



House of Commons
Welsh Affairs Committee

Grid capacity in Wales

First Report of Session 2022–23

*Report, together with formal minutes relating
to the report*

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Welsh Affairs Committee

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Summary

In July 2021, our report on Renewable Energy in Wales concluded that developers of renewable energy were encountering problems with grid capacity and connecting to the electricity grid in Wales. Our inquiry in 2022 investigated the capacity of the grid in Wales both to meet current requirements and to support the achievement of the Government's ambitious net zero targets.

The grid network has been built piecemeal over several decades to meet the energy needs of the nation. The energy system in the UK is undergoing enormous change, and the way the electricity grid is designed and developed must adapt accordingly. We are encouraged to see the Government shifting to a more strategic, planned approach to the network. However, given the complexity of delivering new grid infrastructure, the urgency of net zero targets and the multiplicity of different actors, there is a need for a more joined-up approach, led by the UK Government.

We recognise the strengths of an electricity grid that serves the whole of Great Britain but consider that there are distinct challenges and opportunities relating to grid infrastructure in Wales that require specific focus from the UK Government. From farming off-shore wind in the Celtic Sea to harnessing tidal energy at Morlais, Wales is uniquely well-placed to play a leading role in the renewal of the UK energy system. Strategic investment in grid infrastructure is required for this potential to be exploited fully.

Grid capacity

Grid capacity in Wales is significantly constrained. During our inquiry, we were concerned by the difference in understanding between the UK and Welsh Governments over current grid capacity in Wales. The UK Government must work with the Welsh Government to produce an agreed assessment of current electricity grid capacity.

Demand pressures

The current pressure on the grid will be exacerbated by increases in demand for electricity. To ensure that communities and business in Wales can decarbonise in line with government targets, grid infrastructure must be able to cope with the projected increase in demand for electricity. As it stands, the grid in Wales will not be able to facilitate the decarbonisation of heat and transport across Wales.

We consider that it would be inequitable for the UK to benefit from Wales' renewable energy resources while Welsh communities were not adequately connected to the grid. We recommend that the UK Government task the new Electricity Networks Commissioner to determine the grid infrastructure necessary to enable the decarbonisation of heat and transport in Wales.

The connection of new renewable generation

We note the work announced by the Welsh Government to develop a long-term plan for energy networks in Wales and look forward to understanding how the UK Government is engaging with this. The UK Government needs to outline how it is taking into account challenges and opportunities specific to Wales, when considering grid design.

The cost of connecting to the grid

Upfront connection costs can make renewable energy projects economically unviable. This can incentivise developers to wait until grid reinforcement costs have been met by another developer. We are encouraged that Ofgem is reviewing connection arrangements and we look forward to hearing more about the progress being made.

We are encouraged to see that the UK Government recognises that grid connection costs can be prohibitively high for developers. However, we are concerned by the decision to move more of the reinforcement costs to the network charges paid by “all electricity consumers in the area”. This would create a higher burden for rural households and businesses and those in areas which historically lack existing grid infrastructure, which would not be equitable. We ask Ofgem and the UK Government to define what is meant by the phrase “in the area” and to explain how they will ensure that some communities will not be unduly burdened.

Delays in planning and construction

Securing planning consent for grid reinforcements can take longer than constructing the energy project itself. We heard that 11 of the 94 grid reinforcements that are necessary to meet the Government’s 2030 offshore wind target will not be delivered on time for the target to be met, under current regulatory and consenting processes.

We welcome the commitment to cutting process times by fifty per cent but it is clear that to meet government net zero and renewable energy generation targets this is the least that needs to happen. Moreover, while we are encouraged to see the new Electricity Networks Commissioner appointed with a remit to reduce timelines, it is not clear that the UK Government appreciates the step change needed to meet net zero targets. We call on the UK Government to produce a projected timeline for how it will reduce processing times by fifty per cent within a year.

The planning consent process has created a queue of renewable generation projects in Wales to which grid capacity has been reserved before planning permission has been granted. The UK Government should revise consenting processes to align the allocation of grid capacity with applications for planning permission.

Community Energy Projects

The Welsh Government has set a target for 1GW of renewable electricity capacity in Wales to be locally owned by 2030. However, the participation of communities in the energy market is restricted by excessive costs and an unwieldy regulatory process. The

UK Government must directly engage with community energy projects in Wales to understand the difficulties they face connecting to the grid and to explore how access to the grid for community energy projects can be improved in Wales.

Community benefits from commercial generation projects

It is important that communities receive benefits from hosting grid infrastructure of national importance. There is a lack of clear policy or incentives directing energy development companies on how to provide adequate benefits to communities hosting grid infrastructure.

Communities should be directly consulted on the benefits they would like to receive. A starting presumption should be introduced that a proportion of all future energy projects must be partly community-owned or provide direct benefits to the community which hosts the energy project and associated grid infrastructure, such as reduced energy bills.

Anticipatory Investment

Grid reinforcement works only begin once a specific energy generation project and the associated connection requirements have been established. Without significant anticipatory investment in grid infrastructure, the huge renewable energy potential in Wales is likely to go under-exploited for decades to come. We heard that the risk of costly grid infrastructure being built and then not connected to energy generation projects is much lower than the risk of renewable energy generation assets being stranded without access to grid infrastructure. The UK Government should work with energy companies and grid infrastructure owners to determine areas where anticipatory investment in grid infrastructure would be justified to achieve net zero targets.

To realise the opportunities for renewable energy generation in Wales a system of anticipatory investment in grid infrastructure must be created and implemented urgently. We call for further information on the changes to Ofgem's powers in this area and the timeline for these changes to be implemented. The UK Government should also conduct a review, with Ofgem, of the impact of the current price control mechanism on anticipatory investment in grid infrastructure across the UK.

Strategic Planning of the Network

The UK Government needs to provide the leadership and strategic planning to deliver a complicated set of changes across multiple bodies that share responsibility for grid development. This will involve setting renewable energy targets and grid infrastructure investment deadlines; and taking a 'round-table' approach to bring together the bodies involved in grid infrastructure in regular meetings.

As well as considering the grid in Wales as part of a Great Britain enterprise, the UK Government must recognise the distinctive challenges and opportunities associated with the grid in Wales. The UK Government should engage directly and regularly with the Welsh Government to deliver a coordinated and strategic approach to electricity grid network design.

1 Introduction

1. In July 2021 we published a report on Renewable Energy in Wales.¹ One of the key conclusions of the report was that developers of renewable energy were encountering problems with grid capacity and connecting to the electricity grid in Wales.²
2. We recommended that the Government recognise that increasing renewable energy generation in Wales may be significantly hindered by grid constraints if action is not taken. To mitigate this risk, we recommended that the Government work in collaboration with Ofgem and other stakeholders to plan anticipatory investment in the grid in Wales.³
3. In its response to the report, the Government stated that it was working with Ofgem “to help ensure that network companies play a full role in meeting our net zero objectives” and that it “support[ed] Ofgem’s work to enable a regulatory environment where network companies can invest ahead of need, where the need is sufficiently certain to justify this”.⁴ It further highlighted that Ofgem’s next transmission price control period for high voltage electricity transmission networks, RIIO-T2 (running from 2021–2026), would provide £30 billion for network reinforcement across Great Britain; £1.3 billion had already been allocated to Western Power Distribution (WPD)⁵ for the South and mid-Wales networks, and £2 billion to Scottish Power to cover the North Wales and Merseyside network area. The Government stated that Ofgem was taking steps to encourage investment that would be required to support net zero including providing clearer guidance on when and how companies should undertake anticipatory investment.⁶ On offshore wind, the Government cited the Offshore Transmission Network Review to “develop a new plan-led approach that seeks to bring together onshore and offshore network planning in a more holistic way and facilitate more anticipatory investment in the required grid infrastructure”.⁷
4. We launched this inquiry to follow up the questions raised in the Renewable Energy report, to take evidence on grid capacity in Wales and to consider present and future issues which will determine whether the grid is an enabler or barrier to achieving the Government’s net zero targets.
5. We launched the inquiry on 1 February 2022, with the following terms of reference:
 - What are the current capacity issues facing the National Grid?
 - How are the constraints on Wales’ grid likely to be exacerbated as demand for renewable energy surges?
 - How can Wales unlock the grid and ensure that it is ready for future demand?
 - What can be done to incentivise investment in grid flexibility, in particular vehicle to grid technology and ‘smart’ charging?

1 Welsh Affairs Committee, Second Report of 2021–2022, [Renewable Energy in Wales](#), HC 439

2 Ibid., para 71

3 Ibid., para 72

4 Welsh Affairs Committee, Second Special Report of Session 2021–22, [Renewable Energy in Wales: Government response to the Committee’s Second Report](#), HC 756, October 2021

5 Western Power Distribution (WPD) was acquired by National Grid Group in 2021. On 21 September 2022 it was renamed National Grid Electricity Distribution (NGED).

6 Welsh Affairs Committee, Second Special Report of Session 2021–22, [Renewable Energy in Wales: Government response to the Committee’s Second Report](#), HC 756

7 Ibid., p. 8

- What should be done to ensure that the grid, particularly in rural areas, can cope with the extra demand that will be generated from the transition to electric vehicles?
- What level of anticipatory investment in grid capacity is required by the UK Government to ensure that Wales can deliver its decarbonisation roadmap?
- How can the UK Government, the Welsh Government and Ofgem work together to improve grid capacity?

6. We received and published 31 pieces of written evidence. We held six oral evidence sessions with: RWE and EDF, the biggest energy companies producing renewable energy in Wales and the UK; representatives of community energy generation projects; representatives of renewable energy developers and industry; Ofgem; National Grid Electricity Systems Operator (ESO); The Crown Estate; the two Distribution Network Operators (DNOs) operating in Wales, Scottish Power Energy Networks (SPEN) and Western Power Distribution (WPD) and National Grid Electricity Transmission (NGET); Julie James MS, Minister for Climate Change, Welsh Government; and Rt Hon Greg Hands MP, Minister of State and Paul Van Heyningen, Deputy Director, Net Zero Electricity Networks, Department for Business, Energy & Industrial Strategy, UK Government.

7. We received some very detailed, technical evidence to this inquiry but have focussed our deliberations on the broad strategic questions. We also received evidence about community energy generation and supply which were not included in the original terms of reference; we reflect this evidence in our report. We would like to thank all those who contributed to the inquiry. A full list may be found at the back of this report.

8. We have taken note of the report of the Welsh Parliament/Senedd Cymru's Climate Change, Environment and Infrastructure Committee on Renewable Energy in Wales, published in May. It found that:

Wales' grid infrastructure is not fit for purpose. It is holding back renewable energy development. It requires investment, reinforcement and upgrading.⁸

Our inquiry

9. After giving an overview of the grid system and the opportunities for new renewable generation in Wales, we explain the challenges facing the electricity grid in Wales, as presented to us. We discuss constraints on export capability and the connection of new renewable generation, as well as the pressures of an increase in demand for electricity in the future. We consider the cost of connecting to the grid in Wales and the delays caused by securing planning consents for grid infrastructure. We weigh up the role of Ofgem in enabling the net zero transition and explore the particular difficulties faced by households and businesses in rural areas of Wales. We address the concerns of community energy projects and consider the benefits which may be granted to communities that host grid infrastructure. In the last two chapters we outline the evidence we received on anticipatory investment and the arguments for improved strategic planning of the electricity network for the future.

