Drax in a clean power 2030 world

Flexible assets, strategic options

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Flexible assets aligned with clean power 2030

Electrification of the economy will drive a need for significant growth in generation capacity. The government's Clean Power 2030 Action Plan sets out more than three-fold increases in offshore wind and solar, a doubling of onshore wind, a five to six-fold increase in battery capacity, more interconnection capacity, and more long-duration electricity storage. This is complemented by 2-7GW of low carbon dispatchable power, unabated gas running at low load factors, and a step up in flexibility on both the demand and supply sides.

Drax's GB portfolio of renewable and flexible generation assets is geographically dispersed across England, Scotland and Wales, and complemented by an energy solutions business supplying electricity to I&C customers, route to market PPAs for renewable generators, and electric vehicle charging solutions, a mix that is aligned with some of the key pillars of the Clean Power 2030 Action Plan.

Pricing dynamics in recent years have been favourable, but secured Capacity Market revenues, an increasingly intermittent electricity system, NESO predictions that balancing costs will remain elevated, and the current Energy Solutions EBITDA run rate suggest that Drax's post 2027 EBITDA target of £250m+ from FlexGen & Energy Solutions is plausible. A range of strategic options point to incremental upside.

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Executive summary

- The government's Clean Power 2030 Action plan defines clean power as "*clean sources produce at least as much power as Great Britain consumes in total, and clean sources produce at least 95% of Great Britain's generation.*"
- Consumer electricity demand is expected to rise by c.11% by 2030, but exports, storage round-trip efficiency, and curtailments point to a level of GB generation output well above end user demand, driving a need for significant growth in generation capacity.
- DESNZ's Clean Power Capacity Range for 2030 sets out more than three-fold increases in offshore wind and solar, a doubling of onshore wind, a five to six-fold increase in battery capacity, more interconnection capacity, and more long-duration electricity storage (LDES).
- 2-7GW of low carbon dispatchable power, unabated gas running at low load factors, and a step up in flexibility on both the demand and supply sides are also key pillars of the plan. BECCS is seen as an option for post 2030.
- December's dunkelflaute (little wind and sunlight) and January's system tightness demonstrate the need and value of flexibility and system services in the current system, a need and value that is likely to increase significantly on the 2030 pathway. This is an opportunity for entities with technology diversity who can provide flexibility and a suite of system services, particularly those with both supply and demand side capability.
- Drax's GB portfolio consists of renewable and flexible generation assets geographically dispersed across England, Scotland and Wales, complemented by an energy solutions business offering non-domestic electricity supply, route to market PPAs for renewable generators, and electric vehicle charging solutions.
- Biomass is low carbon, dispatchable, and can provide a wide range of system services, many of which were historically provided by fossil-fuel generators that have now retired. Although other renewable/low carbon technologies can provide certain system services, none can match the breadth and scale that biomass offers, nor deliver carbon removals if BECCS is deployed at Drax Power Station.
- Unabated gas will play a crucial role in providing electricity security in the future energy system, particularly in periods of high demand and low wind, and a wide range of essential system services. Drax's three OCGT plants are geographically dispersed and enjoy the visibility and security of 15-year Capacity Market contracts.
- Pumped storage hydro is zero emission, it is dispatchable and can provide a wide range of system services, with some of these characteristics shared by conventional hydro. Drax has assets of both types, is upgrading two units at Cruachan and has secured planning permission to build Cruachan II, consistent with a need for more LDES and supported by the proposed introduction of a cap and floor incentive for investment.
- Drax's Energy Solutions business includes corporate/industrial and commercial (I&C) supply, a route to market for >2,000 renewable generators, and the provision of decarbonisation services, including EV charging solutions, three pillars aligned with the Clean Power 2030 Action Plan.
- Drax has a post 2027 £250m+ recurring adjusted EBITDA target contribution from the FlexGen & Energy Solutions business, with c.£150m from Drax's pumped storage/hydro assets, c.£50m from the OCGTs, and c.£50m from the Energy Solutions business.
- Pricing dynamics in recent years have been favourable, but secured Capacity Market revenues, an increasingly intermittent electricity system, NESO predictions that balancing costs will remain elevated, and the current Energy Solutions EBITDA run rate suggest that this is a plausible target.
- Drax has several strategic options, including data centres and batteries, incremental to existing operations, or alternatives if BECCS conversion is not progressed. These are separate and additional to the £250m EBITDA ambition for the FlexGen & Energy Solutions business.

Clean power 2030: flexibility and dispatchability

Behavioral change and investment across the value chain

Clean Power 2030 Action Plan published on 13th December following advice from NESO…

NESO was commissioned by DESNZ to provide independent advice on the pathway towards the 2030 ambition of clean power. NESO published 'Clean Power 2030' on 5th November 2024, describing clean power 2030 as "…*by 2030, clean sources produce at least as much power as Great Britain consumes in total and unabated gas should provide less than 5% of Great Britain's generation in a typical weather year*." NESO's advice fed into the government's Clean Power 2030 Action Plan published on 13th December 2024.

Recognition that the challenge is huge is clear, and multiple elements must be delivered simultaneously at pace. The debate as to whether this is the correct path will undoubtedly continue to rage, but increasing electrification of the economy drives a need for new generation capacity, in addition to replacement of retiring plant. Renewables will dominate capacity additions, bringing with it the challenges of intermittency, in turn underscoring the need for flexibility, on both the demand and supply sides.

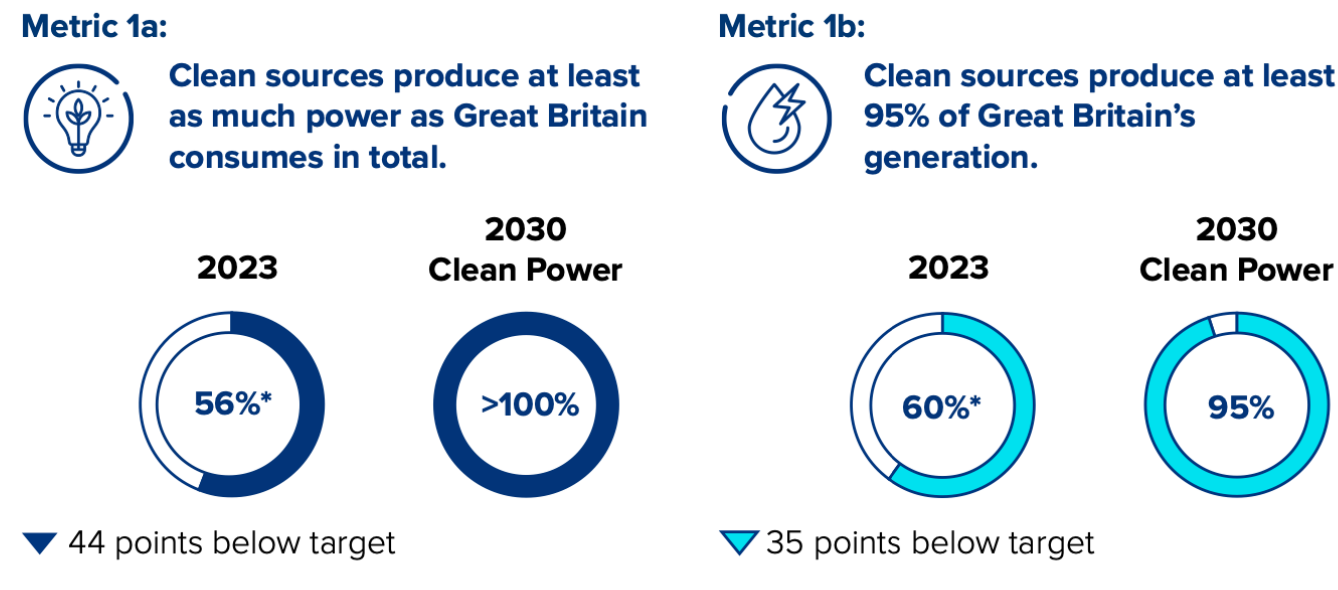
NESO identified five key priorities for successful pathways to clean power:

- **Unlock flexibility of demand and supply:** Flexibility is vital with large opportunities to increase flexibility in both demand and supply, and across residential, commercial and industry.
- **Backing offshore wind and renewables:** No path to clean power without mass deployment of offshore wind, complemented by onshore wind and solar.
- **Recognising the value of dispatchable low carbon plants:** Needed to be able to match demand regardless of conditions. Biomass viewed as being able to shift into this role, as can new CCS and hydrogen projects, if they can be delivered by 2030.
- **Delivering network plans in full and faster:** More than twice as much transmission network needs to be built in the next five years than in the previous ten, along with enabling works, connections and distribution network strengthening.
- **Keeping options open:** Multiple uncertainties on demand evolution and deliverability points to value in pursuing multiple options.

…clean power defined as clean sources producing as much power as GB consumes in total and unabated gas providing less than 5% of GB's generation in a typical weather year

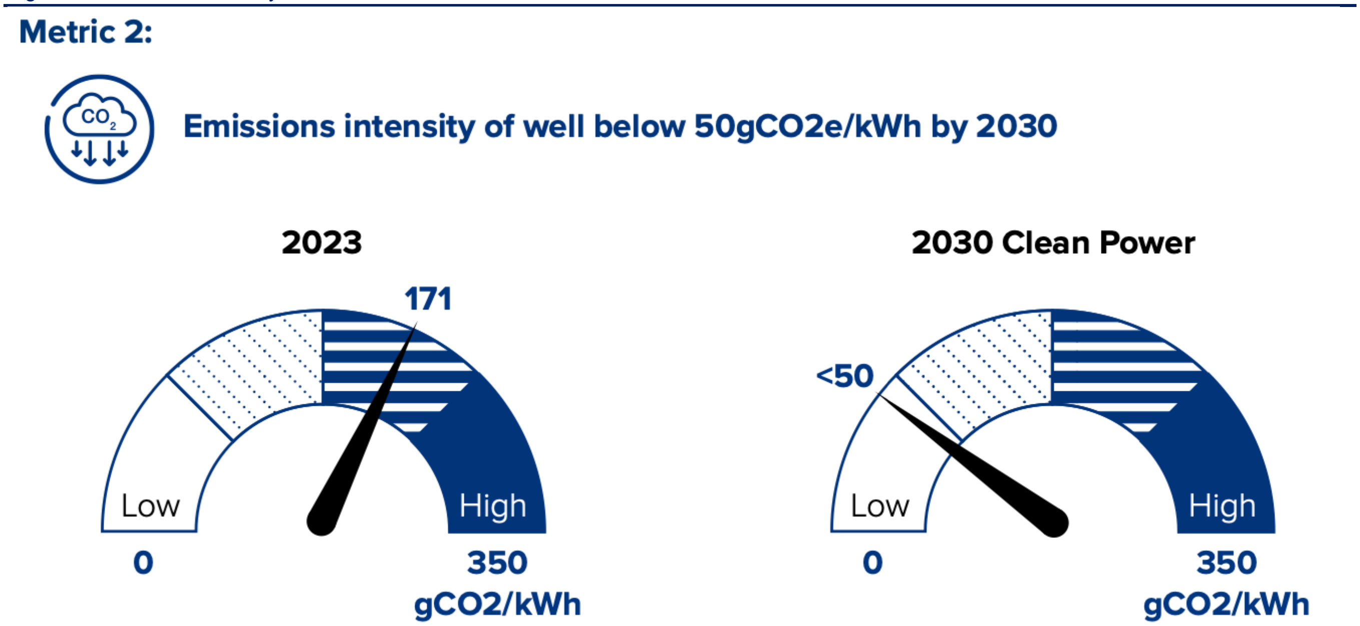
Two clean power pathways (Further Flex and Renewables, and New Dispatch) were presented, albeit with considerable commonality, along with their feasibility, enablers, benefits and costs. The government has adopted NESO's definition of clean power and has set out the DESNZ 'Clean Power Capacity Range', building on NESO's scenarios. The focus of this report is to explore Drax's position in a clean power 2030 world, looking at both its current portfolio as well as strategic options that might be open to the company. Our framing of the backdrop therefore focusses on the demand and supply elements of the Clean Power 2030 report and the government's action plan, as opposed to elements relating to network build, reinforcement and connections reform.

Figure 1: Definition of Clean Power 2030



Source: Clean Power 2030 Action Plan (*This is the closest available official statistic to the clean power 2030 definition at the point of publication. This statistic is for the UK rather than GB and includes gas CHP (Combined Heat and Power) in the denominator and EfW (Energy from Waste) in both the numerator (the proportion assumed to be from bioenergy) and denominator. Official statistics will be reviewed at a future date.

Figure 2: Emissions intensity 2030



Source: Clean Power 2030 Action Plan

Exports, curtailment, and storage round-trip efficiency incremental to consumer demand growth…

NESO's electricity demand projection, adopted by DESNZ, is based on the Holistic Transition Pathway from Future Energy Scenarios (FES) 2024, a pathway which sees economy wide net zero 2050 met through a mix of electrification and hydrogen (mainly around industrial clusters), with strong consumer engagement with demand shifting and flexibility provided by smart homes and electric vehicles.

Figure 3: FES 2024: ESO Pathways to Net Zero

	2023	2030				2035				2050				
Emissions		HT	EE	HE	CF	HT	EE	HE	CF	HT	EE	HE	CF	**Emissions**
Annual average carbon intensity of electricity (g CO_2/kWh)	133	41	73	74	134	-17	-11	-9	69	-28	-36	-36	21	Annual average carbon intensity of electricity (g CO_2/kWh)
Net annual emissions ($MtCO_2e$)	422	297	309	314	387	178	185	191	329	-1	-2	-1	204	Net annual emissions ($MtCO_2e$)
Electricity														**Electricity**
Annual demand (TWh)[1]	285	334	328	332	311	419	425	422	351	667	700	671	533	Annual demand (TWh)[1]
Electricity demand for heat (TWh)	40	42	44	44	42	51	57	53	43	108	114	107	83	Electricity demand for heat (TWh)
Peak demand (GW)[2]	58	62	65	64	64	76	81	76	70	109	119	104	102	Peak demand (GW)[2]
Total installed capacity (GW)[3]	116	219	205	191	166	289	264	244	206	411	386	343	285	Total installed capacity (GW)[3]
Wind and solar capacity (GW)	44	121	106	94	71	189	156	141	113	249	225	197	152	Wind and solar capacity (GW)
Interconnector capacity (GW)	8	12	12	12	12	24	19	17	14	25	22	17	16	Interconnector capacity (GW)
Total storage capacity (GW)[4]	7	34	29	26	22	48	38	30	27	83	66	50	34	Total storage capacity (GW)[4]
Total storage volume (GWh)[5]	34	130	92	86	63	172	112	105	87	269	258	208	132	Total storage volume (GWh)[5]
Maximum vehicle-to-grid capacity (GW)[6]	0	2	1	0	0	18	10	1	0	65	40	19	8	Maximum vehicle-to-grid capacity (GW)[6]
Natural Gas														**Natural Gas**
Annual demand (TWh)[7]	872	642	649	724	790	433	478	545	666	138	127	303	636	Annual demand (TWh)[7]
1-in-20 peak demand (GWh/day)	5082	3811	4327	4726	5352	2786	3289	3786	4933	1047	1136	1791	4593	1-in-20 peak demand (GWh/day)
Residential demand (TWh)[8]	292	266	266	288	307	200	199	215	291	0	0	0	188	Residential demand (TWh)[8]
Imports (TWh)	494	430	446	510	586	308	360	418	540	113	105	279	581	Imports (TWh)
Hydrogen														**Hydrogen**
Annual demand (TWh)	0	32	6	36	1	64	38	134	4	182	138	393	24	Annual demand (TWh)
Residential hydrogen demand for heat (TWh)	0	0	0	0	0	0	0	12	0	15	0	77	0	Residential hydrogen demand for heat (TWh)
CCS enabled hydrogen production (TWh)[9]	0	26	4	42	0	38	25	82	0	60	38	177	8	CCS enabled hydrogen production (TWh)[9]
Electrolytic hydrogen production (TWh)[10]	0	12	5	14	1	25	16	46	4	116	95	161	17	Electrolytic hydrogen production (TWh)[10]
Bioresources														**Bioresources**
Bioresource demand (TWh)	170	151	139	149	102	167	163	176	86	191	205	225	91	Bioresource demand (TWh)

