the green mission SMEs: 2.86 in medium green priority, 2.69 in low priority, 2.49 in high priority, compared to just 1.21 in non-green mission SMEs. Green mission SMEs were significantly more likely to grow employment ( $<.05$ ), despite the onset of the pandemic, but non-green mission SMEs were more stable ( $<.05$ ).

**Table 4: SME Turnover Growth Performance by Green Mission, 2019 and 2020**  
(weighted column %)

	High	Medium	Low	No	Total	UB
<b>Turnover growth in year to 2019</b>						
Turnover Growth	31.4***	30.5***	26.6	26.7	28.6	3789
Stable	46.5	47.9	51	49.3	48.6	2050
Turnover decline	22.1	21.6	22.4	24	22.8	4551
<b>Turnover growth in year to 2020</b>						
Turnover Growth	14.5	12.9	17.4	14.3	14.4	860
Stable	23.2	27.1	27.8	26.1	26	1199
Turnover decline	62.3	60	54.8	59.6	59.6	2606
<b>Expectations of growth 2019-2020</b>						
Turnover Growth	41.8***	35.8	36.2	27.2	33.4	4276
Stable	43.8	50.2	49.7	55.8	51.2	4904
Turnover decline	14.4	14	14.1	17	15.4	1170
<b>Employment change 2019 to 2020</b>						
Increased employment	21.3	24.4	22.9	13.6*	19.1	1115
Same	66.1	63.9	66.2	78.4*	70.7	1905
Decreased employment	12.5	11.8	10.9	8	10.2	1713

Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$

### *Innovation*

The LSBS 2019 measures innovation in three ways depending on whether innovations introduced during the previous three years to the survey involved: (i) new or significantly improved good and/or services; (ii) new processes; (iii) were new to the market.

High priority green mission SMEs are significantly ( $<.001$ ) more likely to be innovative in terms of introducing new or improved goods, services and new processes than their less green mission priority counterparts. However, in terms of benchmarking their innovation as new to the market, they were not significantly more innovative. However, high priority green mission SMEs were significantly ( $<.001$ ) more likely to invest in R&D and receive tax

credits. It was not possible to derive any further evidence on their use of innovation vouchers, due to the small sample (n=12 in receipt of vouchers), indicating that the use of these for green innovation activities is very limited.

**Table 5: SME Innovation Level by Green Mission, 2019** (weighted column %)

	High	Medium	Low	No	Total	UB
New or sig improved goods/services last 3 years	17.8***	11.8	11.7	9.2	11.9	1917
New or sig improved services last 3 years	31.9***	28.1	23.8	19	24.4	2949
Goods/services new to market	32.4	23.2	24.5	28.4	27.7	1159
New processes	21.3***	17.6	13.5	11	15	797
R&D investment	20.4***	12.1	14.8	11.1	13.9	795
R&D tax credit receipt	3.8***	2.1	1.5	0.9	1.9	261

Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$ ; Introducing new processes in 2019 (J3) uses a one third cohort sample

### *Barriers and External support*

Table 6 demonstrates that green mission SMEs appear considerably more constrained by business barriers than their non green SME counterparts. Higher priority green mission SMEs appear to face significantly ( $<.001$ ) greater barriers with regard to accessing external finance and dealing with late payment, Brexit and Living Wage requirements. It is also evident that high and medium priority green mission SMEs face significantly ( $<.05$ ) more barriers with regard to the suitability of their premises, perhaps because their growth or suitable adoption of green practices are constrained (a potential constraint is with landlord ownership and green energy decision making). More generally, green mission businesses are also significantly ( $<.001$ ) more likely to face tax, staff recruitment and skills and regulatory barriers – again this might be due to their specialist skills and development needs.

**Table 6: SME Barriers Level by Green Mission, 2019** (Column %)

	High	Medium	Little	No	Total	UB
Finance	19.1***	22.6***	11.1	14.6	16.9	681
Tax	30.2	38	35.4	26***	30.7	1402
Staff recruitment/skills	24.9	26	29.2	14.8***	21.1	1406
Regulations	40.5	39.5	38.3	30.4***	35.4	1571
Suitable premises	18.2*	18.7*	15.4	14.4	16.2	648
Workplace pensions	11.7	14.5	14	9.4**	11.6	655
Late payment	38.9***	34.4	29.2	26.6	31.1	1295
Brexit	25.6***	20.8	25.2***	17.5	20.8	986
Living wage	17.1***	12.7	9.6	8	11.1	789

Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$

Table 7 offers mixed findings in respect to the use of external assistance by SME green mission status during the year prior to interview – which is restricted to data collected for England and Wales in 2019. Overall, high priority green mission SMEs were significantly ( $<.05$ ) less likely to use external assistance, whilst green mission SMEs were also less likely ( $<.05$ ) than their non green mission counterparts to use strategic advice. Closer examination of the reasons for seeking assistance indicates that green mission SMEs were significantly more likely ( $<.001$ ) to use financial management advice and also to use legal assistance ( $<.05$  for medium priority) and marketing ( $<.01$  for minor green priority).

**Table 7: SME External Assistance Used by Green Mission, 2019** (Column %)

External assistance	High	Medium	Little	No	Total	UB
Day to day info	25	32.8	37.5*	30.3	30.4	807
Strategic advice	23.3	25.7	16.8	28.5*	24.8	579
Both	30.7	32.5	31	24.5*	29	657
Neither	21*	8.7	14.7	16.6	15.7	299
<b>Reasons for assistance</b>						
Growth	23.7	23.2	21.4	21	22.3	589
Ext Finance	10.3	11.5	5	10.6	9.9	218
Financial Management	18.3	18.7	16.8	10.5***	15.6	426
Efficiency	12.8	9.1	15.6	11.3	11.8	310
Legal	6	10*	4.6	4	6.1	327
Marketing	8.1	10.2	17.9**	12.6	11.4	205
Regulations	5.1	5	6.9	8.1	6.3	188
Tax	8.5	12.6	14.4	13	11.8	254

Note: Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$ ; Questions only apply to England and Wales

### *External Finance*

Table 8 demonstrates that green mission SMEs are significantly more likely to use external finance than their counterparts with no green priorities. However, there is no evidence that they experience greater difficulties in accessing external finance.

Green mission SMEs, particularly those with high and medium priority green missions were significantly ( $<.001$ ) more likely to currently use external finance. This particularly related to bank overdrafts, as well as (to a slightly lesser extent) commercial mortgages, factoring, credit cards, grants, peer to peer loans and (less formally) from family and friends.

