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Research and Information Service Research Paper

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Renewable Electricity: progress, barriers and policy in the United Kingdom and the European Union

NIAR 161-25

This Research Paper identifies key barriers to renewable electricity development within Northern Ireland and examines Executive policy adopted to date, and for comparison looks to Great Britain and the European Union.

Paper 75/25 26 September 2025

Key Points

Northern Ireland's statutory target is to secure 80% of electricity consumption from renewables by 2030.

Key barriers to achieving that target include: the absence of a route to market, planning delays, and grid issues. Such barriers are common in other jurisdictions.

With regard to route to market, a comparison of renewable support mechanism across the United Kingdom and the European Union has shown that most countries provide support to both small and larger renewable installations. The most common types of support are Feed-in Premiums, particularly Contracts for Difference variant of Feed-in Premiums.

The United Kingdom Government, the European Union and its Member States are seeking to speed up planning and permitting. Actions to do so include ensuring that authorities are sufficiently resourced and reviewing planning processes, particularly Judicial Review's of planning decisions.

Steps to enhance grid connection processes include grid investment. European Union guidance defines anticipatory investment, an approach to grid investment that is forward-looking and based upon Member State National Development Plans. The United Kingdom's National Energy System Operator has engaged in energy sector spatial planning, including mapping potential areas for development. The United Kingdom Government and European Union Member States have also taken steps to filter or prioritise grid queues, moving away from a "first come, first served connections policy".

The United Kingdom Government and the European Union are both exploring ways to enhance grid flexibility. Actions taken or considered to date include: demand-side or consumer-led flexibility; energy storage; market approaches; and, clean forms for dispatchable or flexible power, such as hydrogen to power, biomass and hydropower.

Executive Summary

Northern Ireland has a statutory target of ensuring 80% electricity consumption from renewables by 2030. Whereas the United Kingdom Government has set a non-statutory target for Great Britain of 95% clean energy generation by 2030; and the 2023 European Union (EU)Renewable Directive specifies a target of securing at least 42.5% final energy consumption from renewables by 2030. The EU target encompasses electricity and other, such as transport and heating. Moreover, some Member States, including the Republic of Ireland, have adopted explicit renewable electricity targets. While other Member States have adopted targets for overall energy consumption i.e. including electricity, heating, transport, etc..

A comparison of progress towards renewable electricity targets across the EU and the United Kingdom identified Austria, Denmark and Portugal as having the largest proportion of renewable generation and have amongst the most ambitious targets. Progress in those countries has been assisted by the use of hydropower (Austria and Portugal) and the early adoption of wind generation (Denmark).

Key barriers to renewable energy development in Northern Ireland include routes to market, planning, and grid capacity. All are common in the other jurisdictions discussed in this Paper.

A comparison of renewable support mechanisms across the Council of European Energy Regulators Member Countries has revealed that most countries offer a mix of support. Feed-in premiums and Contracts for Difference are the most common incentives employed.

In Northern Ireland, the average time for renewable energy applications in to receive planning permission was 45.6 weeks in 2024/25. There was significant variation at local government district level. The Department for Infrastructure's new regional planning policy on renewable and low carbon energy is "at an advanced stage of completion". It requires Northern Ireland Executive agreement prior to publication.

The United Kingdom Government is exploring a range of actions to address planning delays in Great Britain. Those action include ensuring planning authorities are properly equipped, updating policies and introducing changes to the Judicial Review process. In the EU, Member States are also adopting policies to speed up planning and permitting, such as: unifying permitting process; implementing strategy to speed up process; setting objectives for land use; introducing a “one-stop-shop” for the issuance of permits; introducing permit exemptions; and, reforming Judicial Review.

With regard to grid connections in Northern Ireland, a 2023 Department for the Economy and the Utility Regulator report subsequent to their call for evidence on grid connections highlighted key issues to be connection costs, connection processes and processing times. Currently, the Department for the Economy is reviewing the socialisation of connection costs. Moreover, the System Operator for Northern Ireland is instigating a series of grid upgrades to the transmission network outlined in its Transmission Development Plan 2023 to 2032. And NIE Networks have included milestone criteria into connection agreements.

The United Kingdom Government is exploring grid expansion as one of a number of actions to improve grid connections in Great Britain. Other actions include: reform of the connection process, introducing incentives and penalties to drive investments in the network; and, community engagement. In addition, the National Energy Systems Operator has engaged in strategic spatial planning to speed up connection.

The EU guidance advocates anticipatory grid investment based on National Development Plans. Some Member States have also introduced criteria to filter or prioritise grid connection queues.

A number of actions have been taken by the Department for the Economy to address the constraint and curtailment of renewable generation. This includes a smart meter rollout and a Smart Systems Flexibility Plan. In both cases the final policy documents are yet to be published.

The United Kingdom Government and National Energy System Operator are exploring options to address constraint and curtailment. Those options include

the location of demand close to renewable generation, constraint markets, energy storage, consumer-led flexibility and dispatchable clean energy.

Similar actions are in development at EU level, including: renewable flexible generation; system friendly renewable generation; energy storage; demand-side flexibility; and, flexible connection agreements.

Contents

Introduction

This Research Paper, commissioned by the Committee for the Economy (the Committee), supplements the previous Research and Information Service (RaISe) Research Paper "Renewable Electricity in Northern Ireland: a primer" (NIAR 81-25, dated 13 June 2025). It provides a more in-depth look at key barriers to renewable electricity development and policy approaches adopted in the United Kingdom and the European Union to addressing them.

To provide context, the Paper compares progress towards renewable energy targets across the United Kingdom and the European Union (EU). It then examines policy approaches to renewable barriers in three key areas: incentivising renewable generation; planning; and, grid issues.

In each case, the identified barrier is explained from a Northern Ireland perspective, followed by that in the United Kingdom Government with respect to Great Britain and the EU[1]. The Paper concludes, setting out key takeaways.

The Paper is structured as follows:

1. Progress towards renewable electricity targets in the United Kingdom and the European Union
2. Identifying key barriers to renewable electricity development
3. Renewable support schemes in the United Kingdom and the European Union
4. Policy approaches to planning barriers
5. Policy approaches to grid connection and flexbility
6. Key takeaways.

[1] The overview of policy approaches in EU Member States is reliant on information available in English from both the EU and individual Member States.

1 Progress towards renewable electricity targets in the United Kingdom and the European Union

In Northern Ireland, the Climate Change (Northern Ireland) Act 2022 introduced a mandatory statutory target for renewable electricity. By 2030, the Act requires 80% of electricity consumption in Northern Ireland to come from renewable resources.[2]

In Great Britain, the Clean Power Action Plan - published by the Whitehall Department for Energy Security and Net Zero (DEZN) in December 2024 - set a target of at least 95% by 2030 for electricity generation in Great Britain from "clean sources" . The Clean Power Action Plan defines "clean power" more broadly than renewable generation. The Plan's definition extends to include renewables, nuclear, gas with carbon capture and storage, and hydrogen to power.[3] In November 2024, the independent system operator in Great Britain – namely the National Energy System Operator (NESO) - estimated that variable renewable generation would have to reach between 77% and 82% by 2030, for the DEZN's 95% clean power target to be met by 2030.[4]

In the Republic of Ireland, the National Energy and Climate Plan 2021-2030 aims for 80% of electricity consumption to be from renewables by 2030. The Republic of Ireland's target is an outworking of the EU Renewable Energy Directive 2023. That Directive does not contain a mandatory renewable electricity target, but Member States' renewable electricity developments are to contribute to the EU meeting its 2030 binding gross final energy consumption[5] target of at least 42.5% renewable energy generation.[6]

Figure 1 compares progress towards 2030 renewable electricity targets in the United Kingdom and selected EU Member States. As noted, the Renewable Energy Directive 2023, did not include a binding renewable electricity target. Hence, some Member States have opted to work towards an overall renewable

[2] Climate Change Act (Northern Ireland) 2022
[3] Clean power targets - House of Commons Library
[4] Clean Power 2030 | National Energy System Operator
[5] Gross final energy consumption includes electricity, as well as heating and cooling, transport, industry and buildings.
[6] FS3 RED III.pdf

energy target rather than a specific renewable electricity target. Figure 1 below includes only those Member States for which an explicit renewable electricity target could be located when undertaking research for the compilation of this Paper. A full list of sources for the 2030 targets included in Figure 1 is included in Annex 1 of the Paper. Note the upper end of NESO estimate of the proportion of variable renewable generation required to meet the 2030 Clean Power target is used for the United Kingdom, i.e. 82%.

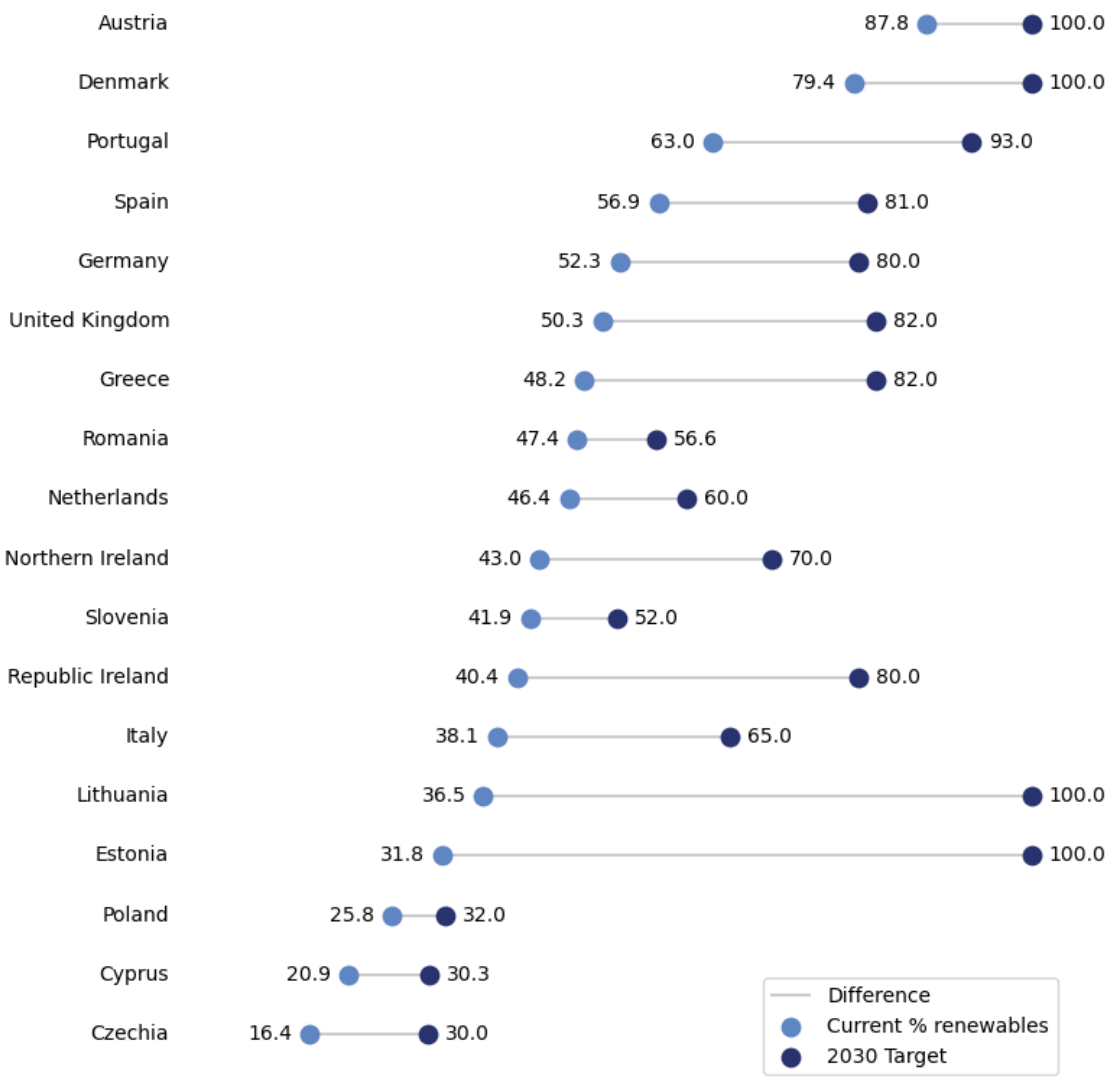
The electricity generation data used in Figure 1 are sourced from Eurostat and are for the year 2023. There are two exceptions to this. Data for Northern Ireland are sourced from the Department for the Economy (DfE) and are for the period June 2024 to June 2025. Data for the United Kingdom are from the Digest of UK Energy Statistics and are for 2024.