1. Customer demand plus on-grid electrolysis meeting Great Britain hydrogen demand only, plus losses, equivalent to GBFES System Demand Total in 'ED1' of data workbook
2. Refer to data workbook for further information on winter average cold spell peak demand
3. Includes all networked generation as well as total interconnector and storage capacity (including vehicle-to-grid available at winter peak)
4. Includes vehicle-to-grid capacity available at winter peak
5. Excludes vehicle-to-grid
6. Less capacity will be available during peak 5-6pm due to vehicle usage
7. Includes shrinkage, exports, biomethane and natural gas for methane reformation
8. Residential demand made up of biomethane and natural gas
9. Carbon capture and storage enabled hydrogen is created using natural gas as an input, with carbon capture and storage
10. Electrolytic hydrogen is created via electrolysis using zero carbon electricity (this figure does not include hydrogen produced directly from nuclear or bioenergy)

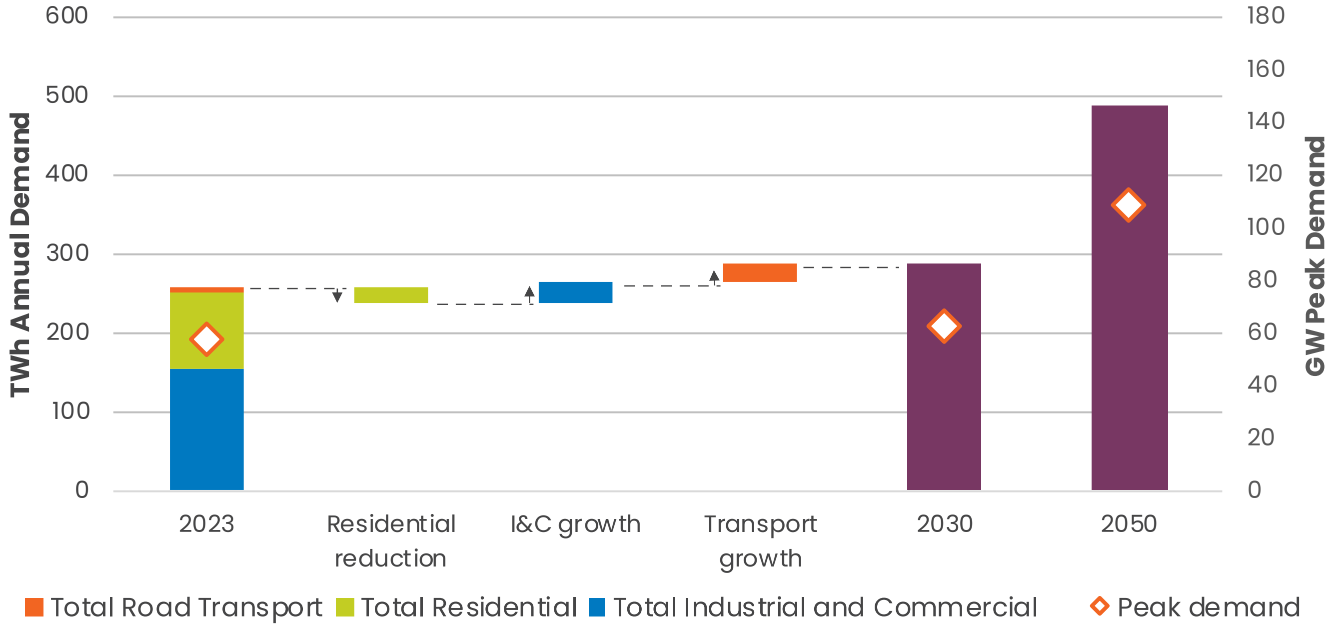
Source: ESO FES 2024 (HT – Holistic Transition; EE – Electric Engagement; HE – Hydrogen Evolution; CF – Counterfactual)

Consumer demand forecast to rise by c.11% by 2030…

Annual consumer demand (Figure 4) set out in both NESO's Clean Power 2030 report and the Clean Power 2030 Action Plan report is shown net of network losses and electrolysis load, with I&C demand adjusted downwards by 4TWh from that set out in the FES 2024 Holistic Transition pathway. The assumptions underpinning this demand growth forecast of c.11% to 2030 are clearly open to challenge as to their reasonableness, but of note:

- Energy savings are largely driven by the efficiency of lighting and appliances.
- Heat pump deployment achieves the previous Government's 2028 target of 600,000 installations a year.
- Insulation measures reduce electricity demand for heat by 11%, a saving of 2.5TWh in 2030.
- The Society of Motor Manufacturers and Traders (SMMT) central forecast is used for EV uptake.
- Data centre consumption is assumed to reach 22TWh in 2030 (vs. 5TWh today).
- 3.7GW of electrolyser capacity installed by 2030.

Figure 4: Changes in consumer electricity demand (2023-30)

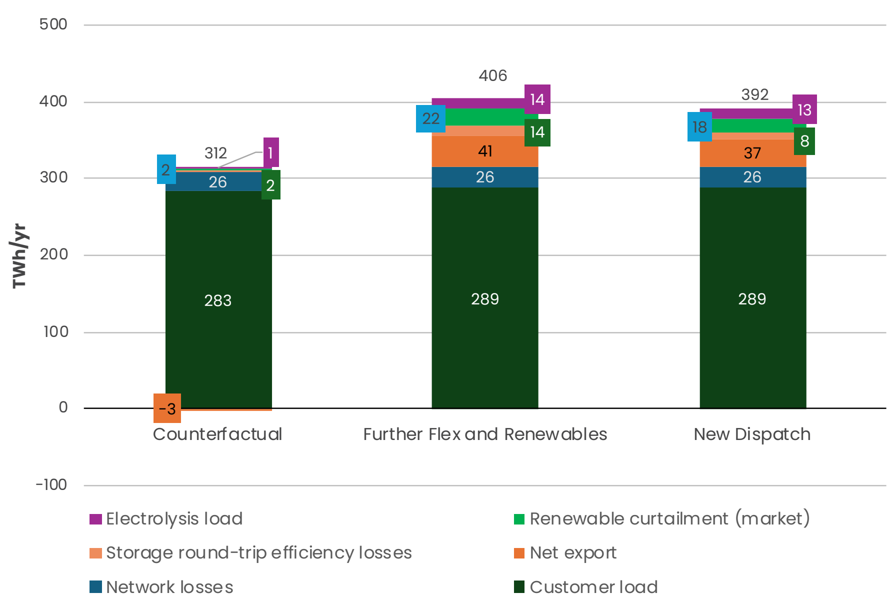


Source: NESO Clean Power 2030 Report

…adding in exports, curtailments and storage round-trip efficiency losses frames potential supply side mixes…

Factoring in interconnection flows, curtailments and storage round-trip efficiency losses, points to a level of GB generation output considerably higher than end user demand, framing potential supply side mixes.

Figure 5: Energy flow 2030



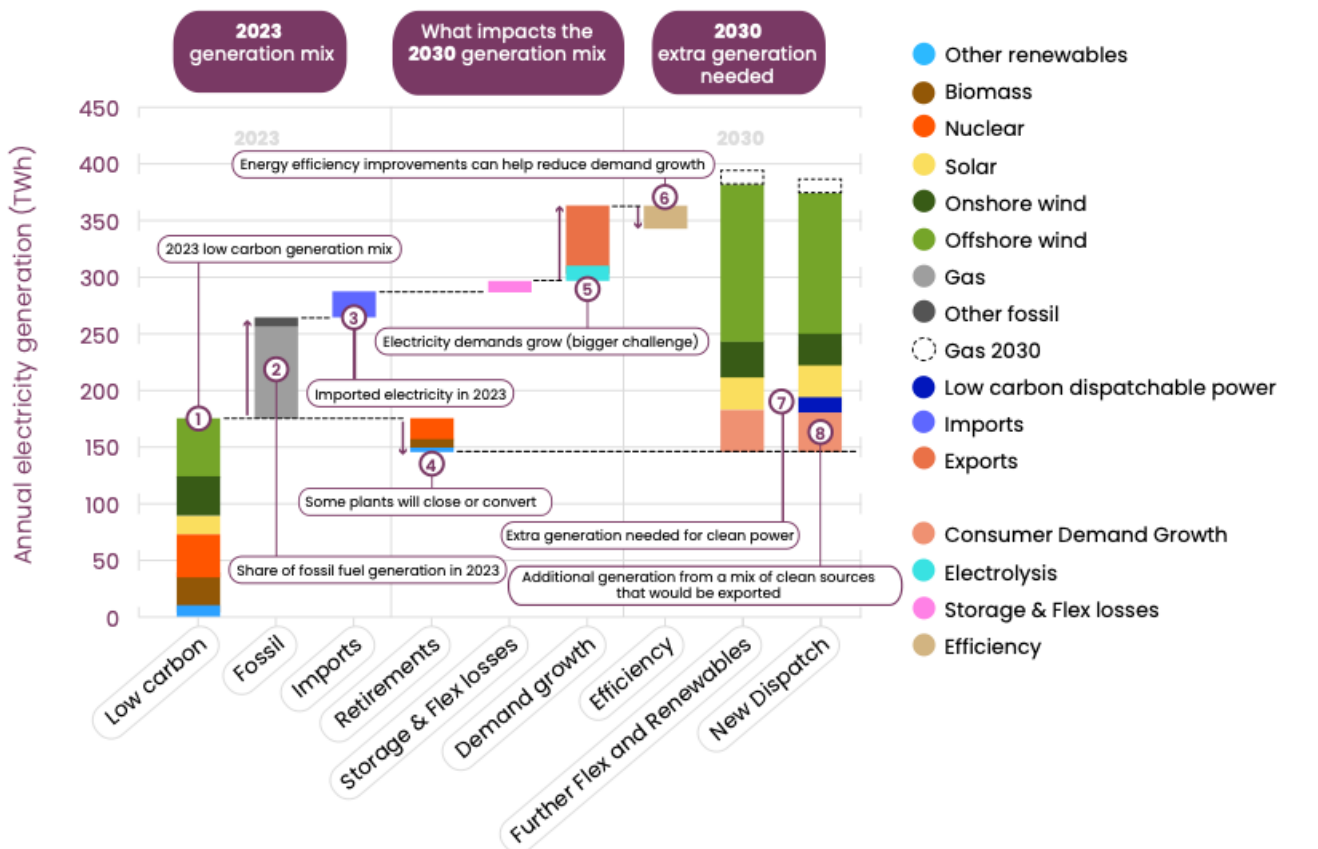
Source: NESO Clean Power 2030 Report Annex 4 (Counterfactual is a FES 2024 pathway)

…driving a need for significant growth in generation capacity

…driving a need for a significant growth in generation capacity

Both of NESO's Clean Power 2030 pathways and DESNZ's Clean Power Capacity Range point to a need for significant growth in generation, with renewables the mainstay of both scenarios, supplemented by nuclear and low carbon dispatchable sources such as bioenergy, gas with CCS and hydrogen. Figure 6 sets out the drivers of change through to 2030 in TWh terms, with Figure 7 disaggregating 2030 generation by technology and Figure 8 disaggregating 2030 capacity by technology.

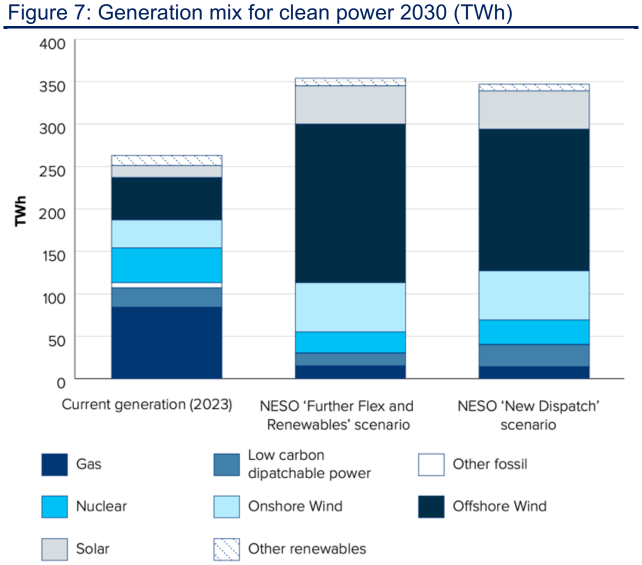
Figure 6: Increase in electrcity supply for 2030



Source: NESO Clean Power 2030 Report

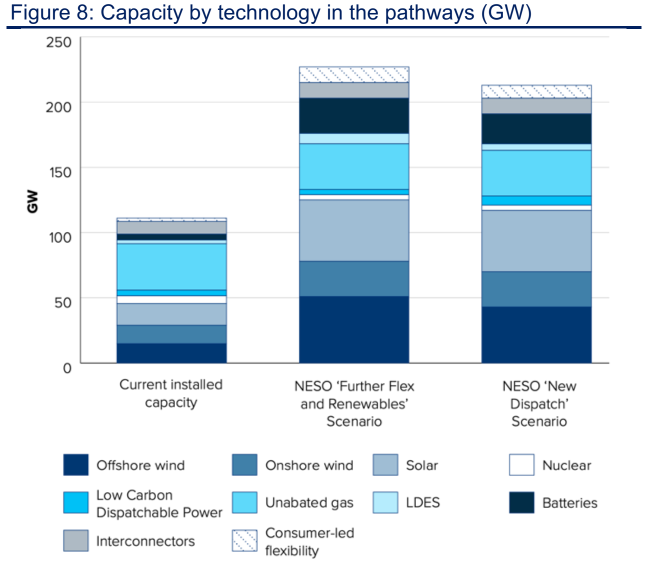
The scenarios set out more than three-fold increases in both offshore wind and solar, a doubling of onshore wind, a five to six-fold increase in battery capacity, more interconnection capacity, and more LDES. Biomass (unabated or BECCS) separately disclosed in NESO's graphics has been subsumed within Low Carbon Dispatchable Power in the Action Plan (Figures 7 and 8).

Figure 7: Generation mix for clean power 2030 (TWh)



Source: Clean Power 2030 Action Plan

Figure 8: Capacity by technology in the pathways (GW)



Source: Clean Power 2030 Action Plan

Policy/investment support is needed to bring forward build and securing the supply chain is critical

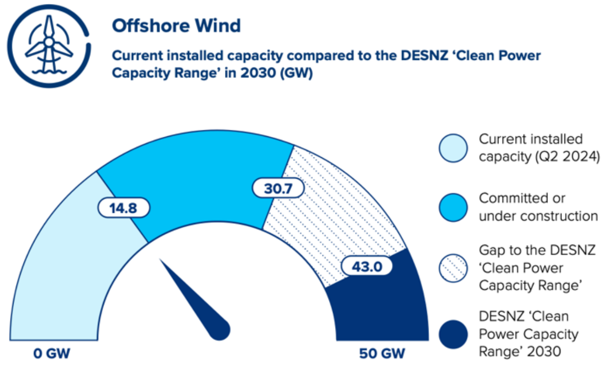
Such rapid growth in capacity will require policy/investment support to bring forward the necessary build, with an added challenge of ensuring that unabated gas, running on low load factors, can secure economic viability to ensure capacity adequacy. Given national and international infrastructure development, securing the supply chain is critical.

