

bsi.

Net Zero by 2050: How Standards Can Drive a Carbon Neutral Energy Ecosystem

BSI Net Zero by 2050 Report

August 2023



Contents

Introduction	3
Roundtable	4
A matter of urgency: when do we need to reframe the standards?	5
A system of systems: considerations and challenges	8
All for one: how could industry convene most effectively?	10
Recommendation: bringing an agile group together	12
Key takeaways	15

Introduction

The UK and EU have pledged to reduce their greenhouse gas emissions to net zero by 2050.

The future energy system plays an important part in supporting this transition and, while the current portfolio of energy and electricity standards are fit for purpose, they will need to evolve and adapt to match the changing landscape.

In 2020, an independent panel commissioned by the Department for Business, Energy & Industrial Strategy (BEIS) and Ofgem released the [Electricity Engineering Standards Review Independent Panel Report](#), which reviewed the current standards portfolio affecting climate mitigation and highlighted any necessary changes.

In April 2023, participants from organizations including Ofgem, Electricity System Operator (ESO), Department for Energy Security and Net Zero (DESNZ) and contributors to the

report convened in a roundtable, “From offshore wind plant to EV charger – standards and the transition of electricity network to Net Zero”, to revisit the findings, reinvigorate the conversation and consider the future of electricity engineering standards.

In this report, we present the discussion, key takeaways and recommendations, alongside the urgency and scale of the challenge, and how standards will play a critical role in streamlining the energy system.



Roundtable



A matter of urgency: when do we need to reframe the standards?

Simon Harrison, Group Head of Strategy, Mott MacDonald, and Chair of the 2020 review, began by reflecting on its findings, including “how we might reframe standards to think from the consumer’s point of view; what they should get from the electricity system and how might we describe standards in a way that delivered that.”

Agility was identified as a key challenge to delivery in a landscape where things were going to have to change much more quickly.

A complex, rapidly shifting and decentralizing landscape needs cohesive direction yet the roundtable participants noted a lack of management of standards in this area as a suite created barriers to the whole system’s agility “different things were owned by different organizations with no co-ordination between them.”

