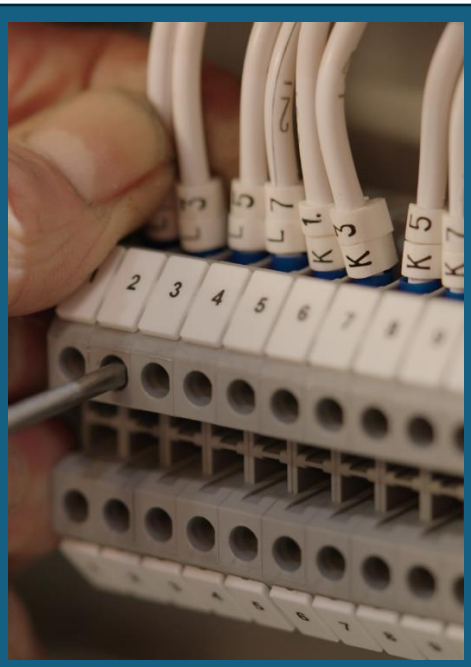
beama
The trade association for energy infrastructure & systems

#ACCELERATING ELECTRIFICATION

BEAMA Industrial Strategy White Paper

How support for the electricity products manufacturing sector can achieve decarbonisation and industrial growth

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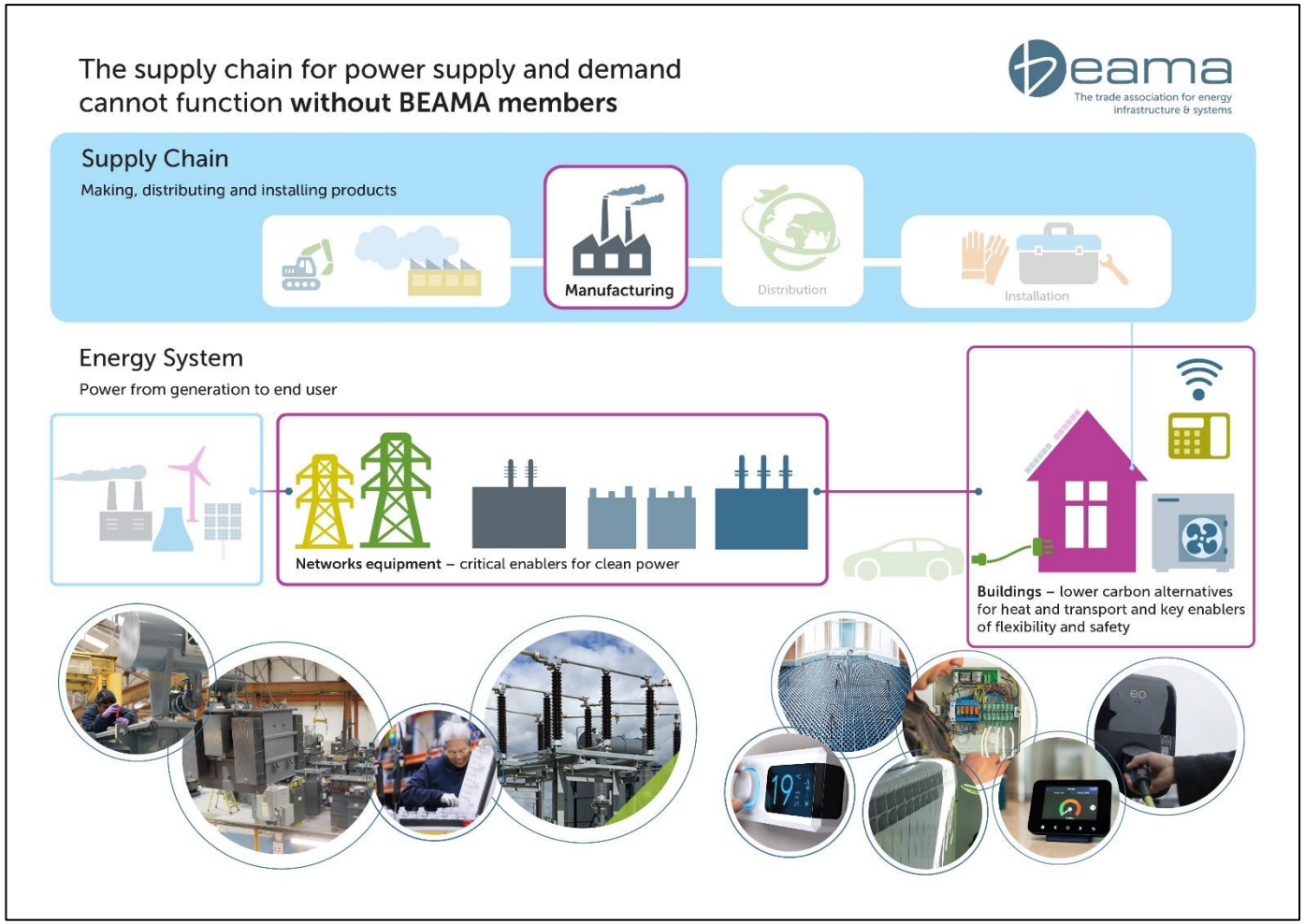


Foreword from BEAMA CEO Yselkla Farmer

I am delighted to share this Industrial Strategy White Paper with Government and industry stakeholders. The publication of the Government's own Green Paper and consultation within a few months of taking office is certainly seen by our 200 member companies as a positive sign of intent to better support industry and the electricity products manufacturing sector specifically. We have had an excellent response from our members during a short consultation period, so this paper is built on a wealth of evidence from the electrical manufacturing industry. As such, the insights contained within are both expert and highly valuable. This evidence builds on the launch earlier this autumn of our quarterly Market Pulse statistics series which we hope will stimulate discussion and action for years to come.

What is clear from our members is that an Industrial Strategy cannot just be a handful of piecemeal actions aimed at one or two sectors. Indeed, our first major conclusion is that what are usually considered as Industrial Strategy measures are highly unlikely to succeed if we do not first improve and clarify product demand across the energy sector, with strong interrelations between the networks and end use markets. This is a prerequisite for investment for our members, and we certainly hope our response is heard across the range of Departments able to improve market conditions, noting the strong international competition for investment.

We also make a range of specific recommendations for improving industrial conditions, from skills and innovation to trade and digitalisation. Our members are eager for the UK to be successful industrially, and also for the country to play a leading role in the transition to Net Zero. This transition simply cannot be achieved without our members, so we look forward to working with Government to securing the economic, social and environmental benefits that decarbonisation can bring to the UK. We are confident that together we can devise and implement an Industrial Strategy to bring the transformational levels of investment that our sector needs.

Yselkla Farmer
CEO, BEAMA

Executive Summary

Why is BEAMA important for an industrial strategy?

BEAMA represents manufacturers in the electrical products sector. This forms part of the clean energy industry, which Government has identified as growth-driving. Our members are also necessary for Clean Power by 2030 and the wider transition to Net Zero, both key Government policy aims. Success will be put at much greater risk without industrial activity in the UK. Therefore, Government should seek to help our sector perform strongly to meet its economic and energy policy goals.

Why is an industrial strategy important for us?

Based on the estimates of investment and growth required for the Net Zero transition – in which our members need to play a critical role – we should expect to be seeing transformational levels of planned investment, but this is not the case. We have some existing strengths to build on in our industry. Government can help significantly improve our members' prospects with a combination of clear long-term policy and targeted support interventions.

Requirements for our Industry – Demand

The overwhelming message from the BEAMA membership is that visible product demand is a prerequisite for businesses to consider industrial growth. Policy consistency, reducing the price of electricity and consumer pathways are cross-sector interventions that will improve demand. We also recommend numerous specific interventions that can improve and clarify demand across electricity networks, heating, hot water and ventilation, smart energy products, electric transport and building electrical systems.

Requirements for our Industry – Industrial conditions

If demand is sufficient, Government actions to improve industrial conditions can create a suitable environment for investment. Recommended action areas include policy consistency, innovation support, positive trade policy, clarity on industrial decarbonisation, securing the benefits of digitalisation in manufacturing, fair competition and direct financial support. BEAMA and its members are ready to constructively and fully engage with Government and industry partners to pursue shared goals of decarbonisation and industrial growth.

Annex 1 – deep dive into electricity networks

Annex 2 – deep dive into electric heating

Why is BEAMA important for an Industrial Strategy?

About BEAMA and its members

BEAMA is the UK trade association for manufacturers and providers of energy infrastructure technologies and systems. We represent more than 200 companies, from start-ups and SMEs to large multinationals. Our members' products ensure low carbon energy and environmental services are delivered safely, securely and efficiently to UK homes, businesses, transport and grid networks.

We are profound supporters for a scientific Net Zero, both in ensuring affordable, just and timely application to the market and in supporting our members to reduce their own emissions at both a product and industrial level. Our members' products span a broad spectrum of technology groups:

The electrical manufacturing already has an important impact on the economy:

Government has identified our sector as 'growth-driving'

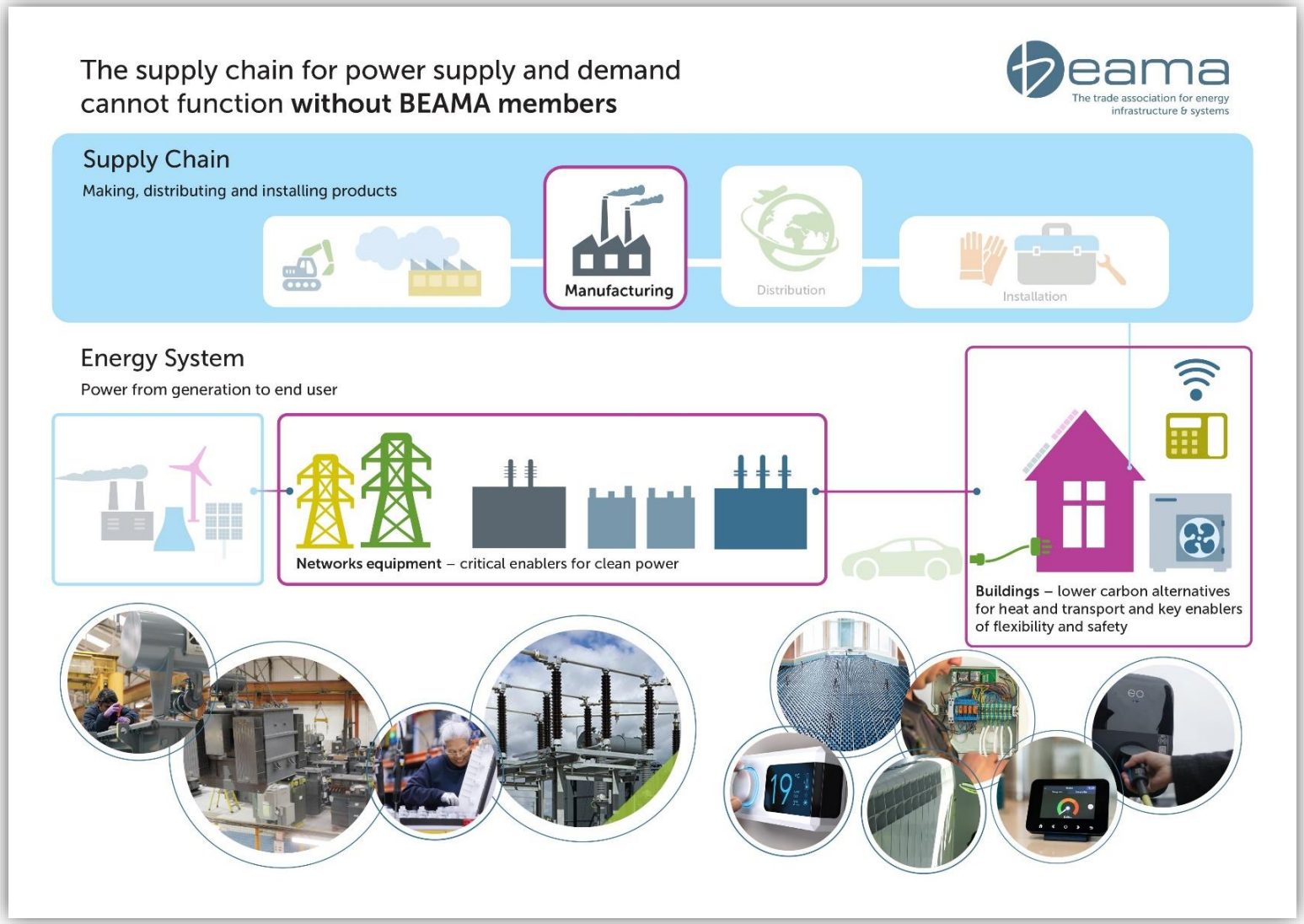
In the Government's recent Green Paper 'Invest 2035: The UK's Modern Industrial Strategy', eight growth-driving sectors were identified. Of these, BEAMA clearly forms part of the Clean Energy Industries sector. Moreover, elements of our members' activities are also part of the Advanced Manufacturing and Digital sectors.