As can be seen from Figure 1, the three countries with the largest proportion of renewable generation – Austria, Denmark and Portugal - also have amongst the highest targets for 2030. According to the International Energy Agency, hydro-energy accounted for 59.8% of electricity generation in Austria in 2023, with wind and solar photovoltaic (PV) accounted for a combined 19.4%.[7] In Portugal, hydro accounted for 30.3% of electricity generation in 2023. The country had a larger share of variable renewables integrated into its system, with wind and solar PV providing a combined 27.3% of electricity generation in 2023.[8]

In contrast, Denmark did not utilise hydro in its energy mix in 2023. A total of 67.5% of the country's electric generation came from wind and solar PV, with 57.5% from wind alone.[9] It should be noted that Denmark was an early adopter of wind generation; and has been developing wind power since the energy crisis of the early 1970s.[10]

[7] Austria - Countries & Regions - IEA
[8] Portugal - Countries & Regions - IEA
[9] Denmark - Countries & Regions - IEA
[10] Blowing in the wind: A brief history of wind energy and wind power technologies in Denmark - ScienceDirect

Figure 1: 2030 Renewable electricity targets and current progress (2023) in Northern Ireland, United Kingdom and selected EU Member States

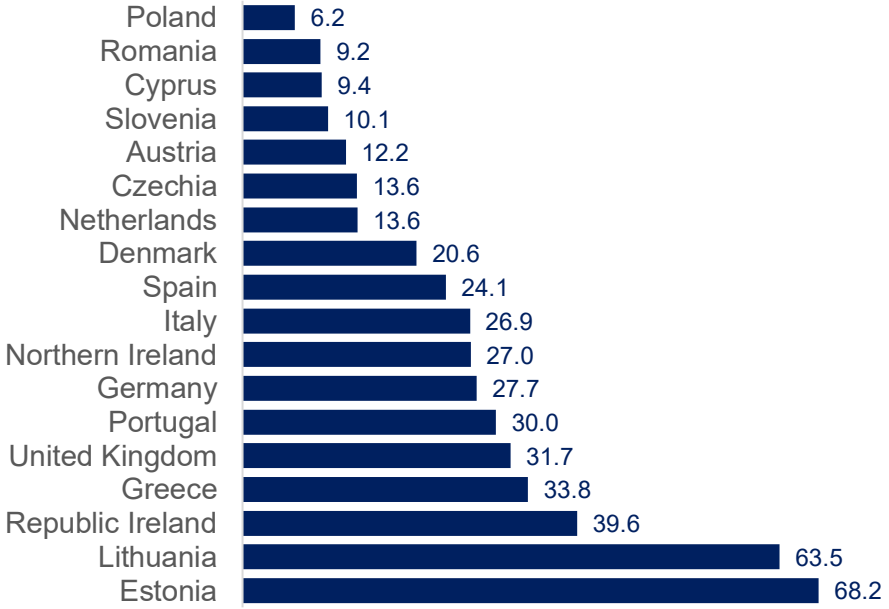


Source: Compiled by RaISe (2025), Eurostat (2023), DfE (2025), DUKES (2024), please see Annex 1 for sources of country specific targets

Figure 2, below, takes a closer look at the difference between current levels of renewables and 2030 targets in the same countries as Figure 1. The Figure shows that Northern Ireland ranked 11th out of 19 countries examined on this measure, with a 27 percentage point difference between current renewable levels and 2030 targets. Many of the countries ranking in the "top ten" on this measure have less ambitious renewable generation targets than Northern Ireland. Only Austria, with a 100% 2030 target, Denmark with 100%, and Spain with 81% had more ambitious, or similar targets, as Northern Ireland and a

lower percentage point gap between current generation levels and 2030 targets. As noted above, Austria's renewable generation is includes significant amounts of hydropower, whilst Denmark has greater levels of variable renewable generation. As of 2024, Spain 21.6% of Spain's electricity generation came from wind and 18.7% from solar. Meaning the 40.3% of generation came from variable renewables. In the same year, 14.2% of generation came from hydropower.[11]

Figure 2: Percentage point difference between 2030 Renewable electricity targets and current progress (2023) in Northern Ireland, United Kingdom and selected EU Member States



Source: Compiled by RaISe (2025), Eurostat (2023), DfE (2025), DUKES (2024), please see Annex 1 for sources of country specific targets

2 Identifying key barriers to renewable electricity development

As noted in the RaISe Research Paper "Renewable Electricity in Northern Ireland: a primer" (NIAR 81-25, dated 13 June 2025), key renewable energy

[11] Spain - Countries & Regions - IEA

development barriers in Northern Ireland include: route to market; grid capacity; connection policies; and, securing planning consents for renewable projects. Northern Ireland is not unique in those regards, as such barriers exist across the wider United Kingdom, the European Union and globally.

For example, the United Kingdom Government's "Clean Power Action Plan 2030" identified planning and consenting, networks and connections and reforms to electricity markets, as key "roadblocks" to the investment in, and the development and deployment of, clean energy in the Great Britain. Other roadblocks identified in that Action Plan were project delivery, short and long-duration flexibility, supply chains and workforce availability.[12]

In the EU, the Centre on Regulation in Europe noted in 2024 that:

> *Lengthy, complex and multiple parallel permitting procedures for renewable energy generation, grid connection and related reinforcement of transmission grid have for long been identified as a major barrier to the deployment of renewable energy sources.*[13]

Taking a global perspective, the International Energy Agency "Renewables 2024" report highlighted the following barriers to development across Europe and in the United States:

- Lengthy permitting wait times.
- A lack of long-term planning, leading to inadequate grid infrastructure investments that delay new wind and solar PV plant connections.
- Insufficient system flexibility to cost-effectively integrate variable renewable energy.[14]

[12] United Kingdom Government clean-power-2030-action-plan-main-report.pdf (December 2024)
[13] CERRE_Speeding-up-Renewable-Energy-Permitting-in-Europe_FINAL.pdf
[14] Renewables 2024

3 Renewable support schemes in the United Kingdom and the European Union

Although evidence from organisations such as International Renewable Energy Agency (IRENA) highlights the decreasing cost of renewable electricity deployment (see for example, IRENA's "Renewable Power Generation Costs 2024", dated June 2025), many countries continue to incentivise renewable energy development in order to meet their climate and energy targets. A key development in recent years is a move towards competitive, market based incentives, in a drive to "increase cost effectiveness and limit distortions on the electricity market".[15]

A range of incentives are used globally, namely:

- **Feed-in tariffs (FiTs):** FiTs are long-term agreements that provide renewable generators with a fixed rate for electricity sold to the grid. The price paid to generators through a FiT is usually linked to the technology type and capacity of the generator. This is to reflect the different generation costs between different generation technologies. Currently, they are mainly used to support small-scale renewables. Prices are often set by administrative procedure which can result in a slow reaction to changes in energy production costs.
- **Feed-in Premiums (FiPs):** FiPs allow renewable generators with a premium on top of the market price for electricity. This premium is typically pegged to a reference tariff level. Should market prices exceed this reference level, no FiP is paid. This ensures that FiPs can be more cost effective compared to FiTs.[16]
- **Contracts for Difference (CfDs):** CfDs are a variation of a FiP and often referred to a as sliding premium FiPs. CfDs work by guaranteeing a set price for renewable electricity sold on the wholesale market. This is known as the "strike price". When the market price is lower than the strike price the renewable generator receives a subsidy up to the strike

[15] The Development of Renewable Energy in the Electricity Market
[16] The Development of Renewable Energy in the Electricity Market

price. Conversely, when the market price for electricity is higher than the strike price the renewable generator pays back the surplus which can be passed onto consumers through their bills. CfDs are typically awarded through competitive auctions.[17]

- **Green Certificates:** Green Certificates are tradeable goods that prove electricity is generated from a renewable resource. RES generators are issued with certificates for every unit of electricity the feed into the grid, typically per MWh. The number of certificates issued is generally technology neutral. Electricity suppliers are required to prove a quota of electricity supplied is from a renewable source, and are therefore encouraged to purchase certificates from generators. Certificates can also be traded on the open market. The sale of green certificates to electricity suppliers or on the open market provides generators with an income above the market price of electricity price of electricity.
- **Investment grants:** Some countries provide renewable energy generators with grants for investing in renewable projects. The aim of such grants is to reduce the financial cost of installation and increase cost competitiveness.
- **Other:** Some countries choose to support renewable development indirectly by providing generators with full or partial exemptions from taxes or levies.[18]
- **Net metering and net billing:** Under net metering schemes, electricity consumers generating renewable electricity (also known as prosumers) are charged for their net electricity consumption from the grid after netting off the renewable electricity they feed into grid. Such schemes rely on bidirectional electricity meters measuring the two way flow of electricity. Net billing is a market-based variant of net metering where the prosumer compensation is based on the market value of kWh of electricity consumed from, or fed into, the electricity grid.[19]

[17] House of Commons Library, Contracts for Differences (12 September 2023)
[18] The Development of Renewable Energy in the Electricity Market
[19] IRENA Net billing schemes: Innovation landscape brief (2019)

As noted in the RaISe Research Paper: "Renewable Electricity in Northern Ireland: a primer" (NIAR 81-25, dated 13 June 2025), the United Kingdom and the Republic of Ireland have adopted a Contracts for Difference approach for supporting larger-scale renewable electricity projects. Both jurisdictions also have schemes to support smaller renewable projects. In both cases, these are funded by consumers through their electricity bills. Northern Ireland currently has no support scheme, but plans to introduce a CfD Scheme to support larger renewables in 2026.[20]

A range of incentives are used across EU and the United Kingdom to support renewable electricity. Table 1 below outlines the types of support available in Council of European Energy Regulators (CEER) Member Countries. It is based on a number of sources, including CEER, the European Commission, and national governments. Where possible, details are included for each country using English-language sources.

