

Why & how energy efficiency policy should address SMEs

Maximum 4,500 words

Abstract

The 2018 IPCC report states that all sectors of the economy, and actors at all scales from individuals to governments, must take urgent action to reduce greenhouse gas emissions. Small and medium enterprises (SMEs) are important actors whose use of energy, and potential for energy and carbon savings, are largely overlooked by current efficiency policy in the UK and EU. Using theory, empirical evidence and policy analysis, this paper sets out the case for increased policy focus on SMEs, and proposes ways forward. SMEs account for more than half of industrial and commercial energy use, however, the details of their energy use and the potential for savings is poorly understood. While energy end-uses are similar to those in larger enterprises, SMEs' capacity for paying attention to energy and responding to policy are different, as are their decision-making processes. Designing and delivering effective policy for this heterogeneous group will require strategic segmentation and targeted interventions, in turn demanding improved data. We set out a research agenda to address deficiencies in data and evidence, and propose a series of options for policy makers.

Key words:

SMEs; organisations; policy; energy efficiency; EU; UK

1. Introduction

In October 2018 the Intergovernmental Panel on Climate Change (IPCC) reported on the scientific evidence for the likely effects of 1.5°C warming, and identified mitigation pathways to keep average global temperature rise below this level (IPCC, 2018). This report was written in response to the Paris

Agreement of 2015, with its ambitious aim to restrict average global temperature rise to 1.5C (UNFCCC, 2015). The IPCC report made headlines around the world with its vivid warnings of the dangers of increasing climate change, and calls for “rapid, far-reaching and unprecedented changes in all aspects of society”.

This paper focuses on one specific sector of society – small and medium enterprises (SMEs) – and the potential for reducing their climate change impacts. While SMEs are often celebrated for producing innovative low carbon products and services which will help to accelerate the low carbon transition, their collective energy use and carbon emissions are often overlooked. This paper identifies potential approaches and opportunities for SME energy efficiency policy, and makes the case that more attention and action is required. The arguments will be supported by evidence primarily from energy use and energy policy in the EU and the UK.

Collectively SMEs are significant users of energy: according to the International Energy Agency they consume more than 13% of total global energy (IEA, 2015), and account for more than half the energy in the industrial and commercial sectors in some countries, including the UK (DECC, 2015). They are currently under-researched in terms of their energy use, the potential for savings, and their energy-related decision-making (Banks et al., 2012; Rawlings et al., 2014). In addition, their energy use is less a focus of policy than that in larger organisations (Hampton and Fawcett, 2017; ODYSSEE-MURE, 2015).

The paper is structured as follows. The following section makes the argument that SMEs should be better addressed by energy efficiency policy, by outlining their distinctive characteristics, the significant potential for energy savings, and the current gaps in policy. Section 3 sets out a new research agenda, to be pursued jointly between academic researchers, policy professionals, national statistical agencies and regional level practitioner-networks. Section 4 identifies three starting points for policy makers, including adopting an experimental and adaptive approach to interventions, making better use of existing structures and experience, and pursuing policies which go beyond efficiency.

The final section summarises our key proposals, concluding that there is a strong case for developing energy efficiency policy focused on SMEs, and that research evidence offers ideas on how such policy should be designed and implemented.

2. Why SMEs should be addressed by energy efficiency policy

This section presents evidence about SMEs, their place in economic life, their distinctive characteristics, energy use and energy efficiency potential. Focusing on the EU and the UK specifically, it demonstrates the lack of energy efficiency policy affecting SMEs.

2.1. What are SMEs?

Small and medium enterprises are defined by the OECD as non-subsidiary, independent companies that employ less than a given number of employees. This number varies across countries: in New Zealand the upper limit is 20, in the EU 250 employees, in the US 500, and in China 1000 (IEA, 2015). Most countries also sub-divide the SME category into various sizes - typically non-employing, micro, small and medium enterprises - and different categories are used for varying data collection and policy purposes. Globally SMEs constitute around 99% of all enterprises (IEA, 2015). In both the EU and the UK, they make up 99.8% of businesses (BEIS, 2018; Eurostat, 2017).