Accelerating electrification is a fantastic opportunity for supply chain investment, directly impacting UK GDP and job creation. These figures show the scale of the likely increase in electricity demand, opportunities to the UK economy of adapting to this need, and the costs of inaction:


91%
of the global economy is committed to Net Zero[3]
Potential
£1 trillion
global market opportunity for UK business in the Net Zero transition
Electricity demand could grow by
70% by 2035...
...Resulting in a tenfold increase in product demand for some sectors[4]
Net Zero could require private investment of up to
£50 billion
per year by
2030[5]
If unlocked, this growing market could deliver
480,000
green UK jobs by
2030[6]
Delaying action by ten years could incur UK debt
23%
of GDP higher in
2050[7]
3 Net Zero Tracker (2022)
4 Growing the Market for a Net Zero Energy System (BEAMA and Energy Systems Catapult, 2022)
5 Mobilising green investment: 2023 green finance strategy (DESNZ, 2023)
6 British Energy Security Strategy (DESNZ, 2022)
7 Fiscal Risks Report (OBR, 2021)

Net Zero cannot be achieved without BEAMA members

Our members also provide critical functions in another key policy aim: the transition to Net Zero carbon emissions. Put simply, without the products and activities of BEAMA's members, Net Zero will not be achieved. The supply of power from generation to the end user requires the use of technologies supplied by BEAMA's members. And as manufacturers, we are a critical link in the product supply chain. If the links provided by our members in either the energy supply or operational chains are broken, we cannot reach Net Zero. Investment in BEAMA's represented sectors is a prerequisite to meeting the Clean Power by 2030 target and delivering clean heat and transport to UK consumers.



Why do we need manufacturing and other industrial activity in the UK?

Economic and energy policy goals would be put at more risk if none of the clean energy industrial activity needed for Net Zero takes places in the UK. By supplying the UK market solely from economic activity overseas, we would narrow our options for growth, be more vulnerable to supply and cost risks, limit exports, lose the flexibility for strategic procurement, miss out on developing skills in industrial decarbonisation, forego the spending that manufacturers make into other supply chains and services, restrict our field of expertise and innovation, and reduce opportunities for employment.

Moreover, our members have expressed a desire for local industrial activity. They are keen to invest, and have expressed pride at manufacturing in the UK, but like any businesses facing global competition, they need the conditions to be favourable.

Chapter summary

BEAMA represents manufacturers in the electrical products sector. This forms part of the clean energy industry, which Government has identified as growth-driving. Our members are also necessary for Clean Power by 2030 and the wider transition to Net Zero, both key Government policy aims. Success will be put at much greater risk without industrial activity in the UK. Therefore, Government should seek to help our sector perform strongly to meet its economic and energy policy goals.

Why is an industrial strategy important for us?

In this section, we explain the current state of our members' markets, manufacturers' investment decision-making process, and how an Industrial Strategy can help us.

We should be operating at full power with strong growth indicators

As recognised in the previous chapter, the medium and long-term investment needed to reach Net Zero targets is huge. We also have important interim milestones to reach in the next five years on clean power generation, heat decarbonisation and zero emission vehicles. Yet the investment required by industry to meet these targets cannot be suddenly increased overnight; it is often needed many years in advance of product deployment. As such, for a confident assessment of the likelihood of meeting targets for low carbon product deployment and emissions reduction, we would expect to see transformational levels of investment happening today. Unfortunately, this is not the case.

There is a mixed picture on optimism and investment, and product deployment is off track

We can demonstrate the current relative under-investment through BEAMA's regular surveys of its members and reviews of other market indicators. These are now published in our quarterly Market Pulse on Growing the Supply Chain for the UK Electricity Sector.

Our latest report shows that while a number of indicators are showing improvement – such as business optimism, impact of unit costs and medium-term investment expectations – **there has actually been a slight reduction in positivity for investment intentions for the next 12 months**. This is at a time when to reach our Net Zero targets – and to secure the resulting benefits to industry and the wider economy – **we should expect actual and planned investment in the electricity products manufacturing sector to be at unprecedented levels**. Many companies are choosing to invest in other countries in preference to the UK.

We also track deployment of key decarbonisation products like smart meters and heat pumps. **On the current trajectory, we are 11 years away from having a complete smart metering system, while to meet heat pump ambitions for 2030 we need to increase deployment by 16 times the current rate.**

SMART METER INSTALLATIONS

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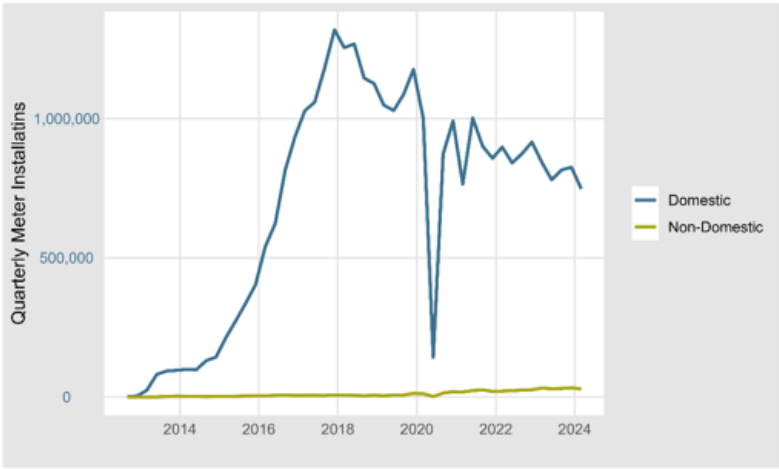
We are 11 years away from having a complete smart metering system to support a smart flexible energy system in the UK. This will not enable us to meet our Net Zero targets.

Manufacturers leave UK market due to slow down in smart meter deployment.

The market is currently operating 1 million units per annum below expected levels.

This is approximately 25% down on what the supply chain has been told to expect and as a result we are seeing a number of companies withdraw from the UK market entirely. There are currently only a handful of manufacturers active in supplying domestic electricity smart meters. The pressures of making a highly complex product which is entirely bespoke to Great Britain, at a commoditised price, is driving long-established manufacturers out of the market.