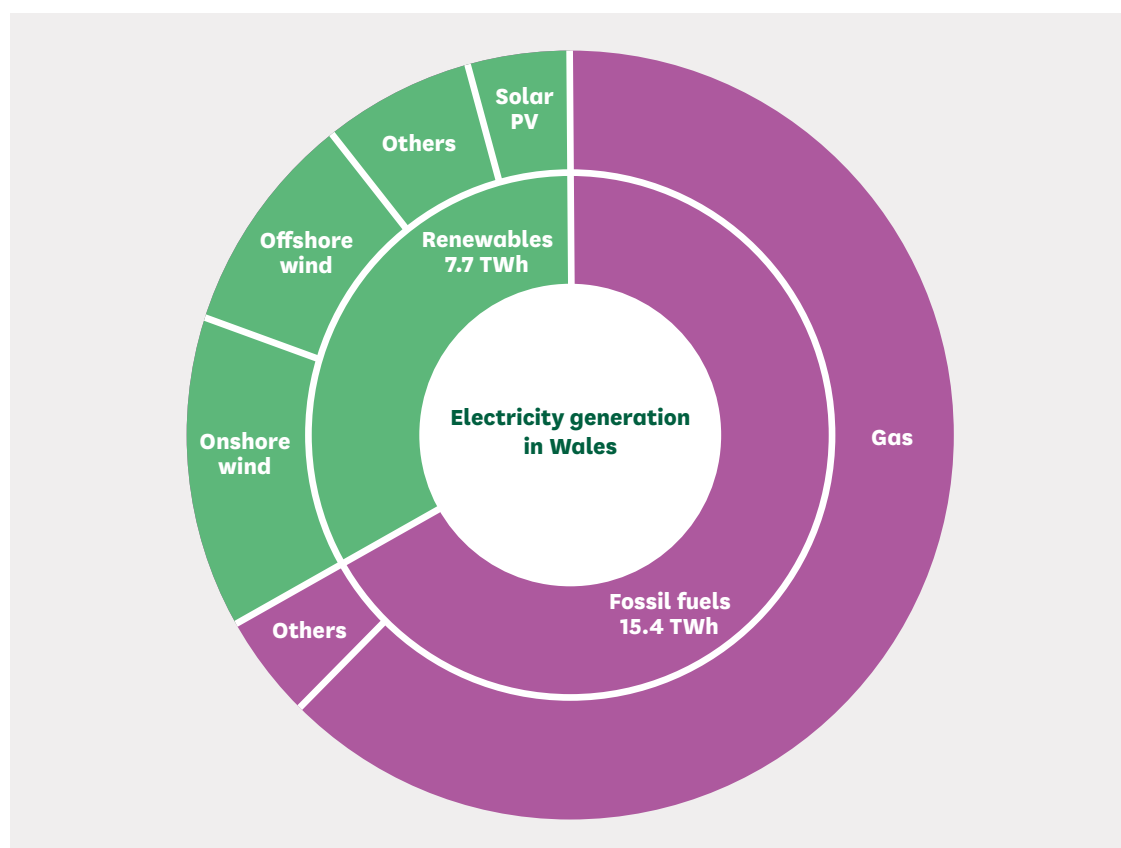
8 Welsh Parliament, Climate Change, Environment, and Infrastructure Committee, [Renewable Energy in Wales](#), 26 May 2022

2 Energy in Wales

10. In 2020 Wales supplied 7.5% of the UK's electricity and accounted for 6.5% of the UK's total demand for energy. Renewable energy constituted 43.1% of the UK's total energy generation and 36.1% of Wales' total in 2020. Wales contributed the least to the UK's renewable energy generation mix of all four nations in 2020.⁹

Figure 1: Energy generation in Wales, 2020.¹⁰

Electricity generation in Wales



11. In Wales, fossil fuel generation has decreased by 60% since 2016, largely due to the closure of several coal generation projects and power plants.¹¹ In 2019, the last coal-fired power station in Wales, Aberthaw power station, ceased commercial generation.¹² Since the closure of Wylfa nuclear power station in 2015, there has been no nuclear power generation in Wales. Wales remains the UK nation with the highest proportion of gas generation, with this accounting for 55.7% of total energy generation.¹³

9 Department for Business, Energy & Industrial Strategy, [Electricity generation and supply in Scotland, Wales, Northern Ireland and England, 2016 to 2020](#), December 2021

10 Welsh Government and Regen, [Energy Generation in Wales 2020](#), May 2022

11 Department for Business, Energy & Industrial Strategy, [Electricity generation and supply in Scotland, Wales, Northern Ireland and England, 2016 to 2020](#), December 2021

12 Welsh Government/Regen, [Energy Generation in Wales 2020](#), May 2022

13 Department for Business, Energy & Industrial Strategy, [Electricity generation and supply in Scotland, Wales, Northern Ireland and England, 2016 to 2020](#), December 2021

UK Government policy

12. The UK was the first major economy to embrace a legal obligation to achieve net zero carbon emissions by 2050. In its evidence to us the Department for Business, Energy & Industrial Strategy (BEIS) stated that the UK “is a world leader in clean growth” and had cut its emissions by more than 40% since 1990.¹⁴ The UK Government has set ambitious goals to achieve net zero targets, which we assume will be continued by the new Prime Minister and Cabinet, including building 50GW of offshore wind by 2030¹⁵ and ending sales of petrol and diesel cars by 2030.¹⁶

13. In the Energy White Paper, published in December 2020, the UK Government committed to creating a fully decarbonised energy system, entailing more, smaller sites of generation across the country as well as large, centralised power stations. The Energy White Paper predicted that electricity could constitute more than 50% of total energy demand in 2050, up from 17% in 2019, due to the electrification of transport and heating.¹⁷

14. In October 2021 the UK Government published its Net Zero Strategy in which it committed to reaching net zero carbon emissions by 2050. The Strategy sets out government policies and proposals for how this will be done, a commitment to deliver a decarbonised power system by 2035 and for all new cars and vans to be zero emission by 2035. The Strategy states that to decarbonise fully and maintain security of supply, it will be necessary to increase spending on the grid network. One of the “essential planks” of the Strategy is identified as “planning and infrastructure”.¹⁸

15. In July, the Government appointed Nick Winser CBE as the UK’s Electricity Networks Commissioner, a new role “to accelerate the delivery of crucial electricity network infrastructure”.¹⁹

Devolved and Reserved Responsibilities

16. Responsibility for regulating the UK oil and gas industry and the electricity industry, including generation, transmission, distribution and supply, is reserved to the UK Government. The Welsh Government has responsibility for the licensing and granting of consent for onshore oil and gas projects, all onshore wind projects, renewable energy projects under 350MW that are developed in the Wales inshore and offshore regions; and the promotion of energy efficiency.

Welsh Government policy

17. The Welsh Government has identified energy and the environment as a “priority sector” for Wales, one of nine priority business sectors judged to be key to the economy of Wales and therefore the focus of government support. Targets have been set for Wales to generate 70% of its electricity consumption from renewable energy by 2030.²⁰

14 Department for Business, Energy & Industrial Strategy ([REW0043](#))

15 Department for Business, Energy & Industrial Strategy and Prime Minister’s Office, [British Energy Security Strategy](#), April 2022

16 HM Government, [The Ten Point Plan for a Green Industrial Revolution](#), November 2020

17 HM Government, [Energy White Paper: Powering Our Net Zero Future](#), December 2020

18 HM Government, [Net Zero Strategy: Build Back Greener](#), October 2021

19 Department for Business, Energy & Industrial Strategy press release “[New Electricity Networks Commissioner appointed to help ensure home-grown energy for Britain](#)”, 6 July 2022

20 Welsh Government and Regen, [Energy Generation in Wales 2018](#), September 2019

18. The Welsh Government also wants to see local ownership of energy assets, setting further targets for 1GW of renewable electricity capacity in Wales to be locally owned by 2030; and for new renewable energy projects to have at least an element of local ownership by 2020.²¹

19. The Welsh Government conducted an exercise to identify opportunities to scale up renewable energy in Wales and in the resulting document, the Renewable Energy Deep Dive, published in December 2021, it pledged to step up its involvement with Ofgem to set out Wales's grid investment needs.²²

Opportunities for increased renewable energy generation

20. Wales' natural resources provide opportunities to generate energy from renewable sources, including by harnessing onshore and offshore wind, solar, wave and tidal energy. Wales has 2,120km of coastline and a marine area of approximately 32,000km², meaning that offshore wind, tidal and marine renewable energy could play important roles in meeting energy generation and decarbonisation targets in Wales. To be brought to market, the energy generated by these new projects must be connected into the transmission and distribution lines of the electricity grid.

21. The energy companies RWE and EDF told us that the locations for new renewable energy sources in Wales were well known. Jon O'Sullivan, Director of Onshore Wind & Solar at EDF Renewables, stated: "the biggest challenge and opportunity is to optimise the natural resources [...] and make Wales a leading exporter of electricity".²³

22. Julie James MS, Minister for Climate Change, Welsh Government, told us that "we [in Wales] absolutely will be net exporters of that energy".²⁴ When we asked Rt Hon Greg Hands MP, Minister of State at the Department for Business, Energy & Industrial Strategy, about the potential for renewable energy generation in Wales, he told us that:

Our energy markets are a Great British enterprise [...] Wales is undoubtedly a fantastic place for producing renewable energy [...] I see the benefits to Wales of being a big renewable energy producer and of being able to use renewable energy within Wales, and/or to export it to England or anywhere else, as being a key, powerful gain for Wales.²⁵

23. There are many areas of Wales which constitute an opportunity for renewable energy generation. The two areas on which we received the most evidence as part of this inquiry were North Wales and the Celtic Sea.

North Wales

24. In Future Wales: The National Plan 2040, the Welsh Government pledged to support proposed renewable energy developments associated with the Isle of Anglesey Energy Island Programme, Wylfa Newydd, and Trawsfynydd as a means of creating significant economic benefits and of generating renewable energy.²⁶ The Isle of Anglesey Energy

21 Welsh Government, [Assessment of onshore wind and solar energy potential in Wales](#), March 2019

22 Welsh Government, [Renewable energy deep dive: recommendations](#), December 2021

23 [Q3](#)

24 [Q99](#)

25 [Q115](#)

26 Welsh Government, [Future Wales: the National Plan 2040](#), February 2021

Island Programme, established by Isle of Anglesey County Council, is a collaboration between several stakeholders to promote Anglesey as a growth area in low carbon energy development. The Isle of Anglesey County Council told us:

Significant contracted projects over the next ten years to connect into North Wales include 750MW of interconnector between Great Britain and Ireland, the Awel y Môr offshore project into Bodelwyddan at 576MW, photovoltaic (PV) and battery storage (some 173MW for Wylfa and Bodelwyddan combined), Morlais tidal energy at 180MW and some 435MW of distribution generation.²⁷

The Celtic Sea

25. On 5 July, The Crown Estate announced new “areas of search” for the development of floating offshore wind projects (FLOW) in the Celtic Sea.²⁸ Further consultation will be used to refine these areas of search into development areas and the competitive tender process for these project development areas will be launched in mid-2023. The intended capacity for floating offshore wind in these areas is 4GW by 2035 but the Crown Estate estimates that the Celtic Sea holds the potential for up to an additional 20GW of floating wind capacity by 2045.²⁹

26. Celtic Sea Power³⁰ is the seabed lease holder of the Pembrokeshire Demonstration Zone (PDZ), an area located approximately 15km offshore from the South Pembrokeshire coastline of Wales and comprising a 90km² area leased from The Crown Estate for a period of 45 years. The purpose of the PDZ was initially intended to be for demonstrating multiple wave & tidal energy technologies but this has since changed to provide for the development of one or two Multi-connection Offshore Substations (MOS). These will be capable of accommodating approximately 1GW of power generated in the Celtic Sea.³¹

27. The Committee notes that the Welsh Government has called for the responsibility for managing The Crown Estate in Wales to be devolved to the Welsh Government.³² The UK Government does not take this view.³³

The grid in Wales

28. The grid refers to the network of powerlines, pylons and interconnectors that transport energy generated to areas of demand. It comprises the transmission grid and the distribution grid. The transmission grid connects high-voltage energy from power stations and substations to smaller, local networks (the distribution system). National Grid Electricity Transmission (NGET) owns the high voltage electricity transmission network in England and Wales.

