

Written evidence submitted by Thermal Storage UK (IND0001)

We recommend that the UK government uses its Invest 2035 industrial strategy to support existing innovative British companies to expand production of highly flexible heat batteries. British companies such as Sunamp and tepeo are leading the way in building and deploying heat batteries in UK homes, while companies such as Caldera are working to decarbonise UK industrial heat processes. The UK is a global leader in the development and manufacture of heat batteries, though there is fierce competition from companies in the US, Europe and Asia.

Heat batteries are one of the clean electric technologies that can heat UK homes and decarbonise UK industrial processes, while providing the necessary flexibility to the electricity grid to reduce peak demand. Heat batteries are a novel but proven technology to decarbonise homes, reducing carbon emissions when the homeowner switches from fossil fuel heating and pairs their heat battery with time-of-use tariffs from companies such as OVO or Octopus Energy.

There is an opportunity for the UK to grow sectors such as heat battery manufacturing, creating and maintaining great careers in manufacturing and research and development. For clean heat, we recommend that the government learns the lessons from the UK losing its lead on wind turbine manufacturing over the last 20 years.

Heat batteries provide an export opportunity for the UK as other countries look to decarbonise domestic heating and industrial processes. The potential for heat batteries is significant, as shown by Sunamp starting to export to countries such as Poland and the United States, while tepeo is working with Jersey Electric and ESB in Ireland. The extent of support from the UK government to deploy these energy-saving products in the UK will influence the speed and scale of exports to other countries trying to reduce carbon emissions from heating.

More about Thermal Storage UK

Thermal Storage UK represents companies who have developed modern thermal storage products. We promote the use of smart thermal storage, particularly heat batteries, in buildings in the United Kingdom and other

countries to achieve net zero. Our mission is to take the carbon out of heating buildings.

You can find out more about Thermal Storage UK at www.thermalstorage.org.uk

Questions

How can UK plc capture its fair share of the economic potential of emerging or less developed energy technologies?

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The key enablers of the heat battery subsector are (a) reducing capital costs for switching from fossil fuels to electrified processes, (b) reducing the cost of electricity relative to fossil fuels (particularly gas) and (c) incentivising flexibility to make better use of renewables and the capacity of the electricity grid.

These enablers are partially being addressed through the government's 2030 clean power mission. However, the UK government could go further in supporting British homes and companies to make the switch to low carbon electric technologies such as heat batteries.

For homes, this support could involve subsidies for capital costs (such as extending the Boiler Upgrade Scheme for heat batteries for space heating where heat pumps are too expensive or difficult to install), or support for low carbon heating with lower electricity prices (similar to the supercharger policy for energy intensive industries).

To support electrifying British industry, we recommend that the UK government provides funding to those pioneers purchasing heat batteries for industrial processes. This will lower the upfront cost for those industrial users and allow British heat battery manufacturers to scale up production and achieve economies of scale. The US government applied this approach through the Inflation Reduction Act, generating significant investment in their US operations from Diageo, a member of the FTSE 100. Without this initial support, there is a risk that American companies such as Rondo or European companies such as Kraftblock may benefit and capture global market share at the expense of British manufacturers.

We recommend that the UK government provides a similar level of support to electrifying British industry as is being provided to big bets on technology such as carbon capture and industrial hydrogen. For a sense of scale, the UK government has committed £1 billion per year for 25 years in support for carbon capture. If those big technology bets around hydrogen and carbon capture pay off, they will provide a decarbonisation pathway within industrial clusters. But more than half of British manufacturers operate outside of industrial clusters. For those manufacturers, electrifying their processes is likely to be the main pathway to decarbonisation.

What more can the Government do to encourage greater domestic supply chain investment in the energy industry by 2035, including through the Contracts for Difference scheme?

We recommend that the government supports British businesses to establish the lead on manufacturing industrial heat batteries by providing up to £25 million during the next Spending Review. This support would transform the landscape for heat batteries for industrial use in the UK and

provide export opportunities for global applications. Today, British manufacturers desperately want to reduce their carbon emissions but are unwilling to invest in flexible technologies such as heat batteries because, as flexibility is weakly valued in the energy system today, the payback on their investment is too long. The scheme we recommend would reduce that payback period from 8 years to 5 years, opening up a wide range of investment cases. The support would aim to bridge the gap between the purchase price that customers are currently willing to pay (which is below long-term cost) and that scaling up heat battery manufacturers can currently sell (above long-term cost).

We recommend that the UK government supports the deployment of the first 250 MWh of industrial flexibility provided by heat batteries. We recommend introducing a mechanism that provides UK-based manufacturers of heat batteries with a preallocated subsidy per kWh of flexibility deployed. This subsidy would then reduce the capital cost of industrial heat batteries. We recommend an initial subsidy of £100 / kWh to reflect the novel technology and high initial production costs. If the support was used in full, it would cost £25 million and deliver a new market worth at least £125 million. The size of the subsidy could then taper down as more heat batteries are deployed. This £25 million is significantly less than what the government has earmarked for other industrial decarbonisation processes, such as the £1 billion per annum allocated towards carbon capture projects.

We recommend that the UK government directly finances this early part of the industrial transition to accelerate electrification and ensure the UK remains within its carbon budgets. Most support schemes in the energy sector, including the cap and floor mechanism for interconnectors and long-duration energy storage and Contracts for Differences for renewables, end up on electricity bills. This increases electricity bills relative to fossil fuels, slowing down fuel switching and electrifying industry. Recognising the tight public finances, the necessary funding could in part come from reallocating taxpayer money currently earmarked for hydrogen or carbon capture projects.

Providing support would also seek to address gaps in the government's work to deliver lower, cleaner and fairer electricity bills. In particular, this scheme fills gaps between the work to remove levies from electricity bills (which focuses on domestic), the supercharger subsidy (which focuses on specific energy intensive industries) and the government's long duration storage work (which focuses on electricity storage). In the absence of network price signals, there is a weak incentive for businesses to switch to flexible technologies.

In addition, we recommend that the UK government runs a second phase of the Heat Pump Investment Accelerator Competition, expanding the scope to cover British manufacturers of heat batteries. We recommend that this is called the Electrifying Heat Investment Accelerator Competition.

Does the UK have the supply chain capacity to deliver the required energy infrastructure by 2035, including an expanded electricity network?

The UK needs to significantly scale up investment in the supply chain to deliver energy infrastructure, including distributed smart thermal storage such as heat batteries, to deliver the Clean Power mission by 2030 to support the Invest 2035 industrial strategy.

To what extent would growing the domestic supply chain bolster UK energy security?

Maximising the use of heat flexibility through heat batteries would enhance energy security by making the best use of renewable generation from wind and solar. This demand-side flexibility in turn reduces the need to import fossil fuels, particularly gas, to manage peak load.

What are the key concerns with respect to the availability of raw materials in the supply chain and how might those be addressed?

One advantage of heat batteries produced by British manufacturers such as Caldera and Sunamp is that, unlike many electro-chemical battery technologies, they do not rely on the import of rare minerals.

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