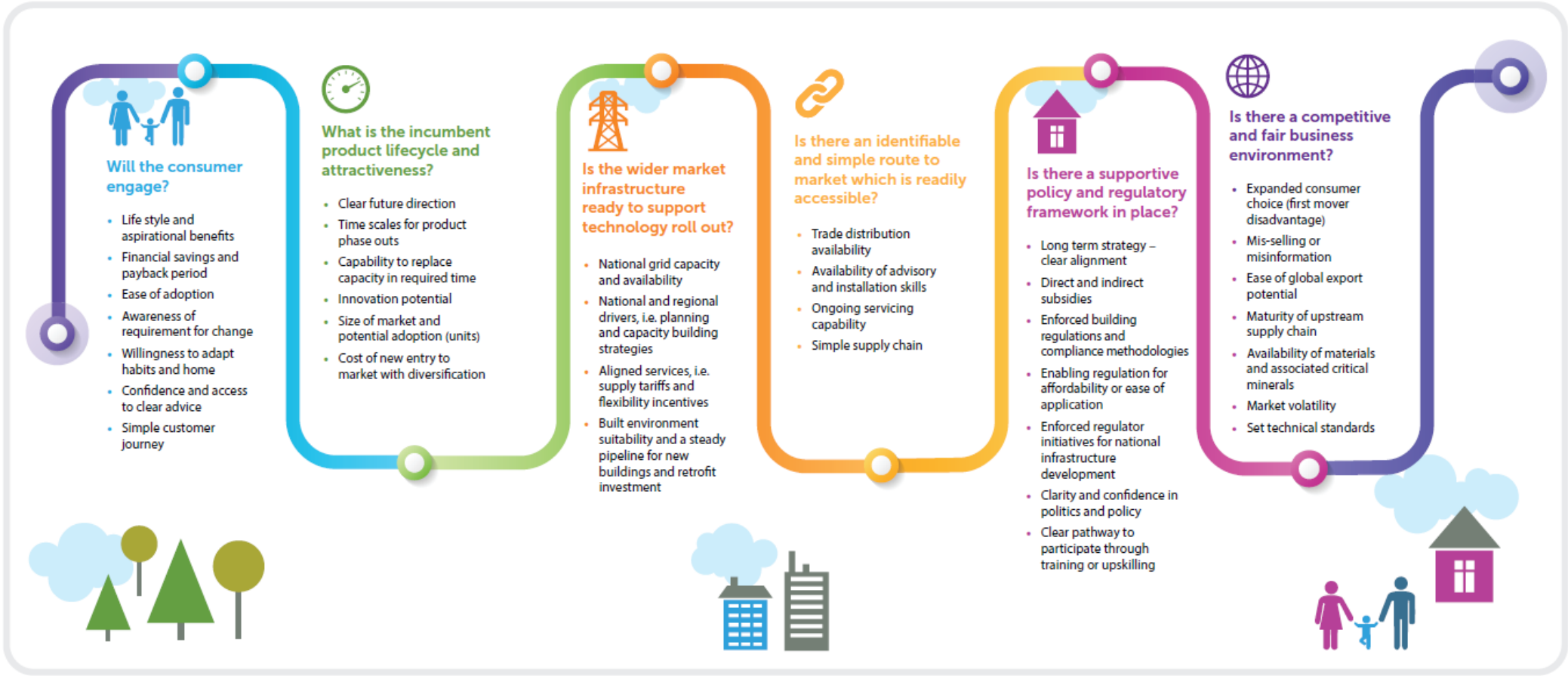


Source: DESNZ

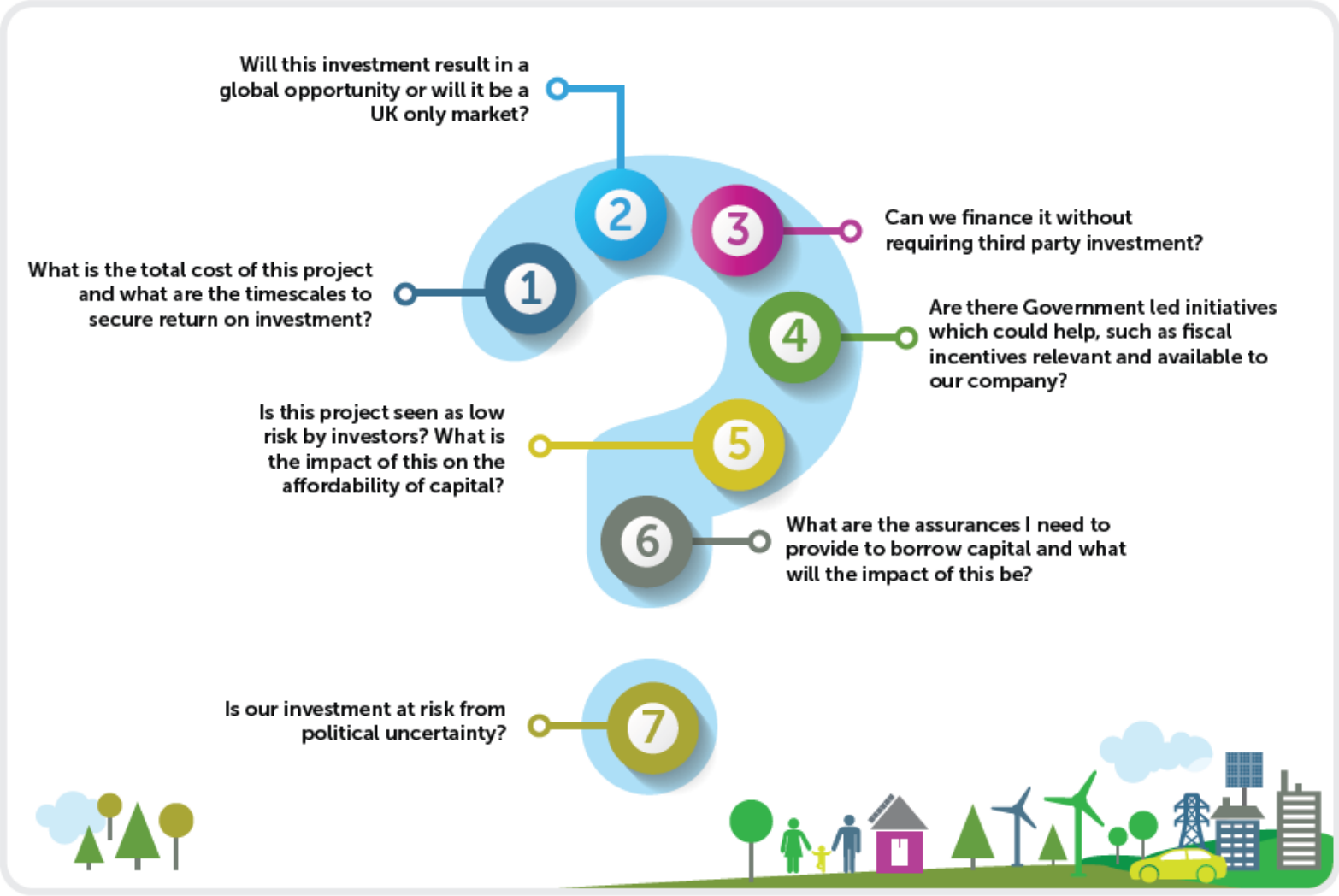
What influences a manufacturer's decision to invest?

We have shown that investment needs to increase to far higher levels than currently seen today. But what factors influence a manufacturers' investment decision? Faced with a series of policy U-Turns under the previous Government, BEAMA set out the investment decision journey to highlight that these decisions have a material impact on manufacturers. **It is important to note that the criteria will be judged in comparison to other countries that a manufacturer has the opportunity to invest in.**

Manufacturers will address the strength of the market for their products based on criteria such as these:



Should there be a strong customer proposition, a manufacturer is also likely to need finance, and will consider the following:



We can see from these processes that manufacturers' decisions will be influenced by Government's decisions, including on regulatory frameworks, political certainty, incentives to businesses and consumers, infrastructure, trade, innovation support and skills.

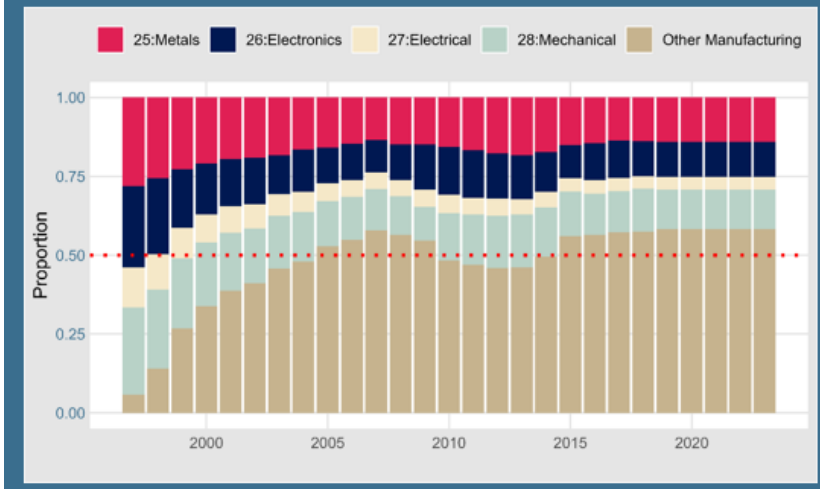
Our industry has existing strengths that can be a platform for transformational growth

Fortunately, we are not starting from scratch in the bid to support clean energy industries in the UK. There is a longstanding heritage of electrical product manufacturing in the UK, which has been supported by BEAMA for 120 years.

Although there are several areas where entirely new technology is being brought to market, in most cases the growth potential is in existing technology that has been subject to enormous strides in development and increased efficiency and digitalisation. Sub-sectors such as electric transportation, renewable energy generation and electric heating have been in existence for decades or over a century but are only now realising their full potential both in growth and in delivering clean energy. It is vital that the UK does not squander the innovation and growth potential in improving existing technology in pursuit of mechanisms that may never deliver on our national goals and missions.

While the proportion of electrical manufacturing in the UK has declined over the years, our industry retains a mixture of manufacturing, R&D, sales & marketing and technical operations to serve the UK and export markets. Market participants include a range of company types from startups to large multinationals.

The proportion by value of electrical manufacturing in the UK has declined dramatically from 12.6% of manufacturing in 1997 to only 4% in 2023. The challenge to drive growth and improve supply chain availability is clear.



BEAMA members operate across four general sectors:

- Electricity networks infrastructure – This equipment is required for networks to enable clean power to be used across the country. Manufacture and assembly of transformers, switchgear and associated equipment already occurs in the UK and can be expanded. Some components, such as steel and electronics manufacture, appear unlikely to relocate to the UK. The UK's access to port infrastructure, if it is invested in to meet the structural requirements, can make the UK an interesting place to locate manufacturing plants to export equipment that will be in high demand globally for the next decades. Moreover, the UK is home to world-renowned universities with excellent potential for more innovation and R&D cooperation with industry.

- Electric heating, energy efficiency and indoor air quality – there is manufacturing of these products in the UK but there is much variability, driven by factors including company ownership, company size, levels of demand and comparative conditions in other markets. Increased understanding of the importance of indoor air quality has seen some ventilation manufacturers increase production. For heating products, stronger demand incentives and fewer "hurdles to clear" in other countries has seen many companies choose to invest elsewhere. For companies that do not manufacture in the UK, the presence of sales, marketing and servicing facilities still offer job creation and knowledge-based employment. There will be a growing market opportunity for electric heating as we decarbonise our homes to take the place of the 1.3 million gas boilers sold each year, so this is a significant industrial opportunity if the right manufacturing conditions are in place.

- Flexible energy – in smart metering, some manufacturers have been leaving the UK market due to the slowing smart meter rollout, but it retains long standing expertise from the development of technical specifications and the smart meter rollout. There are a number of innovative companies involved in electric vehicle charging but the security of these can be subject to fluctuations in the market and influenced by regulatory decisions.

- Building electrical systems – these products are found in every building and allow the safe and efficient use of electricity. This is a mature and stable market, with the ability to change and adapt to changes in product standards and regulation. The sector does consist of an aging workforce, in particular engineering skills. Support in promotion of manufacturing within schools is required to provide a solid and dependable future workforce to enable security in this sector. The sector performance is closely related to that of the construction sector and rates of repair, maintenance and improvement. In terms of materials and components, this sector imports steel, aluminium, copper and plastics to produce a majority of the finished goods. Secure and solid trade deals and routes for logistics are essential to keeping down costs and ensuring supply.

It is our firmly held view that **Government should support the strengths manufacturing and operations that we already have**, and seek to **build on these** for each of the four sectors that BEAMA represents.

How an Industrial Strategy can improve growth and investment in our industry

Across this chapter, there has been a common thread – government decisions matter. We of course do not expect all growth to be determined by political measures; that would be neither realistic nor desirable. However, with the potential for growth, existing strengths, and the current picture of proven under-investment, we believe **our industry should be targeted for support** within the Government's Industrial Strategy. We also know, from modelling carried out in conjunction with the Energy Systems Catapult in 2022, **we need to ensure capacity in the electrical products supply chain is secured** to deliver the needs of the energy transition[1]. We welcome the 2035 date included in the Industrial Strategy, as industry has for some time been crying out for longer term policymaking, giving greater consistency and confidence, in combination with targeted interventions. In the next two chapters, we set out more detail on the condition of our industry and the specific actions that we need from Government.

Chapter summary

Based on the estimates of investment and growth required for the Net Zero transition – in which our members need to play a critical role – we should expect to be seeing transformational levels of planned investment, but this is not the case. We have some existing strengths to build on in our industry. Government can help significantly improve our members' prospects with a combination of clear long-term policy and targeted support interventions.

[1] https://www.beama.org.uk/campaign-themes/net-zero/netzero-publications/growing-the-supply-chain-for-net-zero.html

Requirements for our Industry – Demand

The Government's Industrial Strategy Green Paper recognises many key issues that affect our industry, such as skills, innovation and infrastructure. However, the overwhelming message from the BEAMA membership is that there is one factor that is a prerequisite for businesses to consider industrial growth: visible product demand.

Statements of policy ambition and projections about the future growth of electrification are meaningful, but are not sufficient to give enough confidence or clarity on which to base investment decisions. Other factors may be improved, but without improvements in clear demand, we are unlikely to see the investment required for the Net Zero transition and accompanying benefits.

Fortunately, the key technologies we need to electrify our energy system, buildings and transport are already on the market. This means we are not waiting for significant new innovation in order to make great leaps towards Net Zero. But these products do need interventions from Government to help consumers secure the benefits they have the potential to bring.

Below we set out some ways to increase and clarify demand in our members' sectors. While many of these actions involve DESNZ implementation, they will help to secure the growth objectives of other Departments with responsibility for Industrial Strategy including DBT and HMT.

Cross-sector interventions

Policy signals for consumers

While there continue to be some targeted interventions to increase deployment of low carbon products, such as grant schemes, fuel poverty schemes and Building Regulations, we have not achieved mass market voluntary uptake of electrification technologies that have displaced the fossil-fuel powered incumbents such as internal combustion engine vehicles and gas boilers.

We believe that in order to achieve this change, **Government needs to help address the various barriers in customer uptake** of low carbon technology. These can be summarised in four categories:

KNOWLEDGE

- Is the householder aware that their home will need to change before 2050?
- Can they get advice on technology options?
- Can they get advice on practicalities of home upgrades?

AVAILABILITY OF TECHNOLOGY

- Are there Net Zero compatible products on the market?
- Are these suitable for their home?
- Is there a risk of being locked into using the wrong technology?

