

Sent by email to RIIO3@ofgem.gov.uk

13 January 2025

Dear Ofgem

ED3 Framework Consultation - Thermal Storage UK response

We agree with Ofgem moving away from the “flexibility first” approach for electricity networks as part of revising the ED3 framework. Regulation of electricity networks must look beyond treating flexibility as a way to defer network upgrades. Electrifying heat, transport and industry means more grid infrastructure with flexible demand incorporated into the system. The exact pace of change will depend on factors beyond the control of Ofgem or the networks, so there is undoubtedly some uncertainty. However, the direction of travel towards electrifying much of heat, transport and industry looks unstoppable. The Ofgem price control increasingly needs to ensure that the distribution grid is ready to at least double in carrying capacity over the next two decades. Deferring this investment simply stores up problems for later, as we have seen in other sectors such as water.

The current price control framework encourages distribution networks to explore alternatives to traditional reinforcement. This has included flexibility. Making use of flexibility (and falling demand) has allowed companies to defer investment into the distribution network. Distribution Network Operators (DNOs) are now able to contract for more than 3GW of flexibility, a significant jump on the 2GW available in 2022/23. This is a success story in developing flexibility markets but we agree with Ofgem that now is the time to reconsider the role of flexibility and to ensure flexibility is an enduring part of the whole energy system.

The importance of flexibility for the developing electricity system was reiterated when NESO set out that the Clean Power 2030 mission will require available flexible capacity to increase to around 12GW by 2030, a four-fold increase from today. This requirement for flexibility will increase throughout the next two decades and beyond as the UK electrifies heat, transport and industrial processes. This requires the energy system to fully value flexible technologies such as heat batteries to encourage homes and businesses to invest in these technologies and switch to time-of-use tariffs that can reduce both carbon and energy bills.

During the 2020s and 2030s, Ofgem foresees UK homes installing low carbon technologies such as solar, heat pumps, heat batteries or EV chargers at an

increasing pace. Networks need to either approve or at least be notified of these installations to maintain the integrity of the distribution system and keep people safe. There are two outcomes that Ofgem can usefully incentivise DNOs to achieve. The first outcome is ensuring that the capacity is there for people to upgrade. Nobody should face a delay with the installation of their domestic heat pump, heat battery or EV charger because of the grid. This means DNOs investing in advance. The second outcome is ensuring that the process is straightforward for people and proceeds without delay. DNOs have already taken some steps to make the process for connecting these appliances easier, for instance the ENA has launched Connect Direct.

As these low carbon electric products are installed, DNOs will need to consider how their network can work with these newly flexible homes, streets, towns and cities. This means working with energy retailers on how to manage the combined load from EVs charging in driveways, electric heating keeping homes warm and the impact of solar generating on rooftops. Part of the challenge for DNOs will be having confidence that the flexibility is available from these appliances. DNOs are likely to be more confident in dedicated storage options, such as thermal storage for hot water and space heating or EV batteries, than relying on more complex options such as preheating that use the thermal mass of the building. Ofgem could usefully consider how the price control can incentivise DNOs to value the flexibility from dedicated storage, including emerging technologies such as heat batteries for hot water and central heating systems.

For British industry, it is key that they are able to easily and quickly upgrade their electricity connection as they electrify their processes through a combination of heat pumps, heat batteries and local generation. If the cost of larger connections is too high or companies are offered connection dates that are a decade or more in the future, manufacturers may decide to move outside of the UK. We have already seen the impact of the connections queue on renewables deployment. Similar connections reform is needed for demand. Ofgem could incentivise DNOs to offer connections more quickly and cheaply to manufacturers that use flexibility to reduce or shift their maximum demand. For instance, manufacturers can use the efficiency of heat pumps to reduce the total additional load required, while heat batteries and thermal storage increase the flexibility of the connection and reduce peak load. This focus on keeping manufacturers in the UK by encouraging flexible connections aligns well with Ofgem's new growth duty.

