Chartered Institute of Housing (CIH) response to HMRC call for evidence on VAT energy saving materials relief – improving energy efficiency and reducing carbon emissions

Summary of our response

CIH is supportive of the proposals to add electrical battery storage (henceforth 'battery storage' or 'battery storage technologies') to the list of qualifying technologies for VAT relief. Social housing providers are increasingly considering the retrofitting of battery storage technologies inside their existing homes, and many providers are trialling technologies inside small numbers of their properties. The advantages of installing battery storage inside social rented homes are as follows:

- Reducing domestic energy bills for residents by storing power generated in the home for use in peak pricing times.
- Reducing CO_2 emissions from social rented homes. When retrofitted to solar PV, evidence suggests that the CO_2 emissions savings will be greater than with the PV alone.
- Reducing the demand for electricity from the grid, and curtailing the need for fossil generation to meet grid demand at times of low renewable output.
- Once SAP 10.2 is adopted, contributing directly to energy efficiency targets in the social rented sector.

Currently, social housing providers are disincentivised from installing battery storage technologies inside their homes. This is partly due to the high cost of purchase and installation, and partly because the current [2012 Reduced Data Standard Assessment Procedure] (RdSAP, henceforth SAP2012) does not currently afford any points to battery storage technologies, and their installation does not therefore boost the energy efficiency of a property. However, the forthcoming adoption of SAP 10.2 will provide an increase to the Energy Score with a battery installation, removing this barrier and making batteries eligible through the Social Housing Decarbonisation Fund. The removal of VAT from battery storage will therefore meet the three objectives outlined in the consultation and work in tandem with broader SAP changes to significantly incentivise the installation of battery storage in social rented homes.

We believe that the government should also explore whether Mechanical Ventilation with Heat Recovery (MVHR) should be included in the relief. MVHR systems result in improved ventilation in domestic homes and lower carbon emissions, and MVHR performance outperforms natural ventilation by between 20

and 30 per cent in terms of carbon emissions for all levels of airtightness. Social housing providers are increasingly including MVHR in whole-house retrofit programmes, and extending the VAT relief to MVHR could therefore support the reduction of overall whole-house retrofit costs for social housing providers.

In preparing our response to this consultation, CIH has consulted with our members to understand their views on the proposed changes. Specifically, we issued a survey to members representing registered social landlords to understand the extent to which extending VAT relief to battery storage would encourage their installation inside social homes. We have also consulted directly with some members, and with wider stakeholders and experts, to inform our response.

Detailed responses to consultation questions

Do you think battery storage should be included in the relief when: Question 1: Retrofitted to a solar panel or other ESMs (please provide details)?

Yes (see response to Question 2 for details).

Question 2: As a standalone technology, not connected to another ESM?

Yes, CIH thinks that battery storage should be included in the relief when retrofitted to a solar panel and as a standalone technology.

In both cases, CIH members who responded to our survey agreed that this would encourage installations in social rented homes under their management. Our members noted that battery storage increases the impact of solar installations and enables residents to benefit directly or financially from the power generated on-site. Furthermore, members noted that the installation of battery storage encourages the use of power directly by the resident at times of low solar generation or at times when a flexible electricity tariff may be at its most expensive. This ensures that the benefit derived by residents is less tied to import tariffs provided by energy companies. This testimony is consistent with evaluations of battery storage trials in social rented homes. For example, an evaluation of the installation of battery storage in social homes in 2018 found that higher consuming households saved an average of up to £1.21 per day over the evaluation period, equating to average annual savings of £440. In the present day, with electricity prices much higher than in 2018, this saving would be even more substantial.

However, CIH members noted that the cost of battery storage technologies was often prohibitive. Accordingly, reducing the capital cost required to install battery storage by removing VAT was viewed by our members as a positive step that would encourage increased numbers of installations, and therefore provide financial benefits to residents and reduced carbon emissions from their homes. CIH also thinks that battery storage should be included in the relief when retrofitted to other domestic generation technologies, specifically wind and water turbines. Pole or building mounted wind turbines can generate approximately 9,000 kWh per day but are subject to fluctuations in wind conditions. Battery technologies can effectively supplement both technologies by storing excess electricity and using it when wind and water electricity output is low.