Figure 9: Key supply side technologies in DESNZ Clean Power Capacity Range

Technology	Current installed capacity, 2023 generation	DESNZ 'Clean Power Capacity Range', NESO Clean Power 2030 generation estimate	Enablers/challenges
Weather dependent renewables			
Offshore wind	14.8GW installed capacity, 50TWh generation.	Additional 28-35GW offshore wind capacity, total generation 167-187TWh.	Provision of sufficient investment support, expediting planning and consenting, securing supply chain.
Onshore wind	14.2GW installed capacity, 33TWh generation.	Additional 13-15GW onshore wind capacity, total generation 58TWh.	Unlocking sufficient capacity through next two CfD auctions, streamlining planning, securing supply chain.
Solar	16.6GW installed capacity, 14TWh generation.	Additional 32GW installed solar, total generation 45TWh.	Bring on capacity through CfDs or merchant market, streamlining planning.
Clean firm capacity			
Nuclear	5.9GW installed capacity, 41TWh generation.	3-4GW installed capacity, 25-29TWh generation.	3.5GW in NESO Clean Power 2030 Further Flex and Renewables pathway includes Sizewell B, first unit at Hinkley Point C online, and life extension of one AGR unit. Securing supply chain.
Low carbon dispatchable power			
Gas with carbon capture and storage, hydrogen to power	Nil.	Included within 2-7GW range for Low Carbon Dispatchable Power, 11TWh generation.	Government decisions on investment support for generation capacity and supporting infrastructure. Securing supply chain.
Biomass, BECCS	4.3GW installed capacity, 23TWh generation.	Included within 2-7GW range for Low Carbon Dispatchable Power, 15TWh generation.	Short-term support mechanism for large scale biomass generators announced, but final decisions to formally agree contracts with generators not yet taken. Option of future large-scale power BECCS remains and part of an independent review. Securing supply chain.
Unabated gas generation			
Gas	35.6GW installed capacity, 84TWh generation.	35GW installed capacity, total generation 14-15TWh.	Likely to run at low load factors, and more dependent on Capacity Market, or alterative support mechanisms. Plant efficiency and asset health.

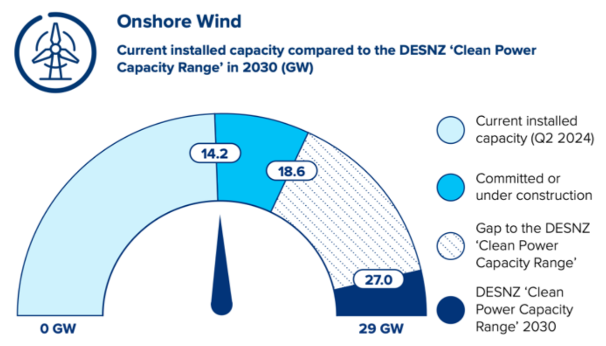
Source: Aquaicity analysis based on Clean Power 2030 Action Plan, NESO Clean Power 2030 Report and supporting data workbook

Figure 10: Offshore Wind – 2030 capacity vs. current installed capacity (GW)



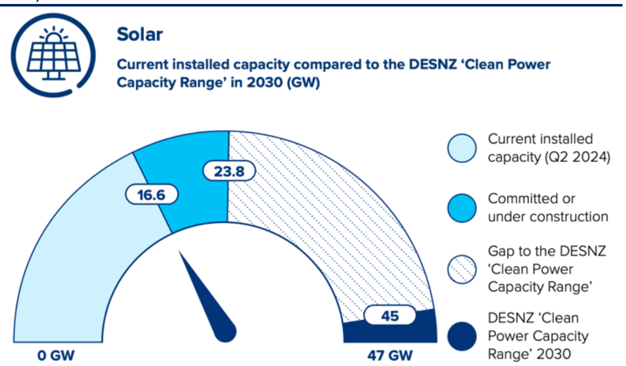
Source: Clean Power 2030 Action Plan

Figure 11: Onshore Wind – 2030 capacity vs. current installed capacity (GW)



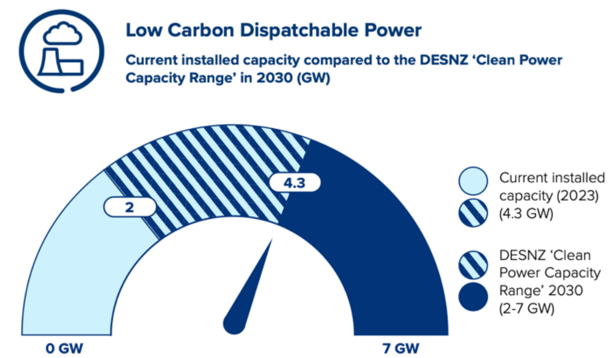
Source: Clean Power 2030 Action Plan

Figure 12: Solar – 2030 capacity vs. current installed capacity (GW)



Source: Clean Power 2030 Action Plan

Figure 13: Low Carbon Dispatchable Power – 2030 capacity vs. current installed capacity (GW)



Source: Clean Power 2030 Action Plan (Low carbon dispatchable power includes biomass, power BECCS, gas CCUS and hydrogen to power)

Flexibility on both demand and supply sides is vital

Flexibility of both demand and supply is vital…

Flexibility of both demand and supply is identified by NESO as "…*vital in a system with more variable renewables*", a view with which we concur. In a system that looks set to be dominated by intermittent renewables, it is essential for managing the system, but also for keeping costs down.

NESO has outlined a broad hierarchy of flexibility options for periods in which there is insufficient clean power to meet demand:

- **Demand side flexibility**: Consumer response to innovative tariffs or retail market offerings.
- **Storage**: Discharge of shorter duration storage such as batteries or vehicle-to-grid (V2G), followed by discharge of longer duration storage.
- **Interconnectors**: Import depending on price differentials vs. alternatives of low carbon dispatchable power and increased demand side flexibility.
- **Unabated gas**: Used if all other resources are exhausted.

In times of excess clean generation, the demand side could be incentivised to turn-up, storage could be charged, and/or interconnectors could export.

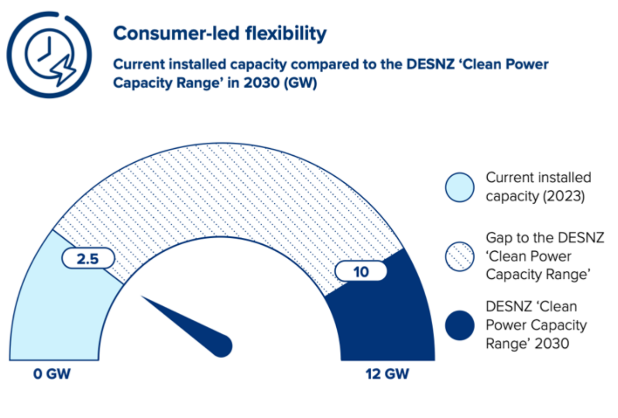
Electrification and innovation will pave the way for consumer involvement…

…consumers will have increased opportunity to demand shift, but will need the tools and incentives to do so

Consumers have always been important, but in the 2030 energy system, their increased engagement will be a key component. Smart appliances, electric vehicles, and heat pump rollout will provide consumers with increased opportunity to flex demand, although to increase participation levels, innovative tariffs (e.g. time-of-use-tariffs) and other retail market offerings will be needed to incentivise demand shifting. Automation and digitalisation will be key.

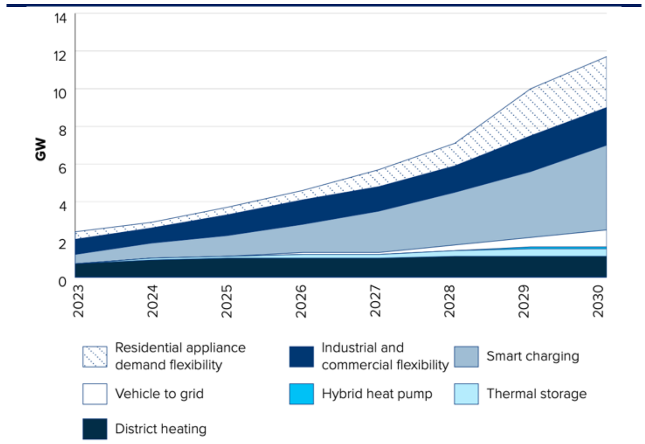
Demand flexibility in DESNZ's Clean Power Capacity Range reaches 10-12GW in 2030, with the largest contributors being smart charging and residential appliance demand side response.

Figure 14: Consumer-led flexibility – 2030 capacity vs. current installed capacity (GW)



Source: Clean Power 2030 Action Plan

Figure 15: Consumer-led flexibility at peak (GW) by type, 2023-2030



Source: Clean Power 2030 Action Plan

…though considerably more system/bidirectional flexibility required

LDES, batteries and interconnectors will be key providers of supply side flexibility

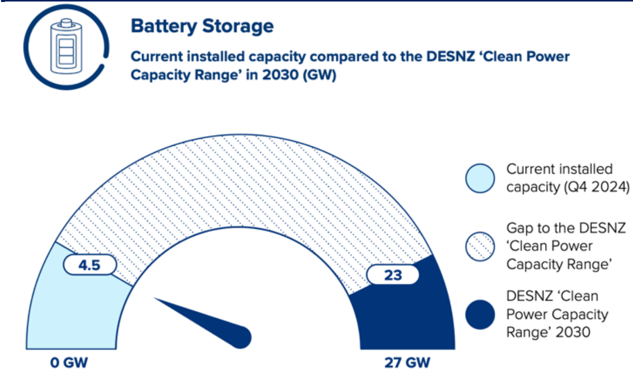
Consumer flexibility can only go so far, and the system will require flexible generation and bidirectional flexibility (e.g. bidirectional charging infrastructure). Low carbon dispatchable power and unabated gas are likely to be features of the 2030 power system, but more energy storage and interconnection will be needed to aid energy security, deal with the intermittent nature of wind and solar, and provide a range of services to NESO to keep the system in balance.

Figure 16: Key providers of flexibility under NESO Clean Power 2030 pathways

Technology	Current installed capacity, 2023 volume	DESNZ 'Clean Power Capacity Range', NESO Clean Power 2030 generation estimate	Enablers/challenges
Long-duration energy storage (LDES)	2.9GW LDES capacity, 32GWh of storage volume.	4-6GW LDES capacity, largely through pumped storage hydro and liquid to air energy storage.	Developing the 'cap and floor' model as soon as possible, securing planning, securing supply chain.
Battery energy storage	4.5GW battery storage capacity.	23-27GW battery storage capacity.	Appropriate market signals and incentives, securing supply chain, speeding up deployment.
Interconnectors	9.8GW[1] interconnector capacity, 23TWh net import.	12-14GW interconnector capacity, 35-36TWh net export.	Rapid decisions on the 'cap and floor' mechanism.

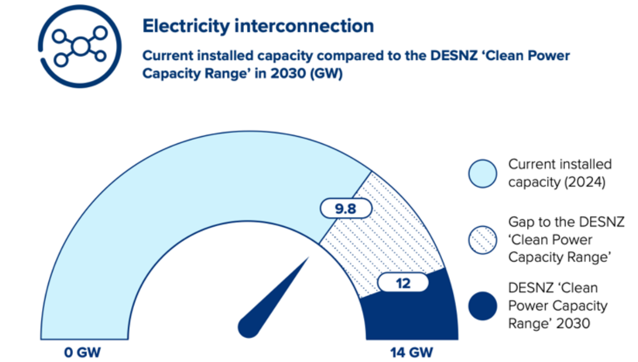
Source: Aquaicity analysis based on Clean Power 2030 Action Plan, NESO Clean Power 2030 Report and supporting data workbook. (1. Greenlink operational since end January 2025, adding 0.5GW.)

Figure 17: Battery Storage – 2030 capacity vs. current installed capacity (GW)



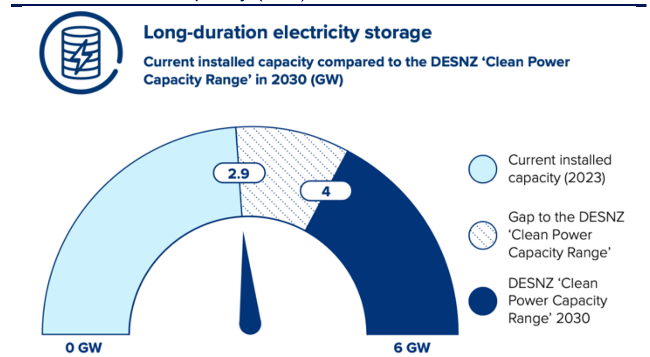
Source: Clean Power 2030 Action Plan

Figure 18: Interconnection – 2030 capacity vs. current installed capacity (GW)



Source: Clean Power 2030 Action Plan

Figure 19: Long-duration electricity storage – 2030 capacity vs. current installed capacity (GW)



Source: Clean Power 2030 Action Plan

An evolving operability challenge

Operability challenge evolving, it's not simply about installed MW…

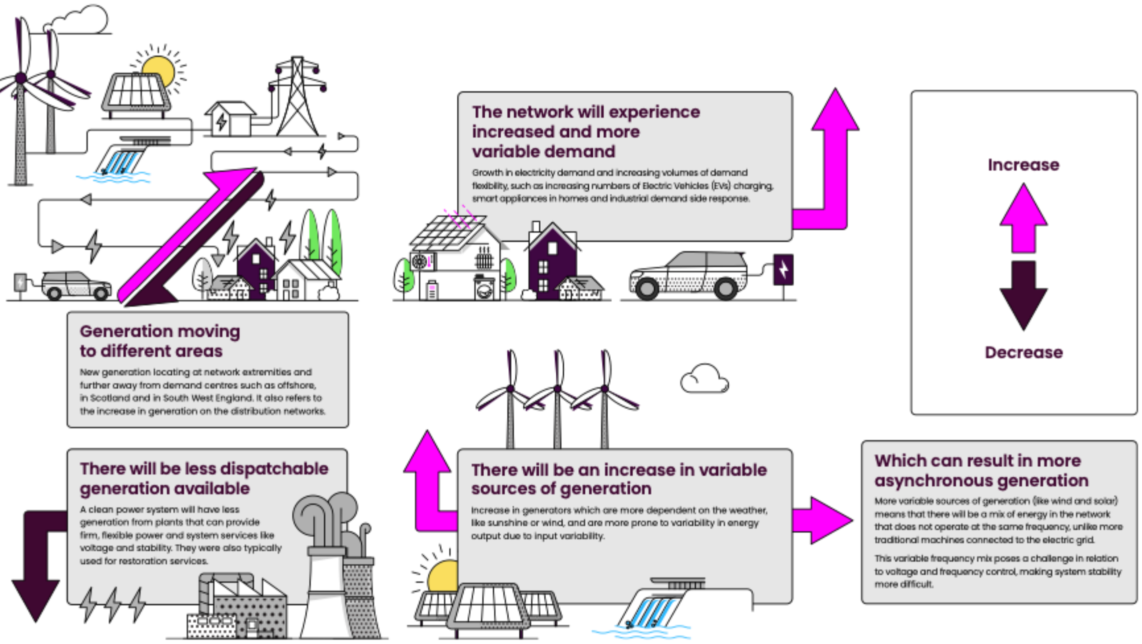
Historically, fossil-fuel generation provided a range of system services that the system operator could call upon to operate the electricity system safely and securely and comply with its licence condition to keep the frequency of the system within +/-1% of 50Hz. Except for BECCS/biomass and pumped storage, non-fossil fuel technologies on the system in 2030 will be unable to provide the full range of system services (Figure 20) that NESO requires, increasing the operability challenge (Figure 21). New services have, and will be, developed, with differing needs served by differing technologies.