27 Isle of Anglesey County Council ([GRD0013](#))

28 Crown Estate press notice, [“The Crown Estate announces areas of search to support growth of floating wind in the Celtic Sea”](#), July 2022

29 Crown Estate press notice, [“The Crown Estate announces areas of search to support growth of floating wind in the Celtic Sea”](#), July 2022

30 Wave Hub Development Services Ltd, trading as Celtic Sea Power (CSP) is a 100%-owned subsidiary of Cornwall Council with funding from the Welsh European Funding Office (WEFO) and the Swansea Bay City Deal (SBCD) to develop ‘The Pembrokeshire Demonstration Zone’ (PDZ),)

31 Celtic Sea Power ([GRD0011](#))

32 [Q84](#) [Julie James MS]

33 HC Deb, 9 February 2022, [col 929](#) [Commons Chamber]

29. The distribution grid draws from the transmission grid to supply electricity at lower voltages than the transmission grid. Distribution Network Operators (DNOs) manage the supply of power to end users, drawing this power from the National Grid's transmission system. There are two electricity DNOs in Wales, SPEN and WPD (the latter was acquired by National Grid plc in 2021).³⁴

30. National Grid Electricity Systems Operator (ESO) is the electricity system operator for Great Britain, which became a legally distinct business of National Grid Group in 2019. The role of National Grid ESO is to move electricity around the country to where demand is, at which point it is handed over to the DNOs for distribution to homes and businesses. The Energy Bill, introduced to the House of Lords on 6 July, includes provisions to establish an Independent Systems Operator (also known as the Future Systems Operator) which will absorb the functions of National Grid ESO in managing the electricity grid in real time as well as supporting its future development, with three strategic objectives: net-zero, security of supply and efficiency and economy.³⁵

31. High voltage transmission assets in Wales are principally located along the North and South coasts, where population density and demand are greatest and where fossil-fuel power generation has been located historically. The North Wales circuit was built to accommodate hydroelectric schemes and the Wylfa nuclear power station on Anglesey. The South Wales transmission network hosts several power stations. The transmission network in North and South Wales are considered separate circuits. There is no transmission network in mid-Wales; only the distribution network is in operation.³⁶

32. As the UK transitions away from fossil fuel energy generation towards renewable energy generation and electrification, the grid will need to adapt to accommodate this. Paul Hewett, CEO of Belltown Power,³⁷ told us in our Renewable Energy in Wales inquiry that:

We are going through a transition from the way that we generated and used electricity 20 years ago to the way that we will generate and use electricity 30 years from now. You would not design the grid network in the way it is currently designed for the future scenario.³⁸

Regulation

33. Ofgem is the independent energy regulator for Great Britain. Its primary duty, laid out in statute, is to “protect the interests of existing and future consumers” in relation to gas and electricity distribution.³⁹ Ofgem is responsible for working with government and stakeholders to enable competition and innovation in the sector and protect customers from bad practices and rising prices. It sets the framework under which Distribution Network Operators operate and incentivises electricity network companies to invest in their networks.⁴⁰ Investment in grid infrastructure by energy network companies

34 National Grid Plc, [Completion of acquisition of Western Power Distribution](#), 14 June 2021

35 Department for Business, Energy & Industrial Strategy, [Energy Security Bill factsheet: Future Systems Operator](#), September 2022

36 Welsh Government and Catapult, [Offshore Wind and Grid in Wales](#), September 2021

37 Belltown Power, [Who are we](#), Accessed September 2022

38 Oral evidence taken on 4 March 2021, [HC \(2021–22\) 1021](#), Q64 [Paul Hewett]

39 Ofgem, [Our powers and duties](#), July 2013

40 Department for Business, Energy & Industrial Strategy ([GRD0027](#))

is regulated by Ofgem through five-yearly price controls known as RIIO.⁴¹ The aim of the RIIO price control is to balance investment in the network against company returns and bills for consumers.⁴² RIIO-2 is the second set of price controls implemented under the RIIO model and sets the outputs DNOs need to deliver for their consumers and the associated revenues they are allowed to collect for the five-year period from 1 April 2023 to 31 March 2028.⁴³

41 RIIO stands for the formula Revenue = Incentives + Innovation + Outputs.

42 Ofgem, [Network Price Controls 2021–2028 \(RIIO-2\)](#), Accessed July 2022

43 Ibid

3 Challenges Facing the Electricity Grid in Wales

34. A consistent theme in the written evidence submitted for this inquiry was that grid capacity in Wales is highly constrained. The evidence we received from National Grid ESO categorised two different types of capacity constraints:

1. Export capability: the ability to transfer electricity across network boundaries without creating constraints or bottlenecks on the network; and
2. The connection of new generation.⁴⁴

Export capability

35. National Grid ESO, which bears the responsibility for real-time balancing of electricity on Great Britain's electricity network, stated in evidence that "at the transmission level we do not currently see capacity issues" and "generation connected to Welsh sections of the network are still below the maximum capacity of the network, following the phase-out of older generation sites in the last five years".⁴⁵ However, NGET, which owns the transmission system, said that "networks are already constrained".⁴⁶

36. Ben Godfrey, Distribution System Operator Manager for WPD, the DNO for the South Wales transmission line, told us that: "[i]n terms of our network, it is very much fit for purpose at the moment and has sufficient capacity to do everything that we need it to do".⁴⁷ SPEN, the other DNO operating in Wales, stated that mid-Wales "requires significant strategic infrastructure investments".⁴⁸ It further explained that it would "maximise [the] use of our existing network through to the early 2030s" but that accommodating growth beyond this date would "require a larger infrastructure solution".⁴⁹

37. EDF Renewables told us that:

There are capacity constraints on the Distribution System networks in Wales (WPD and MANWEB)⁵⁰ and the Transmission System owned by National Grid Electricity Transmission [...] The existing distributed generation installed on the networks has reached a level leading to constraints as spare capacity has been used up. These constraints include thermal, voltage or fault level limits.⁵¹

38. Julie James MS, Welsh Minister for Climate Change, told us that Wales does not have the capacity it needs "right now" and "absolutely" needs new grid infrastructure.⁵² She went on to say that she supported the view of maximising existing infrastructure

44 National Grid Electricity System Operator ([GRD0017](#))

45 Ibid.

46 National Grid ([GRD0025](#))

47 [Q61](#)

48 Scottish Power ([GRD0022](#))

49 Ibid

50 Western Power Distribution and Scottish Power's network covers Merseyside, North Wales and parts of Cheshire.

51 EDF Renewables ([GRD0012](#))

52 [Q71](#)

before building more, but also said that she did not believe that the UK Government fully understood the pressure on existing networks in Wales and the “immediate need to sort that out”.⁵³

39. We put these arguments to the UK Government. Rt Hon Greg Hands MP told us that the UK Government considered the Welsh transmission network to be very strong.⁵⁴ He echoed National Grid ESO in distinguishing between current and future grid capacity. He stated:

There are two separate questions. Is [the grid] fit for purpose today? Absolutely. Will it be fit for purpose tomorrow? That is what we are working on.⁵⁵

40. **We have heard that there are constraints on both the distribution and transmission grids in Wales. Julie James MS told us Wales does not have the grid capacity it needs “right now”. However, Rt Hon Greg Hands MP told us that the grid is “fit for purpose today”. We are concerned by the difference in understanding between the UK and Welsh Governments over current grid capacity in Wales.**

41. *We recommend that the Government explain the timescales of “today” and “tomorrow” in the context of grid capacity in Wales. Further to this we recommend that the Government explains the evidence for its statement that the electricity grid in Wales is “fit for purpose today” in light of the evidence we have received on grid constraints in Wales. The UK Government must work with the Welsh Government to produce an agreed assessment of current electricity grid capacity in Wales and set out the agreed timetable for publication.*

Demand pressures

42. Witnesses told us that there was current pressure on the grid and that this would be exacerbated in the context of future increases in demand for electricity. Grid reinforcements are required not only for connecting new generation but also to meet the projected increase in demand for electricity with the electrification of heat and transport. The Energy and Power Group, Department of Engineering Science at the University of Oxford, estimated that by 2030 the Electric Vehicles (EVs) of Welsh residences could add up to 1.7 GW of demand to the Welsh electricity network.⁵⁶ Logistics UK told us that “[s]ubstantial grid reinforcement and power upgrades will be needed over the coming decades to support an increased reliance on electricity to power new commercial vehicles”.⁵⁷

43. Community Energy Wales told us that car-charging in mid-Wales was “a massive problem” and that in north Wales “there is not even enough capacity on the grid there to install rapid car charging”.⁵⁸ Energy companies told us they were primed to support the move to electric vehicles and domestic heating but that the grid was a constraint. EDF told us:

53 [Q87](#)

54 [Q110](#)

55 [Q138](#)

56 Energy and Power Group, Department of Engineering Science, University of Oxford ([GRD0024](#))

57 Logistics UK ([GRD0003](#))

58 [Qq22](#), [12](#)

We are very keen to enable electric vehicles with the charging infrastructure in homes and in the more communal charging structures [...] but, again, difficult without increasing investment in grid.⁵⁹

44. Community Energy Wales explained that car-charging infrastructure could not be left to the market as “the places that have fewer people, less of a market, will be the last places to get the infrastructure”.⁶⁰ RWE concurred and said that while the private sector could build the charging infrastructure, “you need a strategic plan, national roll-outs and some coordination of it” by Government.⁶¹

45. Chris Williams, Head of Industrial Decarbonisation, Industry Wales⁶², told us that the challenges faced by supplying demand from manufacturing industries as they move to electrify their operations was even greater:

industry is likely to need three to four times the amount of electricity it does now. In fact, it obliterates how much extra electricity will be needed by EVs.⁶³

46. Chris Williams elaborated that “the risk [...] is that if the grid cannot supply industry with the power it needs when it needs it, industry will be forced to leave”.⁶⁴

47. When we asked the Minister about future demand for electricity, Rt Hon Greg Hands MP referred to an expected “doubling of demand” caused by the electrification of transport, heating and industry.⁶⁵ We put the concerns about grid capacity to accommodate both new sources of generation and rising demand to the Minister. He recognised that Welsh grid networks needed enhancing to avoid future capacity constraints and elaborated on various areas of policy to address this, which we discuss below in the chapter on Strategic Planning.⁶⁶

48. To ensure that communities and business in Wales can decarbonise in line with government targets, grid infrastructure must be able to meet the projected increase in demand for electricity. The evidence we received suggested that the grid in Wales will not be suitable to facilitate the decarbonisation of heat and transport across Wales.

49. While we understand that the UK Government must consider the energy and network needs of the UK as a whole, we consider that it would be inequitable if the UK were to benefit from Wales’ natural resources for renewable energy generation while Welsh households, businesses and industry were not adequately connected to the grid.

50. We recommend that the UK Government task the new Electricity Networks Commissioner to determine the grid infrastructure necessary to enable industry, communities and businesses in Wales to decarbonise heat and transport in line with net zero targets.

59 [Q22](#)

60 [Q22](#)

61 [Q23](#)

62 Industry Wales provides services to support companies established in Wales and to advise those looking to situate in Wales.

63 [Q26](#)

64 [Q26](#)

65 [Q102](#)

66 [Q102](#)

The connection of new renewable generation

51. The capacity of the grid in Wales to host new connections is a different matter from current export capability. National Grid ESO predicted the growth of renewable generation would lead to “constraints (bottlenecks) on the electricity system, including in Wales”.⁶⁷ The Energy Saving Trust concurred with National Grid ESO’s prediction of potential bottlenecks caused by more renewable energy generation in Wales.⁶⁸

Mid-Wales

52. There is no transmission infrastructure in mid-Wales, historically due to a lack of generation assets and to the relatively low level of demand from a sparse rural population.⁶⁹ National Grid ESO stated in its evidence that there was a “challenge that relates specifically to the mid-Wales area” as there are “no transmission assets in mid-Wales for generators to connect to”.⁷⁰

53. Peter Bingham, Chief Engineer at Ofgem, told us that the network in mid-Wales would need reinforcing if the potential for renewable energy generation in mid-Wales was to be exploited.⁷¹ EDF Renewables stated that transmission architecture was needed because of the “very limited” capacity on the distribution network. It told us that it had a development pipeline of 260MW of generation capacity in mid-Wales, but that the realisation of this generation relies on transmission infrastructure being built. EDF cited its Garn Fach windfarm planning application, the outcome of which is expected in 2023, but which is only targeted by NGET for connection in 2032, nine years later.⁷²

54. RenewableUK Cymru⁷³ explained that developers and National Grid were locked in a “longstanding” situation in mid-Wales which neither could resolve without some change in their respective incentive structures and rules of operation:

National Grid relies on projects being present and in need of a connection, but there are very few active development projects currently, specifically because of the known connectivity issues.⁷⁴

Beyond mid-Wales

55. We heard that, notwithstanding the specific problem in mid-Wales of a lack of a transmission system, the grid throughout Wales posed problems for new connections to generation projects. EDF Renewables told us that the capacity constraints on both the distribution and transmission networks in Wales prevent further deployment of renewable energy generation in Wales.⁷⁵ RWE, one of the world’s largest renewable developers which owns and operates around 3GW of electricity generation in Wales, told us that electricity

67 National Grid Electricity Systems Operator ([GRD0017](#))

68 Energy Saving Trust ([GRD0004](#))

69 National Grid ([GRD0025](#))

70 National Grid Electricity Systems Operator ([GRD0017](#))

71 [Q49](#)

72 EDF Renewables ([GRD0012](#))

73 RenewableUK Cymru is the Wales branch of RenewableUK, and is the trade body for all renewable energy, and smart energy and storage technologies in Wales.