Higher priority (high and medium level) Green mission SMEs were also significantly ( $<.001$ ) more likely to have applied for external finance at least once during the last year, although high priority green mission SMEs were less likely ( $<.001$ ) to apply for bank loans.

Overall, the higher levels of use of a wide range of external finance by green mission SMEs, but not necessarily bank loans (by high green mission SMEs), may be indicative of the higher investment needs of green companies and also that bank loans are not as appropriate or available at competitive rates as other forms of finance such as P2P and leasing.

It is notable that detailed examination of the success rates for different types of finance is not possible given the survey sample size.

**Table 8: SME External Finance Application and Use Used by Green Mission, 2019**  
(Column %)

	High	Medium	Low	No	Total	UB
<b>Current External Finance Use</b>						
Use External Finance	56.5***	57.6***	50.8	47.8	52.5	7328
Bank Loan	9.5	10.8	10.7	6.7***	8.7	1762
Bank Overdraft	24.6***	25.7***	18.8	20	22.1	2979
Commercial mortgage	3.2	4.6***	2	1.7	2.7	751
Factoring	2.9***	1.9	1.5	1.4	1.8	617
Credit Cards	25.2	30.5***	24.8	23.7	25.7	3940
Grants	4.1***	3.1	3.3	1.4	2.6	631
Leasing	13.9	14.2	13.2	8.7***	11.6	2650
Family/friends loan	7.9***	5.3	5.3	3.1	4.9	471
Business Partner loan	9.5	9.8	10.9*	8.2	9.2	1325
Equity finance	1.4	0.8	2.3	1	1.2	246
P2P loan	1.4*	1.3	1	0.6	1	202
<b>Applied for Finance in last year</b>						
Yes- applied at least once	11.1***	10.9***	6.7	6.2	8.3	1423
Yes - applied more than once	3	2.6	1.2	1.6	2.1	453
<b>Type of finance applied for</b>						
Bank Overdraft	36.1	31.5	34.4	30.7	32.8	502
Bank loan	27.3***	39.2	32.3	46	37.3	538
Credit Cards	16.9	15.4	7.6	18.8	16.1	206
Grants	4.8	8.6	15.2	5.9	7.4	135
Leasing	12.4	14.6	18.3	9.8	12.8	369
<b>Application success</b>						
Obtained any finance	76.2	80.9	78.5	73.9	77.1	1151
Decision pending	10.1	10.1	8.6	13.6	11.1	130
No finance	13.7	9	12.9	12.5	11.8	142

Note: Note: \*<.05; \*\*<.01; \*\*\*<.001

## Energy Efficiency

Having explored the characteristics of green mission we now explore the second indicator of green SMEs in relation to their adoption of energy efficiency measures. A major caveat is that the data sample size relates to a one third cohort (Cohort A for both 2019 and 2020 survey waves), meaning that data relating to the reasons for energy efficiency actions taken and external financing are not robust.

It is notable that SME awareness of UK government energy efficiency schemes has increased between 2019 and 2020 (Table 9). However, even with the increased range of schemes in 2020, more than two-fifths (44.6%) of UK SMEs have no knowledge of these schemes. The most frequently mentioned ('best known') schemes in 2020 are the smart meter roll out (32.4%) and renewable heat scheme (24.5%), with the workplace electric vehicle charge point scheme introduced in 2020 also being known to almost one in five SMEs.

**Table 9: Awareness of UK Government SME Energy Efficiency Schemes, 2019 and 2020** (Cohort A, weighted for 2019 and 2020)

Col%	2019	UB	2020	UB
Energy Technology List	6.1	3486	8.7	1513
Enhanced Capital Allowance	11.8	3486	12.1	1513
Private Rented Sector Regs	12.2	3118	11.7	1513
Renewable Heat Incentive	23.6	3486	24.5	1513
Smart Meter Roll out	n/a	n/a	32.4	1513
Workplace EV charge scheme	n/a	n/a	19.6	1513
Not aware of any schemes	66.6	3486	44.6	1513

Note: One third cohort

Overall, one in seven (14%) UK SMEs had installed energy efficiency measures in 2019 (Table 10) and from this 2019 panel a further 6.1% had installed such measures in 2020. No significant difference was recorded in relation to business property ownership and energy efficiency installations in 2019.

Installation was significantly higher in 2019 ( $<.001$ ) and 2020 ( $<.05$ ) amongst high priority green mission SMEs. Notably, higher priority (high and medium) green mission SMEs were significantly ( $<.01$ ) more likely to have installed smart metres and low carbon heating systems (e.g. heat pumps). Furthermore, high priority green mission SMEs were significantly more likely to be influenced by climate change ( $<.001$ ) and less likely to be influenced by energy cost saving ( $<.05$ ) in installing energy efficiency devices. Notably,

installation of smart meters does not necessarily mean that green SMEs use them any more than non-green mission SMEs to be more efficient!

**Table 10: SME Energy Efficiency Actions by Green Mission, 2019 and 2020** (Cohort A weighting, Column %)

	High	Medium	Little	No	Total	UB
Installed energy efficiency measures 2019	25.9***	13.2	13.3	9.8	14	181
Installed energy efficiency measures 2020	10.2*	7.2	5.6	3.9	6.1	122
Planning to install low carbon heating system <sup>6</sup> in 2019	7.9	4.2	1.8	1.9	3.7	135
Already installed (by 2019)	8.3	5	2.5	5.1	5.4	218
Planning to install low carbon heating system in 2020	3.3	3.6	0	0.9	1.9	37
Already installed (by 2020)	8.9**	7.7**	1.1	3.6	5.3	89
Smart meters installed	40.5**	38.9**	29	28.8	33.9	794
Smart meters used	25.9	30.7	28.6	25.3	27.6	72
Rented property	61.4	55.2	50.4	61	58.1	693
Leased property	12.7	12.5	12	5.2	9.4	186
Owned property	23.5	31	35.2	32.3	30.8	475
<b>Main reason for action</b>						
Reduce energy costs	41.7*	72.4	54.2	64.1	57.8	98
Climate change	47.2***	25.9	24	3.1	25.9	35

Note: Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$ ; Note one third cohort

With regard to access to finance, in relation to installing energy efficiency measures, the data sample is small (Table 11, based on a one third survey cohort). It indicates no significant difference in the proportions of SMEs making external finance applications and success rates in 2019, when comparing installing energy efficiency measures or not in 2019. Further examination of innovation, turnover growth and use of external assistance revealed that SMEs installing energy efficiency measures were only significantly different ( $<.01$ ) with regard to being more innovative in introducing new and improved services. The turnover data suggests that SMEs installing energy efficiency measures were no more turnover growth oriented than their counterparts, but were less so subsequently (although not significantly), perhaps indicating an expected lag in the pay-back of such investment.

