

Sent by email to FutureNetworkRegulation@ofgem.gov.uk

10 May 2023

Dear Ofgem

Thermal Storage UK response to consultation on framework for future systems and network regulation

We welcome Ofgem's review of energy networks regulation. We agree that the current regulation of Distribution Network Operators (DNOs) is insufficient for delivering a net zero energy system. The electricity system is undergoing the largest transformation since at least the 1960s. Indeed, electrifying heat and transport demand while simultaneously moving to renewable generation requires more fundamental change to the electricity system than even the 1960s. Given this, the regulatory regime for networks focuses too narrowly on delivering efficiency, with insufficient consideration of future requirements. For this reason, we welcome Ofgem taking a more forward-looking approach to encourage investment ahead of need and the roll-out of distributed flexibility, as well as moving beyond the "Connect and Manage" regime for renewables and storage.

Progressing at pace

We agree with Ofgem that "without reform, the electricity grid at both the transmission and distribution levels, will become an obstacle to net zero". There is a need to act sooner rather than later. The business plans for the ED2 price control for Distribution Network Operators (DNOs) suggest that, by the end of 2028, there could be 3 million heat pumps operating with thermal stores in Britain. There is a real risk that electrification of transport and heat demand will outstrip the capacity of at least parts of the low voltage network during the ED2 price control. The regulatory framework must ensure that the capacity of the electricity system can cope with more demand and more generation on a forward-looking basis over the next two decades.

The electrical heating systems being installed today often entirely focus on heat provision within the building. These heating systems are installed with very limited consideration of the potential to provide flexibility to the wider electricity system. This is a missed opportunity.

Our own analysis with LCP Delta (shared with Ofgem separately and available on our website) suggests that 2.4 million smart thermal stores could operate with or instead of heat pumps by 2030, providing up to 4.1GW of flexibility on the coldest day of the year. To make the most of this opportunity requires encouraging people and installers to see the financial benefits of heat flexibility. This shows the urgency and importance of Ofgem's work on local energy governance and distributed flexibility, as well as the UK government's work to develop standards for Energy Smart Appliances and reform Energy Performance Certificates.

As with the UK government's work on the Review of Electricity Market Arrangements (REMA), Ofgem needs to juggle reform with encouraging (or not dissuading) ongoing investment. This includes both investment by DNOs in infrastructure and investment by people and businesses in flexible assets such as heat pumps, smart thermal stores and electric vehicles. Adopting a more strategic, whole-systems approach and incentivising these "consumer energy resources" to operate flexibly will reduce the need for at least some investment in network infrastructure. This reduces costs for everyone.

Planning where we are going

Ofgem highlights the importance of system planning for the transformation. We agree. To help deliver this planning, we recommend that the UK government, perhaps working with Ofgem and the Future System Operator, develops real-time and detailed modelling to support system planning. This model would cover connected generation, transmission and distribution capacity and the behaviours of demand-side products (including peak demand, average demand and flexibility capacity). The model would adapt in real-time and could evolve into a digital twin. Even if this model cost as much as the UK government has invested into the Met Office's Cray supercomputer and its

successors, this is a small cost in comparison to the scale of the investment needed for the energy system by 2050.

Enabling transparency

Transparency and certainty are important for the regulatory framework for networks. This is the case whether Ofgem evolves RIIO or shifts away from ex ante price regulation. We recommend that people and businesses are at least able to understand the outputs of the regulatory regime. This may include the ability to connect flexible products such as heat pumps and smart thermal stores and receive rewards for providing that flexibility. We also recognise that investors in networks will need some degree of certainty about revenues to deliver a lower cost of capital.

We agree with Ofgem that the RIIO framework has allowed a wider set of outcomes to be considered than the previous RPI-X approach. However, these wider outcomes come with their own drawbacks, with DNO business plans becoming ever longer and more detailed. The RIIO process takes around 3 years (excluding legal challenges) and places a high computational and knowledge management demand on both DNOs and Ofgem. This reduces the ability of non-experts to understand the process and have confidence in its outcomes. We welcome Ofgem considering how to resolve information asymmetry between networks and the regulator without reducing transparency. The low cost of monitoring and the ready availability of data on network asset performance should assist Ofgem.

Market design

One regulatory question not addressed in the consultation is whether the UK will change its approach to unbundling networks from generation and energy supply. Unbundling has been a cornerstone of British energy regulation, with networks regulated as monopolies and competition encouraged in generation and supply. Energy networks should provide services to all market participants on equal terms and unbundling is one way to ensure this. We welcome Ofgem clarifying whether they see

these proposals altering unbundling requirements. For instance, whether Ofgem sees a role for energy suppliers or generators building or operating parts of the distribution network.