74 [Q25](#)

75 EDF Renewables ([GRD0012](#))

network capacity was the largest single constraint preventing the deployment of renewable energy generation in Wales.⁷⁶ Community Energy Wales claimed that there would be a lot more renewable energy generation in Wales if the grid were not so severely constrained.⁷⁷

56. Tom Glover, RWE UK Country Chair, told us his organisation had applied for a grid connection for a 400MW Celtic Sea development and was told by National Grid ESO and NGET that they could not connect to the South Wales transmission line at Pembroke due to lack of capacity; RWE was offered a connection in North Devon instead.⁷⁸ Ofgem told us that the South Wales transmission line would need to be reinforced in order to support offshore developments in the Celtic Sea.⁷⁹

57. RenewableUK Cymru, a trade body for renewable energy suppliers, told us that the potential resource for floating offshore wind in Wales was 15–50GW. However, it stated that without significant grid reinforcements in South Wales, it is likely that FLOW projects in the Celtic Sea will connect into southwest England.⁸⁰ The Celtic Sea Developer Alliance stated that the South Wales transmission network does not have the additional capacity to accommodate the proposed level of floating offshore wind in the Celtic Sea and that this presents a real barrier to the development of this sector.⁸¹

58. Julie James MS, Welsh Minister for Climate Change, told us that ensuring grid capacity to support future renewable energy generation in the Celtic Sea was very important for the Welsh Government. She stated that any suggestions that this capacity should be taken via Devon or elsewhere “would be very damaging indeed to the ability of the transmission network to be fit for purpose in Wales”.⁸²

59. In September 2021, the Welsh Government announced that it, the energy network operators in Wales and the regulator Ofgem had agreed to work together to develop a long-term plan for energy networks in Wales. This piece of work will determine what network infrastructure will be needed to support a net zero energy system whilst serving communities and will inform Future Wales, Wales’ National Plan.⁸³

60. In his remarks on grid investment, Rt Hon Greg Hands MP described the grid as an asset of Great Britain, which seemed to indicate a difference of approach from that of Julie James MS. He said:

When it comes to the grid, we are looking really at a Great Britain grid. [...] I have to look at it as a Great Britain single electricity market.⁸⁴

61. We recognise the strengths of an electricity grid that serves the whole of Great Britain. However, we conclude that there are distinct challenges and opportunities relating to grid infrastructure in Wales that require specific focus and intervention from the UK Government.

76 RWE ([GRD0021](#))

77 [Q3](#)

78 [Q11](#)

79 [Q44](#)

80 RenewableUK Cymru ([GRD0015](#))

81 Celtic Sea Developer Alliance ([GRD0019](#))

82 [Q84](#)

83 Julie James MS, Minister for Climate Change, Welsh Government, [Written Statement: Evolving the Energy Grids for Net Zero Wales](#), September 2021

84 [Q110](#)

62. The Committee welcomes that Celtic Sea projects have been included in the list of infrastructure projects in the UK Government's Growth Plan and notes the recent decision by The Crown Estate to seek to accelerate the leasing process where possible. This appears only to be possible in Wales if improvement to grid infrastructure is also accelerated and we would welcome a clear commitment from the UK Government on this point.

63. *We note the work by the Welsh Government to develop a long-term plan for energy networks in Wales and call on the UK Government to explain how it is engaging with this. The UK Government needs to explain how it is taking into account Wales-specific challenges and opportunities when considering grid design and how it is ensuring that Wales is able to benefit from the increased investment and development associated with grid reinforcement.*

The cost of connecting to the grid

64. Before energy generation projects can connect to the distribution network, the Distribution Network Operator must check with the National Grid Electricity System Operator that capacity is available on the transmission network to accommodate the energy supply. If National Grid ESO requires network reinforcements before the developer can connect, the developer must commit up-front to funding the reinforcement.⁸⁵

65. Rhys Wyn Jones, Director of RenewableUK Cymru, explained that National Grid relied on projects "being present and in need of a connection" in order to carry out grid construction and reinforcement works.⁸⁶ Organisations including Centrica plc, a leading energy services and solutions company, and Celtic Sea Power submitted written evidence which highlighted that up-front costs were often prohibitive and made many renewable energy generation projects economically unviable.⁸⁷

66. Robert Proctor, Community Energy Wales, told us that upfront connection costs constituted a barrier to establishing small-scale energy generation projects. He gave an example of a 3MW connection for a solar energy project in South Wales that was given an offer by National Grid which included upgrades to the transmission network that made that project unviable.⁸⁸ He further explained that small energy projects were often reliant on bigger developers coming into an area and paying for the grid upgrades. The smaller projects could then only hope that there would spare capacity to which they might be able to connect.⁸⁹ Community Energy Wales proposed that initial grid connection costs be deferred over a longer-term payment programme to protect the viability of small projects.⁹⁰

67. Julie James MS told us that the expectation that developers would pay for connection and upgrade of the grid was a barrier to renewable energy development in Wales.⁹¹ She advocated "a planned system of infrastructure... so that we can figure out the best way to

85 Centrica plc ([GRD0014](#))

86 [Q25](#)

87 Celtic Sea Power ([GRD0011](#)); Centrica plc ([GRD0014](#))

88 [Q12](#)

89 [Q14](#)

90 Community Energy Wales ([GRD0001](#))

91 [Q73](#)

pay [...] and not just frontload it on which project comes forward first”.⁹² She believed that the UK Government did not yet fully understand the issue of the first developer having to pay the connection cost.⁹³

68. RenewableUK Cymru explained that there is an incentive to free-ride where prospective developers wait until reinforcement has been triggered by another developer before requesting a connection, known as the ‘chicken and egg’ situation.⁹⁴ National Grid ESO stated that “a new solution is needed to support the connection of new generation and new transmission assets with the aim of removing the current chicken and egg situation”.⁹⁵

69. Ofgem has conducted a review of whether connection charging arrangements are in the best interests of consumers, which noted the disadvantages of the current system, including potentially slowing down the roll-out of low carbon technologies across the energy system. In its final decision Ofgem decided to change the connection charging arrangements by reducing the upfront connection charge for generation and removing it completely for demand connections. Ofgem explained that these proposals are to be considered and implemented by 1 April 2023.⁹⁶

70. Paul Van Heyningen, Deputy Director of Net Zero Electricity Networks at the Department for Business, Energy & Industrial Strategy, told us that the issues of the ‘first mover’ (the first developer) and the upfront costs was a known issue. He stated that that Ofgem was changing its approach so that “some of those additional reinforcement costs will instead be socialised and put on the bill payer in general rather than the connecting customer”.⁹⁷ Rt Hon Greg Hands MP stated that influencing the investor sequence was a role for those “actually delivering the system” including National Grid ESO, Ofgem and energy companies; whereas the UK Government’s remit was to set the framework and make sure incentives for investment are in place.⁹⁸

71. In August, BEIS published the Electricity Networks Strategic Framework (ENSF) which we discuss further below in the chapter on Strategic Planning. In it the Government recognises that connection costs can be prohibitively high. The ENSF referred to Ofgem’s decision, published in May, to reduce the burden of costs on connecting customers “by moving more of the reinforcement costs to the network charges paid by all electricity consumers in the area”.⁹⁹

72. Upfront connection costs can be prohibitive and prevent the development of energy projects. This results in a “chicken and egg” situation whereby developers wait for other developers to commit to the funding of connection costs.

73. *We are encouraged that Ofgem is reviewing connection arrangements and we look forward to hearing more about the progress being made in the run up to 1 April 2023.*

92 [Q74](#)

93 [Q87](#)

94 [Q25](#)

95 National Grid Electricity System Operator ([GRD0017](#))

96 Ofgem, [Access and Forward Looking Charges Significant Code Review: Final Decision](#), May 2022

97 [Q119](#)

98 [Q123](#)

99 Department for Business, Energy & Industrial Capacity/Ofgem, [Electricity Networks Strategic Framework](#), August 2022

We consider that due to the tight timeframes set by government net zero targets, urgent work should be done to overcome prohibitive upfront costs and the ‘chicken and egg’ situation by incentivising developers to share grid connection and reinforcement costs.

74. Larger companies have a financial advantage linked to scale, whereas smaller energy projects are often reliant on the development of larger projects and the availability of spare capacity once these have been completed.

75. *A mechanism should be developed to allow small energy generation projects to defer and spread grid connection payments over time.*

76. We are encouraged to see that the UK Government recognises that grid connection costs can be prohibitively high for developers. However, we are concerned by the decision to move more of the reinforcement costs to the network charges paid by “all electricity consumers in the area”.

77. *It is not equitable that grid reinforcement costs should be shared by consumers in an area because this would create a higher burden for rural households and businesses and those in areas which historically lack existing grid infrastructure. We ask Ofgem and the UK Government to define what is meant by the phrase “in the area” and to explain how they will ensure that rural or isolated communities will not be unduly burdened.*

Delays in planning and construction

78. When new energy infrastructure is needed, several consents and approvals are required from different permitting bodies. The number and type of consents required depended on the type of infrastructure and its location. For example, Nationally Significant Infrastructure Projects require a Development Consent Order (DCO) under the Planning Act 2008 and permits or licences may be required from the Environment Agency or Natural Resource Wales for crossing rivers or working in flood zones.¹⁰⁰

79. Witnesses told us that lengthy planning consent processes for grid reinforcements can dissuade developers when they result in significantly extended project timelines. Centrica plc stated in written evidence that one of the main barriers to its plans to invest in grid assets, other than the lack of connection capacity, was the “wait for reinforcement works”.¹⁰¹

80. The development of the grid network in the Southwest Region, including the South Wales transmission line, is contingent upon the locations and capabilities of those offshore wind farms awarded rights to lease the seabed by The Crown Estate, which will not be known until the end of 2023.¹⁰² EDF Renewables told us that when trying to connect energy generation projects to the transmission line in South Wales, they have been told that the earliest connection will be in 2029. The renewable energy generation sites themselves could be built three to four years earlier than this connection date.¹⁰³ National Grid (NGET) told us that the earliest connection dates for developers to the South Wales transmission line is 2028.¹⁰⁴

100 National Grid Electricity Transmission, [Planning and Development](#), Accessed July 2022

101 Centrica plc ([GRD0014](#))

102 National Grid ESO, [Pathway to 2030](#), July 2022

103 EDF Renewables ([GRD0012](#))

104 National Grid ([GRD0025](#))

81. Julian Leslie, Head of Networks, National Grid ESO, noted that “transmission infrastructure takes much longer to build than an onshore or offshore wind farm”.¹⁰⁵ He explained that it takes 10 to 12 years to build a transmission line, from concept to planning consent and construction.¹⁰⁶ Peter Bingham, Chief Engineer at Ofgem, stated that the consent process was the longest stage in bringing energy developments to fruition.¹⁰⁷ In its Holistic Network Design, National Grid ESO stated that 11 of the 94 grid reinforcements that are necessary to meet the Government’s 2030 offshore wind target will not be delivered on time under the current regulatory and consenting processes. It recommended UK Government intervention to accelerate these projects.¹⁰⁸

82. Rhys Wyn Jones, Director of RenewableUK Cymru, called for reforms to the planning system. He explained that developers must make distinct applications for both their low-carbon generation project and the associated grid infrastructure, which was “very expensive and onerous”.¹⁰⁹ He recommended streamlining and focusing the consenting regime to facilitate these projects more quickly in the future.¹¹⁰

83. As well as disincentivising developers, planning delays also create a queue of projects. Julian Leslie explained that approximately 13GW of potential power generation in Wales was reserved to projects which are yet to achieve planning permission, despite already having been awarded commercial contracts to use grid capacity. Mr Leslie explained that National Grid ESO is looking into how the planning standards can be changed to free-up existing capacity. He stated that there were some short term fixes that National Grid ESO could apply, such as terminating existing contracts for those projects that have failed to achieve planning permission several times.¹¹¹

84. Witnesses cited the review of National Policy Statement for Electricity Networks Infrastructure (EN-5) as a means of reducing long grid connection times. Tom Glover called for the EN-5 to reflect a presumption in favour of development that would help to reach net zero targets, a position also promoted by the Celtic Sea Developer Alliance.¹¹² NGET welcomed the review of the National Policy Statement but stated that it “[did] not currently provide the step change needed to deliver the scale and pace of nationally significant infrastructure development that is required to meet the UK’s net zero ambition”.¹¹³

85. The BEIS Committee has reported on EN-5 and recommended that it be updated to reflect the outcome of the Offshore Transmission Network Review (OTNR).¹¹⁴ The Government will respond to the Committee’s report in due course.