Question 3. Can you explain how this type of battery storage would meet each of the 3 objectives set out in Chapter 2?

Improving energy efficiency and reducing carbon emissions

The energy efficiency of domestic homes is primarily measured by Energy Performance Certificates (EPCs), which are based on SAP2012. At the time of writing, SAP2012 does not afford any points to battery storage technologies, and their installation does not technically boost the energy efficiency of a property. This has been highlighted by CIH members as a barrier to the installation of battery storage technologies. Following the 2017 Clean Growth Strategy, social housing providers have been working towards improving their properties to EPC Band C by 2030. The exclusion of battery storage from SAP2012 disincentivises the inclusion of battery storage in the asset management and home improvement strategies of social housing providers despite the undoubted benefits they could make to the lives of residents, partly because government energy efficiency schemes (e.g. the Social Housing Decarbonisation Fund) use SAP2012 to determine technology eligibility. Battery storage technologies are therefore not eligible to be funded through these schemes, and are consequently not foregrounded in the asset management and improvement strategies of social landlords.

However, SAP2012 is due to be replaced by SAP 10.2, which includes battery storage technologies. SAP 10.2 will provide an increase to the Energy Score with a battery installation. Battery storage technologies will therefore contribute to improved energy efficiency in domestic homes from the date SAP 10.2 is implemented, and the proposed removal of VAT relief is thus aligned with this objective.

Beyond the understanding of energy efficiency described by EPCs, there is evidence that the installation of battery storage technologies contributes to the reduction of carbon emissions from domestic homes. One academic study on the annual CO2 savings of a) solar PV systems and b) solar PV systems with integrated battery storage concluded that in 2018 a PV system could have achieved about 650kg in annual CO2 savings. In comparison, it concluded that a PV system with an integrated smart charging battery system could have achieved a higher annual CO2 saving of 825kg in the same year.

More generally, the integration of PV and battery storage technologies increases self-consumption of renewable electricity and reduces the use of electricity received from the grid. Research from the Energy Saving Trust estimates that adding battery storage technology to a solar system will increase the proportion of electricity used on site by between 35 and 75 per cent. Overall, this reduces the demand for electricity from the grid and can accordingly cut the need for fossil generation to meet grid demand at times of low renewable output. Installed in isolation, electrical battery storage can be charged at times when the proportion of renewable energy supplying the grid is high. It can then be discharged at times when the proportion of renewable energy supplying the grid is low, avoiding the consumption of electricity from the grid at times of high fossil generation. In addition, growing numbers of battery storage installations – supported by the VAT relief – may allow a larger number of solar panels to be retrofitted to existing homes without the need for grid enforcement works by Distribution Network Operators (DNOs). Incentivising the installation of battery storage technologies by removing VAT would therefore contribute to the broader decarbonisation of the electricity grid by reducing the quantities of fossil generation required to supply it, both now and to 2050.

Cost effectiveness

As noted above, removing VAT relief from battery storage is likely to encourage their installation inside social rented homes. This is because, from the adoption of SAP 10.2, their installation will contribute to reduced energy bills for residents and energy efficiency targets in the social rented sector. CIH therefore believes that extending the VAT relief will positively affect the uptake of battery storage in the sector.

To provide a specific example, we received feedback from a CIH member that they are retrofitting hybrid inverters, an interface between solar PV and battery storage, into their homes so that batteries can be added when cost effective to do so at a later date. Other CIH members also noted that they were examining the potential installation of battery technologies in their homes, and that the extension of the relief would encourage them to do so.

Alignment with broader VAT principles
CIH has no comment on this objective, only to note that removing VAT from battery storage would be consistent with broader VAT removal from domestic renewable technologies previously implemented by the government.

Question 4: Can you explain how this type of battery storage operates?

Electrical battery storage operates by storing electricity generated by solar PV, wind turbines, or other on-site renewable generation technologies. This electricity can then be discharged at times of low generation (e.g. in the evening when the sun has set) to power household electrical equipment. Operated in conjunction with a flexible electricity tariff, an electrical battery can also store electricity obtained from the grid at cheaper times of the day, which can then be discharged at times of peak electricity pricing.