This connection issue is also relevant for housebuilding in the UK. There is a risk that DNOs could inadvertently stand in the way of the government's housebuilding targets. Once the Future Homes Standard is fully implemented, possibly in 2027, new homes in England and Wales may have electric heating solutions, EV chargers and rooftop solar. DNOs will need to consider how to connect these new estates - it would be a drag on growth if DNOs delayed the release of new housing because of

network capacity issues. DNOs could consider working with developers and energy retailers to reduce maximum demand through the use of flexible technologies, either in individual homes or co-located with the new development.

Given the importance of DNOs delivering timely and cost-efficient new connections and upgrades, Ofgem monitoring will need to increase during the next price control. This may include incentives on DNOs to deliver a minimum percentage of upgrades on time and on budget, with penalties for underdelivery. DNOs could be rewarded for facilitating new flexible connections and penalised for failing to deliver what people and businesses ask for. Ofgem could require DNOs to publish periodic updates on connections they have committed to deliver and how those connections are progressing.

There is a role for innovation funding to explore flexibility, particularly heat flexibility, through a revamped Strategic Innovation Fund (SIF). DNOs will need to learn more about the flexibility of households and businesses connected to their network and the SIF provides a low cost route to achieve this. Importantly, the SIF encourages collaboration with innovators. Ofgem can provide more certainty to those innovators by setting longer term challenges for networks and consider how to capture benefits beyond the energy network. Heat from homes and businesses is a good example of an area where DNOs need to collaborate with innovators to understand what flexibility is available. As we electrify through the 2030s, domestic and industrial heat has more potential flexibility to offer than electric vehicles. There's a risk that heat flexibility is underutilised.

If you have any questions about this response, please contact tomlowe@thermalstorage.org.uk. The response is not confidential and may be published on the Ofgem website.

Best wishes

Tom Lowe

Founding Director
Thermal Storage UK

Questions

1. Do you agree with our characterisation of the wider context for ED3? Are there any other areas of context that you consider material for ED3?

We broadly agree with Ofgem's description of the wider context for ED3, including the increasing use of electric heating and transport and the importance of demand flexibility.

We note that, while some heat pump tariffs are available, most air-source heat pumps are not currently installed to optimise flexibility (though the heat pump may be used flexibly in practice). We also note that other low carbon heating technologies are available, with heat batteries providing significant flexibility at peak times.

It is unclear at this point what flexibility capacity will be available from electric vehicles (EVs), particularly in terms of vehicle-to-everything. It is reasonable for Ofgem and DNOs to expect that households will charge EVs overnight during the ED3 price control period. It is uncertain to what extent customers will adopt vehicle-to-everything during this time period.

Finally, we note that the UK government expects a proportion of British manufacturers, particularly those outside of industrial clusters, to switch from fossil fuels to electricity during the ED3 price control period.

2. What are your views on our overarching objective and proposed consumer outcomes?

We agree with the overarching objective and recommend that Ofgem considers the consumer outcomes for domestic consumers and non-domestic consumers (including manufacturers).

For British industry, it is key that they are able to easily and quickly upgrade their electricity connection as they electrify their processes through a combination of heat pumps, heat batteries and local generation. If the cost of larger connections is too high or companies are offered connection dates that are a decade or more in the future, manufacturers may decide to move outside of the UK. We have already seen the impact of the connections queue on renewables deployment. Similar connections reform is needed for demand. Ofgem could incentivise DNOs to offer connections more quickly and cheaply to manufacturers that use flexibility to reduce or shift their maximum demand. For instance, manufacturers can use the efficiency of heat pumps to reduce the total additional load required, while heat batteries and thermal storage increase the flexibility of the connection and reduce peak load. This focus on keeping manufacturers in the UK by encouraging flexible connections aligns well with Ofgem's new growth duty.

This connection issue is relevant for housebuilding. There is a risk that DNOs could inadvertently stand in the way of the government's housebuilding targets. Once the Future Homes Standard is fully implemented, possibly in 2027, new homes in England and Wales may have electric heating solutions, EV chargers and rooftop solar. DNOs will need to consider how to connect these new estates - it would be a drag on growth if DNOs delayed the release of new housing because of network capacity issues. DNOs could consider working with developers and energy retailers to reduce maximum demand through the use of flexible technologies, either in individual homes or co-located with the new development.