86. Julie James MS told us that planning delays in terms of grid connections had “certainly been an issue”.¹¹⁵ She called for more clarity on the proposals in the British

105 [Q56](#)

106 [Q47](#)

107 [Q57](#)

108 National Grid ESO, [Pathway to 2030](#), July 2022

109 [Q30](#)

110 [Q30](#)

111 [Qq54](#), 55

112 [Q20](#), Celtic Sea Developer Alliance ([GRD0019](#))

113 National Grid ([GRD0025](#))

114 House of Commons, Business, Energy and Industrial Strategy Committee, [Revised \(Draft\) National Policy Statement for Energy](#), February 2022

115 [Q74](#)

Energy Security Strategy to shorten the consenting and licensing process for offshore developments.¹¹⁶ Rt Hon Greg Hands MP agreed that the planning system needs to be streamlined and improved. He stated that part of the Government's ambition for the NPS review was to improve process times to around fifty per cent faster within a year.¹¹⁷ The remit of the UK's first Electricity Networks Commissioner, appointed in July, includes accelerating the delivery of electricity network infrastructure and reducing timelines for onshore transmission network infrastructure by around 3 years.¹¹⁸

87. The Pathway to 2030 Holistic Network Design (HND) report, published in July by National Grid ESO, provides a blueprint of routes to connect 23GW of offshore wind to the electricity grid network in order to meet the UK Government's ambition for 50GW offshore wind capacity in Great Britain by 2030. Several recommendations in the HND relate to Wales, including a North-South Wales grid connection between existing transmission lines, a connection between the North Wales and South Scotland transmission lines, a connection to proposed wind farms in the Celtic Sea and an offshore wind farm to the North Wales transmission line. The next steps include consultation and network design by organisations appointed to fulfil these recommendations, such as NGET.¹¹⁹

88. In the ENSF, published in August, the Government stated that the "planning and consenting processes for the high-voltage network under the Nationally Significant Infrastructure Projects regime will deliver more certainty and better, greener and faster outcomes" as well as reducing barriers for network infrastructure that is not classed as nationally significant. The Government proposes to achieve this by revising the Energy National Policy Statements and reviewing land rights and consent processes for electricity network infrastructure.¹²⁰

89. **There is a multiplicity of different bodies involved in securing planning consent for grid infrastructure and this process needs to be streamlined. We welcome the commitment to cutting processing times by fifty per cent and appreciate the challenge that this constitutes. However, in light of the evidence we received, it is clear that in order to meet government net zero and renewable energy generation targets a reduction in processing times of fifty per cent is the least that needs to happen.**

90. *We are encouraged to see the new Electricity Networks Commissioner appointed with a remit to reduce timelines and look forward to understanding in more detail how this will be achieved. However, it is not clear that the UK Government appreciates that a step change is necessary to deliver a streamlined planning and consent process that enables the achievement of net zero targets. We call on the UK Government to produce a projected timeline for how it will reduce processing times by fifty per cent within a year.*

91. **The planning consent process has created a queue of renewable generation projects in Wales to which grid capacity has been reserved before planning permission has been granted.**

116 [Q91](#)

117 [Q107](#)

118 Department for Business, Energy & Industrial Strategy and The Rt Hon Kwasi Kwarteng MP, [New Electricity Networks Commissioner appointed to help ensure home-grown energy for Britain](#), July 2022

119 National Grid ESO, [Pathway to 2030](#), July 2022

120 Department for Business, Energy & Industrial Capacity/Ofgem, [Electricity Networks Strategic Framework](#), August 2022

92. *The UK Government should work with National Grid ESO, National Grid Electricity Transmission, the Distribution Network Operators and Ofgem to revise consenting processes to align the allocation of grid capacity with the application for planning permission. National Grid's work should be expedited on reviewing commercial contracts with developers reserving grid capacity, where those projects have consistently failed to achieve planning permission.*

Role of Ofgem

93. We received evidence stating that Ofgem's remit to protect consumers from price rises associated with grid reinforcement was preventing it from playing an enabling role in building the infrastructure needed to meet net zero targets. RWE told us:

National Grid will say, "We can only justify [spending on grid infrastructure] if there are enough connection requests in that area, up front". [...] if we are doing an offshore wind farm, normally National Grid will not start the onshore investment until we have a CfD [Contract for Difference], which is quite late in the process.¹²¹

94. Tom Glover told us that "what we don't think [Ofgem] are doing properly is asking what the overall lowest cost is to meet net zero".¹²² Witnesses, including RWE, Renewable Cymru and National Grid ESO, told us that Ofgem's duty to protect consumers should be balanced by a duty to assist energy markets to reach net zero targets.¹²³

95. On the other hand, Peter Bingham, told us that Ofgem's role was "enabling the net zero future and the reinforcement of networks that will be required to get us there".¹²⁴ He stated that in terms of determining the extent to which the networks would need to be reinforced was a role for the network companies, rather than Ofgem.¹²⁵ RWE, however said that "Ofgem has a very minor carbon emissions objective but that seems to be met by reducing every year, which is not, to be honest, very hard to achieve".¹²⁶

96. Rt Hon Greg Hands MP said that Ofgem's obligation to secure best value for the customer could not be ignored and that he was confident that everyone in the sector was aligned on net zero and "how to get there".¹²⁷ He stated that a key challenge was striking the correct balance between being able to anticipate where energy generation is going to come from while still protecting consumers.¹²⁸

97. The Minister cited the Holistic Network Design and an ongoing review into the onshore electricity network as enabling planning consent and Ofgem's regulatory timescales to be accelerated.¹²⁹ The Government has also indicated its intention to consult on a Strategy and Policy Statement for Ofgem which will create a framework for Ofgem's decision making that allows the regulator to protect consumers and achieve net zero.¹³⁰

121 [Q16](#)

122 [Q16](#)

123 [Q16](#), RWE ([GRD0021](#)); RenewableUK Cymru ([GRD0015](#)); National Grid Electricity System Operator ([GRD0017](#))

124 [Q49](#)

125 [Q51](#)

126 [Q16](#)

127 [Q103](#)

128 [Q113](#)

129 [Q102](#)

130 Department for Business, Energy & Industrial Strategy ([GRD0027](#))

98. Ofgem, as the market regulator, must ensure that the regulatory environment enables the decarbonisation of energy markets. Whilst ensuring the best value for consumers is important and should remain one of Ofgem's primary considerations, this should be balanced against achieving net zero targets.

99. *We recommend that the UK Government amend Ofgem's primary duty to include both ensuring the best value for consumers and achieving net zero targets, by bringing forward government amendments to the Energy Bill. This would provide strong signals to developers and grid infrastructure owners.*

Rural Areas

100. We have heard that delays and upfront costs are often greater in rural areas, which lack existing grid infrastructure. The situation is complicated by the fact that there is a higher proportion of energy inefficient, older and off-grid properties across rural Wales.¹³¹ Witnesses including Robert Proctor from Community Energy Wales and Tom Glover cited rurality and the historic lack of grid infrastructure as constraints on Wales utilising its potential for renewable energy generation.¹³²

101. Community Energy Wales stated in written evidence that there is a huge disadvantage for rural communities in terms of grid infrastructure in Wales. It explained that the transition towards electrification of transport would be particularly challenging in mid-Wales partly because it is difficult to find sites where the grid is able to accommodate rapid car charging. It also stated that small generation projects were facing costs of more than £100,000 to connect to the grid in rural areas, which was a "major stumbling block for community renewable projects" as the "connection costs simply undermine any business case for small scale renewable schemes".¹³³ This was a particular issue in areas of low population, which simply cannot support the high costs associated with connecting to the rural grid.¹³⁴

102. NFU Cymru submitted that the uneven distribution of rural electricity network capacity may constitute a barrier to the investments needed to drive agricultural productivity growth and warned against the development of a "rural-urban divide".¹³⁵ Centrica plc stated that targeting government funding may be necessary in rural areas to support investment in grid capacity.¹³⁶

103. BEIS recognises that connections to the grid in rural areas can be more challenging due to increased distance from substations and limited existing capacity resulting in higher connection costs and greater planning delays.¹³⁷ However, Rt Hon Greg Hands MP told us that "all areas of the country will face different challenges and costs in connecting to the network and we do not believe it would be appropriate or fair to allow one area of the country to have subsidised connection charges".¹³⁸

131 Welsh Parliament, Equality and Social Justice Committee, [Fuel poverty and the Warm Homes Programme](#), May 2022

132 [Qq4](#), 5

133 Community Energy Wales ([GRD0001](#))

134 Centrica plc ([GRD0014](#))

135 NFU Cymru ([GRD0009](#))

136 Centrica plc ([GRD0014](#))

137 Department for Business, Energy & Industrial Strategy ([GRD0027](#))

138 Department for Business, Energy & Industrial Strategy ([GRD0031](#))

Laying cables underground

104. In total around 25% of Wales is either in a National Park or Area of Outstanding Natural Beauty (AONBs).¹³⁹ The majority of new electricity lines are supported by pylons but in National Parks and AONBs the strong starting presumption is that new lines should be put underground, unless the harm of so doing outweighs the visual and other benefits to the landscape.¹⁴⁰

105. Roisin Quinn, Director of Customer Connections, NGET, told us that her organisation welcomed this policy. She stated that the presumption in favour of “undergrounding” would reduce the time taken to secure planning permission and gain the support of local communities for the construction of necessary grid infrastructure.¹⁴¹ Ben Godfrey, Western Power Distribution, and Malcolm Bebbington, Scottish Power, concurred.¹⁴²

106. However, Peter Bingham stated that undergrounding grid infrastructure was expensive and hugely disruptive. He explained that it requires the excavation of a tract of land the width of a dual carriageway.¹⁴³ Witnesses estimated that constructing underground lines was between 3 and 15 times more expensive than overhead lines.¹⁴⁴

107. Julie James MS told us that it was important to involve the local people in decisions about new power lines and to look at each landscape “in its own right” but that the immediate disruption to landscapes involved in laying cables had to be balanced against other priorities.¹⁴⁵ She said that further discussion was needed with the UK Government on how to balance those conflicts:

We have to balance the nature and climate emergencies we are facing, the cost-of-living crisis we are facing and the need to get this energy on stream with a variety of landscapes in Wales that are highly protected, very beautiful and support our tourist industry.¹⁴⁶

108. Rt Hon Greg Hands MP told us that before undergrounding is considered as an option for constructing transmission or distribution lines, re-routing to avoid AONBs should be considered first.¹⁴⁷

109. **The policy in favour of laying cables underground in AONBs is welcome. However, due to the significantly higher construction costs it is likely that overhead lines will simply be re-routed around AONBs. This will mean that communities and businesses in those areas will remain isolated from grid infrastructure and face high costs to connect to the grid.**

110. ***The Government should outline the circumstances in which higher grid construction costs, for example due to undergrounding, are justified to enable rural communities to keep pace with the decarbonisation transition.***

139 Welsh Government, [Help for Wales’ countryside following boost in tourism](#), May 2022

140 Department for Business, Energy & Industrial Strategy, [Draft National Policy Statement for Electricity Networks Infrastructure \(EN5\)](#), September 2021

141 [Q68](#)

142 [Q68](#)

143 [Q52](#)

144 [Q52 \[Peter Bingham\]](#); Liquid Gas UK ([GRD0006](#))

145 [Q92](#)

146 [Q92](#)

