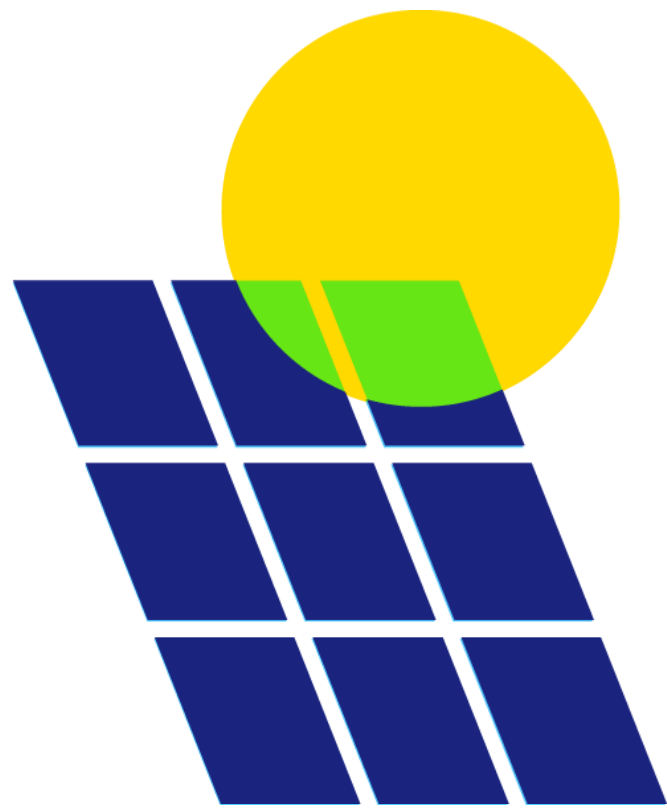




Solar Energy Scotland consultation response

New Build Heat Standard: Scoping Consultation



About us

Since 1978, Solar Energy UK has worked to promote the benefits of solar energy and to make its adoption easy and profitable for domestic and commercial users. A not-for-profit association, we are funded entirely by our membership, which includes installers, manufacturers, distributors, large scale developers, investors, and law firms.

Our mission is to empower the UK solar transformation. We are catalysing our members to pave the way for 40GW of solar energy capacity by 2030. We represent solar heat, solar power and energy storage, with a proven track record of securing breakthroughs for all three.

Solar Energy Scotland, part of Solar Energy UK, works to shape policy that will enable Scotland to fully realise its potential for solar and energy storage application within the power, heat and transport sectors, in contribution to the nation's aim of reaching net zero by 2045.

Respondent details

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Would you like this response to remain confidential? No

Introduction

We welcome the opportunity to respond to the *New Build Heat Standard: Scoping Consultation* from the Scottish Government. Solar Energy Scotland has rightfully highlighted this to be an area of importance and one that the Scottish Government must get right in the decarbonisation of heat.

Our main concern is to ensure that, given the significant expected increase in demand for power which will result from the electrification of heat in Scottish homes and buildings, measures to improve energy performance support the inclusion of onsite electricity generation are promoted wherever possible. This would help make certain that electrified heat is not produced at unnecessary expense to consumers, reduce the need for expensive and complex grid reinforcement works, and enable renewable heat objectives to be met as quickly as possible. We develop these points in our responses to the questions below. Thank you for taking these into

consideration.

Question 1: Do you agree with the above key outcomes? Please explain your view.

Please see our response to Question 2.

Question 2: Are there any additional outcomes which should be embedded here?

Yes. There are three additional outcomes we recommend be embedded:

1. The demands of electric heating must not overburden grid connections and ongoing efforts to decarbonise electricity generation. Decarbonising the grid is a necessary step to achieving net zero, but the additional load implied by electrifying heating across Scottish building stock risks system-level strain on the network, absent major investment and engineering works. This will also take years to deliver. To mitigate against this, the Government should prioritise and further incentivise the use of distributed and onsite power generation for new and existing buildings to help meet their own demand wherever possible.
2. Building standards should move to considering the total energy use of the property, including an allowance for plug-in-loads such as white goods, audiovisual equipment, additional lighting, and IT. Regulations already make an allowance for hot water use, which is not under the control of the building developer, and the same approach should be adopted to include an allowance for this portion of electricity use.
3. Building standards should reflect existing and encourage further progress in the uptake of smart, zero-emissions technologies, and should not enable developers to reverse the progress made in the improvement of fabric and incorporation of onsite generation in new buildings. The updated regulations should therefore include as a minimum both a heat pump and onsite generation, such as solar PV, in the notional building.

Question 3: Do you agree with limiting this Standard to ‘new buildings’ as defined within section 2.2?

No response.

Question 4: Do you agree with: (a) our approach taken to require future installed heating systems to be zero direct emissions only, and (b) our approach taken to focus on direct/ point of use emissions that a building owner has responsibility over only?