<sup>6</sup> LSBS question E12: Are you planning to install a low carbon heating system e.g. heat pumps, biomass, solar or thermal system in any of your premises in the next 12 months

**Table 11: External Finance Application and success rate where Energy Efficiency SME 2019** (cohort A weighting, Column %)

	Installed	Not Installed	Total	UB
Sought external finance	9.4	7.8	8	105
Application success	89.5	91.7	91.3	92
Turnover Growth 2019	30.8	29.4	29.6	331
Turnover Growth 2020	7.1	12.1	11.5	76
New or improved services	32.5**	21.8	23.2	233
Used external assistance	10.8	15.1	14.5	223

Note: Note: \* $<.05$ ; \*\* $<.01$ ; \*\*\* $<.001$ ; Note one third cohort

## 4. SUMMARY OF DESCRIPTIVE FINDINGS AND IMPLICATIONS

There has been an increase in green mission SMEs (in terms of having either a high or medium priority environmental mission status), rising from 32.9% in 2017 to 43.7% in 2019 (Table 1). Data here relate to the 2019 LSBS wave for green mission and the 2019 and 2020 LSBS waves for energy efficiency data. It should be noted that energy efficiency data is only drawn from a one third cohort sample in these two annual survey waves and is therefore less statistically robust (particularly in relation to assessing external financing). It is notable that the vast majority of UK SMEs remain profit driven over and above environmental motivations, suggesting on the one hand the potential attraction of the UK Government's green growth strategy, but also concerns about the UK SME population's understanding of the need for more sustainable business models (Owen et al, 2020).

### *Characteristics (T2, T3)*

Green mission is significantly ( $<.001$ ) related to activities in the production, construction, transport and retail sectors, larger SMEs (with 10-249 employees) and those established 6-10 years (suggesting a stage of business development where there is greater ability to self-fund or part-fund investment into green business activities) (T2).

High priority green mission SMEs were significantly ( $<.001$ ) more likely to be located in devolved nations and rural areas and ( $<.01$ ) more likely to be MEG-led and less likely to be women-led (T3).

### *Performance (T4)*

High and medium green mission SMEs were significantly ( $<.001$ ) more likely to have improved turnover and increased employment levels ( $<.05$ ), with high green mission SMEs more likely ( $<.001$ ) to forecast future turnover increase. However, Green mission SMEs were less stable in employment ( $<.05$ ) during the early Pandemic period (covered in the 2020 LSBS survey).

### *Innovation (T5)*

High green mission SMEs were significantly ( $<.001$ ) more innovative during the past 3 years for goods, services and processes (although not in introducing new to the market goods and services). High green missions SMEs were significantly ( $<.001$ ) more likely to invest in R&D and use R&D Tax Credits (although the use of these by UK SMEs remains low).

### *Barriers to business activities (T6)*

Higher (High and medium) level green mission SMEs appear significantly ( $<.001$ ) more constrained by financial issues and more generally those with a green mission were significantly ( $<.001$ ) constrained by regulations, recruitment and skills issues, tax, Brexit and premises ( $<.05$ ).

### *External Assistance (T7)*

High green mission SMEs use significantly ( $<.05$ ) less external assistance than their SME counterparts and green mission SMEs were less likely ( $<.05$ ) to use strategic advice in 2019. However, green mission SMEs were significantly ( $<.001$ ) more likely to require financial management assistance, with lower priority green mission SMEs also more likely to require legal ( $<.05$ ) and marketing services ( $<.01$ ).

### *External Finance (T8)*

Green mission SMEs exhibit significantly ( $<.001$ ) more use of external finance than their non green SME counterparts and a significantly wider range of types of finance (although data size is not sufficient for statistically robust findings for some forms of finance such as P2P).



Green mission SMEs are also more likely ( $<.001$ ) to be currently using bank loans, overdrafts and leasing finance for equipment and vehicles, with high green mission SMEs significantly ( $<.001$ ) more likely to use grant finance and informal finance from family and friends.

Higher level green mission SMEs were significantly more likely ( $<.001$ ) to apply for finance in 2019 than their SME counterparts, although high green mission SMEs were less likely ( $<.001$ ) to apply for bank loans, indicating their greater requirement for alternative types of finance (but not necessarily grant finance), or the lack of suitability of bank loans.

#### *Energy Efficiency (T9-11 – one third cohort 2019-2020 data)*

The level of awareness of SMEs rose between 2019 and 2020, but approaching half (44.6%) were still not aware of any government schemes in 2020. The most frequently mentioned government schemes were: Smart Meter Roll Out (32.4%), Renewable Heating Incentive (24.5%) and Workforce EV scheme (19.6%) (T9).

One in seven SMEs installed energy efficiency measures in 2019, with the LSBS 2019 panel SMEs increasing by a further 6.1% in 2020 (T10).

High green mission SMEs were significantly more likely to install in 2019 ( $<.001$ ) and in 2020 ( $<.05$ ) than their SME counterparts and they were more likely ( $<.05$ ) to have installed heat pumps in 2020. These high green mission SMEs were significantly ( $<.001$ ) more likely to install for climate change requirements and less likely ( $<.001$ ) to be persuaded to do so for cost savings (T10).

External financing for energy efficiency installation work is too small to provide useful data. However, there is a significant ( $<.01$ ) positive correlation between energy efficiency installation and innovation in new services. There are no signs of improved business performance, but such improvements may well be lagged (and too early capture in this survey) (T11).

Overall, as with other recent studies (e.g. British Business Bank, 2021) SMEs do appear to fall into categories which range from higher green mission, more proactive leaders and investors, to moderate/low green mission and laggard (less innovative) non green SMEs.

Following this initial descriptive analysis of the LSBS green mission and energy efficiency we now sought explore the relationship between green mission, and going green or becoming greener through energy efficiency actions, to seek out key business

characteristics and factors such as financing, external support and prior performance that contribute to SMEs ongoing green and sustainable performance. We sought to shed light on how this SME activity can contribute to the UK's potential green growth economy. The limited size and scale of the data required some consideration for 'stacking' the LSBS data across waves to create greater sample size and also required consideration for the added value of data linking to other data sets or the establishment of potential instrumental variables (e.g. UK regional renewable energy data) to offer improved context to the findings.