Question 5: What is the typical cost of installing this type of battery storage in residential accommodation?

One previous study noted a total cost of £6,708 for an appropriate battery storage technology. This was split into £5,708 equipment cost and £1,000 installation cost.

However, a more recent estimate for the same model suggests an installation cost of between £12,970 and £17,760, depending on different factors. More generally, increases in labour and capital costs for domestic retrofit and renewables installations are increasingly problematic for social landlords; extending VAT relief to battery storage would consequently be a welcome step in encouraging landlords to incorporate their installation into asset management cycles.

Question 6: What are the advantages and disadvantages of including this type of battery storage within the relief?

We have nothing to add to the advantages outlined above.

Are there any other technologies you believe meet our objectives, but do not currently qualify for the relief?

CIH believes that the government should explore the inclusion of Mechanical Ventilation with Heat Recovery (MVHR) in the relief.

If so, for each technology, can you answer the following questions:
Question 7: How would you describe and define this technology for the purposes of the ESMs relief?

MVHR are one of several ventilation systems used in domestic dwellings. They are defined by the Passivhaus Trust as a system that extracts warm air from bathrooms, kitchens, and utility rooms before passing this over a heat exchanger which transfers the heat to fresh air from outside the building.

Question 8: How does the suggested technology meet each of the 3 objectives in Chapter 2?

Improving energy efficiency and reducing carbon emissions

Analysis by the Passivhaus Trust has shown that MVHR systems result in improved ventilation in domestic homes and lower carbon emissions, and that MVHR performance outperforms natural ventilation by between 20 and 30 per cent in terms of carbon emissions for all levels of airtightness. They concluded that there is a strong case for MVHR systems to be encouraged in retrofits where significant reductions in energy demand are being targeted. Feedback received from CIH members also suggested that MVHR should be considered for VAT relief in the future.

Cost effectiveness

CIH does not have specific evidence on the cost-effectiveness of including MVHR systems within the relief. However, some evidence suggests that MVHR systems are increasingly common in new build homes, but are more costly when retrofitted into domestic homes. Local authorities and housing associations are also increasingly including MVHR within sustainable whole-house retrofit design programmes, and considering their inclusion, especially as part of a single supply, could support the reduction of overall whole-house retrofit costs for social housing providers.

Alignment with broader VAT principles

CIH has no comment on this objective, only to note that the evidence above suggests that removing VAT from MVHR may be consistent with broader VAT removal from domestic renewable technologies previously implemented by the government.

Question 9: Can you explain how this technology operates and does it work in conjunction with other technology? If so, how?

MVHR operates by extracting warm air from bathrooms, kitchens, and utility rooms before passing this over a heat exchanger which transfers the heat to fresh air from outside the building.

As described in one academic study, improved thermal performance associated with low- and zero-carbon domestic homes is accompanied by a focus on airtightness levels, which reduces natural infiltration and heat loss through building fabric. This makes appropriate ventilation a necessity to avoid poor internal air quality, high humidity, and potential issues with damp and mould in highly airtight homes. In such homes, MVHR is required to create adequate ventilation, and can also reduce space heating energy demand through recovery of heat through the extracted air.

Consequently, MVHR works in conjunction with other technologies in the sense that it is sometimes required for fully achieving the benefits of wider whole-house retrofit in existing homes.

Question 10: What is the typical cost of installing this technology in residential accommodation?

We do not have a reliable estimate to share in response to this question.

Question 11: What are the advantages and disadvantages of including this technology within the relief?

We have nothing to add to the advantages outlined above.

About CIH

The Chartered Institute of Housing (CIH) is the independent voice for housing and the home of professional standards. Our goal is simple – to provide housing professionals and their organisations with the advice, support, and knowledge they need to be brilliant. CIH is a registered charity and not-for-profit organisation. This means that the money we make is put back into the organisation and funds the activities we carry out to support the housing sector. We have a diverse membership of people who work in both the public and private sectors, in 20 countries on five continents across the world. Further information is available at: www.cih.org.

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