

# Responding to stakeholder feedback

## – clean power pathways

### Background and context to the clean power 2030 programme

The Government has committed to achieving a net-zero carbon economy by 2050. As part of this broader goal the Government has formally asked the National Energy System Operator (NESO) to develop advice on how to achieve clean power by 2030.

The formal commission letter from the Secretary of State can be [found here](#), as well as NESO's [open letter](#) to industry on formulating this advice. The programme for developing this advice will conclude within the Autumn, with an expected Government plan being published by the end of the year.

### Approach to analysis

Our analysis so far focuses on six key elements of the solution to clean power 2030. All of which must progress together to enable delivery. Critical considerations such as emissions and environment, consumer and community impacts, energy security, whole energy and beyond 2030 and economic impact cut across the key areas.

The key strands of our analysis so far include:

- Electricity Demand (electrification, efficiency, demand side flexibility)
- Electricity Supply (spatial clean power generation mix)
- Networks (planned pipeline of investment against need for 2030)
- Connections
- Operability (stability, voltage, restoration, flexibility for frequency, within-day and adequacy)
- Operations and system access

Our analysis will consider the actions that government, Ofgem, NESO and industry should take to deliver on the clean power mission across five critical enablers we have so far identified which are:

- Planning, consenting and communities
- Grid connections reform
- Markets, funding and financing
- Supply chains and workforce
- Institutions and governance

### Our work with stakeholders

As NESO we engage with over 3,000 stakeholders each year to create our future energy scenarios as well as specialists from the energy industry and planning experts to undertake Britain's future electricity network plans. Our engagement also goes beyond the sector, working with end-users of our energy from housing associations and local authorities to energy intensive industries.

NESO has taken a similar, whole-system approach to developing this advice, building on the annual engagement undertaken this year. Below are the different ways we have sought feedback during this short programme.

The methods we have engaged with stakeholders are outlined below.



We have been transparent with our analysis during development phase in order to test our thinking and seek input. All interim analysis shared externally has been published on NESO's website.

### How are we responding to feedback?

It is the responsibility of an independent impartial body to weigh up a wide range of stakeholder feedback and provide a judgement on the evidence and feedback presented.

NESO's first feedback window asked for views on the technology ranges and demand assumptions needed to deliver clean power as well as our three identified pathways to clean power. Below is an outline of the original three pathways identified by NESO.

Pathway	CP1 [High Flex]	CP2 [High dispatch]	CP3 [High Renewables]
<b>Pathway description</b>	Fast development of renewables alongside the highest level of energy storage capacity and consumer engagement in demand flexibility. Minimal new dispatchable low carbon power.	Growth in renewables but the lowest of all pathways. Highest deployment of low carbon dispatchable power alongside highest nuclear capacity.	Highest level of renewables capacity across all pathways. Growth in flexibility in line with CP2 (High Dispatch) and minimal dispatchable low carbon power in line with CP1 (High Flex).
<b>Demand assumptions</b>	Transport, heat and industry electrification is driven by the requirement to meet overall emission reduction targets in 2030s. Energy efficiency improvements grow. Highest engagement with residential and industrial DSR,	Transport, heat and industry electrification is driven by the requirement to meet emissions targets in the 2030s. Energy efficiency improvements	Fastest pace of electrification of demand, with sectors decarbonising at a faster pace than in other pathways, to align with highest renewables level. Demand flexibility growth in-line with CP2 (High Dispatch).

	other demand flexibility sectors aligned to other pathways.	grow. Growing levels of smart charging and DSR.	
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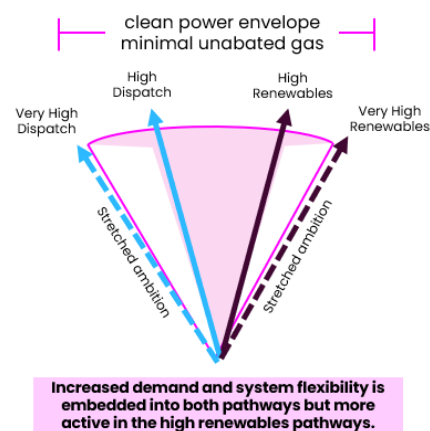
NESO were told by many stakeholders that clean power would only be deliverable if it were to be accompanied with immediate action by Government, Ofgem and NESO to put Britain on a path to achieving clean power by 2030.

On the theme of deliverability within our first feedback window, NESO heard from stakeholders on three key areas:

- That the role of demand and system flexibility should be core components across all pathways, rather than separated out.
- The highest range of offshore wind assumed, ~ 55 GW, was incredibly challenging to deliver by 2030, even with reforms.
- The highest range of low carbon dispatchable power (NESO had grouped Bioenergy with CCS, Gas with CCS and Hydrogen to Power under this term during interim analysis), ~ 3 GW, was not as equally challenging as the ambitions for offshore wind and more could be delivered with the right reforms. NESO also heard opposing views that ~ 3 GW would be too challenging to deliver by 2030.

After reviewing this feedback NESO are adapting our pathways approach. We are now exploring two primary pathways as well as the upper limits of them. The primary pathways are outlined below:

Pathway	[High Renewables and Flexibility]	[High Dispatch]
<b>Pathway description</b>	Fast development of renewables alongside the highest level of energy storage capacity and consumer engagement in demand flexibility. Minimal new dispatchable low carbon power.	Growth in renewables but the lowest of the pathways. Deployment of low carbon dispatchable power alongside the highest nuclear capacity.



We have also developed two wider sensitivities, which offer more stretching levels of deployment of key technologies, alongside our counterfactual scenario which does not accelerate progress and misses the UK's carbon targets. These, along with further exploratory sensitivities, have allowed us to examine a range of possibilities and explore the importance of specific elements of the clean power system.

Further sensitivities have been undertaken on batteries, carbon price, nuclear, weather years and increased demand.

The ranges NESO are now currently exploring within the two primary pathways and their sensitivities are:

Installed Capacity (GW)					
Technology	2023 levels	High dispatch 2030	High Renewables & Flexibility 2030	Very High Dispatch 2030	Very high Renewables & Flexibility 2030
<b>Offshore Wind</b>	14.7	~3 times current level	~3 – 4 times current level	~3 times current level	~4 times current level
<b>Onshore Wind</b>	13.1	~2 times current level	~2 times current level	~2 times current level	~2 – 3 times current level
<b>Solar</b>	15.1	~3 times current level	~3 times current level	~3 times current level	~3 – 4 times current level
<b>Nuclear</b>	6.1	Reduced output, building back up in early 2030s			
<b>Biomass</b>	4.3	Assume broadly consistent capacity. Load factors will depend on any conversion of some units BECCS.			
<b>New low carbon power (Gas CCS, BECCS, Hydrogen to Power)</b>	0	Deployment of ~ 3 – 5 new projects	Limited new deployment	Deployment of ~ 5 – 6 new projects	Limited new deployment
<b>Other Renewables</b>	4.7	Broadly similar levels compared with today			
<b>Batteries</b>	4.7	~5 times current level	~6 times current level	~5 times current level	~6 times current level
<b>LDES</b>	2.8	~2 times current levels	~3 times current levels	~2 times current levels	~2 times current levels
<b>Interconnectors</b>	8.4	Around 50% higher than current levels			
<b>Unabated gas</b>	35.8	Less than 5% electricity generation			

Note: we have used the 2023 levels as the 'current level' when setting out the changes needed by 2030 for our pathways.

The above data is interim analysis. They are subject to review and challenge ahead of final submission to Government.

We thank stakeholders for their continued input as we formulate this advice.