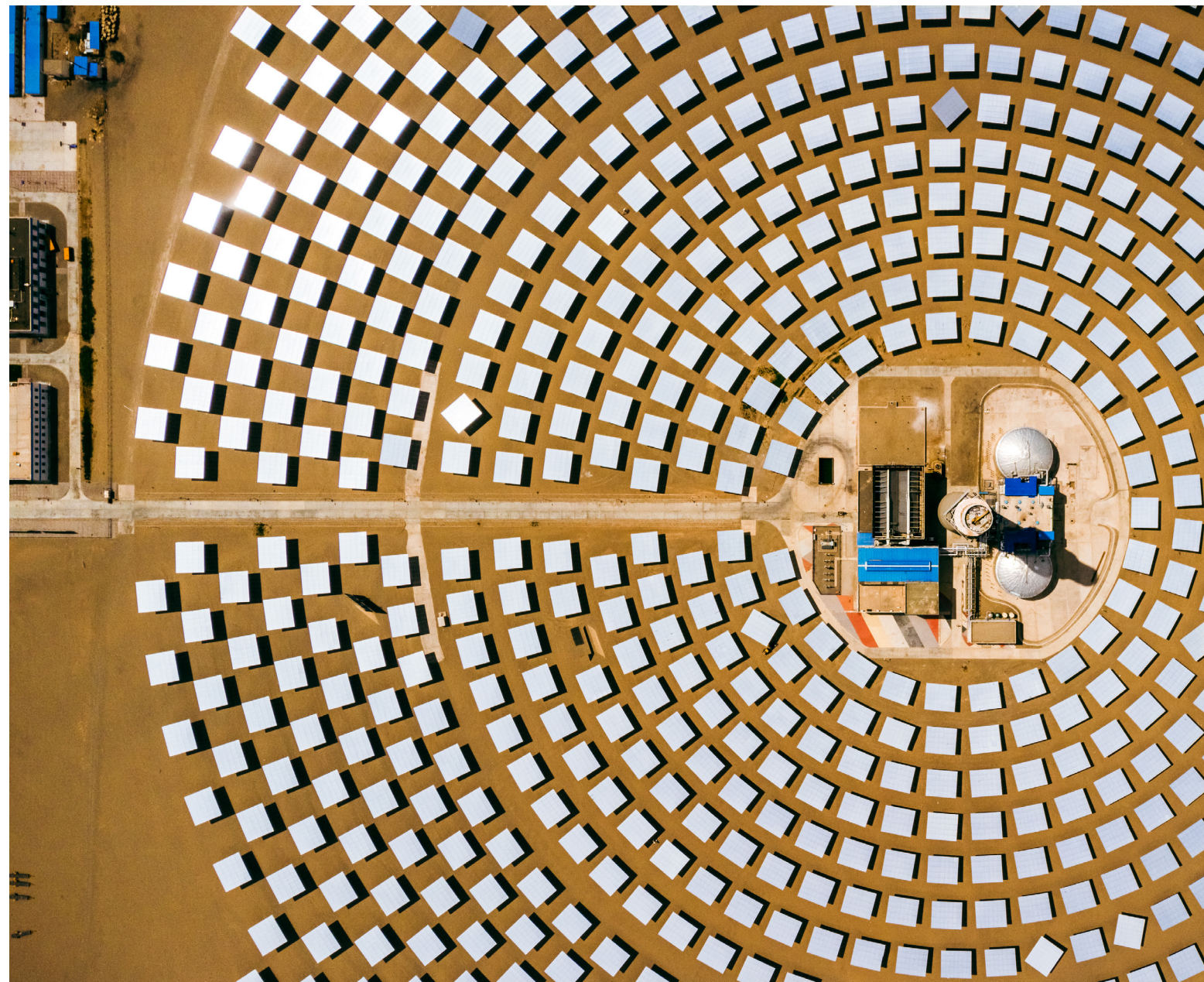


Simon Harrison went on to raise the point of urgency in decarbonization: “We are on a ticking clock to net zero. The government’s target is for a net zero electricity system by 2035. The Labour Party have said if they were in power, they’d like to do it by 2030. Two recent reports from the Committee on Climate Change and the National Audit Office really call out the extent and urgency of the transformational change that’s needed.”

Sebastian Van Dort, Associate Director of Energy, BSI, suggested working backwards from the timelines of 2030, arriving at a reframing of the system by 2027.

John Parsons, Digital Technical Manager, BEAMA, said the answer to the timeframe was “as soon as humanly possible” while Andrew Evans, Technical Director, GAMBICA, summarised that “yesterday would be a good time to start.”

Mike Kay, an independent consultant, raised that the emergence of the Future System Operator (FSO) was of fundamental importance.



“We are on a ticking clock to net zero. The government’s target is for a net zero electricity system by 2035. The Labour Party have said if they were in power, they’d like to do it by 2030.”

Simon Harrison, Group Head of Strategy, Mott MacDonald, and Chair of the 2020 review



Benedict Eyre-White, Energy & Security, ESNM, explained the aim to establish the FSO in 2024, but that “it won’t necessarily be able to do everything on day one, because the sure way to make a reform fail is trying to do everything at once.” The group agreed that as the FSO gradually builds upon the existing capabilities of the ESO, it’s critical that system-wide progress towards net zero is still maintained if timelines are to be met.

Mike Kay also spoke about recognizing that the standards for the historical design of the electricity networks are not geared towards optimization of a decentralized system, as there is not yet an agreed model of how to design such a system.

Graham Oakes, an independent consultant, said the key to decentralization is digitalization, and that “there’s a group of stakeholders not really being addressed: the digital innovators. How do we bring that innovation into the system? Because that’s the only way I can see that we’re going to hit a net zero system by 2035. Or even more scarily, 2030.”

It was also agreed that decentralization, decarbonization and digitalization are all intrinsically linked, and an evolved standards portfolio with these considerations at its core will enable the UK to accommodate changing consumer demands.

A system of systems: considerations and challenges

John Parsons explained that the challenge for this complex decentralized system is the lack of a single responsible body, and that a government-led framework could be key.

Reflecting on the remit of the FSO, Benedict Eyre-White said that it would be difficult to assign the FSO with responsibilities wider than energy, such as standards for batteries and EVs, as this would effectively end up as whole-economy responsibility.

KT Tan, CTO, Reading Solar, raised that in a post-Covid world, broad behavioural changes that go beyond energy but impact demand, such as remote meetings and online shopping, must be considered. Simon Harrison agreed and noted that the original report did highlight the increasing dependence on electricity in people's lives, from mobility and heating through to digital connectivity being critical to livelihoods.

Patricia Massey, Digital and Technology Member, BEAMA, expanded on digital transformation: "We've got rapid innovation and we need to focus now on digital as opposed to mechanical aspects of standards development. Even thinking back to when the initial report was made, it'd be interesting to take one area of technology and see how it's transformed."