Given the importance of DNOs delivering timely and cost-efficient new connections and upgrades, Ofgem monitoring will need to increase during the next price control. This may include incentives on DNOs to deliver a minimum percentage of upgrades on time and on budget, with penalties for underdelivery. DNOs could be rewarded for facilitating new flexible connections and penalised for failing to deliver what people and businesses ask for. Ofgem could require DNOs to publish periodic updates on connections they have committed to deliver and how those connections are progressing.

3. Do you agree that the network investment elements of the framework should be more input based?

No response.

4. Do you agree that we should consider introducing additional controls around network investments and what features should these controls contain?

No response.

5. Do you agree that the incentives on DNOs will need to adapt from RIIO-ED2 and if so, how?

Yes, we agree. Given the importance of DNOs delivering timely and cost-efficient new connections and upgrades, Ofgem monitoring will need to increase during the next price control. This may include incentives on DNOs to deliver a minimum percentage of upgrades on time and on budget, with penalties for underdelivery. DNOs could be rewarded for facilitating new flexible connections and penalised for failing to deliver what people and businesses ask for. Ofgem could require DNOs to publish periodic updates on connections they have committed to deliver and how those connections are progressing.

6. Do you agree that there is still a role for re-openers in ED3, particularly given the timing of the future full RESP output and how should these be triggered?

Yes, we agree.

- 7. Using RIIO-ED2 as the counterfactual, what alternative regulatory models or characteristics are needed in ED3 to ensure the DNOs deliver the above consumer outcomes? What are the trade-offs we should consider?**

No comment.

- 8. Do you agree that the regulatory framework for ED3 should have features of the Plan and Deliver model for network investment and Incentive Regulation model for other elements?**

No comment.

- 9. Do you think that there is a greater role for elements of ex post regulation or of cost pass through in ED3, either specifically in assessing cost changes resulting from changes to investment requirements during the period, or more broadly to reflect the changing context?**

No comment.

- 10. What is the potential availability of network flex across GB for DNOs in the short term and on the journey to net zero during ED3?**

The current price control framework encourages distribution networks to explore alternatives to traditional reinforcement. Making use of flexibility (and falling demand) has allowed companies to defer investment into the distribution network. Distribution Network Operators (DNOs) are now able to contract for more than 3GW of flexibility, a significant jump on the 2GW available in 2022/23. This is a success story but now is the time to reconsider the role of flexibility and to turn it into an enduring part of the whole energy system. The importance of flexibility for the developing electricity system was reiterated when NESO set out that the Clean Power 2030 mission will require available flexible capacity to increase to around 12 GW by 2030. That's roughly a four-fold increase from today. This requirement for flexibility will increase throughout the next two decades and beyond as the UK electrifies more processes.

- 11. To what extent are global supply chain and workforce pressures contributing to longer lead times for delivery network reinforcement?**

No comment.

12. Do you agree that the risk and downside for consumers of network underinvestment in network reinforcement would be greater than the downside of overinvestment?

While we agree, we recommend that electricity network investment builds in demand flexibility on an enduring basis. DNOs could be rewarded for facilitating new flexible connections and penalised for failing to deliver what people and businesses ask for. Ofgem could require DNOs to publish periodic updates on connections they have committed to deliver and how those connections are progressing.

13. What are the benefits and risks to deliverability if network reinforcement is deferred to future periods?

Regulation of electricity networks must look beyond treating flexibility as a way to defer network upgrades. Electrifying heat, transport and industry means more grid infrastructure with flexible demand incorporated into the system.

The price control increasingly needs to ensure that the distribution grid is ready to at least double in carrying capacity over the next two decades. Deferring this investment simply stores up problems for later, as we have seen in other sectors such as water.

14. What do you see as the role of distributed flexibility, both in the short and longer term, to manage distribution network constraints?

The importance of flexibility for the developing electricity system was reiterated when NESO set out that the Clean Power 2030 mission will require available flexible capacity to increase to around 12 GW by 2030. That's roughly a four-fold increase from today. This requirement for flexibility will increase throughout the next two decades and beyond as the UK electrifies more processes.