AFFORDABILITY OF TECHNOLOGY

- Are there incentives or support schemes?
- Will products become cheaper through scaling up of markets?
- Are there finance options?
- Are there policy barriers?

TRIGGERS TO MAKE CHANGES

- What are the voluntary and incentivised opportunities?
- Will there be obligations on householders?
- Do Building Regulations require works suitable for the future?
- What improvements can be made while other work is being done?

This requires a multi-faceted approach, underpinned by clear signals and a consistent direction of travel to ultimately help foster more organic market growth.

Cost of Electricity for Consumers

A reduction in the cost of electricity for consumers has been the **single most requested policy measure** by BEAMA members. While subsidies and incentives have been put in place to drive the electrification of heat and transport, it is still cheaper to run fossil fuel systems. We need a genuine market for low carbon and electrified products. This is especially so given the UK's target for Clean Power by 2030 as we need to ensure we can utilise this power for the benefit of the end consumer.

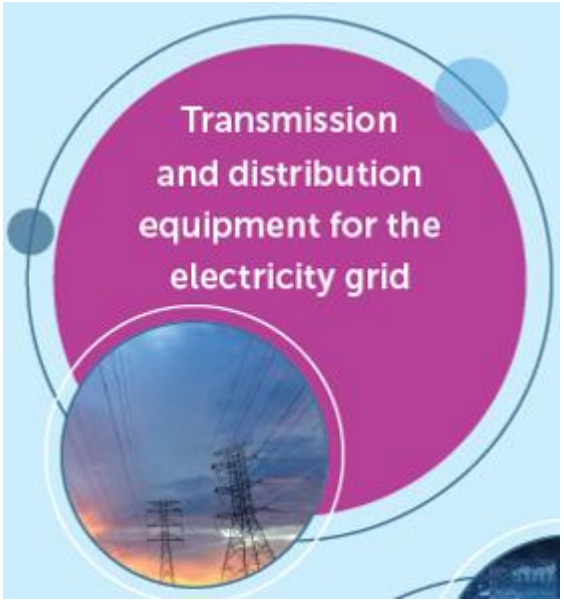
Growth in the electrotechnical products sector requires a rebalancing of electricity costs. This involves rebalancing between gas and electricity, so that disincentives to electrify based on the artificially low cost of fossil fuel, notably gas for heating, are removed. Moreover, the Government should **consider rebalancing between energy bills and general taxation**: paying for the costs of decarbonisation only through electricity bills is a regressive approach, hampers progress in electrification and makes the UK uncompetitive in terms of electricity cost as a key manufacturing input. Therefore, general taxation should have a role to play in paying for decarbonising.

Reduction in electricity costs has the potential for a strong multiplier effect. Increased attractiveness of electric heating and transport solutions should stimulate associated upgrades in building electrical systems, metering, flexibility services and electricity networks.

Reducing the cost of electricity is a prime example of an issue that **only Government can solve**. Industry can do all it can to bring efficient and reliable products to market, engage with customers and provide training, but structural mechanisms such as the cost of electricity mean there is not a level playing field for lower carbon product manufacturers. This affects consumer demand and consequently investment by businesses.

Business can make Net Zero happen, but some ceilings can only be smashed by Government facilitating action to unlock the market opportunity and encourage UK investment.

Sectoral issues



- Expected future demand for electricity networks products is high, given the Government's welcome mission-led approach and policy ambitions on establishing clean power. However, the main issue is with **lack of more precise demand visibility** and lack of confidence in a time-specific 'order book'. This has hindered network product manufacturers' investment decisions.
- The **ambitions for Clean Power by 2030 and Net Zero by 2050 must be added to by a clear pipeline of orders from network owners and operators**, in order to give manufacturers **confidence** and allow them to plan their production and invest in additional capacity where needed. The result of this lack of clarity to date has been for many companies to invest to an extent, but not to the transformational levels we would expect to need for accelerating progress to Net Zero.
- Ofgem's price control mechanisms often only give **short notice of network company spending plans** – this does not align well with longer manufacturing lead times. Even then, actual orders placed by network companies differ from the announced intentions.
- Furthermore, the **current spending plans fall behind the level of investment** in networks that for example NESO state is needed.

Please see Annex 1 for more details on the electricity networks product market.

- **The current and expected market size is insufficient and too unclear** to stimulate significant additional investment from manufacturers. This is largely because the consumer proposition for low carbon heat needs improving. Our members state that government interventions are needed to rectify this.
- The market should ideally run on the following principles:
  - Low carbon heating should be the **most rewarding option for the consumer**
  - **Consumers have choices** that suits their property and circumstances
  - Heat policy is designed to be **coherent with other energy system policy**, such as for networks and flexibility
- There are specific measures that could benefit all low carbon electric heating options:
  - First among these is **reducing the cost of electricity**, which will materially change the cost-benefit of low carbon electric heat
  - We also need clarification of regulations for new buildings following industry consultation under the previous administration
  - Government should set phase-out dates for fossil fuel heating to give a long term view of changes to buildings
  - More can be done to encourage beneficial tariffs and green consumer finance

- Consumer incentives do have their place in the meantime as long as they last for long enough to allow consumers and businesses to react and need to be coupled with a plan to stimulate more organic market growth in the longer term so that markets are not endlessly reliant on subsidy.
    - Widening existing support schemes like the Boiler Upgrade Scheme and VAT relief to include all proven low carbon heating solutions will set a more level playing field for manufacturers and give consumers choice, also helping to make markets stronger.
- There are examples of success, such as in the ventilation market where additional recognition of the importance of indoor air quality has led to regulatory change and a resulting improvement in demand, with some companies increasing manufacturing capacity.

Please see Annex 2 for more details on the electric heat market.

- Based on the current trajectory and rate of installations it would take approximately another 7 years to complete the rollout, but factoring in additional SMETS1 meters that will need replacing to be compatible with 4G we are likely to be **11 years away from having a robust smart metering system** that would support a smart flexible energy system in the UK.
- This will not enable the UK to meet our Net Zero targets
- **Our Government needs to get the program back on track through a cohesive programme** to support suppliers in reaching those customers yet to have an installed smart meter and demonstrate the pathway to Net Zero as a whole and what this means for the consumer.
- This is also critical to retaining the existing manufacturing base, which has already seen meter manufacturers reducing their UK manufacturing operations or leaving the market entirely.

- Market incentives for Electric Vehicle Uptake continue to hold up the market, and any decision to reduce targets would have significant impact on the supply chain for charging infrastructure. The rate of take up is still not fast enough and needs support.
- The proportion of Electric Vehicles sold in comparison to Internal Combustion Engines continues to increase, albeit at a slower pace than would be expected.

- **The maintenance and improvement of incentives to purchase EVs is therefore essential** to maintain growth in the market, linked to increased provision of EV charging infrastructure.
- This market is also affected by limitations from network connections and planning.

- Demand for these products is linked to the construction market as well as that for repair, maintenance and installation.
- However, the market will also benefit from clearer and improved demand for electric heating and transport products and flexibility services – with additional and bi-directional electricity demand comes the need for additional circuit protection, accessories and other products.

- Furthermore, **there needs to be an assessment of how many buildings will require upgrades to, for example, building fuses** in order to be suitable for increased loads.
- Combined, these measures will allow the building electrical systems market to be more closely benefited by the rollout of electric heat and transport, while also improving the reliability of those products, giving consumers more confidence in their purchases.

Chapter summary

The overwhelming message from the BEAMA membership is that visible product demand is a prerequisite for businesses to consider industrial growth. Policy consistency, reducing the price of electricity and consumer pathways are cross-sector interventions that will improve demand. We also recommend numerous specific interventions that can improve and clarify demand across electricity networks, heating, hot water and ventilation, smart energy products, electric transport and building electrical systems.

Requirements for our Industry – Industrial Conditions

For industrial growth, should there be sustained improved consumer demand, businesses will also need helpful conditions for them to increase their activity in the UK. **There are a number of current barriers that should each be tackled by Government** with industry input.

Lack of Policy and Regulatory Consistency

The single most significant impediment to industrial investment in this country in the last few years has been the lack of a stable regulatory environment, because stability increases certainty, reduces barriers to business, encourages innovation and provides protection against disruption in the supply chain.

Skills and labour

50% of BEAMA members report an intention to hire more employees, but challenges in filling vacancies remain because of ongoing engineering and STEM skills shortages at various career stages, and **almost all of our members reported that skills and labour availability are a current barrier to growth and investment**.

A step-change in investment by employers is possible, if Government leads with a strong strategy and puts in place a suitable framework. **Skills and workforce development requires strong leadership from Government** because there is intense competition for skilled labour. Without Government leadership and a framework to invest within, it will be difficult to grow the pool of suitably skilled workers because companies worry about 'free-riders' and not seeing the return on their investment in training, should staff move on to competitors.

The first step could be for Government to help with **sharing a greater understanding of issues around people and skills**. While companies will understand their own experiences, it is difficult for them to establish a wider view of skills and labour gaps across the industry and the wider economy (noting that people with certain skills do not always stay in the same sector). The previous Government had been compiling 'heat maps' to highlight skills and labour shortages, but publication of these was delayed and did not happen. We are aware that the current Government is planning to reach out under its Office for Clean Jobs, and we request that it makes use of previous analysis that was conducted to speed up the mapping process. This can then be mapped out against existing training opportunities, which come from numerous sources.

Action is needed to support skills and labour at various career stages. We would like to see more promotion of engineering careers in schools. Industry would like to see more support for apprenticeships. There are significant skills retained in employees closer to the end of their careers, but these need to be passed on to the younger generation to avoid further employment and skills shortages in the years to come; this is particularly felt in technical roles.

We are also affected by shortages of non-manufacturing roles such as heating installers – we believe funding currently funds only around one tenth of the skilled engineers needed for installation and maintenance of low carbon heating systems.

Where local labour force is not available, it is important to **reduce the cost of administration associated with bringing workers into the country**, including the cost of visas, and generally **ease the process** to move workforce. Sometimes this will be necessary only on a temporary basis.

Hiring costs will increase as a result of the October 2024 Budget announcements, so we request that Government seeks to quantify the impact of these measures in key sectors, and helps to **alleviate any negative impacts by implementing the policy changes we have requested** to improve demand and investment conditions by other means.

Innovation

As previously stated, many of the products needed to accelerate electrification for Net Zero are already on the market. However, these products can be improved, adapted for new regulations, and combined with new services and business models. This means that continuing to support research and development – and crucially enabling this to result in commercial gain – is vital.

Government could **improve manufacturers' experience with R&D tax credits**. The scope of what is being able to be claimed is being reduced every year with greater scrutiny applied. This increases the amount of time and cost to compile the claim whilst also reducing the amount received. A very low tax R&D regime would be highly beneficial. We should reward companies who are doing R&D, in place of the current system where these companies are, for example, having to pay expensive tax attorneys to get anything out of the system. If companies are rewarded for developing new products and bringing them to market then this will attract more companies to develop products, and would be a virtuous cycle.

Regulations can be proposed and implemented that require changes to product design. Product design changes require at least some element of R&D, depending on the level of change. Often the R&D process from funding proposal to project completion can be 2-3 years.

As such there should be a **Government-wide approach to product design regulations that allows early notice of proposals and then a reasonable amount of time for manufacturers to adapt**. Failing to do so can cause difficulties for manufacturers and use up Government resource – for example challenges with the 2021 Electric Vehicle Smart Charging Regulations required many discussions on compliance between industry, government and the regulator due to lack of clear guidance with unrealistic implementation times.