Table 1 shows:

- Most countries offer a **mix of support, often tailored to the size of the renewable installation.**
- **Feed-in Premiums (FiPs)** and **Contracts for Difference (CfDs)** are the most common incentives — used in 24 out of 28 countries.
- **Feed-in Tariffs (FiTs)** are used in 17 countries, mainly to support small-scale projects.
- Fewer countries use **green certificates**, **net metering**, or **other incentives** like tax exemptions.

In addition to the above, it is worth noting that a European Commission discussion paper on The Development of Renewable Energy in the Electricity Market (June 2023) found that:

> *The level of effective support receive by solar and wind technologies varies quite significantly per country.*[21]

[20] Department for the Economy Design considerations for a renewable electricity support scheme for Northern Ireland: response | Department for the Economy (9 April 2024)
[21] The Development of Renewable Energy in the Electricity Market

And that support:

> *…reflects country specific framework conditions, in particular the electricity market set-up and technology mix, the maturity of the technology markets as well as the history of deployment of the technologies in the given country.*[22]

The discussion paper also found that FiT support offered to developers in earlier years tended to be higher reflecting the earlier stage of development of technologies.[23] This downward trend was also noted in a further European Commission "Study on energy subsidies and other government interventions in the EU" (January 2025), which found that renewable subsidies had decreased over the period 2020 to 2023. The study concluded that the downward trend was the result of "favourable market conditions" for subsidies, such as FiP and CfDs, that are sensitive to wholesale electricity prices.[24]

[22] The Development of Renewable Energy in the Electricity Market
[23] The Development of Renewable Energy in the Electricity Market
[24] Study on energy subsidies and other government interventions in the European Union - Publications Office of the EU (January 2025)

Table 1: Comparison of support schemes in CEER Member Countries 2025

Country	Type of Support	Further detail
Austria	CfD and Investment Grant	CfD: In 2022, Austria replaced its previous FiT with a FiP. The "sliding market premium" compensates a RES producer for the production cost of electricity renewable sources and the average market price for electricity. The subsidy is available only to those generators the feed into the grid. Investment subsidy: Austria's Renewable Energy Expansion Act provides for subsidies to support the construction, revitalisation and expansion of renewable energy developments. RES developers can only receive support through one of the two schemes outlined above.
Belgium	Green Certificates and CfD	CfD supports offshore wind. A Federal Green Certificate Scheme, is complimented by three regional Green Certificates.
Bulgaria	FiT and FiP	Feed-in tariff: Since 2018 new RES plants with a installed capacity of up to 30kW can receive a feed-in tariff. Feed- in premium: Since 2021 RES plants with an installed capacity of 500kW or higher can receive a feed-in premium for electricity sold to the grid. This limited to a "net specific production" level set in legislation.

Country	Type of Support	Further detail
Croatia	FiT, CfD, Net-metering and Other	A FiT is available for installations up to 500kW. The FiT is awarded through a public tender. Larger installations can avail of CfDs, again awarded through a public tender. Net-metering is available for micro-renewables with installed capacities of up to 50kW. Loans are available for private and public sector capital investment in renewables.
Cyprus	Net-metering/net-billing	Cyrus had previously supported smaller renewable generation through a net-metering scheme. Larger renewables were supported through a net-billing scheme. As of 2025, net billing applies to installations of all sizes.
Czechia	FiP	As of 2023 FiT no longer available for new installations, replaced by a FiP.
Denmark	CfD, FiP, Net-metering and other	Since 2020 Denmark has ran CfD auctions for offshore wind, as well as technology neutral auctions. This has not always been successful, with a 2024 auction receiving no bids. A FiP is available for test wind farms and depreciated biomass installations. In the case of wind 40MW of capacity could receive support, on a first come, first served basis. Net-metering: Solar PV with a capacity of up to 50kW, wind with capacity of up 25kW and other installations with a capacity up to 11kW can be exempted from all public tariffs. Other: Denmark offers loan guarantees to local ownership associations seeking to establish wind, solar, hydro or wave installations. The loan guarantees are used to facilitate feasibility studies. A total budget of €1.3 million has been set.
Estonia	FiP	Since 2018, participation in Estonia's FiP has been subject to a reverse auction process whereby developers submitting the lowest cost bids are selected to receive a premium.

Country	Type of Support	Further detail
Finland	FiP	Finland's FiT was closed to new applicants over the period 2017-2021, but payments are still made to recipients approved before closure. The FiP has operated in 2018. It was a tender based system under which aimed to support the production of 1.4TWh electricity annually. Developers bid to receive support with the most affordable bids accepted. A total of 26 developers were successful. The scheme has not operated since.
France	FiT and FiP	France's FiT are available to installations of up to 12MW in capacity, but only for solar PV, offshore wind, hydro power and biogas. Support varies by technology. France's FiP is available to onshore wind energy, geothermal, biogas and hydropower. The FiP pays the difference between the price of electricity and a reference price. Participation in the FiP and FiT are based on a tendering process.
Germany	FiT, CfD and Other	FiT is available to installations of up 100kW. Installations up to 1MW and community projects of up to 6MW can avail of CfD without bidding in auction. Larger projects must participate in tender auction to determine their support level. Other support includes: low-interest investment loans, subsidies for to add biogas generation at existing plants, and exemption from electricity tax for renewable generation.

Country	Type of Support	Further detail
Greece	FiT, CfD and other	Greece's FiT is available to onshore wind with a capacity below 3MW, Solar PV with a capacity of below 50kW and biogas/mass, hydropower and geothermal with capacities below 400kW. The tariff paid is calculated on a monthly basis. The CfD is available for the above technologies of larger installed capacities than the FiT limit. Since 2016 a competitive application process has operated for solar PV and onshore and offshore wind to participate in the CfD scheme. Smaller onshore wind installations of below 60kW capacity are supported through a net billing scheme. Net-metering is available for rood top Solar PV.
Hungary	FiT and FiP	Further detail unavailable at the time of undertaking research to compile this paper.
Republic of Ireland	FiT, CfD and investment grants	Ireland's FiT is called the Small-Scale Renewable Electricity support Scheme and supports generators with a capacity of between 50kW and 6MW. The scheme is non-competitive and offers support for 15-years. The CfD scheme – Renewable Energy Support Scheme – was introduced in December 2019 with the first auction taking place in July 2020. Three categories of auction were held -a technology neutral auction, a solar PV auction and a community-led projects auction. Other support includes grants for micro-generation and a subsidy grant for roof-top solar PV.
Italy	FiT, CfD, and Other	Italy's FiT is available for biogas/mass, geothermal, hydro, onshore wind and solar PV installations of between 1kW and 1MW installed capacity. The tariff paid varies by technology type. Installations of above 1MW participate in competitive auction for CfD support. Wind and solar developer benefit from a 10% reduction in value added tax on products and services related to investments in their renewable plants.

Country	Type of Support	Further detail
Latvia	FiT	Further detail unavailable at the time of undertaking research to compile this paper.
Lithuania	FiT and CfD	FiT no longer available for new installations. CfD now the main incentive.
Luxembourg	FiT, FiP and Investment Grant	Luxembourg provides a FiT for renewable generation with a capacity of 400kW or less. A FiP is available for installations larger the 400kW. Support is available for wind, solar PV, hydro, biogas, gas from waste and solid biomass and varies according to technology. The "Klimabounusgrant" scheme provides investment grants to support "individual action on climate change and energy transition". The scheme supports a range of clean energy investments including solar PV.
Malta	FiT, FiP and Investment Grant	FiT support is available for solar PV installations with a capacity of less than 40kW. Medium (400kW-1MW) and large (1MW and over) are subject to a tendering process to access FiP support. Grant support is available for solar PV and battery storage.
North Macedonia	FiT, FiP	FiPs were introduced in 2019 and provide applicants successful at auction with a fixed premium above the price of electricity.
Poland	FiT, FiP	Further detail unavailable at the time of undertaking research to compile this paper.

Country	Type of Support	Further detail
Portugal	FiT, CfD and Net-metering/Net-billing	A FiT is available to renewable projects with installed capacity of up to 1MW. This subject to a tendering process with a limited amount of support available each year (e.g. in 2020 the limit was 20MW). Solar PV developers can avail of a CfD. Producers must pay a security deposit of €10,000/MW to apply. Winning bidders must pay a further deposit of €60,000/MW. Net metering is available to smaller self-consumers.
Romania	CfD and Other	Romania has operated a CfD for utility-scale renewables since April 2024. Smaller renewable installations of between 200kW to 400kW can sell energy the do not consume to suppliers. Installations can opt for quantitative compensation were surplus energy delivered from the grid can be deducted from future bills.
Slovakia	FiT	Slovakia has supported renewables through a FiT. Subsidy support is due to end by 2026.
Slovenia	FiT	Further detail unavailable at the time of undertaking research to compile this paper.
Spain	CfD, Net-Billing and Other	CfD auctions took place in 2021 and 2022. A net-billing scheme is available for onshore wind and solar PV installations with a capacity of up to 100kW. Other support includes competitive grants for renewable development, grants for wind and solar PV projects in “non-peninsular territories”, exemptions on Real Estate Tax for solar PV projects, and allowances on the Tax on Constructions, Installations and Works are available for solar PV installations.

Country	Type of Support	Further detail
Sweden	Green Certificates and Other	Sweden's main RES support scheme utilises Green Certificates. It is available for biogas/mass, geothermal, hydro, on and offshore wind and solar PV. Three tax incentives are also used to support RES. These provide exemptions from energy taxes, an income tax allowance and a reduction in real estate tax for wind power.
The Netherlands	Net metering, FiP, Investment Grants and Other	Net metering is available for small-scale renewable installations. A FiP is available for renewable projects developed by energy co-operatives. The FiP applies to hydro, onshore wind and solar PV. Support varies by technology and is available on a first come, first served basis. Grants are available for renewable producers, subject to annual budgets and subject to competitive auction. Grants are also available for cooperative projects. An exemption from Environmental Protection Tax is available to consumers on renewable energy the use. An income tax deduction is available on investments into renewables.
United Kingdom	CfD and other	CfD is main support scheme for larger installations. Smaller generation can benefit from a Smart Export Guarantee.