We do not agree. The policy objective of delivering a net zero building sector in the UK must take into consideration carbon emissions across the heating supply chain. Heat delivered to a building from a heat network cannot be meaningfully considered zero carbon if the system-level inputs produce global warming emissions.

While we welcome the progress Scotland has made on decarbonising its grid-connected electricity, there are also concerns relating to fugitive emissions including refrigerant gases from heating systems. These gases can escape as part of the installation, scheduled and unscheduled maintenance, service and repair, and decommissioning of heating systems, and can have Global Warming Potential thousands of times higher than carbon dioxide. We therefore recommend that the full consultation seek views on whether fugitive emissions should be incorporated into assessments of point-of-use emissions, potentially with a

requirement for the performance benefits of other measures to be increased to compensate for the carbon impact of these emissions.

Question 5: What evidence can you offer on ways of ensuring zero direct emissions from heating that could be compliant with this Standard?

No response.

Question 6: What are your views on section 2.6, specifically regarding what mechanism the Scottish Government could use to ensure compliance with the Standard?

No response.

Question 7: What steps can the Scottish Government take to support industry to deliver this Standard, and how could we make compliance with this Standard easier?

No response.

Question 8: How do we ensure that consumers are protected from increased energy bills, while giving developers flexibility to comply with the Standard?

This is a very important consideration.

Our first recommendation is to include an affordability target in the Standard, similar to the target proposed (although subsequently dropped) in the update of English building regulations. By doing so, the Scottish government can demonstrate leadership on this issue, and ensure that the twin objectives of delivering carbon-neutral homes at reasonable cost to the consumer are achieved.

One way to mitigate against higher energy bills from new heating systems is to ensure a continuing core role for onsite generation. Onsite generation, such as solar, combined with home energy storage, such as batteries, is cost effective because:

- Consumers with a solar system on their home or building produce part of the power needed to meet their own demand.
- Solar is a form of distributed generation, and hence helps avoid the need for investment into grid and other infrastructure, the costs of which would otherwise be borne by consumers as part of their energy bills.
- The capital costs of delivering domestic scale solar are relatively small compared with some fabric measures, such as significant increases in insulation. This is because they have an impact in turn upon structural considerations such as the thickness of walls, and hence foundation sizes. The costs of these are ultimately passed on to house buyers in the sale price of new homes.

Our second recommendation is to initiate a research programme to confirm the installed performance of heat pumps, as opposed to the laboratory or theoretical performance. This would build on research from the Energy Saving Trust,¹ which indicates that the real-world system performance of heat pumps may not be as high as modelled, and so the cost of heating may be higher than anticipated. There is a major risk to consumer willingness to adopt low-carbon technologies if stories emerge about buyers of new homes receiving high

¹ <https://www.energysavingtrust.org.uk/sites/default/files/reports/TheHeatisOnweb%281%29.pdf>

energy bills due to regulations imposing a particular type of heating system, and so it is important that this be investigated in detail.

A key mitigation against the cost of any electrical system in a new building is the installation of onsite power. Technologies such as solar enable the deployment of electrified heating and other smart technologies to be cost effective, because homeowners will produce at least some of the power needed to meet their electricity demand, and hence reduce their energy bills. Note that Solar Energy UK is currently running a research project to produce detailed evidence on this topic, and will be happy to discuss the findings with Scottish Government once complete. Publication is scheduled for Autumn 2021.

Question 9: What are your views on new buildings connecting to an existing heat network, where development takes place within a heat network zone? Do you envisage any unintended consequences as a result of this proposal?

No response.

Question 10: Do you agree with the Scottish Government's proposal to introduce this Standard in 2024? What are your views on this Standard being brought into force for new buildings consented earlier than 2024?

We agree with the introduction of the complete Standard in 2024. However, we recommend an interim step be implemented in advance its introduction, to include improved fabric measures and increased onsite power generation in the notional building. This would encourage the construction and renewable energy industries to scale their supply chains in advance of the transition at scale which will need to take place from 2024, and ensure that the materials, workforce and logistical structures are in place to deploy the capacity required.

Question 11: How can opportunities be maximised for the supply chain involved in the delivery of new homes (ranging from product suppliers to on-site operatives), including skills?

Scotland has an established solar supply chain, with a wide range of companies involved in the manufacture, distribution, installation, operation, maintenance and decommissioning of PV and thermal systems. The technology is mature and solar companies are used to integrating their work with that of the construction, roofing, and electrical and mechanical installation industries. Indeed, the current Scottish building regulations have provided strong support for and delivered a successful PV installation industry in Scotland. This industry, and the associated supply chain, are significantly larger than in the rest of the UK, on a per-capita basis. For example, approximately 80% of new Scottish homes are built with a solar system installed.