Figure 20: Selected technologies – system service capability

System Services	Biomass	Pumped Storage	Hydro	Gas CCS	Nuclear	Wind	Solar	Batteries	Inter-connector
Carbon removals	BECCS	NO	NO	NO	NO	NO	NO	NO	NO
Clean electricity	YES	YES	YES	PARTIAL	YES	YES	YES	PARTIAL	PARTIAL
Controllable/Dispatchable	YES	YES	PARTIAL	YES	NO	PARTIAL	PARTIAL	YES	YES
Inertia	YES	YES	YES	YES	YES	NO	NO	NO	NO
Dynamic response	YES	YES	YES	YES	NO	PARTIAL	NO	YES	YES
Reserve	YES	YES	NO	YES	NO	PARTIAL	NO	YES	YES
Reactive power	YES	YES	PARTIAL	YES	YES	PARTIAL	NO	YES	YES
Black start	YES	YES	PARTIAL	YES	PARTIAL	NO	NO	NO	YES

Source: Aquaicity analysis based on Drax Capital Markets Day May 2023/July 2020

Figure 21: Operability considerations for the future network



Source: NESO Clean Power 2030 Report

…many of the challenges are already playing out…

Some of the operability challenges already exist today, as evidenced by significant swings in the composition of electricity supply between the dunkelflaute (dark wind lull with little generation from wind and solar) period in mid-December and more windy conditions a few days later.

Figure 22 depicts the production breakdown on 12th December, a day in which a dunkelflaute was experienced, and one in which wind and solar only contributed 5.8% and 0.6% of supply, respectively. Dispatchable generation and sources of flexibility dominated the supply side, with gas contributing 65.9%, biomass 8.9%, and imports 6.7%. The real-time wholesale price was £172.62/MWh (£197.42/MWh day ahead) and according to analysis from Modo Energy, batteries exported 11GWh of wholesale energy across 11th and 12th December, earning their highest single-day revenue for two years on 12th December.

Contrast this with 15th December (Figure 23). A little more solar (1.1%), but wind dominated, contributing 60.7% of supply. Biomass was a smaller part of the mix (6.1%), imports as a percentage (6.8%) unchanged, but gas collapsed to a 13% share. Wholesale prices were much lower at £55.48/MWh (£49.83/MWh day ahead).

…a clear opportunity for entities who can provide flexibility and a suite of system services

This, and the challenges of Wednesday 8th January 2025, demonstrates the need and value of flexibility and system service provision in the current system, a need and value that is likely to increase significantly on the pathway to 2030, as elaborated in DESNZ's Clean Power 2030 Action Plan. This represents an opportunity for entities who can provide this flexibility and a suite of system services, particularly those with capability on both the supply and demand sides, and across a range of technologies.

Figure 22: GB electricity system (12/12/2024)

Source: Drax Electric Insights

Figure 23: GB electricity system (15/12/2024)

Source: Drax Electric Insights

Rumblings of energy nationalism, unabated gas could benefit

Interconnectors are key part of the Action Plan, with the Clean Power Capacity Range pointing to an additional 2.2-4.2GW by 2030. With Greenlink (500MW) operational since end January, 1.4GW under construction, and a further five projects approved under Ofgem's cap and floor regime, it is possible that the target range will be met.

Wholesale pricing benefits of interconnectors less evident…

At the time of the introduction of the cap and floor regime, interconnectors were considered beneficial to GB consumers enabling imports of cheaper electricity from Europe. The dynamic is changing and by 2030 interconnectors are likely to be exporters on a net basis. Ofgem's Initial Project Assessment of the Third Cap and Floor Window for Electricity Interconnectors consultation recognises the consequences, alluding to "*…lower consumer welfare and a marginal rise in the wholesale price in GB*", albeit noting "*…it is likely there are additional benefits to be gained from interconnectors in meeting national and international policy goals related to decarbonisation, flexibility and renewable energy integration*."

…raising the spectre of energy nationalism…

In other countries, friction over the impact of interconnectors raises the spectre of a rise in energy nationalism, and the possibility that country first approaches might gain populist support which could feed through into energy policy.

- Both the FT and EuroNews reported in December that Norway's two governing parties want to turn-off interconnectors to Denmark when they come up for renewal in 2026, with the junior coalition Centre Party also wanting to renegotiate existing interconnection with Germany and the UK. The Centre Party subsequently moved to leave the coalition, with Euractiv reporting its leader as stating that the decision “*is about political matters, and we do not want to align ourselves more closely with the EU’s energy policy*”.

- Last June, the Swedish government turned down an application to build a new interconnector with Germany, with the Energy Minister concerned it “*…would risk leading to higher prices and a more unstable electricity market in Sweden*”, although as Euractiv reported in December, a position that could be revisited if Germany reforms its power market.

…restrictions on interconnector operation could benefit unabated gas

Any restrictions of the operation of GB’s interconnection capacity could impact energy security and increase price volatility, of likely benefit to unabated gas given NESO’s hierarchy of flexibility options.

Drax in a clean power 2030 world

Diverse GB portfolio aligned with Clean Power 2030

Renewable and flexible generation assets, energy solutions business

Drax has a diverse portfolio of renewable and flexible generation assets well aligned with a clean power 2030 world

Drax's GB portfolio consists of renewable and flexible generation assets geographically dispersed across England, Scotland and Wales, complemented by an energy solutions business supplying electricity to corporate and I&C customers, route to market PPAs for renewable generators, and electric vehicle charging solutions. This diverse mix offers solutions to the clean power 2030 challenges outlined earlier, although there are many hurdles to overcome, and in some instances, regulatory solutions put in place for the full value of the portfolio to be realised by consumers and Drax.

Figure 24: Drax GB portfolio

Source: www.drax.com

Low carbon dispatchable power

Drax Power Station, the UK's largest source of renewable energy by output…

DPS is the single largest source of renewable output in the UK…

Drax Power Station (DPS) is a 2.6GW four-unit (4 x 645MW) biomass power station located on a c.1,200 acre site at Drax, North Yorkshire, and is the single largest source of renewable energy by output in the UK. Historically a six-unit coal-fired plant, four of the units were converted over 2013-18 to run on sustainable biomass, with the other two shuttered in 2023. Output from DPS since the completion of conversion has been in a range 11.5-14.8TWh driven by system needs, planned outages and the economics of biomass generation. This represents c.10% of GB renewables output and c.4-5% of total generation output.

…Drax is planning the conversion of two units to BECCS, with the potential to capture up to 8Mt of CO_2

Drax is planning the conversion of two units at Drax Power Station (DPS) to BECCS, with the potential to capture up to 8Mt of CO_2 per annum.

Figure 25: Drax Power Station biomass generation (2019-2023A, TWh)

Region	2019A	2020A	2021A	2022A	2023A
ROC	8.9	9.3	11.1	10.5	10.4
CfD	4.5	4.8	3.7	2.2	1.1
Total	**13.4**	**14.1**	**14.8**	**12.7**	**11.5**

Source: Company reports, LCCC

…capable of providing a range of system services needed in the clean power 2030 world

The capacity needs of a clean power 2030 electricity system and the challenges of operating it were discussed earlier. The Clean Power 2030 Action Plan suggests a need for 2-7GW of low carbon dispatchable power in 2030, while NESO has developed, and is developing new services so that it can continue to operate the electricity system safely and securely and comply with its licence condition to keep the frequency of the system within +/-1% of 50Hz.

Biomass is low carbon, dispatchable, provides a wide range of system services, and if BECCS is deployed, deliver negative emissions

Power from biomass is classified as low carbon, it is dispatchable, and as set out in Figure 20, can provide a wide range of system services, many of which were historically provided by fossil-fuel generators that have now retired. Although other renewable/low carbon technologies can provide certain system services, none can match the breadth and scale that biomass offers, nor deliver carbon removals if BECCS is deployed at DPS. This points to the need for, and value of, biomass in a clean power 2030 electricity system, something recognised in NESO's Clean Power 2030 report, where the New Dispatch and Further Flex and Renewables pathways included 3.8GW and 4GW of biomass capacity, respectively, the lower number reflecting reduced export capacity on BECCS conversion.

Enablers, challenges and risks

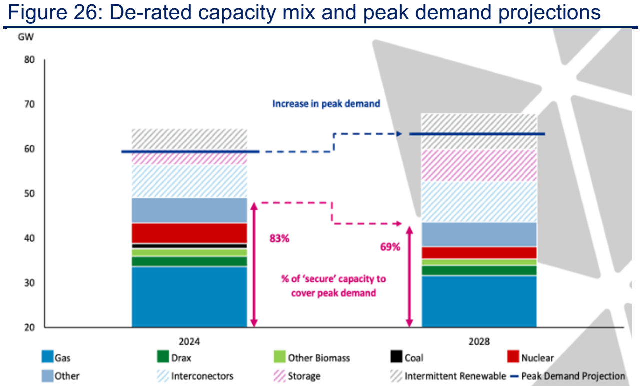
Transitional support for biomass is welcome, but with apparent political support for the longer-term role of biomass, further policy development at pace is imperative

DPS is the largest asset in Drax's GB portfolio, and by some margin the most controversial. There appears to be political support for a longer-term role of biomass in the GB electricity system, but much still needs to be done in respect of support mechanisms and sustainability criteria. We discuss a few key issues below, but it is imperative that the government moves at pace in developing policy that can assist the UK in meeting its Net Zero targets, and ensuring security of supply, out to 2050.

- **Transitional support for large scale biomass generators:** Three of DPS's units (units 2, 3 and 4) operate under the Renewables Obligation (RO) scheme, receiving one Renewable Obligation Certificate (ROC) for each unit of output, subject to an overall station cap (10,415,000 ROCs for obligation year 2025-26), while unit 1 operates under a CPI index-linked CfD. Both support mechanisms for DPS expire on 31st March 2027.

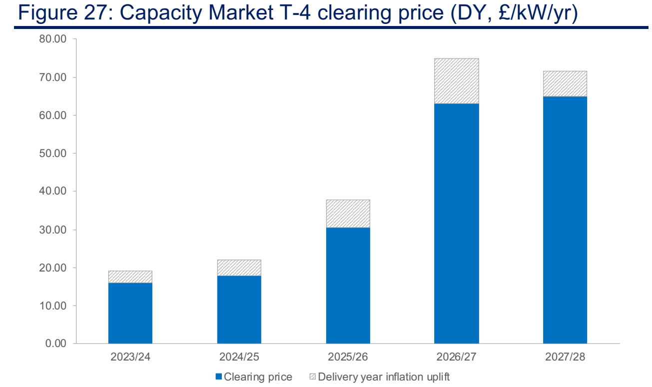
  The energy security challenge of clean power 2030 is clear, with system likely to be a lot tighter towards the end of the decade. Analysis prepared for Drax indicates a reduction in the percentage of secure capacity to cover peak demand in 2028, a situation exacerbated by termination of one of the Eggborough CCGT new build Capacity Market contracts, although nuclear life extensions at EDF's four AGR power stations offer a degree of respite. Likely tightness is also reflected in T-4 Capacity Market auction clearing prices which have trended upwards across the auction cycle.

Figure 26: De-rated capacity mix and peak demand projections



Source: Baringa analysis (January 2024) prepared for Drax (nuclear closure dates those that were publicly announced when the analysis was prepared)

Figure 27: Capacity Market T-4 clearing price (DY, £/kW/yr)



Source: Aquaicity analysis of EMR auction results (Annual factor of 1.02 assumed where applicable to estimate CPIx and CPIbase for CCP calculation)

Recognising the contribution that biomass makes to the UK's energy mix, and risk of plant closure post March 2027, DESNZ consulted on a transitional support mechanism for large-scale biomass electricity generators in January 2024. The consultation set out the case for intervention, including stating that:

"*Plant closures would also have implications for the UK's near-term security of supply. There are supply-side factors that may increase the relative importance of reliable and dispatchable power generation, like biomass, to the UK's energy mix during the expected period of the transition mechanism.*"

DESNZ finally published its consultation response on 10th February 2025, reaching a decision that there is a case in principle for the development of a short-term support mechanism for large-scale biomass generators, stating:

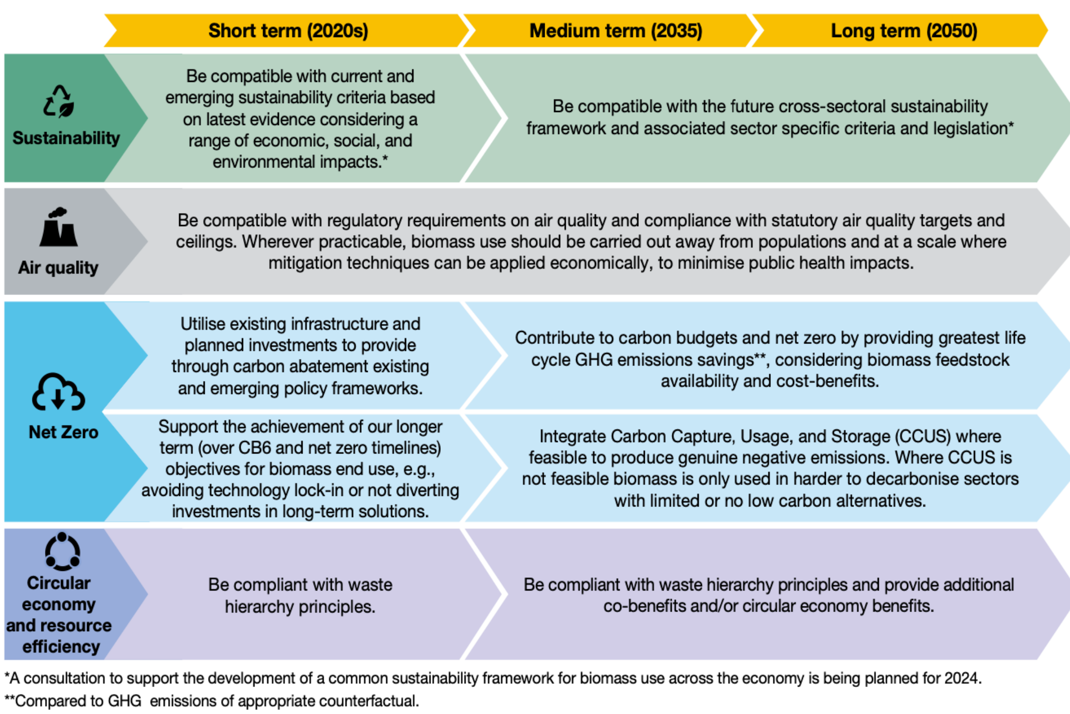
"*…that the continued operation of these plants plays an important role in bolstering our security of supply between the late 2020s and early 2030s by providing low-carbon, dispatchable electricity to the grid.*"

Supported volumes will be lower than under current arrangements, and final decisions to formally agree contracts with generators will have to pass strict plant specific, value for money assessments, sustainability checks, and confirmation that eligibility criteria have been met.

Drax has agreed head of terms on a CfD scheme to run from 1st April 2027 to 31st March 2031 with a strike price of £113$_{2012}$/MWh and a c.6TWh generation collar, with a floor volume of c.5TWh per annum. The proposal allows for system support and ancillary services, and features a gain share mechanism. Drax is targeting average adjusted EBITDA from DPS of £100-200m pa during the agreement period, excluding merchant generation above the collar which could provide further benefit.

- **Biomass sustainability:** The UK government's Biomass Strategy, published in 2023, recognises the finite nature of biomass suggesting that harder to decarbonise areas, technologies and sectors should be some of the priority uses of biomass, albeit differentiating between the short-term (2020s), medium-term (to 2035) and longer-term (to 2050).

Figure 28: UK Government Biomass Strategy – guiding principles for prioritising the uses of biomass in the short, meedium and long term



Source: DESNZ Biomass Strategy 2023

Fibre used by DPS is sourced from Drax's own North American pellet production business and third-party suppliers under contracts typically of 5-10 year duration. Drax's pellet business also supplies the third-party market, and is expanding its capacity, offering increased optionality for increasing self-supply as existing third-party contracts mature.