Source: CEER (2025), RaISe (2025)

4 Policy approaches to planning barriers

The issuance of permits in the context of RES development refers to "the administrative procedure run by public authorities to allow for renewable energy projects". This can include authorisation, certification, licensing and administrative procedures. As such, it can involve multiple procedures and several public bodies. Furthermore, it can impact various parts of the RES development chain. For example, it can impact construction, repowering and operation of renewable energy plants. It can also have impacts beyond generation itself, affecting grid connection and network development (both of which are explored in greater detail in sub-section 4.2).

The below sub-sections first look at planning processes in Northern Ireland and how they are effecting renewable electricity developments in the region. Next, they set out policy proposals to speed up planning and permitting in United Kingdom and EU Member States.

4.1 Northern Ireland

In Northern Ireland, the industry association Renewables Northern Ireland identified planning delays as one of the key barriers to RES development in Northern Ireland. In particular, the organisation highlighted:

- The length of timelines and the lack of clarity on decisions, noting that the current average decision time is three years.
- A lack of consistency across council area.
- Over consultation.
- The variable quality of applications.
- Under resourced planning departments.
- Knowledge gaps across departments.[25]

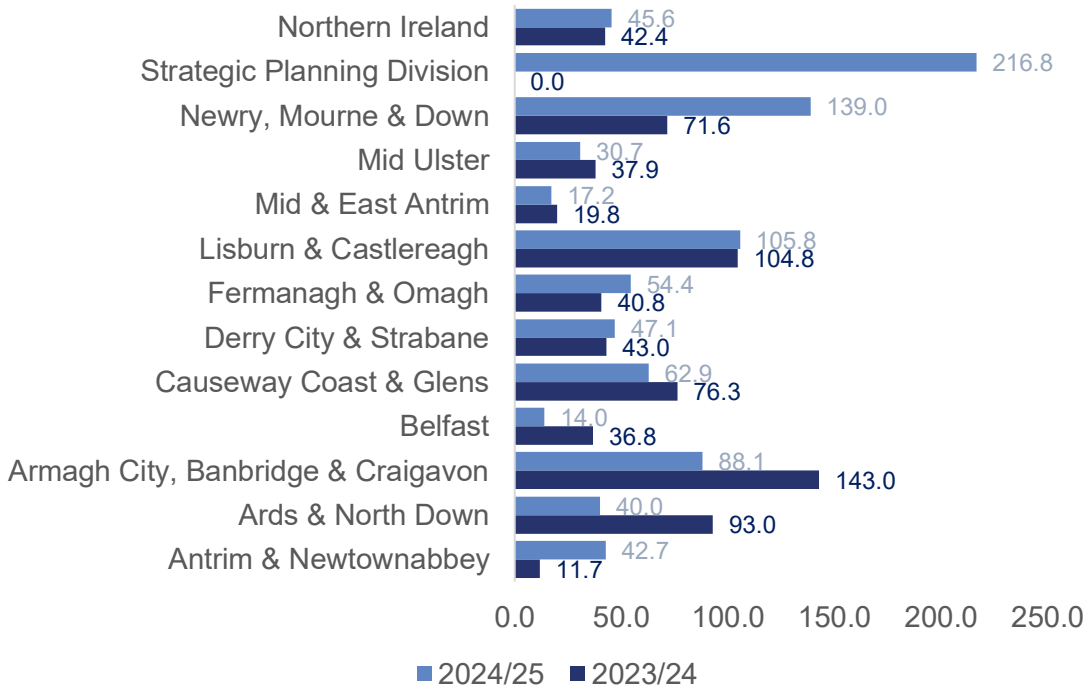
According to the DEZN's Renewable Energy Pipeline 122, renewable generation and battery storage projects had submitted an planning application, but had not

[25] Renewable Northern Ireland, Accelerating Renewables Report (September 2023)

received a decision, as of Quarter 2, 2025. Not all of those projects had a stated installed capacity, but of those that did, the total installed capacity was 1,782.44MW.[26]

The Department for Infrastructure's (DfI) Renewable Energy Planning Statistics 2024 to 2025 show the average processing time for renewable energy applications in 2024/25 across Northern Ireland was 45.6 weeks. Processing times show significant variation in processing times across local government districts, with applications in Newry Mourne and Down taking an average of 139.0 weeks in 2024/25. This compared to 14 weeks in Belfast in the same year. Figure 3 below provides a summary of average processing times for the year 2023/24 and 2024/25.

Figure 3 Renewable energy applications average processing times (weeks) by planning authority, 2023/24 and 2024/25[27]



Source: DfI (2025)

[26]DEZN Renewable Energy Planning Database: quarterly extract - GOV.UK (June 2025)
[27] Department for Infrastructure, Northern Ireland planning statistics April 2024 - March 2025 | Department for Infrastructure

The DfI is due to publish a new regional planning policy on renewable and low carbon energy policy. The Department consulted on this between December 2021 and February 2022. The intention of this consultation was to support a review of strategic planning policy on renewables, that could lead to the amendment of Strategic Planning Policy Statement. It was also intended to inform local development plans and enable the development of "appropriate local policies".[28]

The DfE's March 2025 report on the Energy Strategy Action Plan 2024 noted that the policy review was "at an advance stage of competition" and that the final policy was expected in "early 2025 following Executive and Infrastructure Committee agreement".[29] In an answer to an Assembly Written Question on 12 September 2025, the Minister for Infrastructure stated that the final policy would be published "as soon as possible following Executive Committee agreement".[30] In answer to an earlier Assembly Written Question on 29 May 2025, the Minster noted that a Draft Executive Paper on the policy had been submitted to the Executive four times between September 2024 and February 2025.[31]

Potential Scrutiny Point

- The Committee may wish to ask the DfI for an update on the status of the new regional planning policy on renewable and low carbon energy policy.

4.2 United Kingdom Government policy approach in Great Britain

A key manifesto pledge of the Labour Party was a "national mission for clean power by 2030". In December 2024, the DEZN published its Clean Power 2030

[28] Review of Strategic Planning Policy on Renewable & Low Carbon Energy - Issues Paper
[29] Department for the Economy Energy Strategy - Path to Net Zero Energy - 2024 Action Plan Report (March 2025)
[30] Northern Ireland Assembly AQW 30380/22-27 AIMS Portal
[31] Northern Ireland Assembly AQW 27057/22027 AIMS Portal

Action Plan. That Plan set out the steps the government will take to achieve its ambition of achieving at least 95% of generation from "clean power" by 2030.

On planning and permits, the Action Plan noted that:

> *Our planning systems across Great Britain are not working at the pace required to meet our target for clean power by 2030. Planning systems are devolved and the regimes across Scotland, England and Wales, although similar problems are encountered in each. Lengthy paperwork and often-delayed processes for infrastructure projects hinder out energy security, our economic growth, and fails to deliver for the natural environment. The increased risks to projects associated with delays in planning decisions also increase costs across the system.*[32]

To address the issues identified in the above quote, the DEZN has set out six actions to speed-up planning consents:

1. Equip organisations across the planning system with the tools they need to help deliver Clean Power 2030. This will include a review of resources at "key organisations" to determine whether they are suitable for handling the increased demand. It will also include workplace reform, enhanced training and reformed career development.
2. Update National Policy Statements for Energy and Planning Policy Guidance to improve certainty for developers and planning authorities.
3. Undertake a programme of legislative reform to introduce changes to the planning system in England and Wales and the framework for electricity infrastructure consenting process in Scotland to streamline the process. The United Kingdom government will also "explore reforming the Judicial Review process".
4. Ensure the protection of nature is "embedded in the delivery of Clean Power. This will include delivering Marine Recovery Funds for offshore wind in England, Scotland and Wales.
5. Ensure community benefits from clean energy by building on existing approaches and ensuring consistency of approach.

[32] Clean Power 2030 Action Plan

6. Work closely with the Scottish and Welsh Governments to implement further planning reforms in those jurisdictions.[33]

4.3 Policy approaches in the European Union and Member States

At an EU level, legislation includes provisions that require Member States to speed up and simplify their permit granting procedures. Such legislation includes the:

- Renewable Energy Directive (REDIII)
- TEN-E Regulation
- Emergency Council Regulation (EU) 2022/2577 of 22 December 2022 to accelerate the deployment of renewable energy
- Commission Recommendation on speeding up permit-granting procedures for renewable energy projects and facilitating Power Purchase Agreements

An analysis carried out by the CEER, and later published in the October 2024 report entitled "Speeding up renewable energy permitting in Europe: overcoming implementation challenges", identified examples of CEER Member States' current "best practices" to expedite permit procedures. CEER categorised those policy approaches into the following categories:

- Specifying the scope limit for the definition of permitting procedure in the context of speed up requirements
- Implementation strategy for speeding up measures
- Setting objectives for area use
- One-stop-shop, national coordination scheme
- Definition of the meaning and deadlines for the decision period
- Scope of Environmental Impact Assessments
- Exemption from permit requirements below certain thresholds
- Use of regulatory "sandboxes"
- Digitisation of permitting procedures

[33] Clean Power 2030 Action Plan

- Grid Connection agreements
- Judicial Review[34]

Table 2 provides a summary of the CEER analysis.

[34] "Speeding up renewable energy permitting in Europe: overcoming implementation challenges"

Table 2: Best practices in permitting and planning identified by CEER in 2024[35]

Category	Country	Detail
Specify the scope limit for the definition of permitting procedure in the context of speed up requirements	Denmark	Denmark introduced legislation to unify its permitting processes. This covers permits for building, grid connection and operation of renewable energy plants. It provides clarity on the timeframe for permitting and applies to all relevant authorities.
Implementation strategy for speeding up measures	Republic of Ireland	The Department of Climate Energy and the Environment established an Accelerating Renewable Electricity Taskforce as part of Climate Action Plan 2023. The Taskforce is responsible for identifying, coordinating and prioritising policy to increase the deployment of onshore RES. It's focus is on three areas: grid development; planning; and route to market.
Setting objectives for area use	Germany	Germany's Federal Government set statutory targets for wind power deployment in geographic areas through the Onshore Wind Energy Act 2022. By 2026, Germany's 13 larger states must designate an average of 1.4% of their surface area for onshore RES, this increases to between 1.8% to 2.2% by 2030. To achieve this, the state must carry out area planning, guided by a set of rules and modelling issued by the Federal Government.