Joining up activity

We encourage Ofgem to publish a schematic showing the governance of the proposed system, including the likely interaction between consumer energy resources, flexibility providers, the Future System Operator (FSO), DNOs and energy suppliers. It is difficult to understand how the proposals interact with other Ofgem consultations, requirements in the current price controls for DNOs, the creation of the FSO and government activities such as REMA.

Indeed, we encourage Ofgem to join up this work with other activities. For instance, we would welcome Ofgem setting out how reform of price controls could interact with flexibility products. There is significant focus on ensuring that high load electrical products such as EVs, heat pumps and heat batteries are cybersecure, interoperable and flexible. The Energy Security Bill introduces requirements for Energy Smart Appliances and the UK government is working on standards for these Energy Smart Appliances.

We answer some of the consultation questions below. This response is not confidential and may be published on the Ofgem website.

Best wishes

Tom

Founding Director
Thermal Storage UK

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 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

Consultation questions

Q.1. What should the role of the ‘consumer voice’ be and through what institutions and processes should it be channelled?

When Ofgem discusses the “consumer voice” in the consultation, we take this to mean people and businesses. We would welcome Ofgem confirming that is their intent. Businesses, large and small, are able to provide flexibility through their heating systems and industrial processes.

As well as the consumer voice, we recommend that any whole system regulatory framework for networks considers the voice of manufacturers, installers and operators of distributed flexibility. As highlighted by Ofgem in this and parallel consultations, electrified heat and transport will significantly increase electricity demand. To ensure that networks operate efficiently throughout this transformation, it is important that flexibility is built into these systems wherever possible.

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We agree that the RIIO framework has allowed a wider degree of outcomes to be considered than the previous RPI-X approach. However, this comes with its own drawbacks, with business plans becoming ever longer and more detailed. The RIIO process takes around 3 years (excluding legal challenges) and places a high computational and knowledge management demand on both networks and Ofgem. This reduces the ability of non-experts to understand the process and have confidence in its outcomes. We welcome Ofgem considering how to resolve information asymmetry between networks and the regulator without reducing transparency.

Q.2. How detailed could an independent, cross vector view become to determine future plans for periods beyond RIIO-2 and support effective use of the 'Plan and Deliver' model?

We recommend that the UK develops detailed real-time modelling to support the system planning aspects highlighted by Ofgem. This model would cover connected generation, transmission and distribution capacity and the behaviours of demand-side products (including peak demand, average demand and flexibility capacity). The model would adapt in real-time and could evolve into a digital twin.

Even if this model cost as much as the UK government has invested into the Met Office's Cray supercomputer and its successor, this is a small cost in comparison to the scale of the investment needed for the energy system by 2050.

The Future System Operator may be the best owner of this model, with the information feeding in real-time into Ofgem's decisions on regulating network monopolies.

Q.3. Under what circumstances would competition, or other procurement models such as open book contracting, have benefits over ex ante incentives as a cost control mechanism?

One regulatory question not addressed in the consultation is whether the UK will change its approach to unbundling networks from generation and energy supply. Unbundling has been a cornerstone of British energy regulation, with networks regulated as monopolies and competition encouraged in generation and supply. Energy networks should provide services to all market participants on equal terms and unbundling is one way to ensure this. We welcome Ofgem clarifying whether they see these proposals altering unbundling requirements. For instance, whether Ofgem sees a role for energy suppliers or generators building or operating parts of the distribution network.

Q.4. What is your view on the options identified for simplification of incentive regulation? What would be the benefits and costs by comparison to the approaches used in RIIO-2?

We recognise the trade-offs identified by Ofgem between sophisticated and complex ex ante regulation and simpler approaches to incentive regulation such as RPI-X. Whatever approach Ofgem adopts, we encourage Ofgem to consider both investment in networks and flexible assets. Incentivising these “consumer energy resources” to operate flexibly will reduce the need for some investment in the network infrastructure. This will help to deliver Ofgem and the UK government’s Smart Systems and Flexibility Plan. We recommend that the regulatory framework provides appropriate weight to flexible consumer energy resources.

Q.5. What are the network activities where there would be benefits for a move to an ex post monitoring regime, and what would be the associated costs?

We are unconvinced that a cost-plus rate of return regulatory framework would deliver the most cost-effective balance between network investment and the use of flexible consumer energy resources. We note Ofgem’s concerns about potential gold-plating of assets and the limited incentives for cost-reducing innovation. It is unclear to us whether a cost-plus rate of return approach would sufficiently encourage distributed flexibility and a cost-optimal transformation.