The sustainable biomass used at DPS is required to comply with the standards set out in law, regulations, and the renewable support mechanisms under which Drax operates, including compliance with the Land Criteria and the Greenhouse Gas (GHG) Criteria. Compliance is monitored and evidenced through third-party certification, supplier engagement, post-harvest evaluations, and Catchment Area Analyses. 97% of the biomass consumed at DPS in 2023 was woody biomass, of which 97% was compliant under the Sustainable Biomass Program (SBP), with the remaining 3% of woody biomass, and the non-woody biomass subjected to Drax's own checks and audits to ensure compliance with the Land Criteria.

Consulting on developing and implementing a cross-sectoral common sustainability framework is a key commitment of the government's Biomass Strategy, and government has signalled its intention review existing sustainability criteria and develop a Biomass Sustainability Common Framework, subject to consultation later this year. Making progress on sustainability requirements is likely a necessary building block for BECCS support.

- **BECCS:** The Action Plan acknowledges that "*large scale power BECCS has the potential to support low carbon electricity and deliver negative emissions from hard-to-abate sectors*", consistent with the government's Biomass Strategy ("…*current modelling implies that uses that are combined with BECCS will contribute the most towards net zero*"). Yet the Action Plan says nothing about the support mechanisms necessary to make BECCS economically viable.

  Government's March 2023 response to the power BECCS business model consultation confirmed the overall contractual framework and CfDe + CfDc dual payment mechanism for large-scale power BECCS, but from the outside, subsequent progress appears to have been slow. A December 2023 update set out minded-to positions to use a baseload market reference price for the CfDe, and a contract length of 15-years. A number of working group sessions looking at various design aspects of the business model have subsequently taken place.

  DESNZ has also recently announced that it is setting up an independent review to consider how greenhouse gas removal technologies including large-scale power BECCS can assist the UK in meeting its Net Zero targets, and ensuring security of supply, out to 2050.

  In our opinion, this review and work to develop the BECCS business model need to move at pace, and the transitional support mechanism should not be a precursor to a more leisurely pathway. This BECCS business model would also likely insulate the BECCS units from the impact of zonal pricing, if implemented.

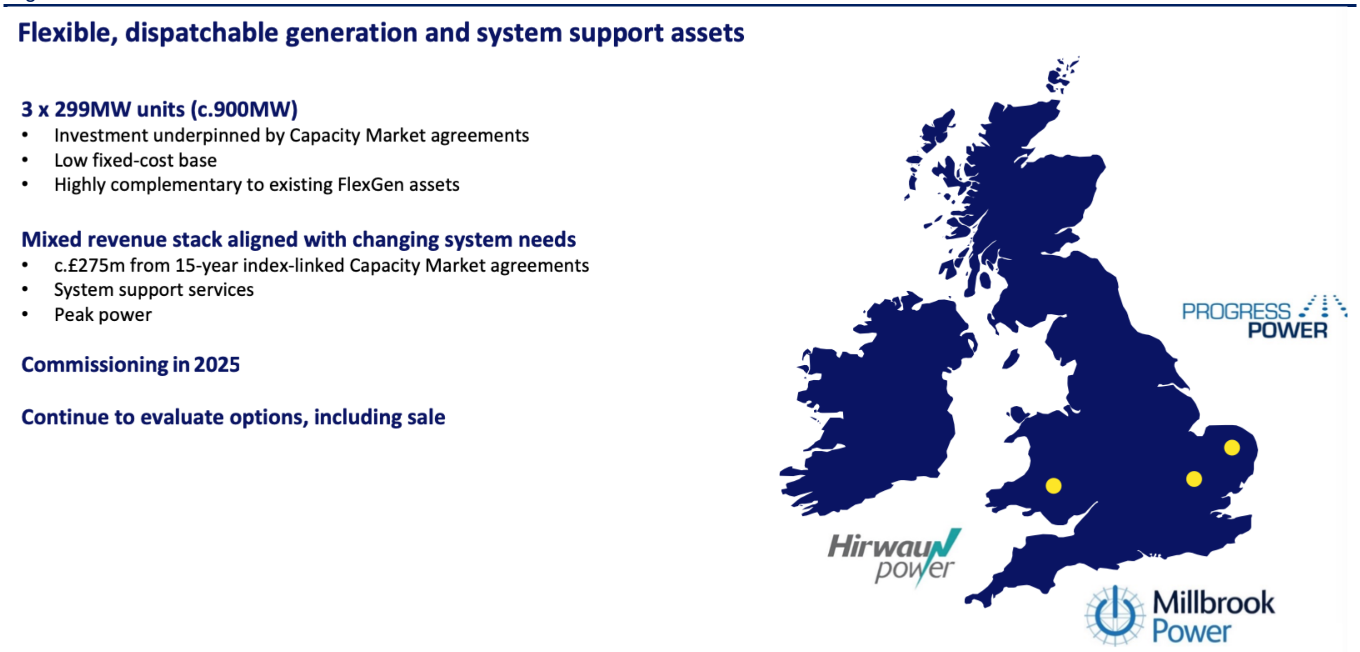
Unabated gas

Three 299MW OCGTs under construction…

Drax is constructing three new build 299MW OCGT plants, with expected commissioning this year

Drax is constructing three new build 299MW OCGT power plants in England (Progress, Suffolk and Millbrook, Bedfordshire) and Wales (Hirwaun), each of which is expected to be commissioned this year. Each of the three plants has a 15-year Capacity Market contract at £18/kW/yr (2019/20 prices, CPI linked) for the delivery period October 2024 to September 2039.

Figure 29: Drax OCGTs



Source: Drax 1H24 results presentation with Aquaicity updates

…unabated gas will play a crucial role in providing electricity security

Unabated gas is set to play a crucial role in a clean power 2030 system providing electricity security and essential system services…

The role of unabated gas will change in the clean power 2030 system with it playing a crucial role in providing electricity security, particularly in periods of high demand and low wind, and a wide range of essential system services. The Action Plan suggests that 35GW of unabated gas will be needed in 2030, with NESO's Clean Power 2030 report indicating supply of 14-15TWh in a normal weather year, possibly concentrated in a few short periods.

Enablers, challenges and risks

…mechanisms such as the Capacity Market will be important in ensuring that sufficient unabated gas capacity remains on the system

Retention of the existing gas fleet is seen as the most cost-effective means of having sufficient gas capacity in 2030 to meet the needs of the system. Lower load factors will challenge the economics of unabated gas, with gas plants becoming more dependent on support mechanisms such as the Capacity Market or alternatives. Government is consulting on measures to make it easier for gas assets to stay in the Capacity Market, and to access multi-annual Capacity Market agreements which could bring forward investment in extending the life of older plants. Substantially refurbishing or new combustion plants in England will be required to declare that they will comply with Decarbonisation Readiness requirement to participate in the 2026 Capacity Market auction. Gas assets tied into long-term Capacity Market agreements will be offered the opportunity to transfer to the CCUS Dispatchable Power Agreement (DPA). Government is also committed to introducing a hydrogen to power business model.

Drax's OCGT plants enjoy the visibility and security of 15-year Capacity Market contracts, have the optionality of switching to a CCUS DPA, albeit an unlikely pathway, and have a geographic diversity that should offer some protection if zonal pricing is the implemented REMA option.

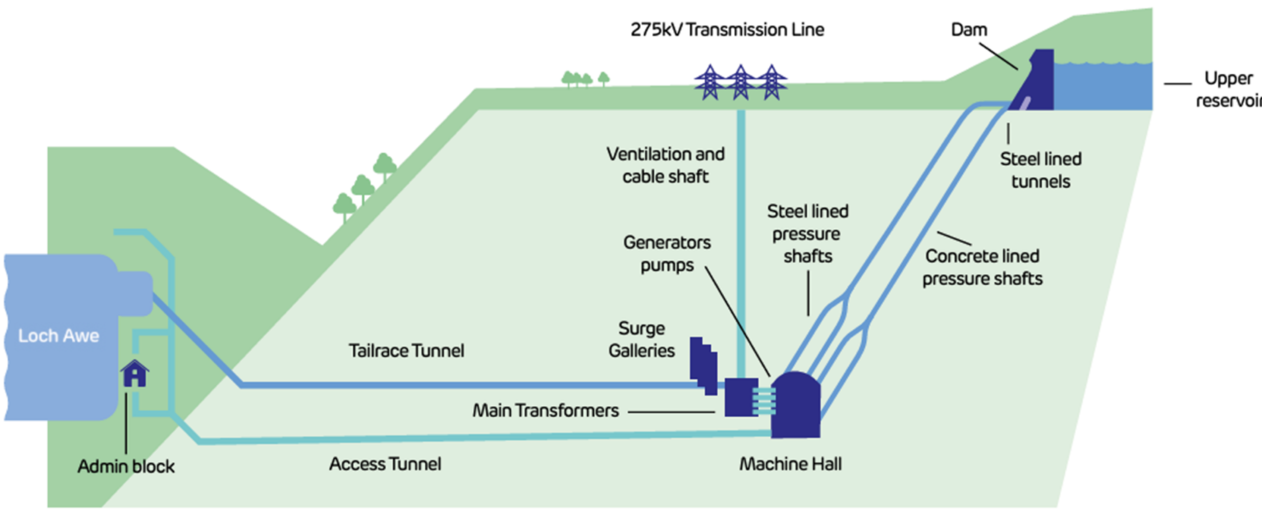
Pumped storage hydro

440MW capacity at Cruachan, plans to upgrade, Cruachan II under development

Cruachan is one of four pumped storage plants in GB and is a scale provider of long-duration electricity storage to the GB electricity system

One of four pumped storage plants in GB, Drax's Cruachan is a reversible 440MW four unit pumped storage power station which uses electricity from the grid at times of low electricity prices to pump water from Loch Awe in Argyll and Bute, Scotland to the storage reservoir on Ben Cruachan, which also collects water from the surrounding hills. Cruachan can reach full load in 30 seconds and maintain it for up to 15 hours, making it a scale provider of long-duration electricity storage to the GB electricity system.

Figure 30: How Cruachan works (simplified diagram)



Source: Drax

Drax is upgrading units 3 and 4 to increase the capacity of each to 120MW (from 100MW), increase efficiency and enable a wider operating range. Preliminary on-site works commenced in late 2024, with a target of mid-year 2027 completion. Drax has indicated that the upgrade will cost £80m, with the investment underpinned by a 15-year Capacity Market contract at £65/kW/yr (2022/23 prices, CPI linked), a record high in the T-4 auctions. This is complemented by the benefits of increased capacity, improved efficiency, and a wider operating range.

Drax has also secured planning consent for a 600MW expansion of the Cruachan Power Station, and subject to the right investment framework Drax is targeting a final investment decision (FID) in 2026, with commercial operations commencing in 2030.

Clean power, capacity and system support, a favourable product suite

The Action Plan suggests a need for more LDES, and several pumped storage hydro projects have planning permission, including Cruachan II

The capacity needs of a clean power 2030 electricity system and the challenges of operating it were discussed earlier. The Clean Power 2030 Action Plan suggests a need for 4-6GW of long-duration electricity storage, up from the currently installed 2.9GW. Capacity needs will most likely be met by pumped storage hydro and liquid to air energy storage, and several pumped storage hydro projects already have planning permission, including Cruachan II. Pumped storage hydro is zero emission, it is dispatchable, and as set out in Figure 20, can provide a wide range of system services. This is a product suite that positions it favourably vs. other technologies.

The appetite for pumped storage assets in GB is supported by Brookfield's disposal of its 25% stake in First Hydro to Caisse de dépôt et placement du Québec (CDPQ) in a transaction reported by IPE Real Assets as having an enterprise value of £2bn. Adjusting EBITDA for fair value movements on energy trading commodities suggests a transaction multiple of 9.4x EV/EBITDA on trailing FY23 underlying EBITDA.

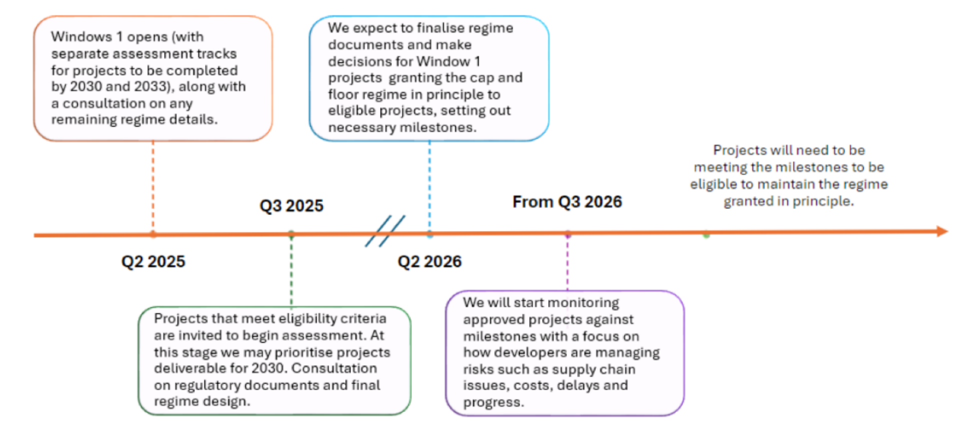
Enablers, challenges and risks

A cap and floor scheme will be introduced to bring forward investment, with Ofgem as regulator…

Drax has previously indicated that it is evaluating investment models for Cruachan II with a final investment decision dependent on the right investment framework. Government has decided that a LDES cap and floor scheme should be introduced to bring forward investment, and NESO has called for the model to be developed as soon as possible.

Ofgem will be the regulator for the LDES cap and floor regime, and it published a call for input in December ahead of a joint Ofgem/DESNZ Technical Decision Document (TDD) containing the regime details to be published during winter. The TDD will outline application window timelines, eligibility criteria, the approach to setting the cap and floor, the potential LDES capacity needed, and other technical details. Ofgem has indicated that it will prioritise projects that can be delivered by 2030.

Figure 31: Timeline for LDES Window 1 approval



Source: Ofgem Call for input - LDES Cap and Floor Regime: Our Role, Plan, and response to the DESNZ publication

…Ofgem's expected timeline is consistent with Drax's targeting of 2026 for FID for Cruachan II

Ofgem has set out its initial thinking on eligibility criteria including deliverability, grid connection, planning consent, capacity and duration limits, and a technology readiness requirement. Cruachan II meets all these eligibility criteria. Eligible projects will progress to assessment, with Ofgem planning to approve LDES cap and floor projects by Q226. This is consistent with Drax's previously expressed targeting of 2026 for FID.

Ofgem will work with stakeholders to develop the LDES cap and floor regime. It will build on the interconnector cap and floor model, with a goal is to finalise many aspects in the TDD, with implementation in Q325. Overall aims include: (i) consumer protection by ensuring cap and floor levels reflect efficient project costs and efficient financing structures and costs; (ii) allowing developers flexibility in their financing process and encouraging competition and innovation; and (iii) creating a repeatable model that supports multiple LDES windows over time, with separate financing for each project. Ofgem considers it can maintain multiple models for the LDES regime, aiming to reach a 'minded to' position in the TDD. The two models under consideration are: (i) an administrative (notional) cap and floor set by Ofgem; and (ii) market and competitively derived cap and floor for project finance (or equivalent for balance sheet financing).

Units 1 and 2 of the existing plant remain eligible to participate in the annual Capacity Market auctions, and we expect that Drax will continue to enter both in the T-4 auctions. Drax's post 2027 EBITDA target for the hydro business assumes capacity market payments of £35/kW/yr for units 1 and 2, suggesting a degree of upside if the T-4 auction for 2028/29 outturns at a level commensurate with recent auctions. Pumped storage is less exposed to outright power prices, arguably limiting the impact of zonal pricing, if adopted under REMA, on Cruachan I, while Cruachan II would be protected by the cap and floor.

Conventional hydro

Galloway and Lanark hydro schemes, 126MW of capacity…

Drax has 126MW of conventional hydro capacity across Galloway and Lanark hydro schemes…

Drax's generation portfolio also includes the Galloway and Lanark hydro schemes in southwest Scotland, with a combined capacity of 126MW.