On commercialisation from R&D, the key feedback from members is that the Government does not trust or support existing evidence and data sources and prefers to manage its own information gathering. However, even when evidence has been gathered through policy related trials i.e. innovation trials linked to RIIO, **there is a lack of post-trial commercialisation planning up front.**

This needs to be urgently addressed. For example, the upcoming field trial for heat batteries with the Energy Systems Catapult must have the following:

- What does good look like from a customer perspective?
- Will trial data enable the Government to amend its Home Energy Model to ensure technology solutions are valid for EPCs or other related policies?
- If successful, which fiscal measures do we need to deploy to accelerate commercialisation and are these guaranteed?
- Will the sector require any skills/market development initiatives to support growth?

This is currently missing from policy related programmes and needs to be addressed to continue incentivising and rewarding R&D conducted by manufacturers and others.

Cost of Electricity as a key input for manufacturing

The cost of electricity for industrial businesses in the UK is the highest of all members of the International Energy Agency, and has jumped 124% in just the last 5 years. It is now 50% more expensive than in Germany and France, and four times more expensive as in America, which is a massive barrier to growth, competitiveness and profitability (IEA).

Advancing electrification within industrial processes is a key mechanism that will support industrial decarbonisation. It is important that this advancement is not coupled with unintended consequences related to electricity procurement that could expose manufacturers to increased costs.

The current market for electricity is difficult to navigate, as shown by the energy pricing crisis in 2022, volatility in the market can leave manufacturers exposed to increased costs of a key commodity needed to run their business while making revenue projections that can become inaccurate. This exposure can vary depending on procurement method, renewal dates of contracts and the level of knowledge and support a manufacturer may have. All these variables mean that different manufacturers can achieve varying commodity unit rates, making electrification more or less attractive to them based on their procurement capabilities.

For government driven electrification goals to be effective, there needs to be a fairer structure that supports all manufacturers equitably, and crucially in a way that makes the UK competitive with other countries.

Long wait times for electricity network connections

Another key barrier to investment and growth in the UK more widely is that there are delays in connecting to electricity networks. The wait-times that distribution and transmission network operators quote for facilities looking to connect vary, but some applicants are quoted wait-times of several years. Currently:

- connections can cost millions of pounds and face years of delays
- installing EV chargepoints at industrial facilities can take 6 months
- lack of grid capacity can hold back industrial electrification for example through the installation of large heat pumps
- approval for solar installations above a certain capacity, and thereby requiring the G99 application process, is often slow
- Overall, customers sometimes continue with a build process in advance of having connection approval, which feels like a gamble but the alternative is even greater delay and lost revenue.

The reasons for such extended wait-times are related to delays in receiving planning permission, to the rules and system through which connection requests are managed and implemented (managed by distribution and transmission network operators, NESO and Ofgem), as well as to a lack of capacity on electricity networks in some places, as influenced decisively by the overall level and rate of investment (as determined by network owners and by Ofgem via RIIO). The move to more strategic planning of the energy system including of electricity networks[2] should improve the situation, as it will promote a more strategic and longer-term view of network needs. Ofgem and DESNZ

[2] The National Energy System Operator (NESO) will produce a Strategic Spatial Energy Plan (SSEP) and Centralised Strategic Network Plans (CSNP).

must continue to work on reforming the process for electricity network connections (Connections Action Plan) as a matter of great urgency.

Competition

Competition issues risk lower quality or unsafe products entering the market, with a feeling in industry that enforcement bodies are unlikely to catch or take action against non-compliant products in most of our market areas. This means there is no level playing field for fair competition, as those responsible companies who spend money to comply with relevant regulations are undercut by unscrupulous non-compliant manufacturers, which can have a negative effect on investment.

Concerns and ideas raised with us by our members in our most recent survey include:

- Local production and government subsidy in China and India means they have cheaper input prices for the same products eg steel bars
- Imports of cheap devices has driven down prices at the expense of quality and compliance, which has a negative impact on product development and growth
- In some cases reports have been made to the relevant authority about non-compliant products (eg motors) but no action has been taken
- A race to the bottom for EV charging products has started; it is not known what support those companies are receiving. It means that some UK competitors are reviewing their business models and focusing on a narrower target segment.
- Circulator pumps not compliant with 2021 regulations are still being sold; some of these can consume up to eight times more electricity than certified compliant pumps.

A consistent message from BEAMA – often the first line of our responses to Government consultations – is that **if regulations are in place, they must be properly enforced**. Funding for trading standards has been regularly cut; there has been slow progress tackling issues with online marketplaces and fulfilment houses; and the previous Government did not make market surveillance a priority. This must be rectified to give businesses confidence that if they invest in new and better products, they will not be undercut by an influx of lower quality cheaper product from other markets. Therefore **there is a strong link between regulatory oversight and investment**.

We also recommend that **Government reviews the EU initiative on Green Claims**; any rules on product claims should cover performance claims as well as company-wide environmental claims (as some heating products are sold claiming unproved efficiency ratings).

It is essential that measures brought in through the Industrial Strategy to support UK growth and to deliver clean energy do not become diverted through unfair competition from sub-standard, inefficient or non-compliant imports or those available at lower cost due to unfair subsidies. While supply chains are highly integrated internationally, and few products in the Advanced Manufacturing sector will have entirely UK supply sources, **any procurement based on the Industrial Strategy must have effective oversight to ensure fair competition and a level playing field**. There are many examples of UK projects to deliver clean energy that have been undermined by the use of non-compliant equipment that fails to deliver the efficiencies and performance promised or specified. One aspect of the Industrial Strategy must be the oversight to avoid such market failures.

Carbon Border Adjustment Mechanism

The introduction of a Carbon Border Adjustment Mechanism (CBAM) in the UK in 2027 will cause a **significant administrative and cost burden for many UK manufacturers**. In the EU equivalent, some member states such as the Netherlands are already offering tax rebates and incentives for manufacturers hit by additional CBAM costs on imports. There will be two specific CBAM challenges for the growth of Advanced Manufacturing and Clean Power in the UK:

1. Clean steel: Many advanced manufacturing products used in the transmission of clean power depend on the import of specialised forms of steel, such as grain-oriented electrical steel (GOES) for efficient, modern power transformers. This is not available to purchase from UK steel producers and supplies from elsewhere in Europe are also limited or non-existent. This has in recent years built in a dependence on GOES imported from China. Should these imports be subjected to additional costs due to CBAM charges, this will not only prove a barrier to growth in UK manufacturing of many technical products but will **potentially threaten the infrastructure required for clean power**.

2. Offshoring: In so far as CBAM currently has an impact on imported raw materials, making it potentially more expensive to import those, there is **a risk that it will be cheaper to move manufacturing outside of the UK and Europe**. By doing so, manufacturers may avoid CBAM charges on imported materials while not attracting additional charges for the import of finished or semi-finished products. CBAM may therefore risk shifting carbon leakage from raw materials to manufactured goods.

Trade Policy

The impacts of CBAM may make it attractive to extend scope from raw materials to manufactured goods to combat offshoring and carbon leakage. However, any imposition of additional charges or other tariffs to protect UK manufacturing from potentially unfair competition could create further risks both to growth and clean power.

In the Advanced Manufacturing sector, supply chains are highly integrated internationally, making it unheard of for technical products to be wholly UK-sourced. Any additional costs applied to imported products will then have an impact on the price and availability of UK-manufactured goods that depend on components sourced elsewhere. While in some cases these will be from markets where equivalent carbon costs to the UK apply, this is not the case for a number of critical materials and components. **A long period of consultation and analysis of the impact on UK manufacturing of any additional charges or tariffs will be essential to avoid creating new barriers to growth**.

Additionally, for most Advanced Manufacturing and Clean Power products an export market is essential to the financial viability of innovative products. Introducing any UK protectionist measures, while apparently providing an advantage to UK manufacturers, will inevitably lead to counter-measures being adopted in the markets affected which will hamper UK export growth.

Further concerns apply from the threat to critical and strategic supply sources from both geo-political risks and protectionist action in key markets. The **UK must ensure that there are reliable sources for those raw materials and critical components** that currently cannot be sourced sufficiently in the UK, both by increasing UK capacity in production and recycling and ensuring friendly trading conditions where UK and European capacity is not currently available.

Overall, our members surveyed were **in favour of more alignment with the European Union** on various grounds, including manufacturing efficiency from reduced product design divergence, labour availability and export potential.

It was felt that **UK Government should reinstate support for manufacturers to visit export markets and trade shows**.

Investment and capital

In terms of capital grants or other financial mechanisms to support industrial growth, there will be no single answer that suits all companies in the electrical products sector. We do know that companies have benefited from the following in other countries:

- Capital grants and tax credits have attracted investment in US, Canada, Saudi Arabia and India
- The Hungarian Government provided 50% of the cost of a 45mEuro investment for one of our members
- Ireland:
  - Sustainable Energy Authority of Ireland offers many grants for business energy upgrades
  - Enterprise Ireland offers wide range of supports for businesses including innovation, sustainability, building capability and scaling locally and internationally, including funding of significant proportion of factory developments
- Germany
  - 35% funding is available for installation of a heat pump with wide eligibility. Although this is a measure that drives the market adoption, rather than a grant directly to manufacturers, it does incentivise investment in manufacturing.

The most recent targeted example in the UK was the plan for a Green Industries Growth Accelerator (GIGA) fund, which would have allocated a share of a £1bn funding pot for electricity networks product manufacturing, but this has not been taken forward by the new Government.

The aim for any financial support should be to make measures as simple as possible to reduce uncertainty and risk for companies.

We support the creation of a Green Taxonomy and welcome the recent consultation. We urge Government to **accelerate policy development** in this complex area.

Various other options remain open to Government, and we are **eager for further engagement** to discuss which are under consideration and to assess which may be most beneficial:

- Tax incentives
- Capital allowances
- Tax holidays
- Grants

- Reduction in industrial energy costs
- Planning and permission reforms

Industrial Decarbonisation

An effective industrial strategy must urgently address industrial emissions, supporting businesses in meeting the UK's legally binding emissions reduction targets. With deadlines approaching, a **clear, cohesive, and actionable policy framework** is needed to help business navigate the complexities of decarbonisation while achieving their growth potential.

The UK Government must play a key role in facilitating this transition by enabling investment in innovation and adaptation to new market conditions. This requires **balancing ambitious emissions reductions with the practical realities facing UK manufacturing**. BEAMA and its members welcome and industrial strategy that achieves this balance, ensuring a fair and effective transition through clear regulations, well-targeted incentives, and is internationally aligned. This approach will allow the UK to meet its decarbonisation goals while strengthening its position in the global green economy.

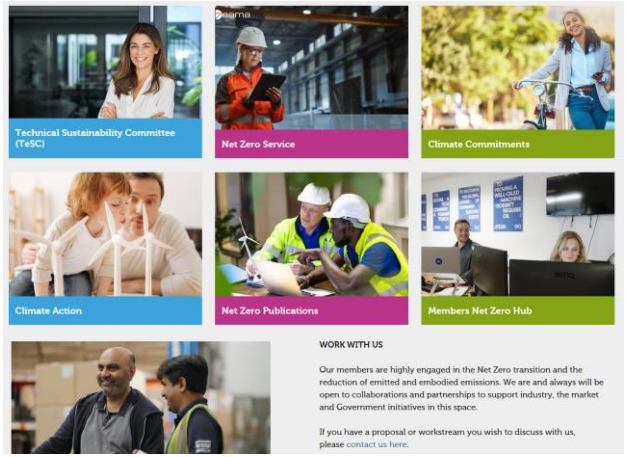
Achieving the 2030 target will require policies that are more aggressive both in pace and scale, as highlighted by the Committee on Climate Change[3]. Policies must reach across diverse sectors, instilling confidence and securing investment for industrial decarbonisation. The Government must provide robust, predictable, and enabling regulations, supported by a long-term vision that reinforces market leadership while maintaining fairness.