There are over 23 million SMEs in the EU, and 5.7 million in the UK (which compares with just 7,500 large firms) (BEIS, 2018; Eurostat, 2017). In 2012, SMEs accounted for between 53% and 70% of employment in EU member states, and SMEs collectively accounted for 57% of the global value added in the non-financial business economy across the EU (Eurostat, 2015). The UK is fairly typical of EU countries, with SMEs accounting for 60% of employment and 52% of private sector turnover (BEIS, 2018). Turnover here is defined as the value of sales, work done and services rendered - it excludes VAT. SMEs are extremely diverse: they are active in almost every business area, occupy the full range of property types, and range from service providers with no business premises, to manufacturing businesses operating across multiple sites.

2.2. SMEs as organisations with distinctive characteristics

SMEs are considered to be collectively different from larger organisations beyond simply their size. The distinction between SMEs and larger business organisations is already made in many aspects of business policy and regulation within the EU and its member states. For example, in the UK, specific policy and funding is directed at small businesses and SMEs for encouraging new business creation and growth of existing business (Ward and Rhodes, 2014) and about 40% of the European Regional Development Fund expenditure in England 2014 to 2020 is on competitiveness support for SMEs (DCLG, 2015).

In the context of the transition to a low carbon economy, Vickers et al. (2009) identify a number of reasons why SMEs warrant differentiated policy approaches. These include: limited resources and access to skills and knowledge; organisational cultures dominated by the owner-manager; low levels of awareness of and a reluctance to access advice and support. Echoing these findings, a rapid evidence assessment of OECD literature on energy-related decision by organisations (Banks et al., 2012) found that organisation size, sector and sub-sector are influential on energy-related decisions, although in a complex way because size and sector interact. Two findings which are particularly relevant to SMEs, regardless of sector, are:

- Individual beliefs and values will be particularly important in SMEs, where management functions are concentrated on one single or very few individuals.
- Smaller organisations will tend to have less time and technical skills to consider energy efficiency opportunities, to sift and process relevant information.

This second point is widely recognised by policy makers at EU and national level, and processes are in place at the EU level to identify possible exemptions or lighter requirements for smaller enterprises (European Commission, 2011). However, the first has been largely ignored by policy-makers to date and represents an opportunity for further intervention.

2.3. Energy use and energy savings potential

Collectively SMEs are significant users of energy. According to an estimate from the International Energy Agency, they consume more than 13% of total global energy (IEA, 2015). However, there is limited information on the energy consumption of SMEs as a proportion of national or industrial and/or commercial energy usage. Nationally, the most comprehensive data probably come from Australia, where figures for use of energy by fuel are available by business size. In 2014-15, the proportion of business electricity used by firms with less than 200 employees was 29% of the total, and for natural gas the figure was 27% (ABS, 2016). The USA produces figures for manufacturing energy use by business size: in 2010, 57% of energy was used by SMEs (EIA, 2013). However, for the commercial sector, energy use is recorded in terms of buildings and number of occupants rather than by business size (EIA, 2016). Thus, it is not possible to have a complete picture of energy use by SMEs across the American business sector. In the UK, the government estimates that in 2016, 55% of all business energy was used by SMEs - with 34% used in small and micro businesses, and 20% in medium sized businesses. For energy used in buildings (i.e. not including process energy use), 42% is used by SMEs (BEIS, 2017). In other European countries, figures for energy use by SMEs are not generally available and some of the estimates published are of uncertain origin. For example, the figure of Italian manufacturing SMEs' energy demand being 70% of the total industrial sector energy quoted by IEA (2015) was based on one estimate of 'over 60%' (Trianni and Cagno, 2011).