Lanark operates a run-of-river facility powered by three waterfalls with water flow diverted into Lanark's two power station by weirs. Lanark's operating profile is dictated by the availability of water.

The Galloway system is different, as Galloway also operates a reservoir and dam system providing power storage capabilities and opportunities for peaking and system support services. Galloway typically generates power when there are peaks in electricity demand when water is released from the reservoirs and used to spin turbines and generate electricity. Average annual output from the Galloway system is in the region of 250GWh.

Figure 32: Galloway and Lanark hydro schemes

Scheme	Type	Location	Scheme description	Capacity (MW)	RO accreditation
Galloway	Run-of-river hydro	Ken/Dee river system, Galloway and South Ayrshire	Six power stations (Drumjohn (2.2MW), Kendoon (24MW), Carsfad (12MW), Earlstoun (14MW), Glenlee (24MW) and Tongland (33MW), 12 turbines, 8 dams, 16km of tunnels and pipelines. Average load factor of 25%, with average annual output of c.250GWh.	109	28MW (Drumjohn, Carsfad, Earlstoun)
Lanark	Run-of-river hydro	River Clyde, Lanark	Bonnington (11MW) and Stonebyres (6MW), with annual output of c.50GWh.	17	17MW (Bonnington, Stonebyres)

Source: Drax company reports

…providers of clean power and certain system services

…providing clean power and certain system services…

There are limited references to non-storage hydro in the Action Plan and NESO's Clean Power 2030 report, yet natural flow hydro accounted for 1.9% of electricity generated in 2023. We may not see any meaningful new build, but existing hydro will undoubtedly have a role to play in a clean power 2030 world and beyond as a source of clean power, a provider of inertia, dynamic response, and in some instances, dispatchable power.

Enablers, challenges and risks

Both of the Lanark power stations are RO accredited, receiving one ROC/MWh through to March 2027, and participating in the Capacity Market from October 2027. 28MW (Drumjohn, Carsfad, Earlstoun) of Galloway is RO accredited, receiving one ROC/MWh through to March 2027, with the other power stations (Kendoon, Glenlee, Tongland) participating in the Capacity Market. All the Galloway power stations are participating in the Capacity Market from October 2027.

…the plants are exposed to zonal pricing should this be where REMA lands, underscoring the importance of the Capacity Market

Drax's strategy for trading its hydro power plants is to forward sell a proportion of the electricity output based on the expected forecast of rainfall through the year, with these sales re-profiled in the short-term markets to match expected generation. The running profile depends on market prices, rainfall, storage capability and river conditions, and both plants are arguably exposed to zonal pricing, if implemented under REMA, underscoring the likely increasing importance of the Capacity Market to Drax's hydro assets. As noted above, the EBITDA target for the hydro business assumes capacity market payments of £35/kW/yr, suggesting a degree of upside if the T-4 auction for 2028/29 outturns at a level commensurate with recent auctions.

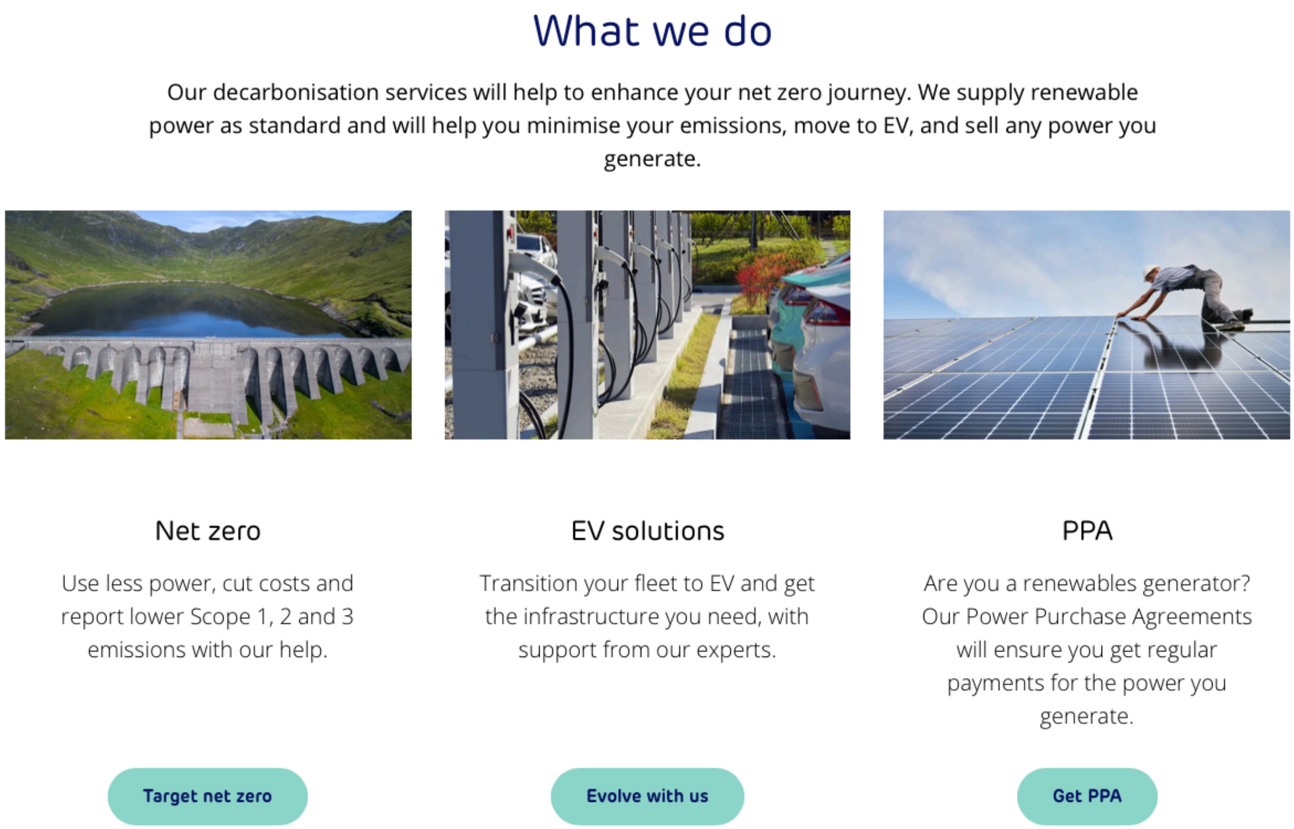
Energy solutions

I&C supply, PPA offtake, EV solutions

Energy Solutions includes I&C supply, PPA offtake and EV charging solutions…

Drax's Energy Solutions business comprises the supply of renewable power to corporates, large industrial and commercial (I&C) customers, a route to market for >2,000 renewable generators, and the provision of decarbonisation services.

Figure 33: Drax Energy Solutions faciltating the decarbonisation journey



Source: www.drax.com

- **Energy supply**: Following the sale of c.90k SME meter points under the Opus Energy brand to EDF Energy in a transaction that completed in 2H24, Drax's energy supply business is focused on I&C customers with annual supplied volumes of c.15TWh. Elexon data suggests that Opus (Drax) is the third largest supplier in the half hourly metered market. As set out in Figure 34, the EBITDA contribution from the Energy Solutions business has been volatile, with Drax reshaping the business, culminating with the SME meter point (ex. renewables sales business) disposal in FY24, while FY23 benefitted from higher priced supply contracts and elevated Renewable Energy Guarantees of Origin (REGO) pricing in Q423. REGO prices moderated in 1H24, although a proportion of higher priced supply contracts are yet to roll off and the I&C contribution increased vs. 1H23.
- **EV Solutions**: Drax acquired BMM Energy Solutions in August 2023, bringing installation capability inhouse and enhancing the Drax EV proposition. Drax offers a range of service options including viability appraisals, hardware, installations, and ongoing Charge Point Operation services including maintenance, remote monitoring and managed payment services. Drax does not invest in charging infrastructure itself but earns revenue through these services. Our analysis suggests the contribution from the acquisition to Drax's consolidated results in FY23 was immaterial.
- **PPAs**: Drax has PPAs with 2,000+ generators. Contract length has historically been 1-2 years with a focus on small generators, although more recently Drax has moved into the 1-10MW generator market. Contracts are typically priced with reference to the wholesale price with a fee and margin to reflect intermittency risk. REGOs are an

additional source of revenue. Market share is low, suggesting an opportunity for expansion.

Figure 34: Energy Solutions Adjusted EBITDA (£m, 2018A-1H24A)

	2018A	2019A	2020A	2021A	2022A	1H23A	2023A	1H24A
Adjusted EBITDA	**29**	**28**	**17**	**(39)**	**26**	**34**	**72**	**22**
o/w I&C						27		36
o/w SME						7		(14)

Source: Company reports

Aligned with the direction of travel

…three pillars that align with the direction of travel set out in the Clean Power 2030 Action Plan…

Renewable capacity growth and a marked increase in consumer led flexibility, notably in smart charging and V2G are key pillars of the Clean Power 2030 Action Plan. The Demand Flexibility Service has moved to an in-merit product, albeit without the enhanced rates of the previous two winters, but the incentives to load shift non-critical volume are likely to remain. Drax's move into EV charging solutions aligns with the electrification of personal and fleet transportation, growth in renewable capacity should offer opportunities to grow the PPA business, supporting the I&C supply business as the needs of large consumers evolve. The run-rate EBITDA of Drax's Energy Solutions business is annualising above £50m, in part due to supply contracts signed against a higher price backdrop and the value of renewable services, but it appears reasonable to suggest that Drax's post 2027 adjusted EBITDA target for its Energy Solutions is not overly stretching.

Enablers, challenges and risks

…market frameworks, policy and regulation will need to evolve, innovative offerings and digitalisation are key

The planning, consenting and connections processes are critical for the pace of development of onshore renewables, and to the extent that projects seek CfD support through future Allocation Rounds, it is important that there is not an investment hiatus as REMA plays out. Policy and regulatory collaboration across Government, NESO, Ofgem, Elexon and industry is needed to ensure demand side flexibility enjoys a level playing field, with it rewarded at levels commensurate with its true value. Common standards in flexibility markets would be positive, and regulatory changes may be needed. Greater innovation in commercial offerings and increased digitalisation are imperative. Government is currently consulting on options to end the sale of new cars with internal combustion engines from 2030, seeking views on establishing a CO_2 requirement for vans from 2030 and measures to support the uptake of zero emission vehicles, alongside seeking views on the flexibilities within the Zero Emission Vehicle mandate. Sharpening consumer incentives to accelerate the uptake of low carbon technologies may well be necessary.

Strategic options to diversify and/or expand

Drax has strategic options to diversify and/or expand, offering pathways if BECCS conversion is not progressed

Although a role and need for Drax's portfolio of assets in a clean power system has been elaborated, it would be amiss not to consider broader strategic options for Drax, incremental to existing operations, or alternatives if BECCS conversion is not progressed. If executed, these would be separate and additional to the communicated £250m EBITDA ambition for the FlexGen & Energy Solutions business.

Data centres

The data centre market looks set to grow significantly…

Digitalisation of the economy, migration to cloud based platforms, and the demand for data and artificial intelligence applications is set to drive significant growth in the global data centre market, the UK included. Growth pathways vary amongst industry forecasts, but growth could well be the strongest at the hyperscale (Figure 35) end of the spectrum in tiers 3 or 4 (Figure 36).

Figure 35: Overview of data centre types

Type	Description
Enterprise	Fully owned dedicated on-site facilities offering full control but can lack economies of scale.
Colocation	Provision of data centre space for the customer to locate its servers.
Managed infrastructure	IT service model with customers leasing dedicated infrastructure from the data centre provider.
Edge	Smaller data centres located close to the end user providing low latency.
Cloud	Virtual data centre typically sold by hyperscale providers operating large data centres.

Source: Aquaicity analysis

Figure 36: Overview of data centre tiers

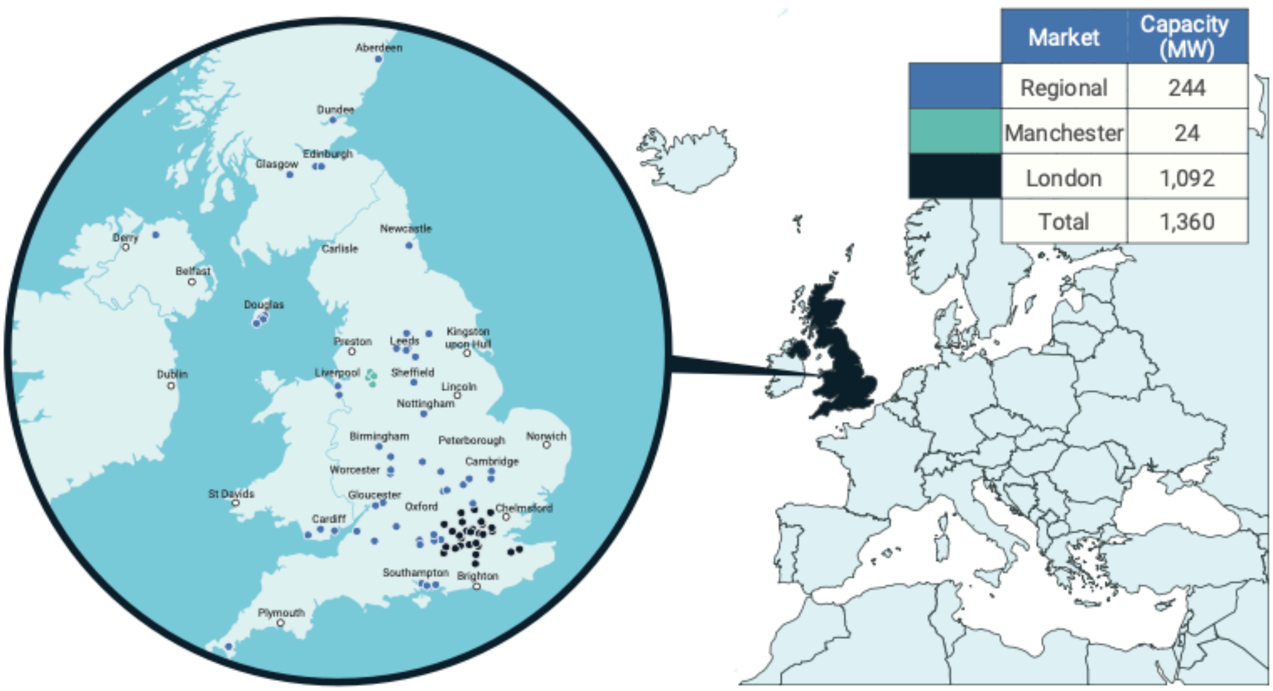
Tier	Characteristics
Tier 1	Single path for power and cooling and few, if any, redundant and backup components. Expected uptime of 99.671% (28.8 hours of downtime annually).
Tier 2	Single path for power and cooling and some redundant and backup components. Expected uptime of 99.741% (22 hours of downtime annually).
Tier 3	Multiple paths for power and cooling and systems in place to update and maintain it without taking it offline. Expected uptime of 99.982% (1.6 hours of downtime annually).
Tier 4	Built to be completely fault tolerant and has redundancy for every component. Expected uptime of 99.995% (26.3 minutes of downtime annually).

Source: Hewlett Packard Enterprise (https://www.hpe.com/uk/en/what-is/data-center-tiers.html)

…with hyperscale expansion in the South East facing challenges, there are economic benefits from regional expansion

The UK data centre market is currently heavily skewed to London and the South East (Figure 37), although hyperscale expansion in the London area faces a number of challenges, as reported by DCD. The economic opportunity of locating data centres outside the South East is discussed in techUK's 'Foundations for the future' report which highlights the amount of undeveloped Combined Authority land, and the theoretical data centre capacity this could accommodate.