[35] "Speeding up renewable energy permitting in Europe: overcoming implementation challenges"

Category	Country	Detail
One-stop-shop, national coordination scheme	The Netherlands	The Dutch National Coordination Scheme aims at streamlining permit-granting procedures for large-scale RES products, through coordination with the national government. The Scheme limits residents and other organisation to responses to two specific moments in the process, as well as allowing them to appeal the final decision. No further objections are possible.
One-stop-shop, national coordination scheme	Denmark	The Danish Energy Agency is the central authority for all relevant planning and consenting procedures for offshore wind projects. The Agency coordinates all relevant authorities to gran he necessary permits.
One-stop-shop, national coordination scheme	Austria	Austria operates a simultaneous procedure whereby developers can apply for multiple permits (such as electricity production licence, building permits, environmental approvals) in parallel. Site selection and grid connection application can also be applied for in parallel.
One-stop-shop, national coordination scheme	Portugal	In Portugal, production and connection rights are approved simultaneously once an applicant has obtained a grid capacity reserve title.

Category	Country	Detail
Definition of the meaning and deadlines for the decision period	The Netherlands	The Dutch Environmental Act 2024 introduced a “decision period”. The Act requires authorities to provide a decision with specified timelines – eight weeks for regular applications and six months for “extensive procedure” application – or face potential penalty payments.
Scope of Environmental Impact Assessments	France	France’s Code de l’Environnement, introduced a several reforms aimed at simplifying environmental impact assessment process for modifications to onshore windfarms. These concerned the threshold for when a EIA is required. For example, if a wind turbine tip height of increase of up to 10% is required this is not considered a significant change and therefore only a limited EIA is required. For increases of 50% or over, a full EIA is necessary. A proposed changes to tip height of between 10 and 50% are dealt with on a case by case basis.
Exemption from permit requirements below certain thresholds	Austria	Austra has revised it permitting code to ensure all solar PV systems installed on roofs are to be notification free.
Exemption from permit requirements below certain thresholds	Czechia	Rooftop solar PV installation up to 50kW no longer require construction permits. Previously the threshold was set at 20kW.

Category	Country	Detail
Use of regulatory “sandboxes”	France	The French regulatory monitors a website and scheme dedicated to regulatory sandbox. The scheme issues calls for proposals and is focussed on the multiple uses of space including the co-location of projects, and the joint approval of co-located projects.
Digitisation of permitting procedures	Spain	Spain has introduced an entirely digital permitting process for RES at all levels of administration. This has streamlined processes.
Grid Connection agreements	Ireland	Flexible connection agreements.
Judicial Review	France	As of 1 November 2022, decision on renewable energy projects must be challenged within two months. This does not apply to wind projects. Projects can continue to be developed until the court reaches its decision, unless a suspension is requested from and granted by the court.
Judicial Review	The Netherlands	Onshore wind projects over 100MW and Solar PV projects over 50MW can only be appealed to the high court.

Category	Country	Detail
Judicial Review	Denmark	Administrative appeals boards have been created as an alternative to court proceedings.
Judicial Review	Austria	The Environmental Impact Assessment Act has been amended to ensure that blanket and insufficiently substantiated complaints do not result in the suspension of projects. It also set deadline for when complaints can be submitted, to addresses delay caused by late submissions.
Judicial Review	Poland	Poland has introduced a Coordinator for Negotiations within its Energy Regulatory Office. The role of the coordinator is conduct out-of-court dispute settlement procedures between energy prosumers and energy companies. The focus is on grid connection of micro-installation and the provision of transmission or distribution services.
Judicial Review	Germany	Germany has introduced courts that specialise in renewable energy disputes.

Source: CEER (2024)

5 Policy approaches to grid connection and flexibility

As noted in Section 2, the interrelated issues of inadequate grid infrastructure curtailing connections and insufficient flexibility are common barriers to renewable development in the United Kingdom and the EU. Solving these problems will enable countries to increase the share of integrated renewable generation into their electricity systems, and ultimately enable progress towards 2030 targets discussed earlier.

The following sub-sections look at each noted issue in turn, first from a Northern Ireland policy perspective, then EU.

5.1 Grid connection

Securing grid connection is key to incorporating renewable generation onto electricity systems. Limited capacity and costly grid upgrades are barriers in many jurisdictions, including Northern Ireland, the Great Britain and EU Member States, as highlighted below.

5.1.1 Northern Ireland

In July 2023, the DfE and the Utility Regulator for Northern Ireland launched a joint call for evidence on Northern Ireland's grid connection policy. Stakeholder responses revealed the following:

- Developers, generators and building suppliers expressed support for a shallower connection regime, in which there was greater socialisation of costs. Other respondents, including those from consumer representatives, expressed concern about the impact of such changes on consumers.
- Respondents felt the first come, first served approach to the connection queue should be amended.
- Respondents argued that the length of time it takes to first receive a grid offer and to then connect to the grid was too long.

- Respondents also indicated that the cost of grid connection was too high.[36]

As an outworking of this call for evidence, the DfE published a consultation on the "Increased Socialisation of Connection Costs in the Electricity Distribution Network" in January 2025. That consultation proposed four policy options ranging from business as usual to full socialisation. The consultation closed on 24 April 2025 and was due to report in the "middle half of 2025.[37]

Potential Scrutiny Point

- The Committee may wish to ask the DfE for an update on the Increased "Socialisation of Connection Costs in the Electricity Distribution Network".

Other steps taken forward by a range of stakeholders to address the identified issues include:

- **The System Operator for Northern Ireland's** "Transmission Development Plan for Northern Ireland 2023 to 2032", which sets out a range of upgrades to incorporate more renewable generation on to the system. That Development Plan was in turn based on an earlier report "Tomorrow's Energy Scenarios Northern Ireland", which identified areas of the system that required reinforcement in order to facilitate renewable generation.[38]
- **NIE Networks** current connections policy for generators of 5MW or less (as revised in November 2023) places applicants in a queue based on when their application is received. In other words, it is based on the "first-come, first-served" approach highlighted by respondents to the Utilities call for evidence as set out above. The policy does, however, include milestone terms for connections, which are designed to prevent the

[36] 202406 Joint Connections Update CfE resposnes final v3_3.pdf
[37] DFE Increased Socialisation of Connection Costs in the Electricity Distribution Network | Department for the Economy
[38] UR Decision TDPNI 2023-2032.pdf

"hoarding of capacity". These include milestones for securing planning permission, completing construction and utilising the connection. Connection capacity will be withdrawn should those milestones not be met.[39]

5.1.2 United Kingdom Government policy approach in Great Britain

The United Kingdom's Clean Energy Action Plan 2030 states that:

> *Great Britain's electricity network must undergo unprecedented expansion, as the economy electrifies, to deliver decarbonisation, energy affordability and energy security, and support economic growth. To connect new generation and meet future demand, around twice as much new transmission network infrastructure will be need in Great Britain as has been delivered in the past decade.*[40]

To facilitate this expansion, the United Kingdom Government proposes the following actions:

- "Fundamentally reforming the connection processes" to prioritise viable projects that align with Clean Power targets.
- Regulatory reform to ensure the targets are better integrated into planning and investment decision, enabling investment ahead of need.
- The Government will explore the appropriateness of "tightening the incentives and penalties" to drive network investment.
- Improving network planning and consenting to provide the tools to accelerate the expansion and upgrades required.
- Engaging with communities so that the can benefit from living near to new infrastructure.[41]

In addition to the Clean Energy Action Plan 2030 and associated actions, the United Kingdom Government has made changes to how network planning is carried out in Great Britain. Since 1 October 2024, both electricity and gas

[39] Distribution Generation Application and Offer Process Statement
[40] Clean Power 2030 Action Plan
[41] Clean Power 2030 Action Plan

network planning has been the function of the newly formed National Energy System Operator (NESO). The NESO is a publicly owned body, with responsibility for the independent, strategic oversight of Great Britain's gas and electricity networks.[42] It engages in strategic spatial energy planning (SSEP) to speed up network development; taking the form of a "GB-wide plan, mapping potential zonal locations, quantities and types of electricity and hydrogen generation and storage". This is aligned to clean energy and climate targets.[43]

5.1.3 EU and it individual Member States

In June 2025, the European Commission issued a "Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks". The guidance noted that the deployment of variable RES and changes in demand, such as increased electrification and hydrogen production, necessitate changes to current network development practices. On the European grid, the guidance states:

> *Europe's electricity system is based on grids mostly built, in anticipatory manner, in the 1970s and 1980s for the traditional types of generation capacities at the time. These grids are both in need of modernisation and refurbishment, but also in urgent need of expansion to capture the current complexities of the energy transition, both at transmission and distribution levels… Moreover, the transformation of our energy systems moving towards clean energy sources, and the length timeframes traditionally required to develop grid projects lead to significant delays in connecting to the grid. For wind farms, getting access to the network can take as long as nine years.*[44]

[42] New publicly owned National Energy System Operator to pave the way to a clean energy future - GOV.UK

[43] Strategic Planning | National Energy System Operator

[44] European Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks 0c176369-b0c9-416b-9d77-d9f22c482770_en

To enable renewable electricity development, the European Commission's guidance recommends that Member States partake in "anticipatory investment" – that is:

> *…investments into the grid infrastructure that proactively address network development needs beyond the ones corresponding to reinforcements relating to currently existing grid connection requests by generation or demand projects. Anticipatory investments are forward-looking investments based on identified medium – and long-term network needs, justified by network development plans, based on scenarios that project plausible trajectories of generation and demand capacities that sport the energy, climate and industrial policies, including National Energy and Climate Plans.*[45]

The above quote from the European Commission highlights the central role "network development plans" (NDPs) are to play in enable anticipatory investment. To enable this, the Commission recommends Member States and/or National Regulatory Authorities should:

- Ensure NDPs are based on scenarios of future development and should clearly explain the link between estimated future development, consumption and grid development.
- Ensure scenarios align with long-term energy and climate policy goals and consider stakeholder input.
- Consider introducing "an adequate forward looking period" for network planning to allow for the approval of investments.
- Coordinate the respective layers of network planning to ensure cost-effectiveness.[46]

It also recommends that grid operators should:

[45] European Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks 0c176369-b0c9-416b-9d77-d9f22c482770_en
[46] European Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks 0c176369-b0c9-416b-9d77-d9f22c482770_en

- Ensure that NDPs are the "first and foremost instrument where anticipatory investments should be included, assessed and eventually approved by the regulatory system".
- Consider solutions that would allow for potential future capacity increases, preparing assets for future expansion.[47]

The Commission's guidance highlights a number of Member States as best practice examples of NDP development to allow for anticipatory investment. Those Member States and a summary of their processes are outlined in Table 3 below.