With respect to energy efficiency potential in SMEs, the IEA (2015) brings together various estimates of cost-effective measures which equate to 10 - 30% of current energy use. Research for the UK government reports 'conservative' potential savings of 18-25% for SMEs (DECC, 2014), suggesting a similar range of savings. Of these savings, 37% would require zero capital investment (DECC 2014). These figures suggest there is significant potential for energy demand reduction.

2.4. The policy gap

For countries which are member states of the EU, efficiency policy is set at both EU and national (and sub-national) levels. The majority of policy either covers organisations of all sizes, or focuses on larger organisations. While there is some policy targeted at SMEs, this is a minor component of the whole.

EU policy sets efficiency requirements for organisations of all sizes. These include product efficiency standards and labelling for lighting, appliances, boilers, motors and other end-use equipment (Ecodesign Directive - 2009/125/EC), minimum efficiency standards for new buildings and building energy labelling (Energy Performance of Buildings Directive - 2010/31/EU). Overall, the Energy Efficiency Directive (EED - 2012/27/EU) sets binding national energy efficiency targets up to 2020. In addition, energy efficiency or energy saving policy which focuses only on larger organisations includes the requirement for energy audits by high energy users (Article 8 of the Energy Efficiency Directive) and involvement in the EU Emissions Trading Scheme.

The EU funds various small-scale programmes of information, advice and financial incentives for SMEs through the European Regional Development Fund (DCLG, 2015). Projects are typically designed and delivered at the municipal scale. In England, these are organised according to the complex and overlapping geographical boundaries of Local Enterprise Partnerships. £125m has so far been awarded to projects under the 2014-20 programme, focused exclusively on assisting SMEs to implement energy efficient measures through grants, loans and the provision of free audits (MHCLG and BEIS, 2019).

Policy in a number of important areas is developed at national level, particularly that related to energy and carbon taxation. In the UK, several significant policies apply only to larger organisations, notably the Climate Change Levy (a tax on energy consumption, from which exemptions are possible), Climate Change Agreements (voluntary agreement routes to exemption from the Climate Change Levy) and the CRC Energy Efficiency Scheme (taxes to improve energy efficiency and cut emissions in large public and private sector organisations). This lack of focus on SMEs has continued in the UK's 'Clean Growth Strategy', which sets out the government's approach to meeting its carbon budgets in the period 2023-2032 (BEIS, 2017). The Strategy has little to say about SMEs as energy consumers, beyond promising

a consultation on how to improve the provision of efficiency advice and information (BEIS 2017:66). This pattern is seen in other EU countries: a compilation of energy saving policies in eight EU countries showed that of 113 listed, only two were specifically focused on SMEs (ENSPOL, 2015)

This lack of policy focus on SMEs leads to low expectations of energy and carbon savings from the sector. This is demonstrated in member state reports on policy measures to meet energy savings targets required by the Energy Efficiency Directive (Article 7). For example, the UK's calculation of expected energy savings from non-domestic energy efficiency policies includes no specific contribution from SMEs (HM Government, 2016) – which is striking given the government's estimate that over half of business energy is used by this sector. Setting aside estimated savings from building regulations, which are considered to be much too high and based on flawed analysis (CES, 2015; ENSPOL, 2015), by far the majority of savings were expected from large organisations (84%), with the remaining 16% from all sizes of organisation. The UK government has not systematically calculated energy savings associated with ERDF-funded SME programmes, nor submitted them in their Article 7 report to the European Commission, so they are not included in this analysis.

3. A new research agenda

Designing policy to increase energy efficiency in SMEs is a major challenge (Bröckl et al., 2014; IEA, 2015; Thollander et al., 2015). In order to create effective policy, governments would ideally know where, why and how much energy is used by SMEs. They would also understand how decisions regarding energy are made by SMEs, so that the right policy instruments and policy mix could be adopted. Thus, we propose the following three areas as priorities for research:

3.1. Improved information on SME energy use:

Most OECD countries do not hold the kinds of data which allow insights into how much energy SMEs use, let alone have sufficiently detailed data to support targeted SME energy efficiency policy. Within

a strategic approach to addressing data gaps, basic data collection needs to be instigated, more detailed data collection priorities agreed, and better use must be made of existing data sources.