147 Department for Business, Energy & Industrial Strategy ([GRD0031](#))

Community energy

111. The Welsh Government has committed to expanding public body and community enterprise renewable energy generation in Wales by over 100MW between 2021 and 2026.¹⁴⁸ This is in the context of the longer-term target of 1GW of renewable energy generation capacity to be locally owned by 2030.¹⁴⁹ In the Community Energy in Wales Report, published in 2021, the Welsh Government explained the importance of community energy in achieving net zero by “gaining consent, increasing participation and embedding behaviour change”.¹⁵⁰ In the Community Energy Strategy the UK Government highlighted the benefits of community energy including maintaining energy security, tackling climate change and wider social and economic benefits.¹⁵¹

112. Robert Proctor, Community Energy Wales, told us that there is currently between 20MW-25MW of community-owned energy in Wales. He added that community projects struggle to compete with commercial developers for land and access to the grid.¹⁵² He called for a certain percentage of grid capacity to be reserved for community energy projects.¹⁵³

113. Community Energy Wales stated that the participation of communities in the energy market is being restricted by excessive costs and a lack of appropriately tailored regulatory process.¹⁵⁴ It explained that most community energy projects operate by selling the energy they generate back to the grid and in that way reduce bills. A few community projects have been set up which sell the energy they generate directly to their communities at a lower than market rate, but “they are not commonplace and are very challenging to develop so most communities are not able to do that”. Moreover, those projects are “very reliant on finding a friendly energy company to work in partnership with”.¹⁵⁵

114. The Welsh Government has stated that all new energy generation developments should be at least part-owned by the people and businesses of Wales.¹⁵⁶ Julie James MS told us that the Welsh Government works with firms across Wales for collective energy purchase and supply, but that these initiatives were very problematic “because there just is not the capacity for them”.¹⁵⁷ The Welsh Government has used the Banc Cambria project to look at ways of enabling communities to raise the fund necessary for grid reinforcement costs. The Welsh Government is working with the Development Bank of Wales to take a stake of the necessary investment on behalf of communities, which can then slowly buy into the cost of connecting.¹⁵⁸

148 Welsh Government, [Schools and public buildings to get solar panels as Wales drives community owned renewable energy](#), April 2022

149 Lee Waters, Deputy Minister for Climate Change, Welsh Government, [Written Statement: Outcome of the Deep Dive into Renewable Energy](#), December 2021

150 Welsh Government/Community Energy, [Community Energy in Wales: State of the Sector Report 2021](#), 2021

151 Department of Energy & Climate Change, [Community Energy Strategy: People Powering Change](#), January 2014

152 [Q6](#)

153 [Q19](#)

154 Community Energy Wales ([GRD0001](#))

155 [Q7](#)

156 Welsh Government, [Policy Statement: Local ownership of energy generation in Wales – benefitting Wales today and for future generations](#), 2020

157 [Q84](#)

158 [Q81](#)

115. Rt Hon Greg Hands MP told us that the UK Government was very supportive of community energy and that he did not “recognise there being specific difficulties around the grid when it comes to community energy”.¹⁵⁹

116. **We have heard that community energy projects face specific difficulties in connecting to the grid, and that the UK Government is not aware of those difficulties.**

117. *We recommend that the Government engage directly with community energy projects in Wales to understand the difficulties they face connecting to the grid. The UK Government should lead a working group made up of the Welsh Government, grid infrastructure owners, energy companies and communities to explore how access to the grid for community energy projects can be improved in Wales.*

118. *We recommend that the UK Government strengthens the legislative framework to support the growth of community energy schemes. The Energy Bill provides a potential opportunity to do this.*

Community benefits from commercial generation projects

119. Multiple witnesses highlighted the importance of communities receiving benefits from hosting grid infrastructure. It was suggested that benefits could be direct, such as through reduced energy bills, or indirect, for example through a community fund.

120. National Grid Electricity Transmission (NGET) stated that it was essential that the journey to net zero had minimal impact on and delivered maximum benefits to communities which are hosting grid infrastructure. It stated that the UK and Welsh governments have an opportunity to set out clearly in policy the appropriate approach to community benefits.¹⁶⁰

121. We heard about various ways in which communities can benefit from hosting grid infrastructure. RWE explained that it has provided benefits to communities consisting of “£10 million in 10 years” in independent funds managed by communities in Wales.¹⁶¹ It highlighted the importance of consulting directly communities which host grid infrastructure on the benefits they would like to see.¹⁶²

122. There are also examples of opportunities for communities to invest in commercial projects. RWE told us that their latest two windfarms incorporated Memoranda of Understanding about options for local councils and the communities to invest.¹⁶³

123. Julie James MS told us that to gain support for the infrastructure that will be necessary to achieve net zero, communities need to see the benefits of them. She stressed that these benefits must be “real” and not just philanthropic.¹⁶⁴

124. The British Energy Security Strategy (BESS) states that local energy partnerships could have the ability to deliver lower local pricing.¹⁶⁵ Rt Hon Greg Hands MP told us that

159 [Q132](#)

160 National Grid ([GRD0025](#))

161 [Q9](#)

162 [Q9](#)

163 [Q9](#)

164 [Q85](#)

165 HM Government, [British Energy Security Strategy \(BESS\)](#), April 2022

getting local communities on side was increasingly the UK Government's focus.¹⁶⁶ In the ENSF the Government committed to exploring options for community benefit schemes which acknowledge the role of communities hosting grid infrastructure.¹⁶⁷

125. There is a lack of clear policy directing energy development companies on how to provide adequate benefits to communities hosting grid infrastructure.

126. The Government should incentivise energy companies and transmission infrastructure owners to provide benefits to communities hosting network assets. Communities should be directly consulted on the benefits they would like to receive. A starting presumption should be introduced through policy that a proportion of all future energy projects must be partly community-owned or provide direct benefits to the community which hosts the energy project and associated grid infrastructure.

¹⁶⁶ [Q116](#)

¹⁶⁷ Department for Business, Energy & and Industrial Capacity/Ofgem, [Electricity Networks Strategic Framework](#), August 2022

4 Anticipatory Investment

127. Throughout this inquiry we have heard that anticipatory investment in grid infrastructure is essential to achieving net zero. In its Consultation on Anticipatory Investment in April, Ofgem defined the term as investment in grid infrastructure to support the later connection of a specific development or developments.¹⁶⁸ Currently, grid reinforcement works will only begin once a specific energy generation project and the associated connection requirements have been established. In relation to offshore wind, Ofgem stated in the consultation document that the existing framework for development “disincentivises [...] developers from taking on additional development risks which may put them at a competitive disadvantage due to factors such as cost and timescale”.¹⁶⁹

128. Witnesses suggested to us that anticipatory investment was essential to meet net zero targets. Tom Glover explained that the grid was an enabler to decarbonisation and that if the grid was constructed in advance, developers would then compete to connect. Mr Glover highlighted an example in Germany whereby an offshore substation was built with three bays, but only two projects already committed. He explained that multiple companies then competed to connect into the final bay.¹⁷⁰ Celtic Sea Power highlighted the benefits of Multi-connection Offshore Substations (MOS) including reducing costs and time delays as well as providing “strong and strategic locational signals”, which enable supply chains to be established near Welsh port infrastructure.¹⁷¹ It further stated that a more anticipatory approach to investment in the grid would ultimately create a stronger marketplace and attract investment.¹⁷² National Grid ESO explained that “anticipatory investment will enable networks and industry to address the chicken and egg scenario that has developed in Wales”.¹⁷³

129. Witnesses also highlighted the potential risks of not investing in grid infrastructure on an anticipatory basis. RWE stated that without significant anticipatory investment in grid infrastructure taking place now, the huge onshore and offshore potential in Wales is likely to go under-utilised for decades to come.¹⁷⁴

130. The risk of anticipatory investment is that costly infrastructure will be built at cost to the consumer and then not utilised. Tom Glover said that Ofgem regulated transmission “by only allowing investments when they are very, very certain that connections are required” and that:

only a very small amount of anticipatory investment is allowed. Under RIIO-2 proposals, there is what is called the net zero investment, which is really small.¹⁷⁵

131. The energy companies told us, however, that the risk was low. Jon O’Sullivan, EDF Renewables, explained that industry was aware of the best places to build new renewable energy wind farms, solar farms and offshore wind farms and that it was therefore low risk

168 Ofgem, [Consultation on our Minded-to Decision on Anticipatory Investment and Implementation of Policy Changes](#), April 2022

169 Ibid., para 1.4

170 [Q15](#)

171 Celtic Sea Power ([GRD0011](#))

172 Celtic Sea Power ([GRD0011](#))

173 National Grid Electricity Systems Operator ([GRD0017](#))

174 RWE ([GRD0021](#))

175 [Q20](#)

that grid infrastructure in these areas would not be used.¹⁷⁶ He said “the risk of having stranded transmission assets is pretty much zero whereas the risk of having stranded renewable assets... is far higher”.¹⁷⁷ Hub den Rooijen, Managing Director, Marine, The Crown Estate, stated that the market interest would be there if the transmission line was built on an anticipatory investment basis.¹⁷⁸

132. Chris Williams, Industry Wales, told us that mapping and modelling could ease the risk for anticipatory investment in grid infrastructure.¹⁷⁹ He explained that the current system of grid investment made it difficult for bigger companies and projects to plan in the long term.¹⁸⁰ SPEN, the DNO for the North Wales transmission line, told us that they had released their baseline view of high certainty investments that would be needed for the North Wales region. They stated that the Government should support Ofgem in allowing for anticipatory investment where necessary.¹⁸¹

133. EDF proposed that the exact level of anticipatory investment and locations should be determined by a review of the requirements for the grid system reinforcement which should be carried out by the UK Government, Welsh Government, Ofgem, National Grid ESO, NGET and the relevant DNOs.¹⁸² However, in oral evidence Jon O’Sullivan said:

On anticipatory investment, we all know where the best place is to build these new renewable energy wind farms, solar farms and offshore. We know and I am not sure why we need to wait.¹⁸³

134. National Grid ESO produced a Future Energy Scenario (FES) in July which outlined four different, credible pathways for the future of energy between now and 2050. In the FES, National Grid ESO stated that the delivery of the British Energy Security Strategy would require urgent anticipatory investment to ensure the energy system is not a blocker to net zero.¹⁸⁴

135. However, when we asked Julian Leslie of the National Grid ESO about anticipatory investment he told us that in areas such as mid-Wales, grid infrastructure would only be constructed if there was a clear pipeline of development and not on an anticipatory basis.¹⁸⁵ National Grid ESO recognised the potential role of anticipatory investment a means to overcome the “chicken and egg” situation but also noted that this could also create additional risks for consumers.¹⁸⁶

136. Witnesses highlighted the need for Ofgem and National Grid to enable and encourage anticipatory investment. The Isle of Anglesey County Council stated that, for there to be a demonstrable shift towards anticipatory investment and development of low regret options, there needs to be reform at the regulatory level which was supported by National Grid ESO.¹⁸⁷

176 [Q19](#)

177 [Q17](#)

178 [Q56](#)

179 [Q30](#)

180 [Qq32](#), [33](#)

181 ScottishPower ([GRD0022](#))

182 EDF Renewables ([GRD0012](#))

183 [Q19](#)

184 National Grid ESO, [Future Energy Scenarios](#), July 2022

185 [Q48](#)

186 National Grid Electricity Systems Operator ([GRD0017](#))

187 Isle of Anglesey County Council ([GRD0013](#))

137. Centrica plc told us that Ofgem’s RIIO-ED2 Business Plan Guidance sets out basic guidelines for anticipatory investment and that the Welsh Government should work with Ofgem to ensure that this is sufficiently flexible for Wales’ electricity network needs. Centrica called for Ofgem to review RIIO-ED2 after the first few years of operation to assess whether it was blocking anticipatory investment.¹⁸⁸ RWE submitted that the regulatory framework must create space for anticipatory investment and that these should be introduced with the next price control mechanism.¹⁸⁹

138. Peter Bingham told us that “traditionally as a regulator we have been a little reticent to allow investment where there is not a clear need” but that “our stance has changed and continues to change towards being much more supportive of anticipatory investment”.¹⁹⁰ He gave the example of approving a transmission link to the Shetland Islands. He said Ofgem had “authorised the transmission companies to get on with that before that need had absolutely crystallised” and said that this approach would be taken “forward with other areas, particularly the offshore developments that we will see in other parts of the country”.¹⁹¹