## **5. REGRESSION ANALYSIS: APPROACH**

Following the descriptive analysis of the data we performed a series of probit estimations investigating the relationship between a green status of an SME, external finance and a wide range of other observable characteristics, such as age, sector, profitability, exporting behaviour, etc. Specifically, we examined which characteristics are associated with a higher probability of an SME being green and with becoming greener over time. We also carried out exploratory analysis to test whether green SMEs demonstrate better financial performance over time.

We considered several alternative definitions of green SMEs – based on businesses declaring having green priorities or mission (2017 and 2019 waves) and according to whether they undertook any steps to increase their energy efficiency (2019 and 2020 waves). Table 12 summarises our definitions, sample sizes and time periods available for the analysis of each measure.

**Table 12: Definitions of green SMEs used in econometric analysis**

Green indicator	Definition	Period for the analysis	Sample size	Proportion of Green SMEs
Green Priority	High or medium priority of environmental problems (question D1)	2017, 2019	14,836	49%
Green Mission	Environmental goals are at least as important as financial ones (question D3)	2017, 2019	14,836	21%
Going Green	Increasing priority of environmental issues between 2019 and 2019 (question D1)	2017 - 2019	2,722	33%
Green Actions	Installing energy efficient measures in the 12 months before the survey (question E6A)	2019, 2020	2,763	15%
Green Actions, pure motive	Installing energy efficient measures in the 12 months before the survey, but not to comply with regulations (questions E6A and E6b2)	2019, 2020	2,763	14%

To increase the sample size, when a relevant question that allows identification of a green SME was asked in multiple waves, we pooled that data. For example, when considering the Green Priority and Green Mission definitions described above, we used observations from both 2017 and 2019 waves. If a business responded to both waves, we used the more recent observation. The same approach was used for the Green Action definitions and 2019-2020 waves. The analysis of business characteristics that are linked to becoming greener was carried out on a subsample of 2,722 businesses for which we had both the 2017 and 2019 observations. For each of the measures, we also considered subsamples of businesses with employees. Being green may be higher on their priority list and may potentially be seen as a way to unlock opportunities for growth. However, declaring a green mission and possibly taking some basic steps towards being greener may be less challenging when it is just one person running their business.

The exploratory analysis of the relationship between the green status and financial performance considered whether SMEs that were green in 2017 and/or 2019 were more likely to generate profits or experience higher turnover growth in 2020. The information necessary for this analysis was available for 4,947 SMEs.<sup>7</sup>

Our approach was, to a certain degree, limited by available data – the changes to the survey content and rotation of cohorts i.e. the fact that businesses get sampled into different cohorts over time and as a result are asked different sets of questions, complicates any longitudinal analysis and substantially reduces the sample sizes. We also note that our approach does not establish causality. In fact, if the green status has a strong impact on a particular explanatory variable (e.g., for the sake of the argument, green companies are much more likely to seek equity), the obtained estimates will represent a weighted average of the effect flowing both ways (with unknown weights). As a result, they may be less informative (and/or appear statistically insignificant when in fact the relationship is present). As we briefly mention in the methodology section, we do not believe that at this stage there is a strong ‘reverse’ link, partly because of the operational nature of the questions in the survey. However, further research using the Instrumental Variables techniques and data-linking to external business-level datasets may provide additional insights (potential instruments can include credit rating, target client group, stage of company evolution etc).<sup>8</sup>

## **Explanatory variables**

The key characteristics of interest included in each of the models were linked to current (at the time of the survey) and planned use of external finance – equity, government loans and grants, private loans and all other types, including credit cards and overdraft facilities. Additional observable characteristics we controlled for included:

- SME’s legal status
- Age (number of years SME established)

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<sup>7</sup> We consider this approach to be exploratory as it combines data observed at different points in time into one cross-sectional regressions. The outcome variable is from 2020 all other variables are from the 2017 and 2019 waves. Essentially, this is a longitudinal setup investigated using cross-sectional techniques. Even though additional controls for the time period were introduced, this method does not provide all the benefits of a full ‘panel’ analysis in accounting for e.g. variation in unobservable characteristics across businesses.

<sup>8</sup> We investigated the possibility of utilising additional datasets such as Beahurst. However, any data linking to add additional variables would require working with a de-anonimised version of LSBS (available through e.g. Secure Research Service at the ONS), while linking specifically to Beahurst is likely to result in a limited overlap between the samples.

- size (number of employees)
- sector<sup>9</sup>
- location
- whether they exported
- whether they generated profits and increased their turnover
- whether they had plans to grow
- whether they sought external advice
- whether they innovated i.e. introduced new products, services or processes
- whether they were women and/or minority-led
- whether the SME was family-owned
- whether they owned or rented their premises or worked from home
- and whether they provided any training to their employees.

To reflect the potential influence of regional context on SMEs decision to become green, we controlled for the relative prominence of green energy in each of the UK's regions. This was proxied as a ratio of installed renewable capacity in kWe to GVA.<sup>10</sup> An increase in installed capacity can be seen as a regional contribution to transitioning towards Net Zero. If the increase in capacity exceeds the growth in regional economic activity, this may indicate an increasing importance of the green sector in the region and stimulate further 'greening' of local SMEs. For example, if a new windfarm is built outside an industrial estate, businesses located there may become more environmentally conscious just from observing this development.

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<sup>9</sup> Models included controls for high-tech sectors as defined in Bakhshi, H., Davies, J., Freeman, A. and Higgs, P., 2015. The geography of the UK's creative and high-tech economies.

<sup>10</sup> [Regional Renewable Statistics - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/regional-renewable-statistics)

Table 13 presents summary statistics of key variables used in regression analysis.

**Table 13: Summary statistics for key explanatory variables: Percentages for categorical variables, mean and standard deviation for continuous variables**

	2017-2019 Sample	2019-2020 Sample
Number of observations	14,836	2,763
Use equity	2.20%	1.74%
Use government loans/grants	6.57%	29.21%
Use private loans	27.23%	24.97%
Use other external finance	56.72%	52.80%
Needed finance but did not apply	7.28%	8.65%
Not likely to apply for finance	50.19%	46.65%
Failed to secure any funding they sought	1.32%	0.72%
Generate profits	79.50%	73.18%
Exporter	12.20%	11.62%
Aim to grow	68.97%	74.74%
High-tech sector	10.51%	11.62%
Rural area	30.55%	30.73%
Women-led	15.09%	15.67%
Minority-led	4.46%	4.81%
Sought external advice	26.33%	25.41%
Introduced new product	17.40%	14.84%
Introduced new service	27.19%	25.52%
No training for employees (subsample)	35.29%	38.36%
Employment	21.45 (37.52)	20.52 (39.01)
Turnover growth	2.40% (25.60%)	-6.80% (40.55%)

We note that very few businesses are using equity (due to the nature of the population of the survey) and that there was a sharp increase in use of government grants and loans in the 2020 wave, most likely due to the Pandemic.