Firstly, researchers should work with national statistics agencies to ensure that methods for gathering data on business energy use include business size. The data gathering protocols from Australia, and in the US manufacturing sector may prove good starting points, as will experience from the UK which is trying to improve its SME data (DECC, 2015).

Secondly, evidence on the important parameters influencing energy use should be reviewed, and an enhanced data collection strategy devised. SMEs of similar sizes vary significantly in when, how much, and for what purposes energy is used. These differences can be influenced by business sector, location (e.g. urban vs rural), building type, energy source and business growth rate. Detailed research also shows other factors which influence use of energy. For example, Janda et al. (2014) divide commercial sector organisations into those which are tenants, owner-occupiers or landlords, and show this distinction is important in terms of the capabilities that organisations have to make changes in building-related energy consumption. There are also major differences between SMEs who are 'data rich' or 'data poor', which also determines organisations' capacity to manage and reduce energy use. The Australian Energy Efficiency Council (EEC, 2017) categorises SMEs in three dimensions: on a scale of high to low energy intensity; homogenous to heterogeneous energy using activities; and managerial motivation from satisficing to optimising. Data collection may need to vary by sector, to give effective insights and to highlight intervention opportunities.

Thirdly, research is required to collate existing sources of data, and identify when, how and by whom data is gathered on an ongoing basis. For example, there is a wealth of data generated by myriad SME focused energy efficiency initiatives and projects implemented at the local and regional scales, but this is under-used. The case of European Regional Development Funded SME efficiency projects in the UK is illustrative. Each of the 42 projects in England report their impacts to central government using metrics such as carbon emissions saved and number of enterprises supported to reduce energy

consumption, requiring projects to collect energy consumption data. Further, each project is required to commission independent evaluators to conduct qualitative research and surveys of beneficiaries. This is not extrapolated to make broader generalisations about SME energy use, nor used to inform policy.

3.2. Assessment of energy efficiency opportunities:

Energy efficiency opportunities are constantly in flux. As technologies and their costs, energy sources, energy costs, ways of using energy and demand for energy services change, so too do the opportunities for efficiency and productivity improvements. New technologies and falling costs can deliver new efficiency opportunities - as in the case of LED lighting which has become substantially less costly to produce and install in recent years (Bhardwaj et al., 2017). In addition, the ways in which potential investments are evaluated, which costs and benefits are included and how they are framed, affects whether they are considered worthwhile (economic) opportunities (Killip et al., 2019).

The challenge for research is firstly to ensure that when efficiency opportunities are described, to also explain how they are identified and calculated. A consistent estimation method, used by researchers, consultants, civil servants and others, would help direct attention to particular commercial or industrial sectors, end-uses, management systems and/or behaviours or routines, as well as to opportunities for policy to support change. Adoption of a standard method, or set of methods, for assessing efficiency opportunities would be beneficial to national and international policy making.

3.3. Understanding how SMEs make energy-related decisions:

There has been relatively little research on how energy use and the potential for change in organisations should be conceptualised, and this is a topic in need of further work.

There is considerable evidence showing that measures representing high rates of return, or those requiring zero capital investment, are often not taken by SMEs (Mallaburn, 2016; Parker et al., 2009; Revell and Blackburn, 2007). The dominant approach to addressing the problem of the SME 'energy

efficiency gap’ has been to identify a range of barriers, hidden or otherwise, which lead them to miss, or pass up, opportunities for energy and financial savings (e.g. DECC, 2014; Henriques and Catarino, 2016). While this approach acknowledges the ‘bounded rationality’ of SMEs’ decision-making processes, it has been criticised for being over-simplistic. For energy efficiency investments, the focus tends to be at the point of investment only, rather than acknowledging the importance of the preceding period of problem definition and search for solutions which lead to an investment choice (Cooremans, 2012). More broadly still it fails to fully account for the influence of material, social, cultural and regulatory domains which frame decision practices (Banks et al. 2012). Detailed ethnographic studies have demonstrated the importance of SME owners’ and managers’ personal values in relation to environmental decision-making (Williams and Schaefer, 2013); and how energy management practices are influenced by organisational cultures, team dynamics and the aspirations of individuals (Hampton, 2018a).