On systems technology, John Parsons raised that "a smart charger doesn't become a smart energy appliance until it's connected to an EV. You depend on the EV manufacturer to get the information. They have no great incentive to provide that."



“If we want people to buy EVs, they need to have confidence in the charging infrastructure.”

Graham Oakes, independent consultant

Graham Oakes turned the discussion towards the consumer perspective: “The standards that EVs use are going to be determined by the Japanese and the American OEMs [Original Equipment Manufacturers], so unless we’re participating in those international agendas, we don’t have influence. What assurance do we need to give to the owner of the EV? They need to know that they can plug their car in and get it charged. Another target is no new petrol engines beyond 2035.”





All for one: how could industry convene most effectively?

Mike Kay, a member of the original report panel, raised one of the key recommendations in the report: for the UK to have greater engagement in international standards.

This recommendation was supported by BSI, with Sebastiaan Van Dort asking the group how BSI, industry and UK government could create a framework for the UK to amplify its voice in international standards development.

The participants agreed that convening was critical with roundtable members Benedict Eyre-White and John Parsons emphasizing that while the FSO will be the theoretical convening body of the energy sector, there remains a need for an industry-facing organization to convene all the players in the energy system to capitalize on innovation in the sector.

John Parsons noted in particular “we have got lots of small companies doing very innovative work, but they tend not to be that interested in standards: they don’t have the time for it.”

“Drawing small companies into BSI and then the international standards is the real challenge, because that’s where the innovation is.”

John Parsons, roundtable member

Benedict Eyre-White agreed that, while not something that is currently part of the policy mix, the FSO could play a role for small innovative companies by having interest in standards with a legislative objective around fostering innovation and competition. Mike Kay explained that the overall system has been in developmental stasis, and so the FSO would be required to show decisive leadership, while remaining fleet and agile.

Simon Harrison noted that the FSO is “currently embryonic and no doubt has everybody pulling it in all manner of different directions. We have BSI as the national standards body, and Ofgem might provide coordination either itself or through the code managers. We have the departments as well. It is a good next step to bring those four parties together for a debate.”

Peter Bingham, Analysis & Assurance Director, Ofgem, reiterated that global technology is moving forward, and that new governance structures could allow for the momentum necessary to drive changes to standards, which need to adapt more quickly. He also highlighted regional system planners who, while being responsible for planning and interacting with local authorities, could have a role in setting standards.

Bingham added, "In terms of Ofgem's role as giving strategic direction to the technical code body? Yes – but for code reform, it's going to take several years to actually get there. But that doesn't mean that we can't start this conversation. Ofgem has a part, and BSI, and the industry as a whole.

"It's worth convening discussions so once it's all in place, we're clear on how it works."

Peter Bingham, Analysis & Assurance Director, Ofgem



Recommendation: bringing an agile group together

- Expanding upon convening, Patricia Massey said: “If each player within the electrical network system, obtained a jigsaw piece and wrote on the back what their responsibilities were and what their principal activities were, we could put the pieces together and create a governance structure. Find out who is taking responsibility for different areas within that system of systems.”
- Xiaoyao Zhou, Operability Policy Manager, National Grid ESO, said that the FSO could potentially “take a leading role in putting all these standards together”, and that they would confer internally on taking this forward in further discussions with other roundtable members.
- Laura Schade, Senior Energy Engineer, DESNZ, agreed that drawing from similar complex systems like the IT market would help. Sebastiaan Van Dort echoed this idea, noting the agility of other industries could be replicated for the energy system by obtaining rough consensus through a more agile approach, in instances where it isn’t necessary to go through a full consensus process.
- Sharing positive examples that the standards work could look to, Graham Oakes showcased the IETF (Internet Engineering Task Force), drawing on the internet as the archetypal decentralized system that has emerged through decentralized governance in a flexible and agile way. “They’ve got a principle of rough consensus and running code,” Oakes said. “The energy system spends an awful lot of time trying to come to perfect consensus, and then a long time after that, trying to get code to work from that consensus.”
- Simon Harrison raised moving the discussion forward with a smaller group as a next step, even absent the formal processes.
- John Parsons reflected that: “When you come out of the networks’ own domain, beyond the meter where they don’t really have authority, that’s where the world of standards comes in. You can define the products, you can say how they should interoperate.”

Abbey Dorian, Energy Sector Lead, BSI, summarised the roundtable by saying that, as part of BSI's proactivity towards improving the current framework...

"We'll definitely be taking away your general agreement. It's clear that it's very urgent and it's not too early to be discussing the future of the electricity system."