## 6. RESULTS FROM REGRESSION ANALYSIS

### *Green Priorities and Mission*

Table 14 presents estimated coefficients and marginal effects from the analysis of SMEs with Green Priorities and Green Mission. Models 1 and 1A show the effects on the estimated probability to have Green Priorities (for all SMEs and a subset of SMEs with employees respectively) while Models 2 and 2A show the estimates for having a Green Mission. The table presents both the coefficients as well as marginal effects – the estimated

impact on the probability of being green – so policy significance and statistical significance could be considered alongside each other.<sup>11</sup>

The results are broadly consistent across all four model specifications with some variation in significance and even direction of the effect for a few variables, including having submitted an application for a private loan. This is most likely driven by the noise typical for survey data on small businesses. We, therefore, focus on patterns that are consistently present across the models we considered.

Regarding sources of external finance, the results suggest **that using government loans and grants is strongly linked to being green**. Specifically, the predicted probability of being green for SMEs using such sources of funding increases from c. 40% to c. 50% for Green Priorities, and from c. 17% to c. 27% for having a Green Mission. This is equivalent to almost a 60% increase in the chances of having the latter. The most likely explanation for such a strong effect is the Net Zero agenda that is being promoted by the UK government: businesses' commitment and contribution to future Net Zero economy is often considered when providing support. Likewise, SMEs that are planning to apply for various forms of external funding (not necessarily government-backed) are also c. 5 - 10 percentage points (depending on the model specification) more likely to be green.

The analysis also provides evidence that **SMEs from rural areas and greener UK regions (measured as a ratio of renewable capacity to GVA) are more likely to be green**. A one standard deviation change in the ratio of kWe to GVA is linked to a c. three percentage points increase in the likelihood of having green priorities. To put this into context, one standard deviation of this measure is equivalent to the difference between the South West (which is very close to the 'average' region) and Wales – the second greenest region (after Scotland)<sup>12</sup>. As one would expect, the magnitude of this effect is fairly small, and this result does not provide a direct policy recommendation for increasing the number of green SMEs. However, this highlights the importance of local context and informational pressure as an additional channel boosting the green economy and poses an interesting **question for further research – is there a critical mass of green development in a region that**

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<sup>11</sup> For the purposes of keeping the paper concise, we report estimates only for the variables that were statistically significant in at least one of the model specifications. Full outputs are available on request. A small number of observations had to be omitted from each model in the cases when a particular rare combination of characteristics perfectly predicted the outcome. For example, when only a few companies said they did not know the answer to a particular question, e.g., whether they were women-led, and all of those companies were green/not green.

<sup>12</sup> Table A-1 in Annex A presents the ration of green capacity for GVA for UK regions.

would result in a rapid convergence of the regional economy to Net Zero. If it exists, what is it?

**Table 14: Regression results – Green Priority (Model 1) and Green Mission (Model 2)**

	Model 1 coef.	m.e.	Model 2 coef.	m.e.	Model 1A coef.	m.e.	Model 2A coef.	m.e.
<b>Types of external finance in use</b>								
Government grants/loans	0.297** (0.112)	0.110	0.329** (0.110)	0.092	0.213** (0.072)	0.080	0.284*** (0.074)	0.084
Other external finance	0.066 (0.047)	0.024	-0.060 (0.053)	-0.015	0.099** (0.037)	0.037	0.021 (0.041)	0.006
<b>Seeking external finance</b>								
<i>Likelihood to apply for external finance in the future, base: 'not at all likely'</i>								
Very likely	0.278** (0.107)	0.103	0.260* (0.112)	0.068	0.108 (0.069)	0.041	0.143 (0.075)	0.039
Fairly likely	0.268*** (0.079)	0.099	0.237** (0.090)	0.061	0.160** (0.058)	0.060	0.202** (0.062)	0.056
Not very likely	0.232*** (0.055)	0.086	0.186** (0.063)	0.047	0.119** (0.041)	0.045	0.106* (0.046)	0.028
Don't know	0.114 (0.154)		0.084 (0.143)		0.102 (0.108)		0.104 (0.117)	
<i>Applied for ...</i>								
Private loans	-0.110 (0.168)	-0.039	-0.354* (0.176)	-0.075	0.282** (0.106)	0.105	0.097 (0.112)	0.027
<i>Application outcome, base: 'Did not obtain any finance'</i>								
Obtained any finance	-0.095 (0.193)	-0.035	-0.388* (0.190)	-0.127	0.200 (0.150)	0.071	0.182 (0.170)	0.042
Decision pending	-0.289 (0.277)		-0.398 (0.313)		0.377 (0.213)		0.322 (0.226)	
Did not seek external finance	-0.245 (0.226)	-0.091	-0.619** (0.231)	-0.189	0.385* (0.169)	0.140	0.286 (0.191)	0.069
<b>Observable characteristics</b>								
<i>Firm age, base: '0-5 years'</i>								
6 - 10 years	0.086 (0.078)		0.136 (0.090)		-0.001 (0.067)		0.070 (0.074)	
11 - 20 years	0.059 (0.072)		0.102 (0.085)		-0.094 (0.062)		0.017 (0.068)	
More than 20 years	0.018 (0.070)	0.007	0.078 (0.080)	0.019	-0.174** (0.058)	-0.065	-0.103 (0.064)	-0.027
Number of employees	0.003*** (0.001)	0.001	0.002* (0.001)	0.000	0.002*** (0.000)	0.001	0.001 (0.001)	0.000
Generated profit	-0.049 (0.058)	-0.018	-0.163** (0.062)	-0.042	-0.072 (0.048)	-0.027	-0.125* (0.052)	-0.035
Aims to grow	0.106* (0.048)	0.038	0.126* (0.055)	0.031	0.055 (0.040)	0.021	-0.057 (0.045)	-0.015
Renewable capacity (kWe) per £m GVA in the region	0.003** (0.001)	0.001	0.001 (0.001)	0.031	0.003** (0.001)	0.001	0.002* (0.001)	0.0005
<i>Sector, base: ABCDEF - Production and construction</i>								
GHI - Transport retail and food service/ accommodation	-0.108 (0.068)		-0.033 (0.076)		0.002 (0.047)		0.059577 (0.052)	
JKLMN - Business services	-0.299*** (0.062)	-0.110	-0.162* (0.073)	-0.040	-0.391*** (0.051)	-0.147	-0.176** (0.057)	-0.045
PQRS - Other services	-0.357*** (0.075)	-0.131	-0.081 (0.083)	-0.021	-0.296*** (0.063)	-0.112	0.054 (0.067)	0.015
Rural	0.128** (0.047)	0.047	0.142** (0.054)	0.036	0.160*** (0.038)	0.060	0.061 (0.041)	0.016
Minority-led	0.187 (0.101)	0.069	0.255* (0.107)	0.070	0.054 (0.079)	0.020	0.197* (0.086)	0.057
Sought external advice	0.133* (0.054)	0.049	0.115 (0.059)	0.029	0.140*** (0.040)	0.052	0.110* (0.043)	0.030
<i>Innovation, introduced...</i>								
New product	0.132* (0.064)	0.049	0.018 (0.073)	0.004	0.157** (0.048)	0.059	0.087 (0.051)	0.024
New service	0.256*** (0.055)	0.095	0.294*** (0.062)	0.078	0.093* (0.043)	0.035	0.146** (0.046)	0.040
New process	0.133 (0.079)	0.049	0.054 (0.086)	0.014	0.160** (0.059)	0.060	0.055 (0.063)	0.015
Work from home premises	-0.124* (0.048)	-0.045	-0.040 (0.055)	-0.010	-0.008 (0.045)	-0.003	0.048 (0.050)	0.013
<i>Training for employees, base: no training</i>								
Yes - formal off the job					0.211*** (0.055)	0.080	0.137* (0.059)	0.036
Yes - informal on the job					0.193*** (0.056)	0.073	0.227*** (0.061)	0.062
Yes - Both					0.159*** (0.043)	0.060	0.196*** (0.048)	0.053
Constant	-0.374 (0.252)		-0.696** (0.261)		-0.831*** (0.196)		-1.572*** (0.224)	
Year indicators	Yes		Yes		Yes		Yes	
Observations	14,836		14,829		11,118		11,112	
Pseudo R-squared	0.059		0.049		0.057		0.043	
Log-likelihood	-9586		-6,722		-2,310		-1,701	