A more complex understanding of SMEs, as organisations operating in a socio-technical landscape, and with varied capabilities, objectives and values, offers better insights for understanding decision-making around energy and thus more effective policy design. This is particularly the case given increased media coverage of climate change (University of Colorado, 2018) and rising public concern. For example, a 2019 UK opinion poll showed that the proportion of people “very concerned” about climate change has jumped to a record 52 per cent, up from just 18 per cent five years ago (Cecil, 2019). SMEs’ willingness and capacity to take pro-environmental action may be changing, and new policies would need to take that into account. At the same time, there is a practical limit to how responsive and nuanced policy can be – too much complexity can be counterproductive. The following section considers how a more complex conceptualisation of SMEs could be brought into real-world policy development and implementation.

4. Starting points for policy design

The previous section set out a research agenda for improving information and evidence on SMEs and energy efficiency. Besides pursuing this, this section describes three ways in which policy professionals can begin to address the deficiencies in SME policy design.

4.1. Policy trials

The idea of trialling policy fits particularly well with SMEs, given the diversity of organisations and the importance of segmentation in delivering successful interventions. Accepting that business size alone is an insufficient basis from which to develop policy, there are a number of additional parameters, such as sector, location, tenancy status or data availability, which may allow policy makers to target and test interventions. For example, a policy trial to encourage SMEs to improve the energy efficiency of their buildings would best be targeted at SMEs who own their premises. Policy can be designed for and trialled in one sub-sector, and then adapted and replicated more broadly. The aim would be to distinguish where targeting and use of additional parameters enhances policy design and delivery – bearing in mind the risks of over-complicating policy interventions. When accompanied by well-designed, independent evaluations, trials can help by adding data to the evidence base, or highlight key gaps in knowledge.

There are many possible designs of policy trials – here we briefly outline one possibility as an example. Building on work highlighting the importance of data availability (Janda et al., 2014), a trial could be designed alongside the deployment of smart meters, which at the time of writing (August 2019), is incomplete for European SMEs. It could compare the effect of data availability on the uptake of energy efficiency opportunities such as LED lighting, or building fabric upgrades. Such a trial may select as its focus SMEs employing between 5 and 50 staff and registered as retail businesses. Working in tandem with electricity suppliers who are responsible for smart meter installations, the trial could compare a control group of businesses with smart meters, with those yet to receive them. Such a trial would include an evaluation study, to not only capture insights into decision making processes amongst small

retail SMEs, but to also gather additional data on end-use practices, management structures and tenancy status.

4.2. Building from existing institutions

When it comes to SME-specific policies of all kinds, including the promotion of jobs, innovation and skills, top-down, one-size-fits all policies are ineffective, and thankfully uncommon. The dominant approach to SME policy development recognises that business owner-managers are most likely to seek advice from local, trusted sources including other business leaders, local coaches and accountants (Open University, 2013). The result is that the implementation of policy for SMEs is devolved to levels of governance at the regional level, often through support networks and organisations working in partnership with local authorities, universities and other major local institutions. Regional support networks include for example: Growth Hubs in England, Business Gateway offices operating across Scotland, and *Zones de revitalisation urbaine and rurale* in France.

Business-focussed SME policy is not problem-free however. A review of UK business support initiatives for SMEs showed a ‘mixed level of success’ (Blackburn, 2012) and there have been calls for changes in provision of business advice to make it more effective (Eadson, 2014). Nevertheless, these existing delivery routes offer an opportunity for energy efficiency policy intervention, and it has been proposed elsewhere that the UK’s range of local SME business support offerings could be combined with a national brand for energy efficiency support for SMEs (Hampton, 2018b).