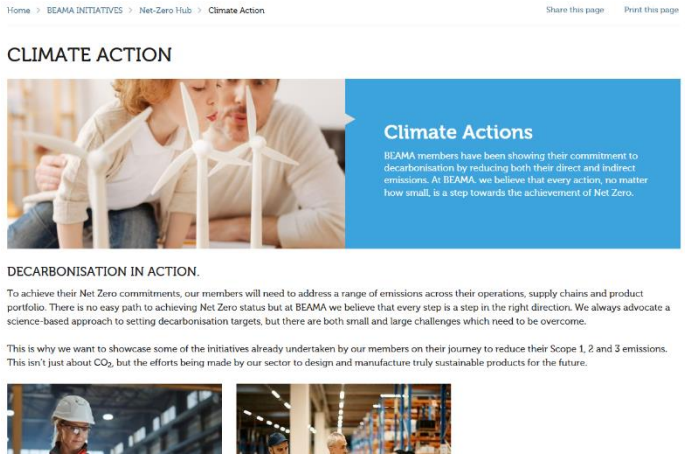
The UK Government has a crucial role to play in guiding this transition. To ensure that businesses can confidently invest and innovate, the government must provide robust, predictable and enabling regulations which are well-enforced, guided by a clear long-term vision that supports the market's leadership while maintaining fairness.

This vision should be embedded within the Industrial Strategy, offering clarity, reducing risks, and ensuring alignment with national and global decarbonisation goals to avoid conflicting or piecemeal regulation. Additionally, the Government must **protect businesses from inconsistencies in decarbonisation practices**. By establishing consistent standards and regulating new practices early, the Government can support a smooth, transparent transition, ensuring the integrity and competitiveness of UK industry as it advances toward a low-carbon future.

[3] Progress in reducing emissions 2024 Report to Parliament (Climate Change Committee, July 2024)

BEAMA is playing a full role by supporting its membership through the Net Zero industrial transition with its Net Zero Hub, full of resources and practical guides for manufacturers. In turn our members are sharing their best practice of steps they have taken to decarbonise their operations.





Data and digitalisation

To support the delivery of the UK's Industrial Strategy, the Government must leverage data-driven solutions to foster digital transformation across manufacturing sectors. Central to this effort are frameworks like Digital Product Passports (DPPs), which will help manufacturers meet regulatory standards, improve product traceability and enhance lifecycle management. DPPs align with regulations such as the Ecodesign for Sustainable Products Regulation (ESPR) and the new Construction Products Regulation (CPR), promoting transparency, safety and compliance.

For these frameworks to succeed and enable ongoing trade with the EU and global markets, **significant government investment is necessary**. The UK must develop **digital infrastructure and regulatory frameworks** that ensure seamless data exchange, compliance with international standards and competitiveness in global supply chains. **This investment will be crucial to maintaining the UK's position in the global market**, particularly as raw material demands challenge manufacturing capacity.

The Information Management Initiative (IMI) can play a pivotal role in this transformation by improving collaboration, efficiency and sustainability across sectors. Through the IMI, the government can enhance supply chain visibility, simplify compliance with international standards and facilitate the integration of emerging technologies like AI and IoT. These efforts will support manufacturers in navigating global markets, ensuring that they remain competitive and adaptable in the face of evolving regulatory environments.

Additionally, the EU's push for DPPs, with a focus and regulatory drive from sustainability and circular economy goals, offers a model that the UK can align with. This includes promoting reparability, recyclability and sustainable practices, which in addition to environmental benefit, can be a competitive advantage for UK businesses. The government can further support manufacturers by investing in training and upskilling to meet these regulatory demands and ensuring that the UK's data frameworks are compatible with European and international standards. This alignment will ensure continued trade with the EU and global partners, enabling manufacturers to stay competitive and meet evolving sustainability standards.

Smart data solutions, such as insights from energy infrastructure and smart metering, can also support manufacturers by forecasting supply chain needs, optimising resources and aligning with energy transition goals. These insights can drive decarbonisation, enhance supply chain resilience and improve decision-making. This will also support the implementation of demand flexibility as required to deliver the government's clean energy targets.

Partnerships & Institutions

In setting up the Industry Strategy Council it is essential to ensure representation that is not based on individual corporate interests but equally is not so broad brush as to lose any insights into industry sectors. Focussing on individual companies, single technology organisations or top-level business representative organisations will either drive the representation into niche interest areas or lose any insight into what is needed to promote growth across an industry sector, covering both large and small businesses. By including organisations such as BEAMA, which represent a critical and highly valuable section of UK industry, but do not attempt to speak for all business or all manufacturing, the correct level of representation will be achieved.

The Electricity Products Supply Chain Council was set up by BEAMA in 2022 and includes energy sector manufacturing trade associations, public sector (DESNZ, DBT, Ofgem, NIC, devolved administrations), arms-length institutions (BSI and Energy Systems Catapult) and individual companies, with discussions also held with network companies. This pre-existing vehicle already has Government recognition through the DESNZ Networks Forum, and can be a useful vehicle for those bodies to continue to engage with industry, with UK

Government backing. We are in active discussions on gathering more data from Council participants to provide a richer and wider dataset to Government to help track progress of actions taken under the Industrial Strategy and other policy areas.

Chapter summary

If demand is sufficient, Government actions to improve industrial conditions can then create a suitable environment for investment. Recommended areas for action include policy consistency, innovation support, positive trade policy, clarity on industrial decarbonisation, securing the benefits of data and digitalisation in manufacturing, fair competition and direct financial support.

BEAMA AND ITS MEMBERS STAND READY TO CONSTRUCTIVELY AND FULLY ENGAGE WITH GOVERNMENT AND INDUSTRY PARTNERS AS WE PURSUE OUR SHARED GOALS OF DECARBONISATION AND INDUSTRIAL GROWTH.

Summary of requested Government interventions

Requested intervention	Department responsible
Identify how to support existing electricity products manufacturing and build on strengths	Cross-Government
Share a consistent direction of travel on decarbonisation to give consumers clear signals, improve demand and help foster organic market growth.	DESNZ
Address the 'spark gap' – the difference in price between gas and electricity that does not account for environmental or efficiency factors – by developing plans to reduce the price of electricity	DESNZ, HMT
Work to give more visibility and time-specific clarity on demand and orders to electricity networks product manufacturers	Ofgem, NESO, GB Energy, Mission Control, DESNZ
Address all heat policies to make low carbon electric heat the most rewarding option for consumers while giving them a choice of technology	DESNZ
Ensure heat policy is coherent with other energy and industrial policies	DESNZ, MHCLG, DBT, HMT
Provide longer-term regulatory clarity by setting a date for the phase out of fossil fuel heating	DESNZ
Widen support schemes like VAT relief and the Boiler Upgrade Scheme to all suitable electric heating technologies	DESNZ
Get the smart metering programme back on track	DESNZ
Maintain and improve incentives to purchase electric vehicles and increase provision of EV charging infrastructure	DESNZ, OZEV, DfT, HMT, DBT
Assess how many properties will need building electrical system upgrades to prepare for electric heat and transport	DESNZ, MHCLG
Share evidence on skills gap data	DESNZ, Office for Clean Jobs

Requested intervention	Department responsible
Address costs of bringing workers into the UK	DBT
Alleviate impacts on hiring costs to businesses from October Budget by implementing other supportive policy measures	Cross-Government
Improve manufacturer experiences with R&D tax credits	HMT
Implement a Government-wide approach to product design regulations that allows early notice of proposals and then a reasonable amount of time for manufacturers to adapt	Cabinet Office
Improve post-trial commercialisation planning	DESNZ, DBT, DSIT
Seek to ease cost of electricity and energy for manufacturers	DESNZ, DBT, HMT
Improve grid connection times for businesses	DESNZ, Ofgem, NESO, Mission Control
Improve resources for market surveillance and enforcement of existing and new regulations	HMT, DBT, OPSS
Review EU Green Claims initiative	DESNZ, DBT
Review impacts of CBAM on manufacturers and engage with industry	DESNZ, DBT, HMT
Consult on analysis of the impact on UK manufacturing of any additional charges or tariffs will be essential to avoid creating new barriers to growth	DBT
Reinstate support for manufacturers to visit export markets and trade shows	DBT, FCO
Accelerate development of a Green Taxonomy	HMT, DESNZ
Offer further engagement with industry on best options for financial support for industrial growth	DBT
Develop clear, cohesive and actional policy framework for industrial decarbonisation	DESNZ, DBT
Invest in opportunities for data and digitalisation in manufacturing	DBT, OPSS, DCMS
Ensure Industrial Strategy officials and Industrial Strategy Council seeks participation from BEAMA and the Electricity Products Supply Chain Council	DBT

Annex 1: Electricity Networks Infrastructure – a key sector for growth

Why is the electricity networks equipment sector a key sub-sector for the Government to prioritise?

The electricity networks infrastructure sector, especially producing equipment such as transformers, switchgear and associated engineered solutions is the right sector for the Government to promote because:

- It is a high-value manufacturing sector, as the solutions are highly engineered, and increasingly available with the option to incorporate innovative digital solutions
- There is clear export potential: these products are seeing a steep rise in demand globally, and will do for the foreseeable future, as the world is extending electricity networks.
- This sector is comparatively labour-intensive in terms of design and engineering but also skilled assembly. Cable manufacturing facilities for instance are less labour-intensive than transformer and switchgear manufacturing facilities.
- The UK already has a footprint of companies and some of these have recently expanded production in the UK. It is a sector with both global multinationals and small and medium enterprises that are ready to expand under the right conditions.
- Making electricity network infrastructure products locally has a resilience benefit, as the availability of equipment will be less vulnerable to global pressures. Resilience is key for electricity networks as they are an important enabler for wider growth of the economy and decarbonising.
- There are synergies and shared skills between workforce designing and making equipment and those servicing and fixing equipment. Making network equipment locally hence has benefits for energy security and efficiency overall because the workforce employed in designing, making and installing the equipment is also deployed to service and fix infrastructure. Importing large proportions of the future equipment that will be installed therefore makes it more difficult for utilities to source to workforce they need.

Demand for Electricity Network Infrastructure products

The decarbonisation of economies around the world and large-scale electrification will require a large expansion and reinforcement of electricity grids, and this means there will be strong and growing demand for electricity network infrastructure products. This makes this sector a key growth-driving sector the Government should promote as part of the Industrial Strategy.

Growing a strong UK-based electricity network infrastructure manufacturing sector also has resilience benefits because it can help avoid supply chain constraints for these key components, reducing the risk of delays in network infrastructure development. As electricity networks are a key enabler for growth also in other sectors, there are multiple benefits of supporting this sector as a priority within the Industrial Strategy programme. For example, currently, there is a supply shortage of on-load tap changers, which is leading to extended lead times for some transformers.

In order to give manufacturers clearer signals to invest in growing manufacturing capacity, the supply chain needs, first, better visibility of the size of the future market in terms of a pipeline of work ahead. The introduction of strategic energy system planning by the National Energy System Operator (NESO) has potential to enable this, if it is accompanied by the associated data-sharing by network owners, Ofgem and Government. Second, manufacturers require commitment and firm orders for equipment from network owners to invest in new and existing manufacturing facilities. In other jurisdictions, for example in Europe, transmission network equipment manufacturers are seeing longer-term commitment and strategic partnerships between network owners and their supply chain. Transmission owners in some European countries have aggregated their purchasing into procuring programmes of work in bulk rather than individual projects, and this must be replicated in GB.