Robust standard errors in parentheses; \* p<0.05, \*\* p<0.01, \*\*\* p<0.001, weights applied.



The rest of the results in relation to observable characteristics are in line with the general idea that more ‘pro-active’, innovative business that care about growth and development of their staff are more likely to be green (on both considered measures). Specifically:

- Businesses with more employees are more likely to be green (a one standard deviation increase in employment is linked to c. 2.5 – 5 percentage points increase in the probability to be a green SME).
- Businesses that introduce new products or services are between 1.5 and 9 percentage points more likely to be green.
- Providing external training to staff is also linked with a five to eight percentage points increase in the probability of being green.
- Interestingly, minority-led employers were found to be more likely to have Green Priorities and Green Mission, possibly reflecting more progressive thinking (and different environmental cultural values) demonstrated by those SMEs.

#### *Going green and financial performance*

When looking at the changes in the level of SMEs’ greenness between 2017 and 2019, we did not find a stable link to external finance. We believe that this could be driven by a substantial reduction in available sample size, and as a result the low number of businesses in the sample that use or apply for each particular type of finance. Similarly, there were no clear consistent patterns among other observable characteristics. However, it is worth noting that there was a statistically significant relationship between a higher probability to become greener and our proxy for the greenness of UK regions (when looking at SME employers, table 15).

**Table 15: Characteristics linked to SMEs becoming greener over time**

	Model 3: Becoming greener		Model 3A: Becoming greener (SMEs with employees)	
	coef.	m.e.	coef.	m.e.
<b>Observable characteristics</b>				
Renewable capacity (KWE) per £m GVA in the region	-0.002 (0.002)	0.001	0.004* (0.002)	0.001
<i>Sector, base: ABCDEF - Production and construction</i>				
GHI - Transport retail and food service/ accommodation	0.077 (0.148)	0.080	0.243* (0.114)	0.080
JKLMN - Business services	-0.000 (0.144)		0.226 (0.123)	
PQRS - Other services	0.030 (0.183)	0.140	0.411** (0.151)	0.140
High tech sector	-0.299* (0.147)	-0.127	-0.406** (0.147)	-0.127
Observations	2,715		2,046	
Pseudo R-squared	0.032		0.046	
Log-likelihood	-1500		-418	
Robust standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001, weights applied.				

The results of our exploratory analysis of financial performance yield largely inconclusive results (partly driven by a smaller sample). **Green SMEs (as defined in 2017 and 2019) were found to be either as likely (or somewhat less likely) to generate profits in the 12 months before the 2020 survey, and experience either similar or lowers turnover growth compared to their non-green counterparts** (see Table 16; Models 4 and 4A). This suggests that currently following the green path does not provide financial benefits and may draw additional resources. The finding (in Table 14) that SMEs using government-backed finance are more likely to be green indicates that the policy is already addressing this issue, however this (Table 16) result highlights a **potential need for further financial support aimed at (and directly tied to) making the ‘green way’ more attractive financially**, since affecting the bottom line will always be one of the most effective ways to encourage a business owner to implement changes.

**Table 16: Estimates of the effect of being Green on future financial performance.**

(Models 4 and 4A)	Profits (probit, m.e.)	Turnover (OLS)	growth
Green Priorities	-0.067***	-0.064***	
Green Priorities with employees	-0.032*	0.000	
Green Mission	-0.085***	-0.050	
Green Mission with employees	-0.023	0.022	
Robust standard errors in parentheses; * $p < 0.05$ , ** $p < 0.01$ , *** $p < 0.001$ ; weights applied; marginal effects for probit estimations, coefficients for OLS			

### *Green actions*

Table 17 presents the results of our analysis of the relationship between external finance, various observable characteristics and businesses taking energy efficient actions – Models 5 and 5A are concerned with green actions with any motivation (for all SMEs and a subset of employers), while Models 6 and 6A tighten up the definition of green actions to exclude motivations related to meeting audit targets and complying with regulations.<sup>13</sup>

This analysis provided little evidence for the link between external finance and green actions. When considering the full sample, including SMEs without employees, we observed that businesses that were planning to apply for external finance (and those that did not know whether they would apply) were less likely to install energy efficiency measures compared to SMEs who were sure they did not need more finance. Those businesses that already applied for certain types of external finance (e.g. credit cards, access to overdraft facilities etc.) were also less likely to take green actions, possibly due to lack of resources.