Working with and through existing institutions offering SME support makes sense as a means for experimenting with different segmentation approaches as outlined above. In the UK, the various regional grants for energy efficiency measures tend to target the SME population as a whole, with correspondingly broad marketing strategies. Designing more focused grant programmes may deliver more effective outcomes. For instance, a grant focused on manufacturing SMEs in a city-region such as Sheffield, South Yorkshire, with its strong industrial legacy, might further narrow its focus on

businesses occupying light-industrial premises of similar architectural design and provenance. This would enable energy auditors to identify generalisable opportunities for efficiency investments associated with similar production processes and building types, and perhaps arrange discounts from suppliers on behalf of a number of SMEs. In terms of maximising energy savings, this approach compares favourably to the commonplace design of efficiency programmes, which typically fund auditors to visit a diverse range of businesses occupying an equally diverse range of buildings (see, for instance *Low Carbon Workspaces*, cited in Hampton, 2018c).

4.3. Moving beyond efficiency: using a values-based approach to engage SMEs on energy and climate change

Given their number, diversity and the proportion of the labour force that they employ, SMEs both reflect and help to construct societal discourse in relation to environmental issues. Whereas the dominant narrative remains focused on business growth, productivity and employment, some researchers have observed a gradual increase in the degree to which climate change, energy conservation and environmental pollution have come to influence everyday practices in SMEs (Revell et al., 2010; North and Nurse, 2014; North, 2016; Hampton, 2018a). The substantial recent increase in public concern and discourse related to such issues (section 3.3), suggests that environmental issues are more salient for SMEs than ever before. It is no longer acceptable to avoid talking about climate change with SMEs. Conventional economic arguments used by policy makers, energy auditors and other intermediaries to motivate action on energy efficiency in SMEs must be supplemented with more ambitious and creative approaches.

These ideas are being developed and tested by developing a toolkit which seeks to empower and enable SME intermediaries to engage SMEs in more meaningful discussions around environmental ethics and responsibility (Hampton et al., 2019). Drawing on Schwartz' Theory of Basic Human Values (Schwartz, 2012), the toolkit equips business advisors and staff working within SMEs to use language and develop arguments which correspond with the values and strategic priorities of different

businesses. Engaging at a deeper, more emotive level expands the nature of what can be discussed. Whereas economic cost-benefit arguments focus on doing *more* (manufacturing, service provision) *with less* (energy, resources), values-based approaches may lead to conversations about the *purpose* of trade and the nature of what is sufficient when it comes to business growth. The approaches advocated by the toolkit require sensitivity and agility on behalf of advisors and internal staff, they no doubt increase the chances of an SME making genuine and lasting change with respect to reducing its environmental impact.

5. Conclusions and policy implications

This article has highlighted the need for substantially more energy policy focus on SMEs. They are largely overlooked by energy policy, and thus do not benefit from energy saving opportunities or contribute sufficiently to carbon emissions reduction.

To enable a focus on SMEs, policy makers must be supported by better data and evidence, which in turn demands a more comprehensive approach to research. A new agenda for research begins with systematic improvements in data gathering and the production of evidence. It also highlights the limitations of conventional approaches to assessing the potential for energy saving, as well as energy related decision-making processes. Developing insights beyond the assumption of economic rationality, to acknowledge the complex internal processes and various external influences on SMEs, will enable more effective, efficient and equitable policy design.

Even with a better evidence base, designing energy policy specifically for SMEs will remain difficult. To enable better policy making, three approaches are suggested: policy trials, building from existing institutions and moving beyond efficiency, specifically using a values-based approach to engage SMEs on energy and climate change. The increase in public discourse and concern for the climate emergency represents an opportunity for policy makers to seek more innovative and ambitious approaches to developing SME energy policies.

The challenge is considerable, but so is the prize – significant and long-lasting energy and carbon savings from this vital part of the economy.

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