Table 3: NDP development in EU Member States – best practice[48]

Member State	NDP processes
Austria	The Federal Ministry of Climate, Energy and Mobility is responsible for developing an integrated NDP. This includes both electricity and gas, based on common scenarios for 2030 and 2040. The Transmission System Operator is required to consider this plan when developing its own NDP.
Belgium	Offshore renewable development is set out in an NDP. That plan is based on scenarios that consider national and EU energy and climate targets.
Denmark	The Danish Energy Agency is responsible for developing the country's NDP. That plan is based on 2050 scenario planning and is used by all Danish system operators.
France	Grid users are required to notify the gird operators of any future development plans to enable the operator to take them into account when planning. France's regulatory framework allows developers to notify gird operators of future plans through a dedicated website. France has also set up "decarbonisation zones". These are industrial areas where electrification is anticipated to replace gas consumption.

[47] European Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks 0c176369-b0c9-416b-9d77-d9f22c482770_en

[48] European Commission Notice on a guidance on anticipatory investments for developing forward-looking electricity networks 0c176369-b0c9-416b-9d77-d9f22c482770_en

Member State	NDP processes
Germany	Future grid development considers joint scenarios at Transmission and Distribution System operator level. The country's Distribution System Operators publish a forward looking NDP annually. That NDP looks forward 10-year and coordinates planning in six regions. Planning scenarios have been prepared up to 2045.
Portugal	NDPs are required to consider energy and climate change targets. The also consider flexibility and alternative grid options. New substations allow for scalability.

Source: European Commission (2025)

In June 2024, the European wind energy industry body, Wind Europe, published a report that outlined the "Gird access challenges for wind farms in Europe". That report identified the main challenges facing projects in the wind sector, categorising those challenges into two broad categories – grid saturation and procedural inefficiencies – and the countries where those challenges were particularly acute. The findings of that analysis are outlined in Table 4 below.

Table 4: Grid access delaying factors - Wind Europe 2024[49]

Category	Delaying Factor	Countries
Grid Saturation	A lack of available grid capacity	Croatia, Finland, Germany, Greece, Italy, Republic of Ireland, Netherlands, Poland, Spain, Sweden, Turkey, United Kingdom
Grid Saturation	No proactive grid planning	Republic of Ireland, Romania, Germany, Sweden, Netherlands, Norway, Spain, Turkey, United Kingdom

[49] Wind Europe Gird access challenges for wind farms in Europe 2024

Category	Delaying Factor	Countries
Grid Saturation	Not enough incentives to accelerate grid planning and optimisation	Croatia, Finland, France, Greece, Italy, Romania, Sweden, United Kingdom
Grid Saturation	No useful mapping of grid saturated areas	All surveyed countries
Procedural inefficiencies	Grid permitting not efficiently linked to other permitting processes	Belgium, Croatia, Finland, Germany, Republic of Ireland, Norway, Romania
Procedural inefficiencies	First come, first severed principle	Applies to all surveyed countries apart from Greece, Spain and Norway
Procedural inefficiencies	Not strict enough criteria to enter the connection queue	Italy, Turkey
Procedural inefficiencies	Shortage of human resources and digitalisation	Croatia, Finland, Germany, Greece, Republic of Ireland, Italy, Norway, Romania, Turkey
Procedural inefficiencies	Not enough incentives to accelerate the assessments	Belgium, Croatia, Greece, Republic of Ireland, Italy, Norway, Romania, Turkey
Procedural inefficiencies	Lengthy grid equipment processes	Romania, Sweden

Source: Wind Europe (2024)

The 2024 Wind Europe report found that most system operators in Europe utilise a “first come, first served” approach to queue management. Others have, however, begun to implement “strategies for dynamic and smarter management of grid connection queues. That includes the adoption of “filtering criteria” and “prioritisation criteria”.

"Filtering criteria" refer to criteria used to deprioritise speculative projects and to prioritise mature and viable projects. "Prioritising criteria" refer to criteria that are used to prioritise mature and viable projects that "fulfil strategic or system integration criteria".

The filtering criteria identified by Wind Europe were typically "milestone achievement criteria"; whereby projects must meet certain milestones or demonstrate a certain financial commitment in order to join the grid connection queue. Examples include of milestone achievement criteria include:

- **United Kingdom:** It adopted new grid connection procedure in January 2024. Under this procedure "slow-moving or stalled projects" are removed from the transmission connection queue". The United Kingdom also requires a substantial fee to be paid for developers to apply for a preliminary grid connection assessment.
- **Spain:** If a project does not reach key maturity milestones in Spain, it loses it bank guarantees and is removed from the queue. Such projects are required to begin the application again if they still require a connection.
- **Norway:** Projects within Norway's connection queue have been identified as mature. Grid capacity has been reserved for these projects.
- **Greece:** Greek projects must reach three milestones: a bank guarantee to reserve grid capacity; a deposit for the signature of a grid connection; and, obligation to apply for a grid connection agreement and installation licence during the first year of applying for a bank guarantee.[50]

Wind Europe notes that the use of "Prioritisation criteria" amongst its Member countries is less developed. It highlighted the following examples:

- **Republic of Ireland:** The "top 25" renewable energy projects in the Republic of Ireland, defined as those project with the potential to deliver the most energy annually", are identified and prioritised on the grind connection list. Other projects are ranked by the earliest date planning permission can be secured.

[50] Wind Europe Gird access challenges for wind farms in Europe 2024

- **Greece:** In August 2022, Greece enacted legislation to remove the "first come, first served" principle for grid connection. This will be replaced by "technical criteria" to facilitate the prioritisation for projects within the grid connection queue.[51]

Overall, Wind Europe recommended the following actions to enhance grid connection procedures:

- The principle of "overriding public interest" should apply to the permitting of grid infrastructure.
- National Energy and Climate plans should be updated to address network infrastructure and grid capacity allocation.
- Entry criteria, such as milestone criteria, should be used to filter grid connection applications.
- National authorities should consider strategies to remove or deprioritise stalled project and use prioritisation criteria to ensure projects that support climate targets and grind integration.
- The regulatory frameworks should allow generation developers to pre-finance and develop parts of the grid infrastructure. Note: this is possible in countries such as Finland, Germany, Greece and the United Kingdom.[52]

5.2 Grid flexibility

The transition to a electricity system requires a significant transformation of electricity grids. Grids not only need expansion and reinforcement, but also need to become more flexible to facilitate the integration of variable renewable generation.

A key issue is ensuring renewable generation can be used to its greatest capacity. The IEA's Renewable 2024 report found that increasing levels of renewable generation is leading to higher curtailment, particularly in countries "where grid investment and system integration are not keeping pace with rapid

[51] Wind Europe Gird access challenges for wind farms in Europe 2024
[52] Wind Europe Gird access challenges for wind farms in Europe 2024

deployment". The IEA concluded that this underlined the "growing need for flexibility" such as energy storage and large-scale demand response.[53]

The following sub-sections provide an overview of the issue, first from a Northern Ireland perspective, and then United Kingdom, followed by EU.

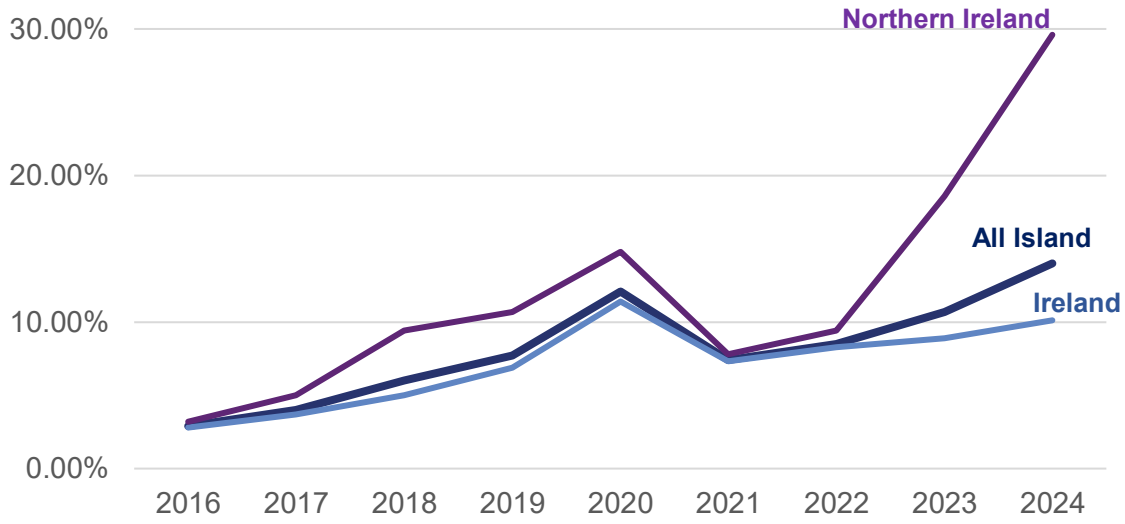
5.2.1 Northern Ireland

A key gird issue on the all-island Single Electricity Market (SEM) is what is known as "dispatch down". This is refers to situations where system operators are required to reduce the output of renewable generation below its maximum level in order to effectively manage the grid. There are two scenarios where this is required: "constraint" were renewable generation is reduce for localised network reasons; and, curtailment were it is reduced for systems wide reasons.

In 2024, the dispatch rate for wind energy in Northern Ireland was 29.6% (i.e. the reduction in wind output was 29.6% of total available wind energy in the region in that year). This represented an increase on previous years. As shown in Figure 4 below, Northern Ireland's dispatch down rate has been higher than that of the Republic of Ireland (10.1% in 2024), and the all-island rate (14.0% in 2024), as also shown in Figure 4 below.[54]

[53] IEA, Renewable 2024 Renewables 2024 – Analysis - IEA (October 2024)
[54] EirGrid/ SONI Dispatch Down Summary Report (August 2025) https://cms.eirgrid.ie/sites/default/files/2025-08/DD_Summary_Report.xlsx

Figure 4: Dispatch down rates: Northern Ireland, All-island and Ireland 2016 to 2024[55]



Source: EirGrid/ SONI (2025)

Since 2021, the largest proportion of dispatch down in Northern Ireland has been the result of constraints, rather than curtailment.[56] In their Annual Renewable Energy Constraint and Curtailment Report 2024, the SONI and Eirgrid noted that:

> *The level of dispatch-down is affected by a number of factors which vary from year to year, such as the amount of wind and solar installed on the system, system demand, interconnector flows and the capacity factor of the renewable generation.*[57]

The Report also notes that the significant increase in dispatch down in Northern Ireland in 2024 was the result of:

- Transmission outages during the summer of that year.
- Security of supply concerns that resulted in a large number of generators being made must run.
- Increases in interconnector imports “even at times of high renewables”.