Given it takes several years to build a new factory, the regulatory framework for electricity networks in the UK needs reform, so as to shift from reinforcing networks only when the need arises, to early investment ahead of need. This will also allow moving from the current situation of a constrained network that inhibits economic development to a connections-ready network that is an enabler of growth. Compared to the increase in network investment required to meet Net Zero targets, the rate of investment has been slow in past years, meaning that most of the reinforcement required will need to be made in the coming years. Arguably, there has been an underinvestment in network infrastructure by network owners, and this has led to well-known barriers to growth and investment in terms of electricity network congestion and long connection-wait times. The lack of investment has also meant that the size of the market for companies looking to invest in the manufacture of electricity network components in the UK has been uncertain, making the UK a less attractive place to invest than other countries.

For the UK to be an attractive place to invest in expanding capacity to manufacture components for electricity grids, the regulatory framework must encourage better visibility of future equipment needs, promote investment ahead of need and it must enable procuring equipment across programmes of work rather than projects.

What else the sector needs to realise its growth potential

Aside from improvements to demand mentioned above, the Electricity Networks Infrastructure (ENI) sector would benefit from specific interventions:

- Capital grant funds that are competitive with other jurisdictions. This means that they must be of an adequate size to justify choosing the UK over other locations to invest in. Grant support must be transparent and predictable. Clarity for companies looking to invest is greater if a company can see – if my organisation meets these criteria, I have a high chance, or I will receive support of *this* magnitude. Increasing certainty for companies may mean reducing the amount of competition employed in the design of a mechanism, because this reduces risk. Lengthy and costly bureaucratic processes to apply for funding with little or no certainty on the outcome will be less impactful in crowding in investment than direct grants or measures like tax credits.
- Local content incentives that make it more attractive for network companies, renewable energy developers, and battery storage developers to buy locally made products, and thereby incentivises their supply chain, that is BEAMA members, to also invest in a local supply chain. Such incentives will generate local growth in line with the Government's Industrial Strategy aims. Incentives for local content must be combined with
    - a suitable transition period with advance notice with input from the industry, as well as
    - support available to grow the local supply chain – so that industry can replace some of the components and services that are imported with alternatives with higher percentages of local content.

  It is important that these local content requirements are designed in a way that makes the support sizable and 'bankable' – so that companies can raise capital to make these investments. This means that they must, like the grant funding, be predictable, rather than uncertain, and sizable.
    - Large enough rather than in small tranches: For instance, the recently reformed 'sustainable industry rewards' scheme (now named 'clean industry bonus'[4]) that is part of the CfD auction scheme that remunerates renewable electricity generators was designed such that for manufacturers supplying components the rewards would result in many small slices from individual generators. This essentially meant that manufacturers and investors, if they are expected to invest in new local capacity on

[4] Department for Energy Security and Net Zero. CfD Allocation Round 7, Clean Industry Bonus framework, see November 19 update https://assets.publishing.service.gov.uk/media/673d0f337524e1b17c494f07/cfd-clean-industry-bonus-allocation-framework-corrected.pdf

this basis, would be asked to invest on the basis of a future potentially expected reward that was not confirmed. This is not a predictable incentive and hence does not work to drive local manufacturing capacity expansion effectively.

- Reliable rather than uncertain and overly competitive: competition is a source of uncertainty which is again less 'bankable' for manufacturers, meaning investors will be less certain to receive a return on their investment. Where renewable generators and their suppliers are competing for receiving these bonus payments, there is uncertainty about whether and when the support will be received. This means that the mechanism will less effectively drive confidence and investment, or – if does lead to investment will mean that the investing party is doing so at greater risk which increases the cost overall.

Annex 2: Electric Heating Manufacturing – a key sub-sector for growth

Why is the Electric Heating Manufacturing Industry a key sub-sector for Government to prioritise?

Summary

- Without electrification of heat there is no energy transition and flexibility benefit.
- Electrification of heat needs to be understood as a movement across the UK and not linked to a single technology solution like Heat Pumps.
- By promoting a wider group of technologies beyond heat pumps alone we offer a range of solutions to customers and installers on the electrification journey and also address the fact that certain applications will frequently require an alternative solution to a heat pump.
- If we do not link the Home Energy Model and Smart Secure Electricity Systems framework, we will have the unintended consequence of not encouraging and rewarding customers to embrace flexibility technologies.
- Hot water is very much the forgotten solution in much flexibility policy at the moment and this needs to be addressed, including ensuring a minimum volume hot water store in all new buildings and discouraging cylinder removal.
- The Economic benefits for developing the market for net zero technologies are well recognised including in the Net Zero Review commissioned by the previous Government.
- Supporting the diversification of the market within the bounds of making progress on decarbonisation widens consumer choice, as some heating technologies are more suited to certain property types and consumer circumstances.
- There are design and manufacturing premises for these products in the UK.

Electric Heating in the UK has a significant market size

Although natural gas has dominated the UK domestic heating market for over 50 years, electric heating, which was established in the UK over 100 years ago, has consistently remained the **second most popular form of heating for UK homes**, and it remains so today.

Of the 28 million homes in the UK, **2.6 million (9.2%) have electric heating**, of which 2.3 million are heated with direct electric resistance heating such as storage heaters, panel heaters or electric boilers. The remaining 300,000 are heated with a heat pump.

Heat pumps are fitted in a wide range of housing stock types, whereas **60% of electric resistance heating tends to be installed in flats** and the remaining 40% is mostly found in older properties.

There are currently 7 million domestic hot water cylinders installed in residential properties with 1.1 million of these heated electrically. Electric instantaneous water heating is long established in commercial and industrial premises in the UK, but as the average newbuild flat has decreased in size over the years, space constraints and occupant lifestyle in these dwellings has **made instantaneous water heating more attractive**. Of the 24 million households fitted with a shower, the most popular choice is an electric one.

Applications and Market Potential for electric heating technologies

Modern storage heating systems are significantly more advanced than the previous generation of products dating from the 1980s. These fully electronic, algorithm-driven intuitive appliances have a long operational life span and no degradation in performance or efficiency over time. They are suitable for around 5% of the current housing stock, giving them over 3-million-unit deployment potential.

Electric panel heaters are ideally placed to fill the requirement for extremely low thermal demand flats and apartments which cannot accommodate heat pumps for practical reasons and are an ideal accompaniment to a domestic hot water heat pump or electric instantaneous water heating. The market potential for this technology is all small newbuild flats or apartments, which usually accounts for somewhere between 16-20% of properties per year.

Smart thermal stores are drop-in boiler replacements utilising smart algorithms and flexibility tariffs. These are suitable for 20 to 30% of homes from small flats up to three to four bedrooms semi-detached houses with up to 5kW heat loss.

A Thermal Hydro Store is a phase-change thermal heat battery for domestic hot water which could integrate with modern storage heaters and most thermal stores but will use less space than conventional cylinders and deliver up to four times more hot water

Heat Batteries charge from electricity, stores that energy as heat, before releasing the heat into a central heating system via a heat exchanger.

Domestic hot water heat pumps are the perfect complement to modern storage or panel heaters fitted in smaller flats but are eminently suitable for any property requiring a standalone low carbon domestic hot water solution.

Heat pumps – to achieve its decarbonisation of domestic heat targets the government is heavily reliant on heat pumps as the key technology. Progress in encouraging households to install heat pumps has been slower than planned due to a variety of factors, with sales of only 60,000 units in the last year. Nevertheless the take-up of heat pumps in the new build sector currently stands at 10.7%, and this is expected to grow to 50% by 2027 as the Future Homes Standard is phased in, and to 89% by 2029 (HPA)

Overall market growth and employment – The current volume of fossil-fuelled boilers that are sold each year in the UK is between 1.3 million and 1.6 million units, and the previous Government's projection was to displace these boiler sales volumes with heat pumps by between 2033 and 2035. This now looks unlikely within that timescale, but unless the policy framework changes dramatically, the general growth trajectory will remain, and **the same number of installers that are currently employed to install fossil fuel boilers (around 130,000) will be needed by 2035 to install and service heat pumps**.

Commercial and industrial applications

The government expects the commercial and industrial sector to decarbonise as part of its overall strategy to reach net zero emissions by 2050, and many electric heating technologies are already available to contribute to this, but in many cases just need to be scaled up for commercial and industrial application. Scandinavian countries lead the way when it comes to industrial-scale heat pumps, but the technology utilised is proven and there is no reason why UK manufacturing could not be part of that success story, heating schools, supermarkets, retail outlets, factories and warehouses etc.

Energy price resilience

The electrification of heat can also make the sector more resilient in that the price of electricity should no longer be inextricably linked to the price and availability of gas as the decarbonisation of the grid continues, and **consumers are thereby protected from the significant fuel price variations** experienced in the last few years.

Export potential

There is global demand for electric heating appliances and particularly heat pumps.

The value projection worldwide for heat pumps is expected to **grow by 74% by 2029 to 157 billion USD** as the world decarbonises its heating. The UK already has a number of long-established electric heating manufacturing centres of excellence with an experienced, skilled workforce, and new factories and dedicated new production lines have opened in the last two years to service the growing demand, not just in the UK but worldwide. The potential to scale up to satisfy an increase in demand is there if the conditions are right.

To support this sub-sector the government should:

Provide long term policy stability

If the Government is truly wedded to the decarbonisation of heat it must look beyond the short term and be seen to introduce long term, sustainable and workable policy measures. Most importantly these interventions must be clearly seen by the public and trade as long-term commitments to the objective of mass rollout of low carbon heating.

The stop/start nature of previous UK policy support has made manufacturers wary of investing in the considerable resource needed to commit to building new premises, or expanding facilities, to support entering or escalating their presence in the market. This impacts other investments such as recruitment, training and equipping of manufacturing, sales, service and installer personnel.

In many cases however, these manufacturers are global or international businesses with the option to expand their operations overseas as an alternative to the UK. This will increasingly be the case if these alternative countries have more favourable market conditions, more lucrative potential returns, fewer bureaucratic hurdles to clear, and a track record of sustained government support.

For businesses these are long-term decisions, often involving significant structural financial implications, as part of a minimum 5 to 10 or multi-year plan. They are not taken lightly and then the business is "locked in" to those development costs once committed because of these sunk costs.

Rebalance the price of electricity against gas for both industry and the consumer

The UK government has disproportionately applied environmental and social obligation levies to the price of electricity for the consumer in the UK. Removing these and effectively re-balancing the relative cost of electricity versus gas would be more likely to encourage demand for heat pumps and other electric heat solutions.

Moreover, the UK has the highest industrial electricity prices in the world. Our industry pays 50% more than Germany and Portugal for its electricity, 92% more than Spain and 264% more than Finland and Sweden, significantly affecting competitiveness in the UK.

Other measures

- Ensure that the Home Energy Model rewards time-of-use tariffs and flexibility or we will exclude many properties through the Minimum Energy Efficiency Standards improvements. This will also serve as an illustration as to how important flexibility is for the market.