Figure 37: UK's leased data centre market by region

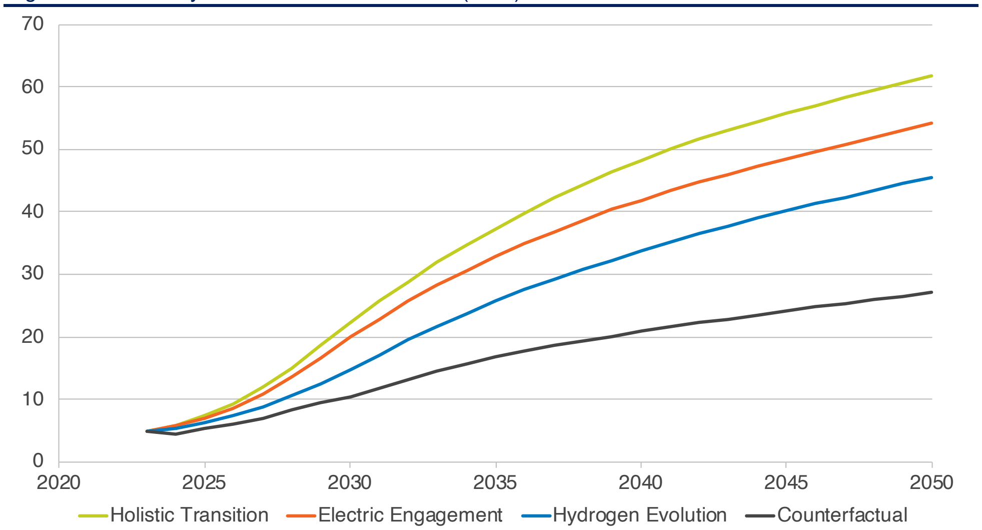


Source: techUK: Foundations for the future. How data centres can boost UK economic growth

Multiple factors to be considered in locating data centres…

Factors to consider in data centre location include (i) reliable and redundant power sources (FES forecasts c.9-10% data centre electricity demand CAGR over 2023-50); (ii) access to high-speed low latency fibre networks; (iii) access to cooling water; (iv) proximity to end-users and/or urban areas; (v) transport links; (vi) sufficient land, including the opportunity to expand; (vii) labour market access; and (viii) physical security.

Figure 38: Electricity demand from data centres (TWh)



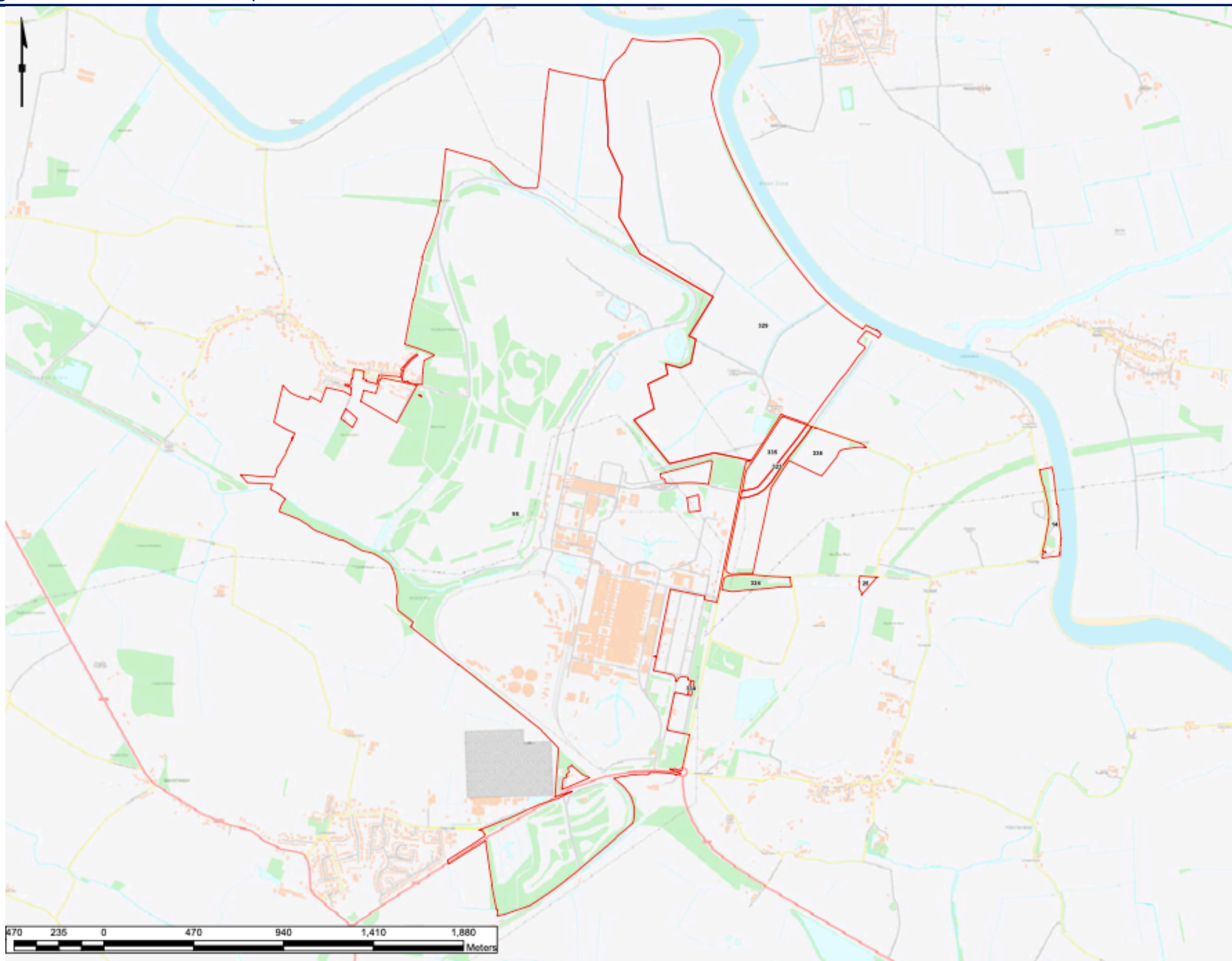
Source: NESO FES 2024

In its November 2024 trading update Drax alluded to the potential for data centre development: "*Drax has received positive engagement with data centre providers in relation to the potential to co-locate a data centre with biomass generation and Drax continues to explore such opportunities*."

…Drax Power Station ticks the boxes

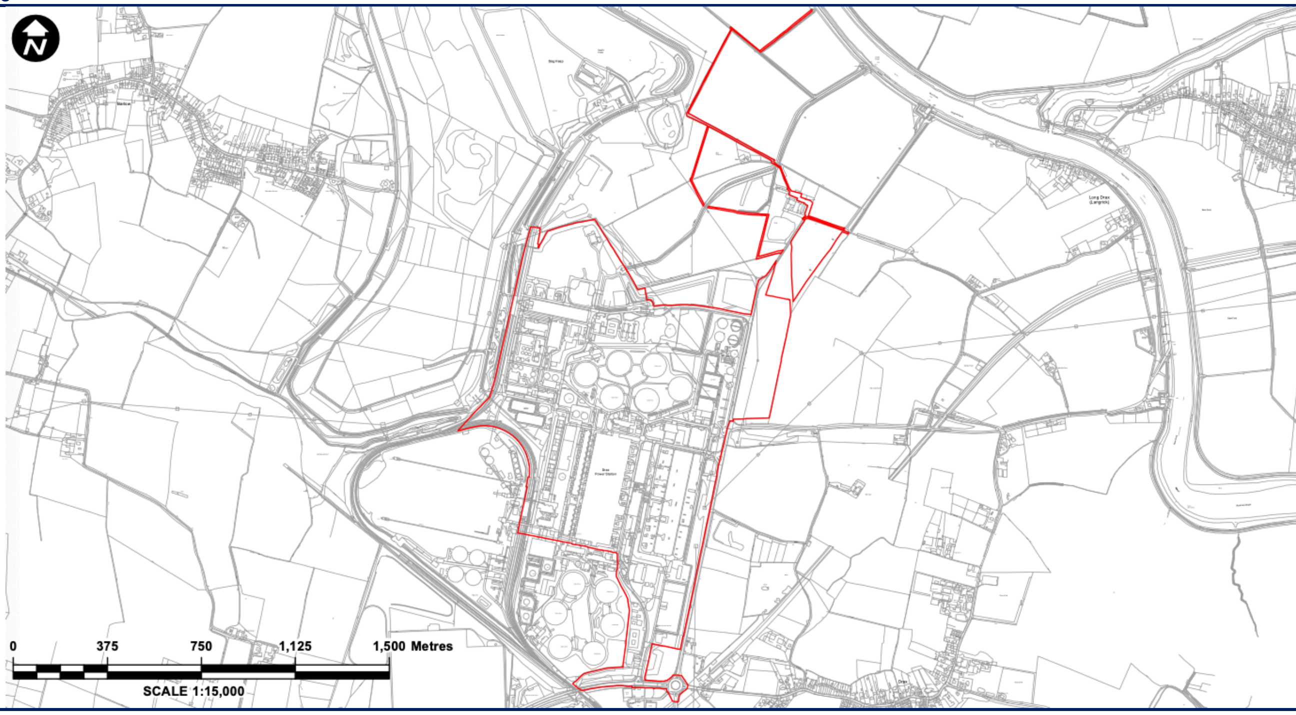
The site is close to the motorway network, a fibre-optic backbone, Leeds-Bradford is the fourth largest urban area in the UK, cooling water could be provided by Drax's cooling towers and the extraction rights from the River Ouse, and site security is already well entrenched. Land is plentiful (>1,200 acres) with Drax's ownership of land at DPS (Figure 39) extending well beyond the footprint of the power station itself offering the opportunity for data centre build irrespective of whether the BECCS project (Figure 40) is taken forward. A biomass unit could provide baseload renewable electricity with redundancy ensured by other onsite generation and developing battery capacity, bundled together under a PPA.

Figure 39: Drax land onwership



Source: Drax Power Limited Site Reconfiguration Works Plans (May 2018)

Figure 40: Drax BECCS DCO



Source: Drax Bioenergy with Carbon Capture and Storage Site Location Plan (May 2022)

Unlike Iberdrola, Drax has not indicated how any data centre involvement would be structured, nor are we aware of any planning applications being submitted. The simplest form would be the provision of land, power and possibly cooling, with the former possibly involving upfront payments, with power and cooling pay as you go. As highlighted above, there are multiple factors that drive data centre location, but price is clearly important.

We estimate Drax's FY23 Free On Board self-supply biomass cost at c.$250/t, or c.$290/t delivered at DPS including transport and logistics. Assuming an exchange rate of 1.25, this would suggest a burnt biomass cost of c.£125/MWh. A private wire PPA with a data centre offtaker would need to cover this, the additional costs of guaranteeing 24/7 power, cover part of the £20-30/MWh fixed cost base of DPS and provide Drax with a margin. This would suggest a price slightly above £200/MWh. Industry commentary (Optrium and The Register) suggests data centre energy costs of c.£300/MWh, although DESNZ data suggests that very large and extra-large electricity consumers are facing prices of c.£220-230/MWh. A long-term power supply agreement would provide certainty to a data centre and remove exposure to an upward trend in network costs. This points to the possible viability of data centre location at DPS.

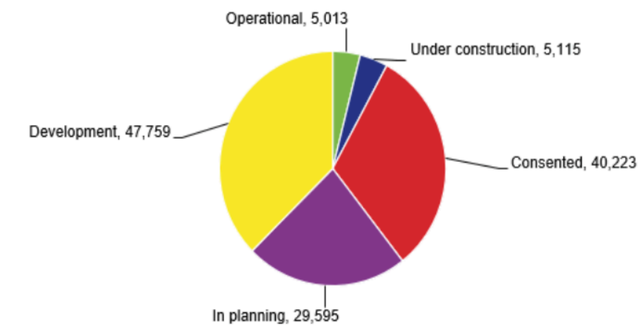
Battery Energy Storage System (BESS) development

Land availability and spare export capacity are supportive of battery capacity development…

Drax has 3.9GW of export capacity at DPS, but with the two coal units decommissioned some of this is spare, a scenario which lends itself to BESS development, either on a stand-alone basis, or in conjunction with other initiatives.

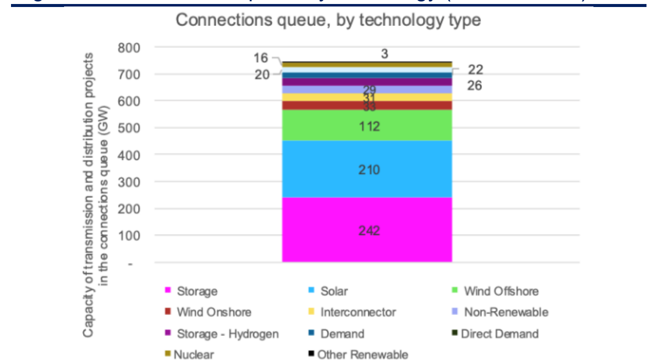
The Clean Power Action Plan indicates a range of 23-27GW of battery storage capacity in 2030, a significant increase on the currently installed 4.5GW. FES 2024 pathways suggest further increases post 2030, with c.29-36GW of battery capacity (ex V2G) by 2050. However, this is dwarfed by a 122GW pipeline of projects under construction, consented, in planning, or in development according to Renewable UK, itself significantly below the 242MW in the connections queue as of October 2024.

Figure 41: UK battery pipeline capacity (MW) by project status



Source: RenewableUK Blog (projects as of 18/11/24)

Figure 42: Connections queue by technology (October 2024)

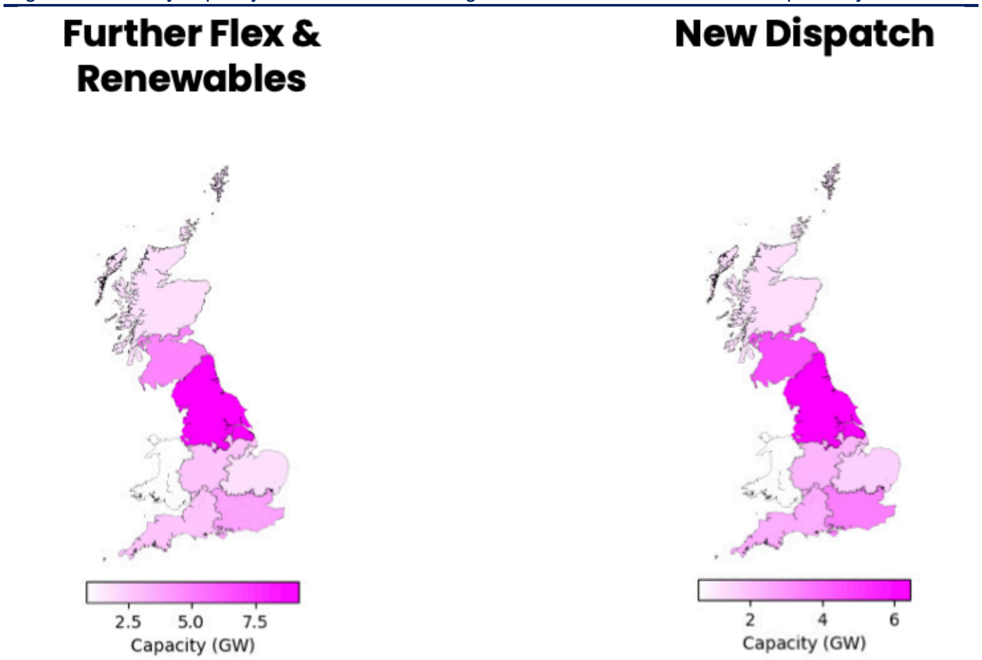


Source: NESO (Great Britain's Connections Reform Overview Document)

…with the need for storage greatest in the north of England

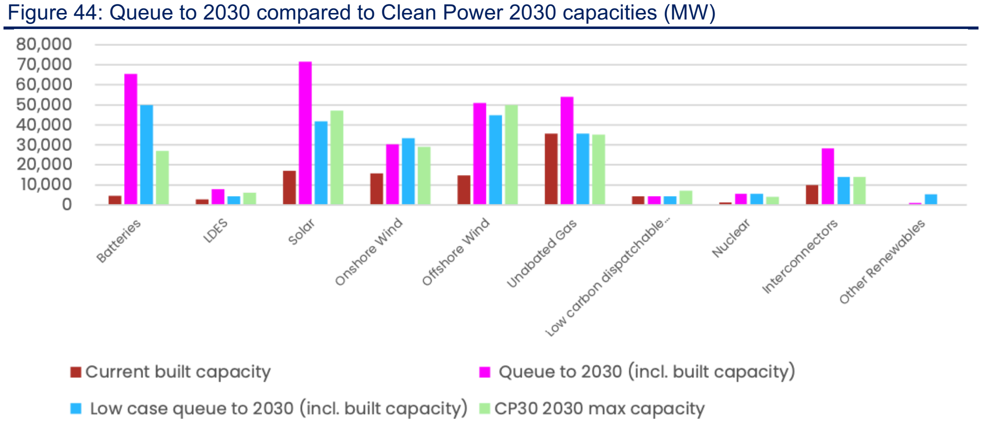
NESO's Clean Power 2030 report points to the greatest need for storage in the north of England (Figure 43), but the impact assessment for the connections reform process still points to a possible oversupply of battery storage by 2030.