Key takeaways



Key takeaways



Urgency is essential to meet the government's 2050 net zero target, with real action required in this decade.



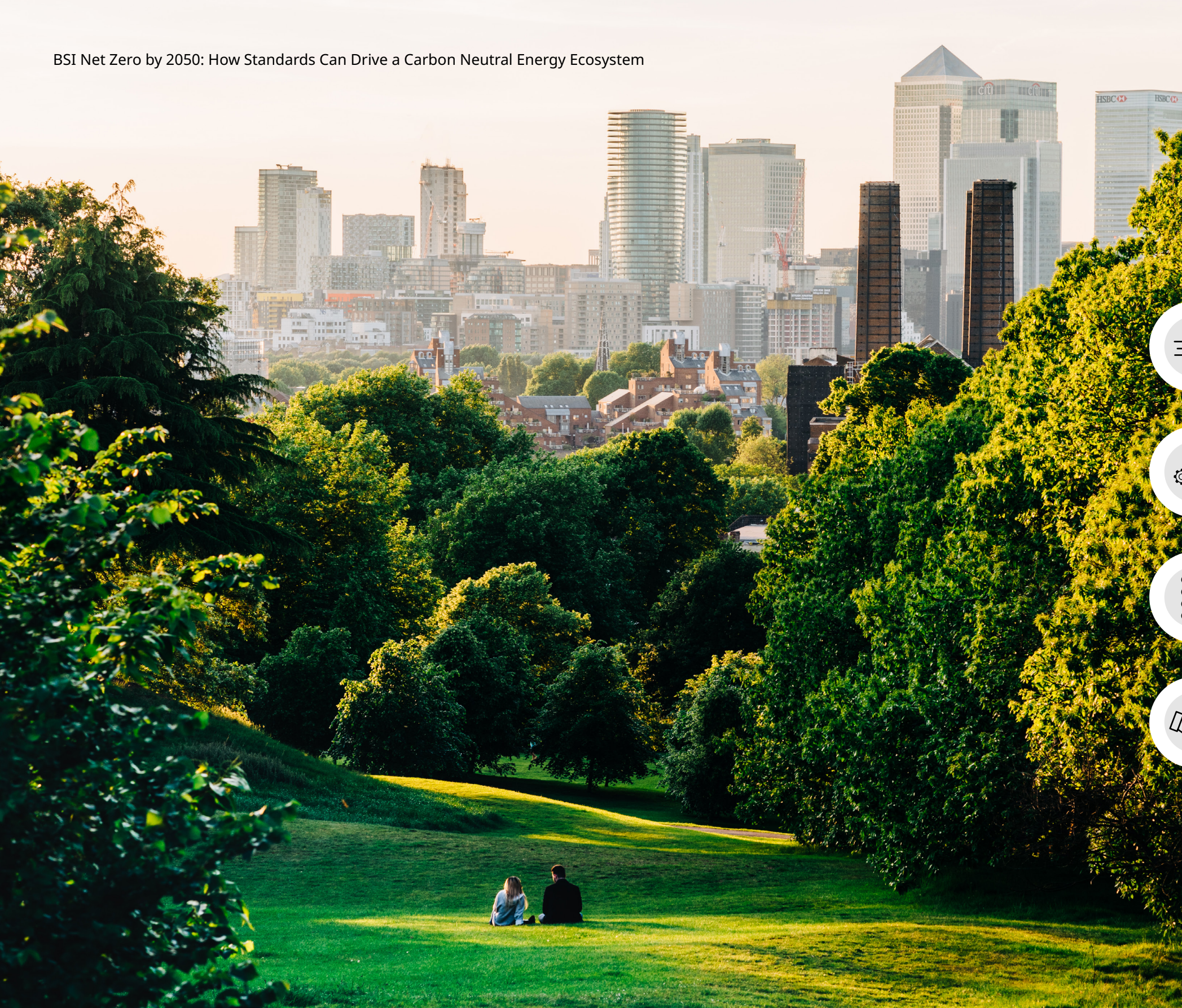
The current standards portfolio must be evolved in order to meet the joint demands of decarbonization, decentralization and digitalization.



The FSO will take a leading role after its launch in 2024 but, while it is in its infancy, whole-system action must continue if timelines are to be met.



Convening is key: bringing together BSI, FSO, Ofgem and DESNZ in an agile way that allows for more rapid consensus.



bsi.



Discover more

about how BSI Knowledge Services is supporting net zero goals for the energy sector.