Solar can and must play a role in the broader decarbonisation of the Scottish economy – for example, by providing the distributed, flexible power needed to support electric vehicle charging. We expect the industry to grow rapidly, and so contribute to job creation as part of a green economic recovery from Covid-19. According to the Construction Leadership Council, the UK needs half a million new professionals to retrofit existing homes alone in line with the net zero agenda,² and the Scottish solar industry is well placed to play a role in this.

Question 12: What do you envisage the key challenges would be for developers, and wider-building industry, in meeting this proposed Standard? How could this sector be supported to address those challenges?

² [CLC-National-Retrofit-Strategy-final-for-consultation.pdf \(constructionleadershipcouncil.co.uk\)](https://www.constructionleadershipcouncil.co.uk/wp-content/uploads/2021/07/CLC-National-Retrofit-Strategy-final-for-consultation.pdf)

We support the principle of technology neutrality. We therefore recommend that the Standard Assessment Procedure (SAP) calculation methodology recognise the role not just that electric heating, but all low and zero-carbon technologies can play in delivering net zero buildings. This should include onsite energy systems, such as solar PV and solar thermal, but also energy storage, fabric improvements, smart technology, and the monitoring and control systems to ensure that the full potential of all these is realised. Developers will then be in a position to establish how best to implement the suite of measures necessary to construct affordable zero carbon homes and buildings, based on their requirements.

Question 13: What are the key challenges for the energy networks regarding the deployment of zero emissions heating in new developments? How could this sector be supported to address those challenges?

A move to electric heating will place major demand upon energy networks. This is true for both national transmission and distribution networks, and local networks: our understanding is some developers are already concerned about how to meet site-wide electrical demand for developments that do not include technologies such as electric vehicle charging. These can reasonably be forecast to generate significant *additional* demand in future, and the impact will be more pronounced unless smart technologies and on-site generation are developed and deployed as a fundamental principle of modern heating, as our response to question 14 discusses.

As such, there is a major infrastructure challenge inherent to delivering the loads necessary to support electrified heating. This in turn implies major investment and engineering work to ensure the networks are ready, over a significant timeframe. However, the use of onsite generation such as solar PV provides a way to mitigate this. Co-locating electricity supply and demand would mean that zero-carbon heating in new Scottish buildings will be able to draw on electricity produced at the point of use. This would help alleviate pressure on high-voltage networks, reducing the need for heavy engineering, and ensure that existing capacity is used to support the Scottish government's broader decarbonisation goals as effectively as possible.

Question 14: How do you see this Standard interacting with wider-energy system changes, and what role do you see for flexibility and smart technologies?

We recommend that onsite generation be considered as a key technology to enable the deployment not only of electrified heat but also of smart and low-carbon technologies. These notably include electric vehicles, but also residential energy storage systems, next-generation appliances, fixtures and fittings, and intelligent controls, such as smart meters, which can enable smart homes to store and supply power to these only when necessary.

Our research demonstrates the energy value of such flexible and smart technologies. For example, delivering 4.4 million 'Smart Solar Homes' – active buildings which include rooftop PV generation, a domestic energy storage system, and smart meters – would enable the UK's overall housing stock to eliminate the evening peak electricity demand on a typical winter's day.³ On an annual basis, these homes could reduce peak demand consumption by 97%, while smart solar homes with a 20kWh battery could enable individual homes to come off the grid all day.

Futureproofing buildings in this way would ensure that Scottish buildings are able to generate a local supply of the power needed to support clean heat. Building regulations can

³ <https://www.solar-trade.org.uk/wp-content/uploads/2020/07/Smart-Solar-Homes.pdf>

help deliver this by default, and we strongly recommend the Scottish government take a lead in decarbonisation policy by delivering a Standard which encourages the building of these smart homes as a core objective.

We would also note that as with other aspects of the energy system, heating systems which respond to network pricing and carbon intensity levels are close to commercial deployment. From an energy perspective, the key feature of these and related technologies, such as dynamic electric vehicle charging tariffs, is their ability to draw power when renewable generation is producing surplus electricity and store it for later use. It is important that the new Standard provide sufficient flexibility for developers to incorporate these technologies in the way they see fit to help decarbonise heating, and not bind them to using, for example, electric heating technologies which cannot regulate their energy demand. Doing so would be detrimental to maximising the potential of a decarbonised grid. Scottish companies have time-of-use products available on the market which can help store and release heat energy when needed, and so this approach would also help grow the market for these products.⁴

Question 15: What can be done to encourage greater consumer awareness and understanding?

No response.

Question 16: What approach should be taken when considering new non- domestic buildings, and what are the specific challenges and opportunities relating to new non-domestic buildings?

No response.

Question 17: By introducing this Standard, what challenges or opportunities might result for households on low incomes (for example, around affordability or access), and how can the Scottish Government best take account of these?

No response.

ENDS

⁴ Eg <https://sunamp.com/about/>