139. BEIS told us in written evidence that network regulation, including agreeing anticipatory investment in the network, is the responsibility of Ofgem as market regulator. It recognised anticipatory investment as having a key role in ensuring network readiness for net zero.¹⁹² In the ENSF the Government stated that a key part of ensuring value for money would be investing in grid networks ahead of need to ensure that the electricity network enables the achievement of net zero targets. It stated that this would be accomplished through enabling strategic investment through Ofgem’s price control mechanism and by increasing competition and promoting innovation.¹⁹³

140. Rt Hon Greg Hands MP agreed with the need for investors to have a greater degree of certainty and that the acceleration of the transmission infrastructure network was part of this. He told us that BEIS planned to strengthen Ofgem’s powers to allow anticipatory work in the future. He explained that anticipatory investment afforded developers a greater degree of certainty but warned against overburdening customers with “too much network” that could end up not being needed.¹⁹⁴

141. Without an established system of anticipatory investment in grid infrastructure the significant opportunities for renewable energy generation in Wales will go under-utilised, which will have an impact on the achievement of net zero targets. Were grid infrastructure to be built on an anticipatory basis in areas where there is a high probability of the construction of future energy projects, this would reduce the risks of costly grid infrastructure not being utilised. Furthermore, multi-connection substations, such as the MOS described by Celtic Sea Power, could have an important role in both reducing the costs and delays associated with grid construction and in providing strong locational signals to establish local supply chains. While we are encouraged that Ofgem’s stance has changed in favour of anticipatory investment and

188 Centrica plc ([GRD0014](#))

189 RWE ([GRD0021](#))

190 [Q53](#)

191 [Q53](#)

192 Department for Business, Energy & Industrial Strategy ([GRD0027](#))

193 Department for Business, Energy & Industrial Strategy and Ofgem, [Electricity Networks Strategic Framework](#), August 2022

194 [Q113](#)

that BEIS is looking to strengthen Ofgem's powers in this area, we consider that this does not reflect the urgency of the situation.

142. *The UK Government should use National Grid ESO's Future Energy Scenarios to work with energy companies and grid infrastructure owners to determine areas where anticipatory investment in grid infrastructure would be justified to achieve net zero targets. Where anticipatory investment in grid infrastructure is deemed justified, the UK Government should encourage the development of multi-connection substations in order to establish local supply chains, which can then support the connection of future renewable energy projects.*

143. *In order to utilise the opportunities for renewable energy generation in Wales a system of anticipatory investment in grid infrastructure needs to be created and implemented urgently. In the government response to this report, we request further information on the nature of the changes to Ofgem's powers and the timeline for this to be implemented. The UK Government should also conduct a review with Ofgem of the impact of the current price control mechanism on the level of anticipatory investment in grid infrastructure across the UK.*

5 Strategic Planning of the Network

144. Energy generation and use has evolved over the past few decades. In the future, the grid network needs to be designed in a different way to facilitate the changing nature of energy generation, supply and demand.

145. Witnesses criticised the approach to grid design of connecting projects on a case-by-case basis and supported a more strategic approach to grid network design and reinforcement. NGET stated that the incremental approach to developing grid infrastructure is likely to result in inefficient developments with higher costs, later delivery and greater environmental impacts whilst also missing the opportunity for significant community benefits.¹⁹⁵ Renewable UK explained that projects will continue to be developed on a ‘piecemeal’ basis which will not provide for an holistic, efficient, strategic approach and which may lead to progress stalling.¹⁹⁶

146. Peter Bingham highlighted the risks of moving away from individual connections towards a strategic, planned approach, including the potential for developers to overbuild and the possibility of stranding grid assets.¹⁹⁷

147. Witnesses called for holistic thinking and greater coordination in grid network design to reduce connection costs, avoid delays and prevent the building of unnecessary infrastructure. Hub den Rooijen highlighted less construction, higher community support and lower costs as the possible benefits of a more coordinated approach.¹⁹⁸ The Isle of Anglesey County Council advocated a fully integrated network approach to capacity planning drawing together the Welsh and UK Governments, Ofgem, National Grid, DNOs and developers to share system knowledge and identify “low regret” infrastructure options.¹⁹⁹ The Celtic Sea Developer Alliance stated that that ongoing reviews including the Offshore Transmission Network Review (OTNR) and Holistic Network Design focus on the East coast, which may affect the ability for Wales and the Celtic Sea to remain competitive.²⁰⁰

148. As well as calling for a more strategic approach to grid investment, witnesses called for the UK and Welsh Governments to clarify the scale of their ambitions by setting grid capacity and renewable energy generation targets for 2030, 2035 and 2050.²⁰¹ RenewableUK and UK Marine Energy Council submitted that by setting targets for specific technologies, the UK and Welsh Governments could provide confidence to network operators and enable them to prepare for future energy projects.²⁰² Logistics UK called for a public spending programme, alongside changes to the regulatory framework to provide a clear structure of responsibility for funding necessary grid upgrades.²⁰³

149. The Welsh Government deems the planned approach as the only way to manage the grid network. Julie James MS told us that government needed to move away from the market-based mechanism of providing grid reinforcements once a need for them

195 National Grid ([GRD0025](#))

196 RenewableUK Cymru ([GRD0015](#))

197 [Q53](#)

198 [Q53](#)

199 Isle of Anglesey County Council ([GRD0013](#))

200 Celtic Sea Developer Alliance ([GRD0019](#))

201 National Grid ([GRD0025](#))

202 RenewableUK Cymru ([GRD0015](#))

203 Logistics UK ([GRD0003](#))

has been established, towards a planned approach to building grid reinforcements ahead of need.²⁰⁴ She further explained that a planned approach would provide certainty and enable developers to formulate investment strategies and affordability packages.²⁰⁵ It would allow those involved in the process to “look at what is required and then share that cost out appropriately”. She said that “some of that [cost] would fall to Government... but some of it will then be able to be distributed among the various groups wanting to connect into the grid”.²⁰⁶

150. Rt Hon Greg Hands MP told us that “fundamental” to the grid in Wales supporting the energy transformation would be “more strategic approaches to planning the electricity network”. The components he cited of the Government’s strategic approach were: the Holistic Network Design published by National Grid on the offshore wind network; a similar blueprint for the whole of the onshore electricity network; revision of the energy National Policy Statement; and the new Independent Systems Operator provided for in the Energy Bill to act as a central strategic network planner.²⁰⁷ Since we took evidence from the Minister, BEIS has also published the Electricity Network Strategic Framework (ENSF) with Ofgem in August; and appointed the Electricity Networks Commissioner to accelerate grid delivery.

151. The ENSF outlines that the Government and Ofgem are working with industry to develop a strategic approach to network planning. It further explains that network planning will evolve over the next couple of years into a single Centralised Strategic Network Plan (CSNP) for the onshore and offshore electricity transmission network. The CSNP will also provide guidance on the development of the wider energy system including 2050 targets for hydrogen and gas infrastructure.²⁰⁸ The ENSF also highlighted the role of the Future Systems Operator (FSO) which, when established, will take the lead on strategically planning the future electricity network.²⁰⁹

152. The grid network has been built piecemeal on the basis of the energy needs of the nation over time. The energy system in the UK is changing and electricity grid network design needs to adapt to meet this change. We are encouraged to see the Government shifting to a more strategic, planned approach to the network and welcome the recent policy work to set this out. However, given the complexity of delivering new grid infrastructure, the urgency of net zero targets and the multiplicity of different actors involved in the sector, we consider that there is a need for a more joined-up approach, which ultimately must be led by the UK Government.

153. *Due to the urgency of the situation the UK Government needs to take control of electricity grid network design by setting deadlines and targets for Ofgem, grid infrastructure owners and other significant bodies including National Grid ESO. The UK Government needs to provide the leadership and strategic planning to deliver a complicated set of changes across multiple bodies. This will involve taking a ‘round-table’ approach with regular meetings between stakeholders.*

204 [Q73](#)

205 [Qq89](#), [70](#)

206 [Q76](#)

207 [Q102](#)

208 Department for Business, Energy & Industrial Strategy and Ofgem, [Electricity Networks Strategic Framework](#), August 2022

209 Department for Business, Energy & Industrial Strategy and Ofgem, [Electricity Networks Strategic Framework](#), August 2022

154. As well as considering the grid in Wales as part of a Great Britain enterprise, the UK Government must recognise the distinctive challenges and opportunities associated with the grid in Wales. The UK Government should engage directly and regularly with the Welsh Government to deliver a coordinated and strategic approach to electricity grid network design.

Conclusions and recommendations

Challenges facing the electricity grid in Wales

1. We have heard that there are constraints on both the distribution and transmission grids in Wales. Julie James MS told us Wales does not have the grid capacity it needs “right now”. However, Rt Hon Greg Hands MP told us that the grid is “fit for purpose today”. We are concerned by the difference in understanding between the UK and Welsh Governments over current grid capacity in Wales. (Paragraph 40)
2. *We recommend that the Government explain the timescales of “today” and “tomorrow” in the context of grid capacity in Wales. Further to this we recommend that the Government explains the evidence for its statement that the electricity grid in Wales is “fit for purpose today” in light of the evidence we have received on grid constraints in Wales. The UK Government must work with the Welsh Government to produce an agreed assessment of current electricity grid capacity in Wales and set out the agreed timetable for publication.* (Paragraph 41)
3. To ensure that communities and business in Wales can decarbonise in line with government targets, grid infrastructure must be able to meet the projected increase in demand for electricity. The evidence we received suggested that the grid in Wales will not be suitable to facilitate the decarbonisation of heat and transport across Wales. (Paragraph 48)
4. While we understand that the UK Government must consider the energy and network needs of the UK as a whole, we consider that it would be inequitable if the UK were to benefit from Wales’ natural resources for renewable energy generation while Welsh households, businesses and industry were not adequately connected to the grid. (Paragraph 49)
5. *We recommend that the UK Government task the new Electricity Networks Commissioner to determine the grid infrastructure necessary to enable industry, communities and businesses in Wales to decarbonise heat and transport in line with net zero targets.* (Paragraph 50)
6. We recognise the strengths of an electricity grid that serves the whole of Great Britain. However, we conclude that there are distinct challenges and opportunities relating to grid infrastructure in Wales that require specific focus and intervention from the UK Government. (Paragraph 61)
7. The Committee welcomes that Celtic Sea projects have been included in the list of infrastructure projects in the UK Government’s Growth Plan and notes the recent decision by The Crown Estate to seek to accelerate the leasing process where possible. This appears only to be possible in Wales if improvement to grid infrastructure is also accelerated and we would welcome a clear commitment from the UK Government on this point. (Paragraph 62)
8. *We note the work by the Welsh Government to develop a long-term plan for energy networks in Wales and call on the UK Government to explain how it is engaging with this. The UK Government needs to explain how it is taking into account Wales-specific*

challenges and opportunities when considering grid design and how it is ensuring that Wales is able to benefit from the increased investment and development associated with grid reinforcement. (Paragraph 63)

9. Upfront connection costs can be prohibitive and prevent the development of energy projects. This results in a “chicken and egg” situation whereby developers wait for other developers to commit to the funding of connection costs. (Paragraph 72)
10. *We are encouraged that Ofgem is reviewing connection arrangements and we look forward to hearing more about the progress being made in the run up to 1 April 2023. We consider that due to the tight timeframes set by government net zero targets, urgent work should be done to overcome prohibitive upfront costs and the ‘chicken and egg’ situation by incentivising developers to share grid connection and reinforcement costs. (Paragraph 73)*
11. Larger companies have a financial advantage linked to scale, whereas smaller energy projects are often reliant on the development of larger projects and the availability of spare capacity once these have been completed. (Paragraph 74)
12. *A mechanism should be developed to allow small energy generation projects to defer and spread grid connection payments over time. (Paragraph 75)*
13. We are encouraged to see that the UK Government recognises that grid connection costs can be prohibitively high for developers. However, we are concerned by the decision to move more of the reinforcement costs to the network charges paid by “all electricity consumers in the area”. (Paragraph 76)
14. *It is not equitable that grid reinforcement costs should be shared by consumers in an area because this would create a higher burden for rural households and businesses and those in areas which historically lack existing grid infrastructure. We ask Ofgem and the UK Government to define what is meant by the phrase “in the area” and to explain how they will ensure that rural or isolated communities will not be unduly burdened. (Paragraph 77)*
15. There is a multiplicity of different bodies involved in securing planning consent for grid infrastructure and this process needs to be streamlined. We welcome the commitment to cutting processing times by fifty per cent and appreciate the challenge that this constitutes. However, in light of the evidence we received, it is clear that in order to meet government net zero and renewable energy generation targets a reduction in processing times of fifty per cent is the least that needs to happen. (Paragraph 89)
16. *We are encouraged to see the new Electricity Networks Commissioner appointed with a remit to reduce timelines and look forward to understanding in more detail how this will be achieved. However, it is not clear that the UK Government appreciates that a step change is necessary to deliver a streamlined planning and consent process that enables the achievement of net zero targets. We call on the UK Government to produce a projected timeline for how it will reduce processing times by fifty per cent within a year. (Paragraph 90)*