[55] EirGrid/ SONI Dispatch Down Summary Report (August 2025) https://cms.eirgrid.ie/sites/default/files/2025-08/DD_Summary_Report.xlsx
[56] https://cms.eirgrid.ie/sites/default/files/2025-08/DD_Summary_Report.xlsx
[57] Annual-Renewable-Constraint-and-Curtailment-Report-2024-V1.0.pdf

More specifically, the report explained that the upwards trend in dispatch down in Northern Ireland was "due to amount of wind on the Northern Ireland system relative to its size", ensuring there is "no option but to constrain wind (and solar) if all the online conventional units are at minimum generation level". [58]

The security of supply concerns noted above were the result of:

> *…the closure of the coal units in* [Northern] *Ireland and the delay in replacement units a "must run" constraint was implemented on a large CCGT that is located in a high wind region. This was implemented to maintain Security of Supply.*
>
> *In 2024 two new large OCGT units were introduced to the Northern Ireland network. The new units required periods of testing as part of the commissioning process. Increased constraints were experienced during these periods of testing.*[59]

Actions have been taken or are planned to address this issue. Those actions include integrate greater levels of renewable generation by enhancing grid flexibility. Such actions involve a range of "grid actors", including:

- **DfE:** In December 2022, the DfE completed a cost/benefit analysis of smart meters in Northern Ireland. A consultation on a Smart Meter Design Plan was completed in January 2025. A summary of consultation responses and a decision paper with a final plan was anticipated for Quarter 2 2025, but had not been published at the time of writing.

  DfE conducted a consultation on a Smart Systems Flexibility Plan between January and April 2024. The Report on the Energy Strategy Action Plan 2024 notes that the DfE was planning to carry out an analysis of responses in early 2025 "with a view to drafting a report mid-way through the year". At the time of writing this Paper, that report was not published. Once published, it is to set out a "policy roadmap" for delivering a renewables-based electricity system". The consultation

[58] Annual-Renewable-Constraint-and-Curtailment-Report-2024-V1.0.pdf
[59] Annual-Renewable-Constraint-and-Curtailment-Report-2024-V1.0.pdf

covers topics such as monitoring flexibility, consumer led flexibility and grid led flexibility (such as storage, interconnection and dispatchable renewable generation).

The DfE is also working with the **DfI** to develop "a support scheme to future proof electric capacity at key sites along Key Transport Corridors". This is designed to support the roll-out of electric vehicles which could in turn provide a vehicle for consumer led flexibility.

Potential Scrutiny Point

- The Committee may wish to ask the DfE and the DfI for updates on these actions.

- **SONI:** As part of its Shaping Our Electricity Future programme -launched in October 2021 -SONI and EirGrid has developed Operational Policy Roadmap 2023 to 2030. That document includes plans to tackle curtailment and constraint trough "network evolution", including plans to test smart devices, incentivise demand flexibility and deliver the North-South Interconnector.
- **SONI** published a Draft Dispatch Down Action Plan in December 2024. That Draft Action Plan includes recommendations to mitigate against the factors contributing to dispatch down in Northern Ireland. It includes a range of actions including a series of reviews of current practices, including imports, the number of "must-run" units and Operational Security Standards. It also sets an intention to "coordinate with the Utility Regulator" to create a mechanism to procure long duration energy storage. The Draft Action Plan also highlights the importance of constructing the North-South Interconnector and the significance of the programme of network development set out in SONI's Transmission Development Plan 2023-32. In setting out their decision on the Transmission Development Plan (January 2025), the Utility Regulator

noted that SONI continued to work on a Dispatch Down Action Plan, which was expected to be finalised by the end of 2025.[60]

Potential Scrutiny Point

- The Committee may wish to ask the SONI for an update the Dispatch Down Action Plan.

- **NIE Networks' "**RP6 Innovation Report" highlighted a range of projects to enhance system flexibility over the period October 2017 to March 2025 and set out the direction of travel for 2025 to 2031. Action over the 2017 to 2025 period included[61]:
    - **The "Flex" project**: It focussed on trials of consumer led flexibility. These are currently being transferred into business as usual.
    - **The Northern Ireland Intelligent Electric Vehicle project**: It explored "managed, or intelligent charging" as a means to mitigate the additional load on the system driven by electric vehicle roll-out.
    - **Smart Metering trial:** In 2022 smart meters were trialled in 1,000 homes to assess the network and consumer benefits. The trial demonstrated benefits in both areas. NIE Networks has stated that "a larger, more comprehensive pilot is required" pending the outcome of the DfE's Smart Meter Design Plan.
    - **Trials of various load management techniques:** The RP6 Innovation Report also outlines a range of technical load management trials that have been carried out over the period.

  Looking forward, the RP6 Innovation Report set out the following actions planned for 2025 to 2031, including:
    - Flexible connections: to manage congestion and reduce network reinforcement costs. [62]

[60] UR Decision TDPNI 2023-2032.pdf
[61] Space does not permit a full overview but details are available in the report RP6-Innovation-Report.pdf
[62] RP6-Innovation-Report.pdf

- A Real Time Flexibility Procurement Framework: to develop a market to trade flexible services in close to real time.
- A range of other technical solutions to improve system monitoring and enhance efficiency.[63]

5.2.2 United Kingdom policy approach in Great Britain

The United Kingdom's Clean Energy Action Plan 2030 highlighted the cost to consumers of dealing with system constraints. It noted that, as of 2022, the cost of dealing with constraint was found to be £2 billion per year. This was estimated to grow to £8 billion, or a cost of £80 per household per year, by the late 2020s without action. The Action Plan highlighted the need for accelerated network expansion to tackle constraints.[64] As noted in sub-section 5.1.2, the NESO's SSEP process will be a key delivery mechanism for network expansion.

A Review of Electricity Market Arrangements is also underway by the United Kingdom Government.

Due to the "long lead time for network expansion, and fundamental market reform", the NESO has launched a Constraints Collaboration Project that is focused on "finding solutions to thermal constraints, which can be implemented and deliver results in the short term". Thermal constraints refer to physical limits on the amount of power that can be safely transmitted over the equipment before it becomes overloaded and overheats.[65]

In this area, the NESO currently are considering the following options:

- "Demand for Constraints": under this option, new sources of demand would be offered reduced cost of electricity to locate locations of constraint to allow renewable generation to be used.
- "Short and Long-term constraint management markets": under these options, the NESO would be able to enter contracts with generators and demand units "in advance of real-time", reducing the cost of managing

[63] RP6-Innovation-Report.pdf
[64] Clean Power 2030: Action Plan: A new era of clean electricity
[65] What is thermal constraint management and why is it important? | National Energy System Operator

constraint. Long-term constraint management markets would utilise 1-year contracts. Short-term constraint management markets would utilise "utilise firm 30 min contract blocks nominated at the day ahead (DA) of the constraint".

- "Extended Intertrip scheme": the Intertrip scheme allows for a great amount of energy to flow on the transmission infrastructure pre-fault and prevents pre-emptive curtailment. NESO is considering ways to enhance this.
- Grid Booster: this option would involve "increasing an/or more effectively coordinating energy storage around the constraint boundary" to allow the transmission infrastructure to run closer to maximum capacity an reduce curtailment.
- Transfer booster: this option would utilise battery storage to act as a "shock absorber" to import energy during times of high wind and export energy during time of low wind. This could "unlock extra network capacity at constrained boundaries due to the need to keep reserve capacity, or headroom on the network".[66]

It should be noted that the first report states its purpose is "to identify next steps for the options assessed" and that the NESO is "…progressing to detail design and cost-benefit analysis, there is still no commitment to implement".[67]

The **Clean Power Action Plan 2030** outlines the United Kingdom Government's goal to boost grid flexibility to support more variable renewable energy. This includes both short- and long-duration flexibility.

- **Short-Duration Flexibility:** The Action Plan estimates an extra 29–35GW (compared to 2023) could come from battery storage, consumer-led flexibility, and interconnection.
- **Long-Duration Flexibility:** Around 40–50GW of dispatchable capacity will be needed by 2030, delivered through low-carbon technologies like

[66] NESO Balancing Costs: Annual Report and Future Projections, Technical Report (May 2024)
[67] NESO Balancing Costs: Annual Report and Future Projections, Technical Report (May 2024)

Carbon Capture Usage and Storage (CCUS) and Hydrogen to Power (H2P).[68]

As part of this Plan, the DEZN published a **Clean Flexibility Roadmap** in July 2025. It outlines actions to support both short- and long-duration flexibility. For short-duration flexibility, the Roadmap focuses on:

- **Consumer-led flexibility (CLF)**: CLF involves switching loads, such as washing machine use, away from peak times, it also includes using electric vehicle batteries as energy storage. To encourage greater CLF, the Roadmap proposes delivering incentives, supporting the rollout of flexible technologies (e.g. electric vehicles or heat pumps) and engaging with customers.
- **Grid-scale battery storage:** The Roadmap sets out DEZN's ambitions for the use of lithium-ion batteries for energy storage. It notes that the Clean Power Action Plan estimated that between 23–37GW of battery storage capacity would be required by 2030. The Roadmap states that as of 2025, 5GW were connected to the grid. An additional 17GW has received capacity marker approval and a further 17 GW had been granted planning approval. To further stimulate growth in battery storage the Roadmap proposed examining ways to encourage investment and to facilitate the co-location of battery storage alongside renewable generation.
- **Interconnection:** The Clean Power Action plan estimated that between 12 to 14GW of electricity interconnection would be required to meet the United Kingdom's 2030 energy targets. The Roadmap notes that as of 2025 a total of 10.3GW had been installed. To encourage further progress, the Roadmap sets states that Government will incorporate interconnection into future energy planning; encourage international cooperation; and develop what are known as offshore hybrid clusters –

[68] Clean Power 2030: Action Plan: A new era of clean electricity

these are offshore wind farms that are linked to more than one country's electricity gird through interconnection[69].[70]

On the long-duration flexibility, the Roadmap is focused on:

- **Long-duration electricity storage (LDES):** LDES is a form of electricity storage that can be used to manage peaks and troughs in demand, in a similar way to gas fired generation does in traditional systems. The United Kingdom has 2.8GW of LDES installed in the form of pump storage hydropower. The Roadmap envisions increasing this to between 4-6GW in 2030 and 13.2-16.6GW by 2050. Development will be supported through a cap and floor scheme.
- **Low-carbon dispatchable power (LCDP):** LCDP technologies can generate electricity over long periods of time to compliment duration-limited technologies. LCDP includes technology such as H2P, CCUS and Biomethane. The Clean Power Act identified the need for 2-7GW a LCDP by 2030. This could be increased to up to 52GW by 2050. In its Spending Review, the United Kingdom Government has announced £500 million in support for H2P and £9.4 billion of capital support for CCUS. The Government has also committed to H2P launching business model in 2026.[71]