As low carbon electric products are installed, DNOs will need to consider how their network can work with these newly flexible homes, streets, towns and cities. This means working with energy retailers, including both energy suppliers and aggregators) on how to manage the combined load from EVs charging in driveways, electric heating keeping homes warm and the impact of solar generating on rooftops.

Part of the challenge for DNOs will be having confidence that the flexibility is available from these appliances. DNOs are likely to be more confident in dedicated storage options, such as thermal storage for hot water and space heating or EV batteries, than relying on more complex and less reliable options such as preheating that use the thermal mass of the building. Ofgem could usefully consider how the price control can incentivise DNOs to value the flexibility from dedicated storage,

including emerging technologies such as heat batteries for hot water and central heating systems.

15. How do we ensure that network flexibility is used only when it is in consumers' long-term interests in ED3?

The current price control framework encourages distribution networks to explore alternatives to traditional reinforcement. Making use of flexibility (and falling demand) has allowed companies to defer investment into the distribution network. Distribution Network Operators (DNOs) are now able to contract for more than 3GW of flexibility, a significant jump on the 2GW available in 2022/23. This is a success story but now is the time to reconsider the role of flexibility and to turn it into an enduring part of the whole energy system. The importance of flexibility for the developing electricity system was reiterated when NESO set out that the Clean Power 2030 mission will require available flexible capacity to increase to around 12 GW by 2030. That's roughly a four-fold increase from today. This requirement for flexibility will increase throughout the next two decades and beyond as the UK electrifies more processes.

During the 2020s and 2030s, Ofgem foresees UK homes installing low carbon technologies such as solar, heat pumps, heat batteries or EV chargers at an increasing pace. Networks need to either approve or at least be notified of these installations to maintain the integrity of the distribution system and keep people safe. There are two outcomes that Ofgem can usefully incentivise DNOs to achieve. The first outcome is ensuring that the capacity is there for people to upgrade. Nobody should face a delay with the installation of their domestic heat pump, heat battery or EV charger because of the grid. This means DNOs investing in advance. The second outcome is ensuring that the process is straightforward for people and proceeds without delay. DNOs have already taken some steps to make the process for connecting these appliances easier, for instance the ENA has launched Connect Direct.

16. How are unexpected constraints dealt with currently? How quickly can these be eased, and what is the impact of these unexpected constraints (eg on LCT uptake)?

The exact pace of change will depend on factors beyond the control of Ofgem or the networks, so there is undoubtedly some uncertainty. But the direction of travel towards electrifying looks unstoppable. The price control increasingly needs to ensure that the distribution grid is ready to at least double in carrying capacity over the next two decades. Deferring this investment simply stores up problems for later, as we have seen in other sectors such as water.

We recommend that this inherent uncertainty in the speed of change is built into the price control. This could involve the continued use of uncertainty mechanisms.

17. Do you agree that the tRESP output outlined for early 2026 will help create a level playing field for DNOs' business planning and support the ED3 objective and consumer outcomes?

No comment.

18. Can anticipatory network reinforcement be used to smooth the long-term build profile to avoid creating pinch points for the supply chain and workforce? What are the risks and trade-offs?

No comment.

19. Do you agree that investment optioneering should aim to reduce the lifetime costs by sizing elements of works for long-term need, including considering the impact of thermal losses?

No comment.

20. Is a 5-year price control (2028-33) the right duration to achieve the objective of securing timely network capacity for the net zero transition at least cost to consumers over the long run?

No comment.

21. To what extent should the price control be more directive on specific anticipatory and strategic investments to achieve the 'networks for net zero' consumer outcome?

No comment.

22. Do you agree with our characterisation of strategic and anticipatory investment and our expectation that these activities would have different regulatory drivers and controls?

No comment.

23. Should the price control provide more guidance or guardrails around the use of particular network solutions to achieve the 'networks for net zero' consumer outcome?

No comment.