Figure 43: Battery capacity needed in 2030 to align with NESO Clean Power 2030 pathways



Source: NESO Clean Power 2030 Report

Figure 44: Queue to 2030 compared to Clean Power 2030 capacities (MW)



Source: NESO Connections Reform Data Impact Assessment

With the existing connection capacity connections reform is less of an issue for Drax at DPS, (although a barrier at other owned sites), although were Drax to seek to develop a BESS project at DPS, it would need to be cognisant of the revenue risk of oversupply. However, Drax's route to market capability and portfolio of flexible generation assets offer advantages not enjoyed by standalone projects.

Oversupply is a risk, but a 300MW BESS project could add c.£35m EBITDA per annum

Centrica is targeting a nominal post-tax unlevered IRR range of 7-10%+ from its plans to deploy capital in flexibility assets (including batteries). Drax's portfolio could facilitate an appetite for risk that would see it look for returns at the upper end or above this range, but by way of example, if Drax were able to generate IRR of 8% real for a 300MW four-hour duration BESS project costing £900k-1,000k/MW, this would suggest an annual EBITDA contribution of c.£35m in real terms.

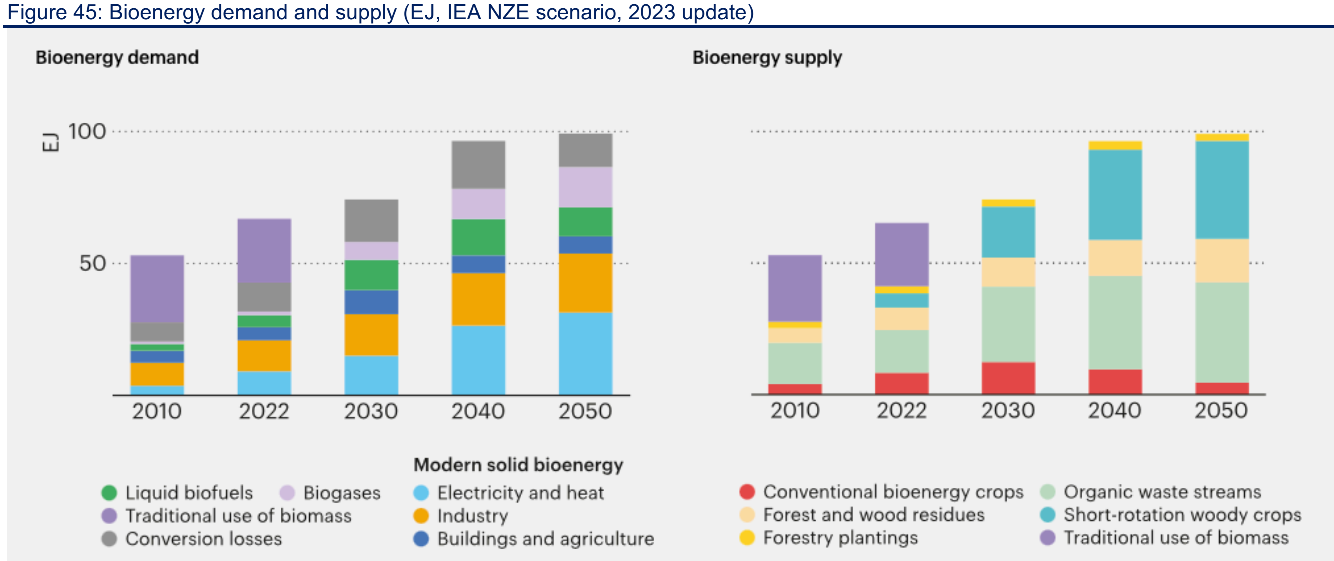
Third-party pellet supply model

Drax Biomass has a post 2027 production volume target of 5Mt, with c.2Mt to DPS…

Drax Biomass supplied 2.1Mt of pellets to DPS in 2023, and continued self-supply is part of a post 2027 production volume target of 5Mt. Meeting this target also requires contracting with new offtakers in existing or new geographical markets.

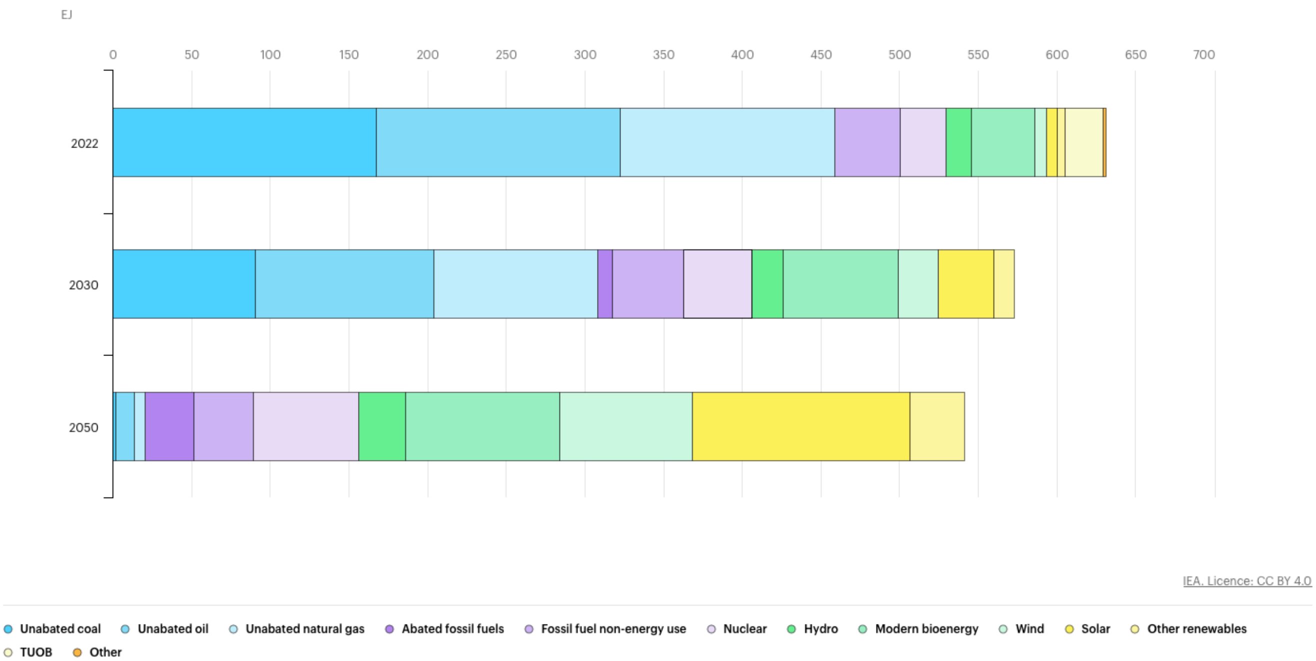
The IEA's 2023 update of its Net Zero Emissions (NZE) scenario is supportive of growth in the global pellet market, outlining multi-decade growth for bioenergy, including a c.67% increase is the use of solid bioenergy in electricity and heat, and a c.36% increase in industrial use by 2030. Notable on the supply side is the growth in short-rotation woody crops, forestry and wood residues.

Figure 45: Bioenergy demand and supply (EJ, IEA NZE scenario, 2023 update)



Source: IEA (2023), *Bioenergy*, IEA, Paris https://www.iea.org/reports/bioenergy-2, Licence: CC BY 4.0

Figure 46: Total energy supply by source in the Net Zero Scenario, 2022–2050 (EJ, IEA Net Zero Roadmap, 2023 Update)



Source: IEA (2023), *Total energy supply by source in the Net Zero Scenario, 2022-2050*, IEA, Paris https://www.iea.org/data-and-statistics/charts/total-energy-supply-by-source-in-the-net-zero-scenario-2022-2050, Licence: CC BY 4.0

…externalising the self-supply volume would be a challenge

Drax Biomass' supply pipeline is growing, with supply under a new 450kt five-year contact with a Japanese offtaker commencing in November 2023, a Letter of Intent agreed with a major European utility for up to 1Mt of biomass, including a biofuel project which is targeting a final investment decision during 2025, and heads of terms agreed with Pathway Energy LLC for the supply of >1Mt of pellets per annum. Shifting Drax Biomass to a fully third-party supply model if generation at DPS were to cease post 2031 would be an option, albeit a challenging one given the volumes involved, notwithstanding the progress outlined above. Possible reduced generation at DPS post March 2027 could also mean the post 2027 EBITDA target for Drax's pelleting business takes longer to reach.

FlexGen & Energy Solutions

>£250m adjusted EBITDA post 2027 appears plausible

Drax is targeting >£250m FlexGen & Energy Solutions adjusted EBITDA post 2027…

At its FY23 results presentation Drax set out a post 2027 recurring adjusted EBITDA target contribution of £250m+ from the FlexGen & Energy Solutions business, with c.£150m suggested to be from Drax's hydro assets (including pumped storage), c.£50m from the OCGTs, and c.£50m from the Energy Solutions business.

This report makes no attempt to provide financial forecasts for the FlexGen & Energy Solutions business, but in the context of the revenue streams available to Drax's Energy Solutions business, hydro and gas assets, appraising the plausibility of Drax's £250m post 2027 EBITDA target has merit, particularly given the direction of travel to a clean power 2030 world.

Figure 47 presents a scenario analysis that looks at possible changes to the revenue streams and cost base of Drax's FlexGen & Energy Solutions between 2023 and 2030. Drax's post 2027 target does not include a contribution from Cruachan II and Cruachan II is not included in the possible bridge, nor have we assumed any contribution from strategic opportunities such as batteries and/or data centres.

Key assumptions:

Pumped storage and conventional hydro

- Assumed 0.3TWh Drax River Hydro output and assumed hydro price of £90/MWh (consistent with winter-27 peak prices in February 2025) vs. estimated achieved price in FY2023 of £257/MWh.
- Balancing Mechanism/Ancillary Services market share at 1.6% of £3.5bn assumed total costs.
- Capacity Market price of £35/kW/yr for delivery years 28/29, 29/30, 30/31, with all hydro assets securing contracts.
- No EGL in 1Q28 (EGL sunset date of 31st March 2028).
- Opex increases of 2% per annum, no step up from upgrade of units 3 and 4.

Unabated gas

- Load factor of 5%, consistent with Clean Power 2030 observations. Assumed that run hours are concentrated in the winter season.
- Average clean spark spread of £85/MWh for the run-hours, with participation in the day-ahead and intra-day markets, as well as optimisation via buybacks. By way of reference, we estimate that the highest 876 clean spark spread hours across winters 22/23 and 23/24 averaged c.£68/MWh in the day-ahead market.
- Capacity market revenue of £21m in 2030, consistent with the 15-year Capacity Market contracts at £18/kW/yr (2019/20 prices).
- Balancing Mechanism/Ancillary Services market share at 0.25% of £3.5bn assumed total costs, consistent with Aquaicity analysis of Spalding OCGT system service revenues.
- Opex cost of £10m per annum for the three units, with 2% annual inflation to 2030.

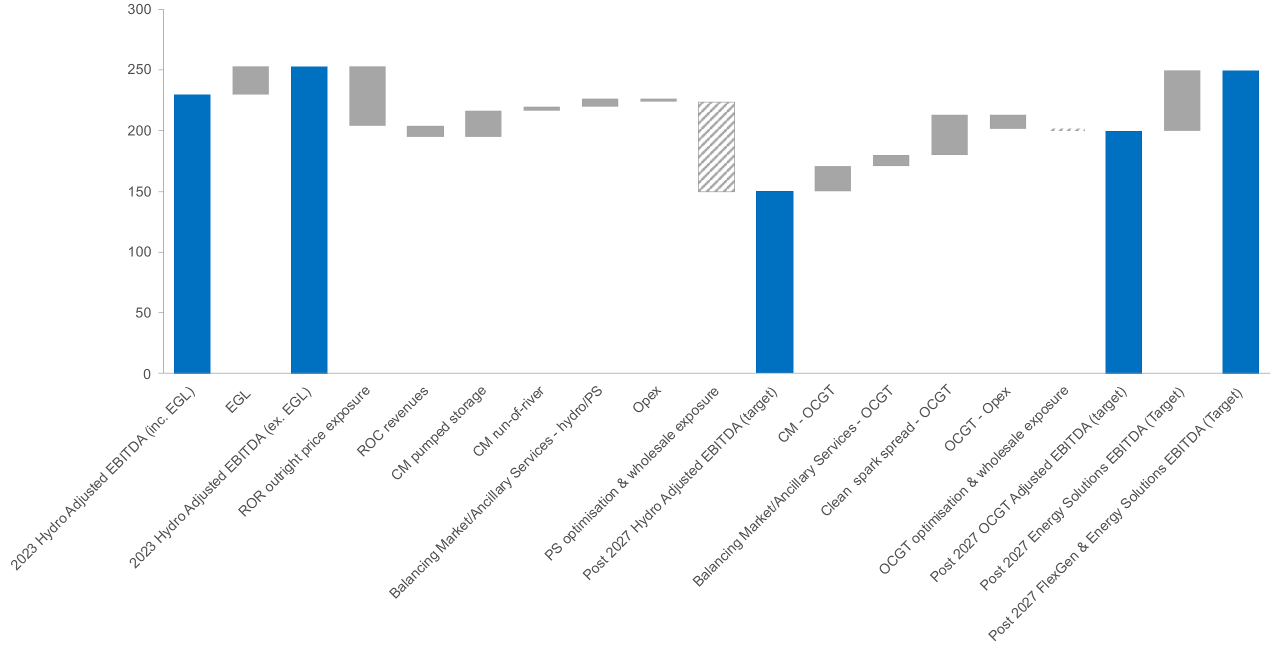
Energy solutions

- I&C Energy Solutions EBITDA of £50m, a discount to the current run rate

…a level that appears plausible

This suggests headroom for contraction in optimisation/spread/wholesale price income of up to £74m in the hydro business to deliver the post 2027 hydro EBITDA target level of c.£150m. Equivalent to c.60% of the 2023 optimisation/wholesale spread, this is a scenario which appears plausible. Adding in a £50m+ contribution from the OCGTs and £50m+ from Energy Solutions, points to a plausible scenario of Drax's FlexGen & Energy Solutions business delivering EBITDA >£250m by the end of the decade.

Figure 47: FlexGen & Eneregy Solutions EBITDA possible bridge to post 2027 target



Source: Aquaicity analysis, Drax company reports

Basis of Preparation

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