Q.6. What are the benefits and costs of this approach for Electricity Transmission by comparison to an evolution of the approach in RIIO-2, and what are the implementation barriers?

No response.

Q.7. What is the potential for Electricity Distribution planning and commissioning to move to an alternative model by the end of RIIO-2, and what might be the benefits and costs of doing so?

We agree with Ofgem that “without reform, the electricity grid at both the transmission and distribution levels, will become an obstacle to net zero”. We encourage Ofgem to move quickly and ensure that any new regulatory approach for electricity distribution networks is in place for the start of the next price control.

There is a need to act sooner rather than later. The business plans for the ED2 price control for Distribution Network Operators (DNOs) suggest that, by the end of 2028, there could be 3 million heat pumps operating with thermal stores in Britain. There is a real risk that electrification of transport and heat demand will outstrip the capacity of parts of the low voltage network during the ED2 price control. The regulatory framework must ensure that the capacity of the electricity system can cope with more demand and more generation on a forward-looking basis over the next two decades.

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As with the UK government’s work on REMA, Ofgem needs to juggle reform with encouraging (or not dissuading) ongoing investment. This includes investment by networks in infrastructure and investment by people and businesses in consumer energy resources such as heat pumps, smart thermal stores and electric vehicles.

Q.8. What is your view on the most effective approach to regulation of Gas Distribution and Transmission beyond RII0-2? What would be the benefits and costs of moving to a simpler approach to regulation of the ongoing costs of operating and maintaining the network?

We agree with Ofgem that the focus of gas network regulation will shift towards decommissioning and repurposing of assets.

Q.9. Should there be a shorter-term price control in gas distribution and/or gas transmission, and how could this work in practice?

We agree that Ofgem should align the price controls for gas and electricity networks. To achieve this, we can see the logic in extending the current price control for gas networks for two years to 2028. This alignment will facilitate the regulatory framework taking a whole systems approach.

We encourage Ofgem to ensure that it is well-resourced with the right team to run the gas and electricity network price controls in parallel ahead of 2028. This resourcing is even more important if Ofgem is changing the regulatory framework at the same time.

Q.10. Would there need to be any changes to maintain a stable and consistent financial framework if we were to make greater use of different regulatory archetypes, and if so, what would those changes need to be?

When considering the financial framework for the future distribution network, we encourage Ofgem to consider how to finance (a) investment by networks in infrastructure and (b) investment by people and businesses in consumer energy resources such as heat pumps, smart thermal stores and electric vehicles. There is a trade-off between the stability and certainty required for the lowest cost investment in infrastructure and the comparative uncertainty caused by the roll-out of distributed flexibility. We recommend that the regulatory framework is capable of incentivising and rewarding both types of investment.

Distributed flexibility assets such as smart thermal storage will improve the operation of the network and make the most of renewable energy. Thermal Storage UK research with LCP Delta in October 2022 indicates that smart thermal storage, working with or instead of heat pumps, could reduce peak electricity demand on the coldest day by 1.6GW by 2030 through shifting when we produce heat and storing that heat for later use. This peak demand reduction from smart thermal storage could increase to 4.1GW if the benefits of flexibility to electricity networks were reflected in pricing. The benefits would be higher still if we achieve a net zero-emission electricity system by 2030.

Q.11. Do you have any views on our proposed analytical approach?

As part of the analytical framework, we encourage Ofgem to consider the role of flexible consumer energy resources such as heat pumps and smart thermal stores and ensure that people and businesses are “fairly rewarded for their contributions to the system”. Businesses, large and small, are able to provide flexibility through their heating systems and industrial processes.

We encourage Ofgem to consider whether the UK will change its approach to unbundling networks from generation and energy supply. Unbundling has been a cornerstone of British energy regulation, with networks regulated as monopolies and competition encouraged in generation and supply. Energy networks should provide services to all market participants on equal terms and unbundling is one way to ensure this. We welcome Ofgem clarifying whether they see these proposals altering unbundling requirements. For instance, whether Ofgem sees a role for energy suppliers or generators building or operating parts of the distribution network.

To help deliver the network planning required in future, we recommend that the UK government, perhaps working with Ofgem and the Future System Operator, develops real-time and detailed modelling to support system planning. This model would cover connected generation, transmission and distribution capacity and the behaviours of demand-side products (including peak demand, average demand and

flexibility capacity). The model would adapt in real-time and could evolve into a digital twin. Even if this model cost as much as the UK government has invested into the Met Office's Cray supercomputer and its successors, this is a small cost in comparison to the scale of the investment needed for the energy system by 2050.