24. Should we consider how we might bring all network capex investment together within the framework, irrespective of driver (eg load, asset health, resilience), to ensure a common approach to future proofing and delivery?

No comment.

25. How can we better strengthen accountability for consumer outcomes?

No comment.

26. What are your views on ED company reporting and the overall transparency of performance and compliance?

Given the importance of DNOs delivering timely and cost-efficient new connections and upgrades, Ofgem monitoring will need to increase during the next price control. This may include incentives on DNOs to deliver a minimum percentage of upgrades on time and on budget, with penalties for underdelivery. DNOs could be rewarded for facilitating new flexible connections and penalised for failing to deliver what people and businesses ask for. Ofgem could require DNOs to publish periodic updates on connections they have committed to deliver and how those connections are progressing.

27. Do you consider that ISGs alone are sufficient to ensure high quality and effective consumer and stakeholder engagement throughout the ED3 price control? What alternative or complementary approaches should we consider?

No comment.

28. Do you agree that Ofgem should adopt research approaches, such as deliberative techniques to ensure that the consumer voice is heard and considered throughout the ED3 and company Business Plan process?

No comment.

29. How should our approach to enhanced stakeholder engagement be adapted to better include the perspectives of all vulnerable customers, including those that are seldom heard, digitally disengaged/excluded and those that are worst served?

No comment.

30. What alternative or additional approaches might we use to ensure that the consumer voice remains central to our policy setting process?

No comment.

31. Has the BMCS incentive served its purpose in driving performance improvements and how can we adapt the metrics to better incentivise performance across a wider range of interactions between DNOs and their customers, particularly relating to connections?

No comment.

32. How should the CVI be adapted for ED3 and should we consider greater alignment with the GD sector?

No comment.

33. Should DNOs have a role in delivering energy efficiency measures to homes and businesses? What might the scope of these services be and how should they be funded?

No comment.

34. How can we drive further service improvements under the TTC incentive?

No comment.

35. Should the TTC also apply to domestic connection upgrades ie fuse/cutout/service cable upgrades, including unlooping?

No comment.

36. What is the best approach towards incentivising services to major connections customers and how should the MCI be adapted for ED3?

No comment.

37. How should the ED3 framework adapt to ensure that customers connecting to the distribution network are provided with the service that they need from the DNOs?

For British industry, it is key that they are able to easily and quickly upgrade their electricity connection as they electrify their processes through a combination of heat pumps, heat batteries and local generation. If the cost of larger connections is too high or companies are offered connection dates that are a decade or more in the future, manufacturers may decide to move outside of the UK. We have already seen the impact of the connections queue on renewables deployment. Similar connections

reform is needed for demand. Ofgem could incentivise DNOs to offer connections more quickly and cheaply to manufacturers that use flexibility to reduce or shift their maximum demand. For instance, manufacturers can use the efficiency of heat pumps to reduce the total additional load required, while heat batteries and thermal storage increase the flexibility of the connection and reduce peak load. This focus on keeping manufacturers in the UK by encouraging flexible connections may align well with Ofgem's new growth duty.

This connection issue is relevant for housebuilding. There is a risk that DNOs could inadvertently stand in the way of the government's housebuilding targets. Once the Future Homes Standard is fully implemented, possibly in 2027, new homes in England and Wales may have electric heating solutions, EV chargers and rooftop solar. DNOs will need to consider how to connect these new estates - it would be a drag on growth if DNOs delayed the release of new housing because of network capacity issues. DNOs could consider working with developers and energy retailers to reduce maximum demand through the use of flexible technologies, either in individual homes or co-located with the new development.

Given the importance of DNOs delivering timely and cost-efficient new connections and upgrades, Ofgem monitoring will need to increase during the next price control. This may include incentives on DNOs to deliver a minimum percentage of upgrades on time and on budget, with penalties for underdelivery. DNOs could be rewarded for facilitating new flexible connections and penalised for failing to deliver what people and businesses ask for. Ofgem could require DNOs to publish periodic updates on connections they have committed to deliver and how those connections are progressing.

38. In the context of greater electrification, is our current approach towards regulating reliability appropriate for ED3?