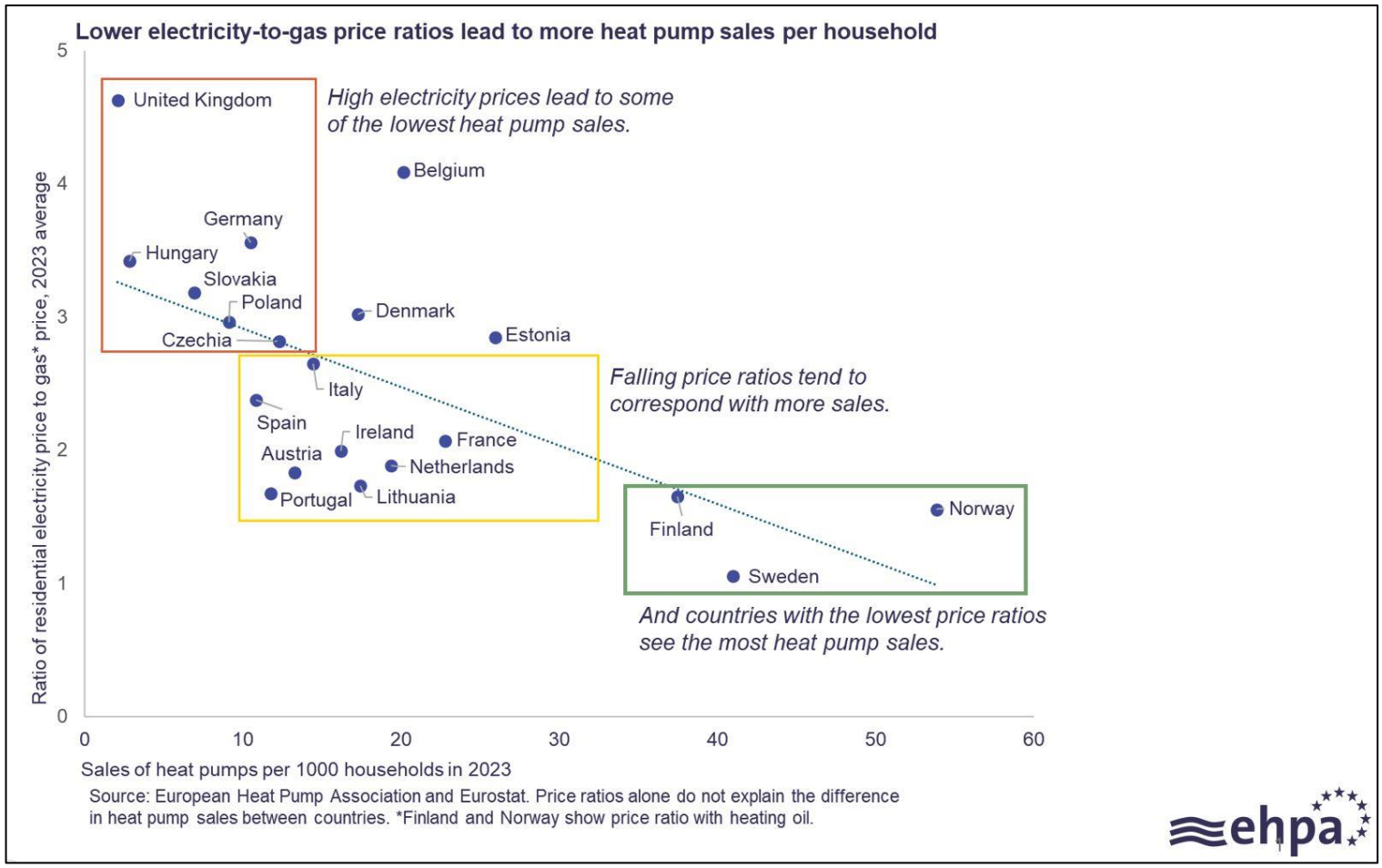
- The Warm Homes Plan must include a strong retrofit strategy. This should factor in how to replace existing older storage heating systems with modern equivalents at pace in order to promote flexibility and reduce household energy bills.
- The manufacturers of ESAs need clarity on specification requirements to attract R&D investment in time to develop products.
- The Future Homes Standard must not be a single technology solution.
- The Energy Company Obligation has an important role to play in promoting storage upgrades to allow lower income and social housing residents to benefit and helping to scale up the market.
- Ensure that alternative heat technologies to heat pumps, such as storage heating and heat batteries as well as hot water, are recognised as part of the decarbonisation solution for the 20% of households which the previous Government estimated are not suitable for heat pumps. These alternative technologies should be listed as accepted measures in recognition that, if installed now, they too will be net zero solutions within the lifetime of the heating system. This should include their eligibility for VAT relief and grant schemes available to heat pumps.
- Increase funding available for training installers and engineers needed to provide maintenance support and heating design, and mandate for installers to attend low temperature heating system training courses.
- Connection of heat pumps needs to be seamless. The ENA Digitisation of Connection project makes it easier for installers to apply for connection, but DNOs are over-cautious with multi-occupancy buildings and rejection comes very late in the transactional process.
- Smart meter take up needs to be accelerated, as digitisation will support rollout of ESAs and flexibility data availability will also enable justification for the use of a wider range of technology applications
- Grid connection delays are hampering the introduction of large-scale heat pumps needed for industrial electrification.

What do other Countries offer?

In contrast to the UK's position, other countries offer our members a range of attractive inducements –

- France, Germany and Italy have grants for hybrid heating systems to increase uptake of heat pump technologies
- Germany offers to fund 35% of the total consumer cost of a heat pump.

- Sustainable Energy Ireland and Enterprise Ireland offer many grants for business energy upgrades, and support innovations, sustainability, building capability and scaling locally and internationally, including funding of a significant proportion of factory developments.
  Perhaps most important of all is the clear demonstration of the correlation between the electricity-to-gas price ratio and Heat pump sales shown in the graphic below, displaying that those European countries with the lowest electricity-to-gas ratios have the highest heat pump sales per capita:



Further details: Flexibility benefits

It is now well established that flexible appliances and a flexible energy system can **cut bills for householders and reduce the costs of grid upgrades**. Increasing demand side response capability while decarbonising home heating will **enable peak avoidance** and maximise the use of abundant renewable energy – but only if the appliances are recognised as Energy Smart Appliances (ESAs).

Heat pumps are mandated as ESAs, and they will be used to manage hourly variability in electricity demand at both national and local level.

The key benefits of heat pump flexibility will include:

- Operational flexibility
- Network balancing
- Demand shifting
- Depending on uptake the aggregated impact of nationally aggregated heat pump flexibility could reach around 4 GW

However, we should also focus on offering consumers a **broader range of technology choices** to decarbonize optimally while enabling the DSR that is necessary for a flexible secure grid.

Modern storage heaters are also mandated as ESAs and the 3 million units currently deployed in the UK enable a potential 66 GWh of daily flexibility capacity with a connected load of 9.4 GW

Smart thermal stores should also be mandated as ESAs as each appliance can store up to 40 kWhs of thermal energy

Thermal Hydro Stores offer up to 1000 kWhs of load shifting potential in a year depending on the size of the solution

Heat batteries These products can be a drop-in replacement for a fossil fuel boiler for a 2-4 bed house with a heat loss of 5kW or less

Domestic Hot Water Heat Pumps could offer 10 GW of flexible load if only 2.8 million hard- to- treat homes adopted this technology for sanitary hot water in conjunction with smart storage heating for space heating.

The humble **domestic hot water cylinder** has been overlooked as a flexible opportunity which can either be heated indirectly paired with a heat pump or thermal battery store or directly with an electric immersion element.

There are around 7 million of these cylinders in situ in a variety of domestic properties. Currently able to provide a potential 54 kWhs of untapped energy, this is more than five times the capacity of the UK's largest pumped storage facility, Dinorwig in North Wales.

This significant collective storage capacity could play a crucial role in balancing the National Grid and yet these cylinders are being removed on a daily basis to accommodate combination boilers.

Further details: Storage

Storage is essential to the UK's drive towards an energy transition underpinned by electrification, but in application, storage is not confined solely to a single overarching thermal storage definition. In effect a storage solution for heat and hot water can be defined through 4 different applications, each delivering the benefits of electricity grid flexibility and stability, low carbon energy use and lower energy bills. The 4 definitions are as follows:

1. A 'high heat retention storage heater' is a device with heat retention not less than 45% measured according to BS EN 60531. It incorporates a user interface timer and electronic room thermostat to control the heat output. These devices are also able to estimate the next day's heating demand based on external temperature, room temperature settings and heat demand periods.

2. A heat battery device that charges from electricity or another energy-saving material, stores that energy as heat, before releasing the heat into a central heating system via a heat exchanger

3. A heat battery device for hot water and high heat retention storage water heaters that charges from electricity or another energy-saving material and stores that energy as heat, before releasing the heat to a hot water system via a heat exchanger. To qualify as energy saving, their insulation must be equivalent or better than the A+ class for hot water storage tanks as defined in *The Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019, Schedule 5, 10. Commission Delegated Regulation (EU) No 812/2013.* e.g.

4. A smart hot water cylinder with machine learning that volumetrically stores energy from electricity or from another energy-saving material as instant useable hot water with an option to also release stored hot water back through a virtual buffer heat exchanger into the heating system at peak heating demand whilst retaining useable hot water. This technology is already classed as an ESA device in the SSES consultation. This technology is recognised through Appendix Q in the building regulations and a new PCBD category in HEM

The above technologies are not exclusive to specific manufacturers in application or green market growth potential and through addressing a range of policy barriers such as the Home Energy Model, Energy Smart Appliance and Boiler Upgrade Scheme scope and

other fiscal incentives such as VAT relief, we can stimulate not only end user investment but also create a platform for new manufacturing and innovation capability.

In all cases, the key definitive criteria are based on a product that is equipped at point of sale to an end customer (including core technology and necessary controls) that can take a charge from an electricity source or other energy saving material (e.g. Photovoltaic, or heat pump for hot water production), store this useful energy and release it in the form of a heat or hot water service. Qualifying storage technologies must be able to operate in a flexible charging mode with end user-controlled output.

As a qualifying technology scope with sub products aligning with the definition, storage can offer:

- Decarbonisation and Net Zero benefits through a contribution to the energy transition to electrification
- A boost to productivity with UK manufacturing in place to deliver these products and train a new segment of 'green skilled' installers.
- Reduced energy bills through offering the flexibility to charge units during cheap supply periods[5]

Policy intervention is needed to allow the heat and hot water storage solutions market to scale up so that the clear benefits are more accessible to the public, placing a number of technology options to enjoy a level playing field with other clean heating options (eg heat pumps). These technologies support the broader rollout of heat pumps through provision of electrical diversity and are an option for people who often cannot electrify via a heat pump for technical/spatial reasons.

The current policy driven fiscal landscape and energy modelling approaches is distorting the market and excluding other low-cost energy efficiency and net zero-compatible electric heating and hot water solutions for many consumers. This distortion not only limits cost effective alternatives for consumers but also creates barriers to investment, restricting growth of key market sectors for the UK's net zero delivery.

The benefits of storage for heating in buildings are significant. Storage allows shifting demand to lower cost times of day as a direct benefit to the consumer – for example, a solution can allow a consumer to heat their home with >95% of the electricity consumption used to do so in off-peak hours. Storage can also limit the impact from increased electrification on the grid by facilitating energy flexibility, which can also mean limiting balancing mechanism costs. There are storage solutions that are quick and easy replacements for gas boilers or capable of complementing existing Energy Saving Appliances (e.g. photovoltaics and heat pumps) with minimal disruption and allowing easy

[5] Including the British Gas Dimplex Quantum Tariff and Octopus Agile Tariff

control. Solutions can have running costs comparable with alternative fossil fuel options. Changes to Government policies on financial support could also see the installed cost to the consumer come very close to that of a gas boiler, with a lower overall subsidy cost to Government than currently available for some other heating technologies to the benefit of extending the range of Net Zero-compatible options for consumers.

The suitability of heat and hot water storage is not limited to any geographical area and oftens favours those in fuel poverty with limited means to engaging in the smart energy grid via other means.