17. The planning consent process has created a queue of renewable generation projects in Wales to which grid capacity has been reserved before planning permission has been granted. (Paragraph 91)
18. The UK Government should work with National Grid ESO, NGET, the DNOs and Ofgem to revise consenting processes to align the allocation of grid capacity with the application for planning permission. National Grid's work should be expedited on reviewing commercial contracts with developers reserving grid capacity, where those projects have consistently failed to achieve planning permission. (Paragraph 92)
19. Ofgem, as the market regulator, must ensure that the regulatory environment enables the decarbonisation of energy markets. Whilst ensuring the best value for consumers is important and should remain one of Ofgem's primary considerations, this should be balanced against achieving net zero targets. (Paragraph 98)
20. *We recommend that the UK Government amend Ofgem's primary duty to include both ensuring the best value for consumers and achieving net zero targets, by bringing forward government amendments to the Energy Bill. This would provide strong signals to developers and grid infrastructure owners.* (Paragraph 99)
21. The policy in favour of laying cables underground in AONBs is welcome. However, due to the significantly higher construction costs it is likely that overhead lines will simply be re-routed around AONBs. This will mean that communities and businesses in those areas will remain isolated from grid infrastructure and face high costs to connect to the grid. (Paragraph 109)
22. The Government should outline the circumstances in which higher grid construction costs, for example due to undergrounding, are justified to enable rural communities to keep pace with the decarbonisation transition. (Paragraph 110)
23. We have heard that community energy projects face specific difficulties in connecting to the grid, and that the UK Government is not aware of those difficulties. (Paragraph 116)
24. *We recommend that the Government engage directly with community energy projects in Wales to understand the difficulties they face connecting to the grid. The UK Government should lead a working group made up of the Welsh Government, grid infrastructure owners, energy companies and communities to explore how access to the grid for community energy projects can be improved in Wales.* (Paragraph 117)
25. *We recommend that the UK Government strengthens the legislative framework to support the growth of community energy schemes. The Energy Bill provides a potential opportunity to do this.* (Paragraph 118)
26. There is a lack of clear policy directing energy development companies on how to provide adequate benefits to communities hosting grid infrastructure. (Paragraph 126)
27. *The Government should incentivise energy companies and transmission infrastructure owners to provide benefits to communities hosting network assets. Communities should be directly consulted on the benefits they would like to receive. A starting presumption*

should be introduced through policy that a proportion of all future energy projects must be partly community-owned or provide direct benefits to the community which hosts the energy project and associated grid infrastructure. (Paragraph 126)

Anticipatory investment

28. Without an established system of anticipatory investment in grid infrastructure the significant opportunities for renewable energy generation in Wales will go under-utilised, which will have an impact on the achievement of net zero targets. Were grid infrastructure to be built on an anticipatory basis in areas where there is a high probability of the construction of future energy projects, this would reduce the risks of costly grid infrastructure not being utilised. Furthermore, multi-connection substations, such as the MOS described by Celtic Sea Power, could have an important role in both reducing the costs and delays associated with grid construction and in providing strong locational signals to establish local supply chains. While we are encouraged that Ofgem's stance has changed in favour of anticipatory investment and that BEIS is looking to strengthen Ofgem's powers in this area, we consider that this does not reflect the urgency of the situation. (Paragraph 141)
29. *The UK Government should use National Grid ESO's Future Energy Scenarios to work with energy companies and grid infrastructure owners to determine areas where anticipatory investment in grid infrastructure would be justified to achieve net zero targets. Where anticipatory investment in grid infrastructure is deemed justified, the UK Government should encourage the development of multi-connection substations in order to establish local supply chains, which can then support the connection of future renewable energy projects. (Paragraph 142)*
30. In order to utilise the opportunities for renewable energy generation in Wales a system of anticipatory investment in grid infrastructure needs to be created and implemented urgently. In the government response to this report, we request further information on the nature of the changes to Ofgem's powers and the timeline for this to be implemented. The UK Government should also conduct a review with Ofgem of the impact of the current price control mechanism on the level of anticipatory investment in grid infrastructure across the UK. (Paragraph 143)

Strategic planning of the Network

31. The grid network has been built piecemeal on the basis of the energy needs of the nation over time. The energy system in the UK is changing and electricity grid network design needs to adapt to meet this change. We are encouraged to see the Government shifting to a more strategic, planned approach to the network and welcome the recent policy work to set this out. However, given the complexity of delivering new grid infrastructure, the urgency of net zero targets and the multiplicity of different actors involved in the sector, we consider that there is a need for a more joined-up approach, which ultimately must be led by the UK Government. (Paragraph 152)
32. *Due to the urgency of the situation the UK Government needs to take control of electricity grid network design by setting deadlines and targets for Ofgem, grid*

infrastructure owners and other significant bodies including National Grid ESO. The UK Government needs to provide the leadership and strategic planning to deliver a complicated set of changes across multiple bodies. This will involve taking a 'round-table' approach with regular meetings between stakeholders. (Paragraph 153)

33. *As well as considering the grid in Wales as part of a Great Britain enterprise, the UK Government must recognise the distinctive challenges and opportunities associated with the grid in Wales. The UK Government should engage directly and regularly with the Welsh Government to deliver a coordinated and strategic approach to electricity grid network design. (Paragraph 154)*

Formal minutes

Wednesday 12 October 2022

Members present

Rt Hon Stephen Crabb, in the Chair

Simon Baynes

Wayne David

Ruth Jones

Ben Lake

Rob Roberts

Beth Winter

Grid Capacity in Wales

Draft report (*Grid Capacity in Wales*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 154 read and agreed to.

Summary agreed to.

Resolved, That the Report be the First Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provision of Standing Order No. 134

Adjournment

Adjourned till Wednesday 19 October at 9.30 a.m.

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the [inquiry publications page](#) of the Committee's website.

Wednesday 16 March 2022

Jon O'Sullivan, Director of Onshore Wind and Solar, EDF Renewables; **Tom Glover**, RWE UK Country Chair, RWE UK; **Robert Procter**, Business Development Manager, Community Energy Wales

[Q1–23](#)

Chris Williams, Head of Industrial Decarbonisation, Industry Wales; **Rhys Wyn Jones**, Head of RenewableUK Cymru, RenewableUK

[Q24–42](#)

Wednesday 27 April 2022

Julian Leslie, Head of Networks, National Grid ESO; **Peter Bingham**, Chief Engineer, Ofgem; **Huub den Rooijen**, Managing Director, Marine, The Crown Estate

[Q43–59](#)

Ben Godfrey, Distribution System Operator Manager, Western Power Distribution; **Malcolm Bebbington**, Head of Future Systems Strategy, SP Energy Networks, Scottish Power; **Roisin Quinn**, Director of Customer Connections, National Grid NGET

[Q60–70](#)

Wednesday 18 May 2022

Julie James MS, Minister for Climate Change, Welsh Government

[Q71–101](#)

Wednesday 8 June 2022

Rt Hon Greg Hands MP, Minister of State, Department for Business, Energy & Industrial Strategy; **Paul Van Heyningen**, Deputy Director, Net Zero Electricity Networks, Department for Business, Energy & Industrial Strategy

[Q102–153](#)

Published written evidence

The following written evidence was received and can be viewed on the [inquiry publications page](#) of the Committee's website.

GRD numbers are generated by the evidence processing system and so may not be complete.

- 1 Anonymised ([GRD0020](#))
- 2 BP plc ([GRD0029](#))
- 3 Celtic Sea Developer Alliance ([GRD0019](#))
- 4 Celtic Sea Power ([GRD0011](#))
- 5 Centrica plc ([GRD0014](#))
- 6 Community Energy Wales ([GRD0001](#))
- 7 Department for Business, Energy & Industrial Strategy ([GRD0027](#))
- 8 Department for Business, Energy and Industrial Strategy ([GRD0031](#))
- 9 EDF Renewables ([GRD0012](#))
- 10 Energy Saving Trust ([GRD0004](#))
- 11 Energy and Power Group, Department of Engineering Science, University of Oxford ([GRD0024](#))
- 12 Enertechos ([GRD0008](#))
- 13 Institute of Welsh Affairs ([GRD0018](#))
- 14 Isle of Anglesey County Council ([GRD0013](#))
- 15 Lightsource bp ([GRD0010](#))
- 16 Liquid Gas UK ([GRD0006](#))
- 17 Logistics UK ([GRD0003](#))
- 18 Menter Mon ([GRD0005](#))
- 19 NFU Cymru ([GRD0009](#))
- 20 National Grid ([GRD0025](#))
- 21 National Grid Electricity System Operator ([GRD0017](#))
- 22 Nova Innovation ([GRD0026](#))
- 23 Ørsted ([GRD0023](#))
- 24 RWE ([GRD0021](#))
- 25 RenewableUK Cymru ([GRD0015](#))
- 26 RenewableUK Cymru ([GRD0030](#))
- 27 ScottishPower ([GRD0022](#))
- 28 Thales ([GRD0007](#))
- 29 The Crown Estate ([GRD0028](#))
- 30 UK Marine Energy Council ([GRD0016](#))

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the [publications page](#) of the Committee's website.

Session 2022–23

Number	Title	Reference
1st Special Report	The Benefits System in Wales: Government response to the Committee's Fourth Report of Session 2021–22, and correspondence from the Welsh Government	HC 402
2nd Special Report	The economic and cultural impacts of trade and environmental policy on family farms in Wales: Government response to the Committee's Fifth Report of Session 2021–22	HC 470

Session 2021–22

Number	Title	Reference
1st Report	Railway Infrastructure in Wales	HC 438
2nd Report	Renewable energy in Wales	HC 439
3rd Report	Implications of the UK-Australia FTA for Wales	HC 481
4th Report	The benefits system in Wales	HC 337
5th Report	The economic and cultural impacts of trade and environmental policy on family farms in Wales	HC 607
1st Special Report	Railway infrastructure in Wales: Government response to the Committee's First Report of Session 2021–22	HC 715
2nd Special Report	Renewable energy in Wales	HC 756
3rd Special Report	Implications of the UK/ Australia FTA for Wales: Government response to the Committee's Third Report of Session 2021–22	HC 895

Session 2019–21

Number	Title	Reference
1st Report	Pre-appointment hearing with the Government's preferred candidate for the Chair of S4C	HC 89
2nd Report	Freeports and Wales	HC 205
3rd Report	The Welsh economy and Covid-19: Interim Report	HC 324

Number	Title	Reference
4th Report	Wales and the Shared Prosperity Fund: Priorities for the replacement of EU structural funding	HC 90
5th Report	Brexit and trade: implications for Wales	HC 176
1st Special Report	The Armed Forces and Defence Industry in Wales: Government Response to the Committee's First Report of Session 2019	HC 97
2nd Special Report	City Deals and Growth Deals in Wales: Government Response to the Committee's Second Report of Session 2019	HC 146
3rd Special Report	Freeports and Wales: Government Response to Committee's Second Report of Session 2019–21	HC 667
4th Special Report	Wales and the Shared Prosperity Fund: Priorities for the replacement of EU structural funding: Government response to the Committee's Fourth Report of Session 2019–21	HC 1083
5th Special Report	Brexit and trade: implications for Wales: Government response to the Committee's Fifth Report of Session 2019–21	HC 1223