No comment.

39. What role should bespoke outputs and CVPs have in ED3?

No comment.

40. How can we optimise late and early competition models for application in electricity distribution?

No comment.

41. How should our approach to cost assessment evolve, to enable us to better manage increasingly pronounced trade-offs between consumer protection, efficiency and investment in the distribution network?

No comment.

- 42. How should our guidance for cost benefit analysis evolve to better enable optioneering between different interventions, taking relevant long-term risks and benefits into consideration?**

No comment.

- 43. Do you agree that the current Real Price Effect (RPE) methodology should form the basis for adjusting allowances in ED3?**

No comment.

- 44. Do you agree that the current approach to setting the ongoing efficiency challenge is a suitable starting point for ED3?**

No comment.

- 45. Do you see any reason why we should not implement the proposed changes to the calculation allowed returns, consideration of investability and assessment of financeability that we set out in RIIO-3 Sector Specific Methodology Decision – Finance Annex for ET, GT and GD?**

No comment.

- 46. Do you see any reason why we should not implement the proposed updates to financial resilience requirements that we set out in RIIO-3 Sector Specific Methodology Decision – Finance Annex for ET, GT and GD?**

No comment.

- 47. What are the key factors (including benefits and costs to consumers) that Ofgem should take into consideration when conducting its review of the appropriate approach to regulatory depreciation in ED3 and beyond?**

No comment.

- 48. How should the price control encourage ongoing development of the DSO role and activities to optimise whole system benefits for existing and future consumers?**

No comment.

49. What should the role of the DSOs be in identifying and delivering whole system benefits?

No comment.

50. Our historic approach to publishing and sharing datasets has been stakeholder-led and focused on establishing good digital foundations in the DNOs. With the rapid pace needed for enhanced data and digitalisation, should we instead be considering incentives around strategic priorities, such as network planning, flexibility, and connections?

No comment.

51. How can we enable greater development of internal digital expertise in its licensees?

No comment.

52. How should network companies use AI to improve network insight and decisionmaking (both operating expenditure (opex) and capital expenditure (capex)) and how should we be encouraging this through the ED3 framework?

No comment.

53. Our aim is for the ED3 framework to be structured to deliver high impact, transformative innovation – do you think that further changes, alongside those proposed for the other sectors in our RIIO-3 SSMD, are required to deliver this?

No comment.

54. Are there any factors particular to DNOs that facilitate or challenge deployment of innovation on their own and across networks?

No comment.

55. Do you agree that we should retain the Network Asset Risk Metric (NARM)? How should it further evolve in ED3?

No comment.

56. Do you agree that we should consider a more integrated approach to managing asset health, together with load-driven expenditure, given the need

to future proof for resilience (climate, cyber and physical security) and future demand? What might the risks and benefits of this approach be?

No comment.

57. In the context of making anticipatory investment decisions, what do network companies and other stakeholders need to enable the planning and delivery of cost-effective network resilience measures against our changing climate? What risks and opportunities do you see linked to an input-based approach to these investment plans?

No comment.

58. How should we monitor progress on the delivery of climate change resilience? Do you have any specific learnings which can help shape this?

No comment.

59. Do you have any comments on the suitability of current incentives to ensure that consumers continue to receive a reliable service in the face of climate hazards?

No comment.

60. Do stakeholders agree with retaining and strengthening the main components of the environmental framework from RIIO-ED2?

No comment.

61. Do stakeholders agree with building on the approach taken to cyber resilience in RIIO-3 for ED3?

No comment.

62. What specific issues are network companies facing in relation to the skills and capacity of their workforce and what measures should we take through the regulatory framework to mitigate these issues?

No comment.

63. What specific issues are supply chains facing and what measures should we take through the regulatory framework to mitigate these issues?

No comment.

64. Given our comments in Chapter 6 around taking a more proactive approach, are there any specific features of a more anticipatory or strategic investment approach that might create risks or opportunities for supply chain and workforce constraints?

No comment.

65. What would the benefits be of a geographical approach to delivering new and upgraded assets in terms of supply chain and workforce constraints?

No comment.