5.2.3 Policy response in the EU and Member States

A 2024 study by the European Commission's Joint Research Centre (JRC), found that in 2040 between 121 and 310TWh of renewable potential energy generation could by curtailed due to gird congestion, depending on the scenario examined.[72] To address this issue, the JRC recommended the redesign of policy instruments to encourage investment, such as renewable auctions and capacity markets, to include a locational element. This approach, the JRC

[69] https://www.nationalgrid.com/national-grid-ventures/interconnectors-connecting-cleaner-future/offshore-hybrid-assets
[70] Clean flexibility roadmap - GOV.UK
[71] Clean flexibility roadmap - GOV.UK
[72] JRC Publications Repository - Redispatch and Congestion Management

argued, could encourage the development of renewable areas of less congestion.[73]

A study commissioned by the European Parliament's Committee for Transmission, Innovation and Health and published in March 2025 - Increasing Flexibility in the EU Energy System - Technologies and policies to enable the integration of renewable electricity sources – highlighted a range of solutions being employed or considered across the EU:

- **Flexible power generation**: Fossil fuel plants still provide a significant amount of flexibility to the EU electricity system. That share is expected to decrease. Only some renewables can provide sufficient flexibility. Several solutions are being implemented or considered throughout Europe. Hydropower reservoirs are the largest source renewable dispatchable generation across the EU. The scope for expansion is limited however. Whilst other solutions, such as "run-of-river" installations can provide limited flexibility. Renewable hydrogen may be used to power dispatchable turbines. In some Member States biomass or biogas is use to provide dispatchable power and could partly substitute for decommissioned coal fired power plants.
- **System friendly renewable electricity generation**: It refers to renewable deployments where measures are taken in the design, siting or operation of the generation asset to enabling them to "have a smoother (or more aligned to residual load) generation" profile, reducing the need for flexibility. This includes the on-site combination of renewables with energy storage or using solar trackers[74] with solar PV farms.
- **Energy storage**: It is expected to play an increasing role in providing flexibility to the European electricity system. This is likely to include:

[73] More coordination needed in renewable deployment to prevent grid congestion - European Commission

[74] A solar tracker orientates solar panels towards the sun.

- Stationary batteries in stand-alone utility facilities or “behind the meter in industrial, commercial and residential buildings”. They may also be co-located with renewable installations.
- Mobile batteries, utilising electric vehicles and vehicle to grid technology that allows electric vehicles to consume from and feed-into the grid.
- Pumped-hydro storage currently provides 95% of storage capacity in the EU. As noted above, the prospect for further development may be limited due to environmental concerns.
- Other medium and long-duration storage technologies are also being considered. These include hydrogen, compressed air storage, thermal storage and renewable/low carbon synthetic fuels.

- **Demand-side flexibility:** The European Parliament study highlighted a range of demand-side response employed by Member States, including:
  - The use of smart technology and energy management systems as well as price signals to encourage customers to adjust their energy consumption to enable more efficient grid management. This can occur at different levels of scale such as industrial demand response, which involves large-scale energy users. Examples include the food industry which has been taking a flexible approach to refrigeration, and the print industry in Germany which has utilised energy storage to increase self-consumption. It can also be undertaken at a commercial or a residential level.
  - Looking forward, the study noted that hydrogen electrolysers could provide future demand side response by consuming electricity during periods of high renewable energy facilitating congestion management.

  The study also noted that demand-side responses relied upon certain enablers including energy management systems such as smart meters and smart appliances. Network tariff structures and dynamic retail pricing could be used to send price signals to motivate customer behaviour.

- **Flexible connection agreements:** Traditional grid connection agreements in the EU have been "firm", meaning the grid users were provided with grid access to a pre-specified MW capacity. Some Member States, particularly the Netherlands, Belgium, France and Austria, have adopted a flexible connection agreements. These include capacity being limited during specific timeslots or times of the day.[75]

The Study also found that the need for flexibility, through solutions such as those set out above, could be reduced through "timely investments in and adequate operation of distribution and transmission grids". Moreover, it notes that insufficient grid capacity can limit the impact of flexibility solutions.

6 Key takeaways

This Research Paper has compared progress towards renewable electricity targets in the United Kingdom and EU Member States. It has also looked at policy approaches to renewable electricity barriers in both the United Kingdom and the EU.

Key takeaways from those analyses include:

- The Climate Change (Northern Ireland) Act 2022 set a statutory to secure 80% of electricity consumption from renewables by 2030. The United Kingdom Government's target for Great Britain, of achieving 95% of generation from clean energy is non-statutory. Across the EU, Member States are contributing to a binding EU target of generating at least 42.5% of gross final energy consumption from renewables by 2030. Gross final energy consumption includes energy used in transport, heat, etc.. Some Member States have set explicit renewable electricity targets, with others opting to set broader renewable energy targets in line with the Renewable Energy Directive 2023.

[75] European Parliament's Committee for Transmission, Innovation and Health - Increasing Flexibility in the EU Energy System - Technologies and policies to enable the integration of renewable electricity sources (March 2025)

- A comparison of progress towards renewable electricity targets across the EU and United Kingdom identified Austria, Denmark and Portugal as having the largest proportion of renewable generation and the amongst the most ambitious targets. In the case of Austria and Portugal, their progress has been underpinned by natural resources, with both countries relying on hydropower to provide significant amounts of renewable generation. Denmark has incorporated a much greater level of renewable energy onto its electricity system, helped, in part, by being an early adopter of the generation technology.
- The barriers to renewable energy development in Northern Ireland identified in the RaISe Paper Assembly Research Paper "Renewable Electricity in Northern Ireland: a primer" (NIAR 81-25, dated 13 June 2025) – route to market, planning and permitting, and grid capacity – are common in other jurisdictions.
- A comparison of renewable support mechanisms across Council of European Energy Regulators Member Countries has revealed that most offer a mix of support, often tailored to the size of the renewable installation. The same comparison also revealed that Feed-in Premiums, and the Contracts for Difference variant, are the most common incentives used. Levels of support vary from country to country, depending on market and technology conditions.
- In Northern Ireland, data from the DfI show that the average processing time for renewable energy application across Northern Ireland in 2024/25 was 45.6 weeks. The same data shows considerable variation across local government districts. The DfI is due to publish a new regional planning policy on renewable and low carbon energy policy. Despite being "at an advanced stage of completion" this has not been published. The Minister for Infrastructure stated in September 2025 that it would be published "as soon as possible following Executive Committee agreement".
- Other regions are also working to speed up planning and permitting for renewables. The United Kingdom Government's Clean Power 2030 Action Plan, which is applicable to Great Britain, includes a range of

actions in this area. This includes: better equipping planning services; updating policy; potential changes to Judicial Review; and developing community benefits.

- In the EU, Member States are also adopting policies to expediate permitting. Examples include: unifying permitting process, implementing strategy to speed up process; setting objectives for land use; introducing a “one-stop-shop” to better coordinate permitting; exempting certain developments from permitting; and reforming Judicial Review.
- In Northern Ireland, respondents to a DfE and Utility Regulator call for evidence on grid connections highlighted the costs of connection, as well as the connection process and processing times as key issues. A range of grid upgrades has been planned by the System Operator for Northern Ireland, these upgrades are based on future energy scenarios. NIE Network has also included milestone criteria in connection agreements.
- In the United Kingdom the Clean Power 2030 Action Plan sets out a range of actions to address grid connection issues in Great Britain. This includes, but is not limited to, grid expansion. Other actions include reform of the connection process, introducing incentives and penalties to drive investments in the network, and community engagement. The National Energy Systems Operator has engaged in strategic spatial planning to speed up connection.
- In the EU, the European Commission has recommended that Member States engage in anticipatory, rather than reactive, grid investment. It has also advised that this investment should be based on National Development Plans. Wind Europe has identified issues with grid saturation and procedural inefficiency across Europe. It has recommended that policy makers move away from the first come, first served approach to connections that has been used to date. In this vein some countries have adopted filtering criteria to deprioritise “speculative” connection requests , and prioritisation criteria to prioritise mature connection requests.
- The incorporation of increasing amounts of variable renewables into electricity systems requires that those systems become more flexible. In

Northern Ireland, curtailment and constraint are resulting in the renewable generation being “dispatched down” and running at a reduced level to help manage the grid. DfE’s Energy Strategy includes a number of actions aimed at addressing this issue, such as a smart meter roll-out, Smart Systems Flexibility Plan. SONI has also published a Draft Dispatch Down Action Plan. In each case, final policy documents are yet to be published. NIE Networks has undertook a range of projects to increase system flexibility over the 2017 to 2025 period, including trials of consumer led flexibility and smart metering. It has also outlined potential actions for the period 2025 to 2031.

- In the Great Britain, system constraints are expected to result in costs to consumers of £8 billion by the late 2020s if action is not taken. The United Kingdom Government and National Energy System Operator are exploring a range of options to address constraint in Great Britain, including incentives to encourage demand to locate close to renewable generation. Other option being explored are constraint markets, energy storage, consumer-led flexibility, interconnection and clean energy forms of dispatchable generation.
- Similar actions are being developed at EU level, including: renewable flexible generation such as hydrogen to power; system friendly renewable generation; energy storage; demand-side flexibility and flexible connection agreements.

Annex 1: Sources of country specific targets

The table below provides a list of sources used to compile the 2030 targets that feature in Figures 1 and 2, in section 1 of this paper.

Country	Source
Austria	Austria - Countries & Regions - IEA
Cyprus	Cyprus | Clean energy for EU islands
Czechia	Czech Draft Updated NECP 2021 2030_en.pdf
Denmark	Green energy | Read why the Danish solutions are at front
Estonia	Estonia_Draft_Updated_NECP_2021-2030_en_1.pdf
Germany	Germany - Countries & Regions - IEA
Greece	Factsheet_Commissions_assessment_NECP_Greece_2023.pdf
Republic of Ireland	Ireland's Energy Targets | SEAI
Italy	Italy aims to turn up renewable power to two thirds of total by 2030 | Reuters
Lithuania	Lithuania Rooftop Solar Country Profile
Netherlands	Renewable Energy and Climate Change | RVO.nl
Northern Ireland	Climate Change Act (Northern Ireland) 2022
Poland	pl_final_necp_summary_en_0.pdf
Portugal	Portugal plans to raise share of renewables in electricity consumption to 93% by 2030 | Reuters
Slovenia	Renewable energy in Slovenia | CMS Expert Guides
Spain	Spain is leveraging industrial clusters to lead Europe's energy transition | World Economic Forum
United Kingdom	Clean Power 2030 | National Energy System Operator