**Other observable characteristics of businesses (not finance-related) linked to green actions included whether a business provided training to their staff (a c. 6 – 9 percentage point increase in the probability to install energy efficiency measures) and whether they owned or leased premises. SMEs with rented premises were on**

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<sup>13</sup> As with the results for Green Priority and Mission, we report estimates only for the variables that were statistically significant in at least one of the model specifications. Full outputs are available on request.

average c. 7 percentage points less likely to improve energy efficiency, reflecting lack of incentives or say in decisions to improve their premises.<sup>14</sup>

The lack of observed patterns could partly be explained by the fact that businesses had improved energy efficiency of their premises at some point in the past and therefore did not need to take any additional steps in the 12 months prior to the 2019 and 2020 surveys. To account for this, we replicated the analysis using a measure defined by question E11 – energy efficiency activities that were undertaken at any time prior to the survey. This additional analysis did not reveal any further patterns, possibly due to the narrow nature of the relevant survey questions – it largely focuses on particular interventions such as the Energy Savings Opportunity Scheme and the Renewable Heat Incentives.

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<sup>14</sup> We note that the result for leasing premises may be considered counterintuitive, since, just as when renting, the business may not have control over, for example, heating units. However, lease agreements are typically long-term and often grant additional rights, such as possession of the premises (including restricting access and making alterations). Perhaps this can generate enough incentives to insist on making energy efficiency improvements in the property.

**Table 17: Regression results – Green Actions and Green Actions with ‘pure intentions’**

	Model 5		Model 6		Model 5A		Model 6A	
	coef.	m.e.	coef.	m.e.	coef.	m.e.	coef.	m.e.
<b>Seeking external finance</b>								
<i>Likelihood to apply for external finance in the future, base: ‘not at all likely’</i>								
Very likely	-0.522*	-0.075	-0.561*	-0.076	-0.004	-0.001	-0.040	-0.008
	(0.219)		(0.223)		(0.171)		(0.176)	
Fairly likely	-0.438*		-0.445*		-0.079		-0.071	
	(0.205)		(0.212)		(0.136)		(0.140)	
Not very likely	-0.213		-0.218		0.035		0.006	
	(0.155)		(0.160)		(0.105)		(0.107)	
Don't know	-1.103***	-0.114	-1.075***	-0.109	-0.420	-0.070	-0.377	-0.061
	(0.311)		(0.318)		(0.277)		(0.295)	
<i>Applied for ...</i>								
Other external finance	-0.583*	-0.070	-0.613*	-0.069	-0.337	-0.060	-0.311	-0.052
	(0.280)		(0.291)		(0.206)		(0.209)	
<b>Observable characteristics</b>								
Generated profit	0.391*	0.057	0.372*	0.052	0.213	0.041	0.185	0.034
	(0.154)		(0.158)		(0.114)		(0.117)	
<i>Sector, base: ABCDEF - Production and construction</i>								
GHI - Transport retail and food service/ accommodation	-0.124	-0.025	-0.167	-0.032	0.305*	0.063	0.248	0.048
	(0.191)		(0.194)		(0.127)		(0.128)	
JKLMN - Business services	-0.276		-0.342		0.171		0.163	
	(0.200)		(0.196)		(0.130)		(0.133)	
PQRS - Other services	-0.583*	-0.091	-0.579*	-0.090	-0.042	-0.007	-0.057	-0.009
	(0.227)		(0.229)		(0.168)		(0.173)	
<i>Premises, base: rented</i>								
Owned by you or your business	0.223	0.042	0.176	0.032	0.219*	0.050	0.141	0.030
	(0.160)		(0.164)		(0.106)		(0.108)	
Leased	0.349*	0.070	0.261	0.049	0.329*	0.078	0.265	0.060
	(0.164)		(0.169)		(0.141)		(0.147)	
Home premises	-0.113	-0.018	-0.125	-0.019	-0.316*	-0.054	-0.357*	-0.059
	(0.155)		(0.157)		(0.154)		(0.154)	
<i>Training for employees, base: no training</i>								
Yes - formal off the job					0.315*	0.065	0.304*	0.060
					(0.145)		(0.144)	
Yes - Both					0.437**		0.375**	
					*	0.096	*	0.077
					(0.109)		(0.112)	
Constant	965.779***		991.693***		1041.184***		1159.045***	
	(264.461)		(272.507)		(241.797)		(239.240)	
Year indicators	Yes		Yes		Yes		Yes	
Observations	2,749		2,749		2,082		2,082	
Pseudo R-squared	0.126		0.129		0.084		0.080	
Log-likelihood	-846		-817		-251		-238	
Robust standard errors in parentheses; * p<0.05, ** p<0.01, *** p<0.001, weights applied								

## 7. CONCLUSIONS

The UK continues to pursue a *green growth* approach - outlined in its Clean Growth (HM Government Clean Growth Strategy, 2017) and Green Finance (HM Government Green Finance Strategy) strategies. These are based on the premise that there is an economic imperative for SMEs to go green and future proof their business models to achieve Net Zero.

This study explored the available data in the LSBS, focusing on more recent data from the 2017 to 2020 annual waves, in order to explore the relationship between external finance and going green, and the various related characteristics of SMEs that might also contribute to their going green to achieve Net Zero.

This study's main research question is:

- How does external finance, including different amounts and types (public supported schemes and grants, or private debt, equity) of finance, impact on the low carbon (energy efficiency), green growth of UK SMEs? (Referencing LSBS sections H and E)

Additionally, the following sub questions are investigated:

- How is SME green external financing related to SME skills and capabilities and use of external assistance? (Referencing also sections K and N)
- How is SME green financing related to sectors and location? (Referencing also sections A and J)
- How is SME green financing related to future business intentions (e.g., growth)? (Referencing also section R)

### Summary of key findings

Here we synthesise the main findings from our initial descriptive univariate analysis and succeeding six regression models (examining all SMEs and separately SME employers), designed to explore and better understand the relationships which exist between external finance, various business characteristics and related external influencing factors that determine going green.

## **Paucity of data and the need for improved national Green SME data sets**

Our first finding is the paucity of useful UK green SME data which is provided by the LSBS (and other UK SME surveys). Our findings are therefore constrained by an inability to gain a sufficient baseline of data for what green investment has taken place prior to the LSBS waves we examine. In this respect, the LSBS is currently limited to defining green SMEs by their green mission status, which is only captured biennially since 2017. Furthermore, the LSBS, presumably driven by an energy efficiency as a driver for economic growth imperative, limits the assessment of SMEs going green to a one third survey cohort for energy efficiency government programme awareness and adoption measures. Such limited data thus renders it impossible to undertake meaningful analysis of the different financing needs and activities of these businesses. The survey design seems at odds with a high (indeed, increasingly high) government policy priority!

**Recommendation 1:** Increase the size of survey and questions in relation to SME green missions, intentions and financing options to more fully explore their motivations and what can lead to more effective take-up of SME green activity – widening this to include innovative green business models and approaches and not just energy efficiency.

## **Developing a useful Green Taxonomy of SMEs**

The descriptive (univariate) analysis and supporting regression models highlight key differences between on the one hand the proactive green mission enterprises that are more likely to invest in going green or becoming greener (the already converted) and the non-green mission laggards. Green mission companies significantly ( $<.001$  significance level) tend to be larger SMEs (with 10 or more employees) and those established at least 6 years with ability to self, or part fund green investments and absorb the lag in green efficiency payback. Indeed, they are significantly ( $<.001$ ) more likely to be high priority green mission businesses which make changes to impact on Net Zero, rather than (at least initially) their bottom-line profit margins. These businesses are also significantly more likely ( $<.05$ ) to be rural, in devolved nations and from sectors which are either more heavily environmentally regulated (e.g. primary, construction, manufacturing, retail) or from cultural backgrounds which are more sympathetic with the environment.

Contrastingly, we find that the majority of UK SMEs (around three quarters) are profit driven – green laggards - that will more likely be motivated to make changes when they can see a clearer financial imperative for getting on board with ‘green growth’. In this respect there is some evidence that the tightening of the economy due to the onset of the Pandemic was

leading to both raised awareness of the need to go green, but a reduction in appetite and available (internal or external) finance for the laggard SMEs to invest in going green (findings supported in the SME Net Zero BBB, 2021 and BBB Small Business Finance report, 2022). These businesses may have reduced their appetite for investment, or switched to more immediate marketing requirements (such as increasing online services).

A final point of consideration is that the regression analysis found that businesses in rented premises were significantly less likely to take green efficiency measures, probably because this was in the control of landlords.

From an external financing perspective, there is strong regression evidence that government grants and loans are associated with going green and can tip the balance and that, despite the availability of relatively 'cheap' business loan finance (current interest rates may be below inflation rates), going green or becoming green appears to involve a wide range of external financing and less so private bank lending. Cowling and Lui, 2021) previously associated this with government funding potentially crowding out private bank lending. However, the evidence here is of a search for cheaper funding that might tip the balance in favour of green investing – given the perceived and actual lag in performance and payback.

**Recommendation 2:** Fundamentally, the UK government needs to develop appropriate incentive financial support mechanisms to encourage going green, particularly for laggard SMEs. This may come in the form of grants, soft loans with low interest and repayment holidays, or other forms of inducement such as improved energy feeder tariffs, green R&D tax credits etc.

**Recommendation 3:** To address the *prisoner* effect of SMEs in rented accommodation, government should give greater attention to landlord incentives and aggregating schemes to incentivise landlords and SMEs to work together to achieve green solutions (Owen, 2021).

### **Improved SME National Going Green Awareness**

Perhaps the most positive aspect of our LSBS findings is that awareness of government programmes is increasing. More than half (55%) of UK SMEs know about UK SME energy efficiency related programmes and there is take up of these services. To some extent this indicates that going green is becoming more attractive, and the current rise in energy prices will only underline the strength of this message.



However, there is clearly a lot more required from UK government policy to engage with SMEs – as many remain green laggard businesses. SMEs do not have any mandatory environmental (or social or governance) reporting - to develop their awareness and actions to develop a Net Zero green and sustainable economy. Thus, whilst we find that high priority green mission businesses are not seeking external advice, they are already the converted – the advice and support is required for the remainder of SMEs.

**Recommendation 4:** An improved and coherent national programme of SME Net Zero awareness, with support and advice for SMEs to becoming Net Zero is required. The small number of SMEs (c. 3,000) that have signed up for the BEIS SME Climate Hub and its lack of connectivity with DEFRA's Handbook on Nature Impact and the relationship between Net Zero and preservation of natural capital and biodiversity (see Central Bankers Biodiversity report, 2022) clearly demonstrates a big gap in the green growth strategy aims and its implementation. There is a need for SME Net Zero champions to offer role models and mentoring to the SME sector as beacons for the way forward and to ensure that this coverage goes beyond the rural and more advanced regions and sectors which are already more aware of environmental matters and the value of going green.

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## ANNEX A: REGIONAL RENEWABLE ENERGY

**Table A-1: Ratio of renewable energy capacity to GVA (kWe/ £million), UK regions**

Region	2017	2018	2019	2020	Δ 2017 - 2019
<b>England</b>	<b>16.92</b>	<b>17.78</b>	<b>17.90</b>	<b>17.69</b>	<b>0.97</b>
East Midlands	26.99	26.59	25.41	24.38	- 1.58
East of England	33.96	35.21	33.84	36.35	- 0.12
North East	21.06	29.15	28.31	27.99	7.25
North West	18.68	20.21	19.16	18.68	0.48
London	0.98	0.96	0.98	0.96	0.00
South East	15.29	15.82	15.29	14.75	0.00
South West	30.37	29.68	27.94	27.38	- 2.42
West Midlands	9.22	8.90	8.37	8.22	- 0.85
Yorkshire and the Humber	36.32	41.74	50.60	48.92	14.29
<b>Northern Ireland</b>	<b>41.82</b>	<b>45.46</b>	<b>43.77</b>	<b>44.06</b>	<b>1.95</b>
<b>Scotland</b>	<b>74.47</b>	<b>79.23</b>	<b>82.55</b>	<b>80.04</b>	<b>8.09</b>
<b>Wales</b>	<b>53.61</b>	<b>53.85</b>	<b>53.99</b>	<b>53.46</b>	<b>0.38</b>
<b>UK average</b>	<b>22.94</b>	<b>24.12</b>	<b>24.36</b>	<b>23.95</b>	<b>1.43</b>
<b>st. dev.</b>	19.23	20.28	21.53	21.05	4.77

Note: data from dark columns used in analysis, 2018 and 2020 data for context.

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