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GREAT BRITISH ENERGY'S ROLE IN THE GREEN TRANSITION

Simone Gasperin and Joseph Evans

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SUMMARY

The UK government created Great British Energy (GBE) to help deliver secure, clean and affordable electricity. Achieving this requires bold, but focused, actions, without burdening GBE with conflicting objectives.

This report offers an implementation strategy for GBE's success. It outlines the rationale and practical implications of an operating model and governance structure aligned with its foundational mandate, designed to ensure swift impact. It also offers suggestions for GBE's post-2030 evolution into a publicly owned domestic champion with a significant presence across a broader scope of the UK electricity sector.

STRATEGIC PUBLIC OWNERSHIP CAN DELIVER CLEAN AND CHEAP ELECTRICITY

Historically, changes in public ownership in the UK electricity sector have been accompanied by shifts in policy objectives. Recently, private ownership combined with government intervention has stimulated investment in renewable energy, but has struggled to reduce bills, due to the structural limitations of the current wholesale market. Public ownership of generation assets has the potential to overcome this.

GBE CAN LEARN FROM LEADING PUBLICLY-OWNED ELECTRICITY COMPANIES BEFORE IT BECOMES ONE OF THEM

GBE is unique as a start-up organisation but can learn valuable lessons from established publicly owned companies across Europe. In their national electricity systems, these are the largest players in generation (with national shares ranging between 18 and 74 per cent) and typically operate in distribution and supply, making them systemic actors.

GBE should aim to grow and reach a similar scale and scope. With the £8.3 billion pledged by the government, GBE could target 5 per cent of the UK's future generation capacity (around 8.5GW), based on National Energy System Operator (NESO)'s 2030 predictions.

GBE SHOULD BE AN OPERATING COMPANY THAT OWNS CLEAN ENERGY ASSETS AND SELLS THE ELECTRICITY DIRECTLY TO CONSUMERS

Owning and operating clean energy assets will distinguish GBE's role from other public organisations, such as the National Wealth Fund (NWF). If GBE is reduced to a pure public financing entity, it will neither ensure additional investment in clean energy generation nor contribute to lowering electricity bills under the current wholesale market structure. While investing through minority stakes could be a first step in entering the energy generation business, GBE's success will ultimately depend on its ability to fully develop and operate clean energy assets. With access to favourable financing conditions and a more flexible approach to profitability, GBE could support lower-return clean energy projects while delivering cheaper electricity directly to consumers through long-term contracts, bypassing the wholesale market.

THE OPERATING MODEL OF GBE TO DELIVER ON ITS MANDATE BY 2030

GBE should prioritise investment in marginal clean energy projects that are less likely to be delivered by the private sector. The electricity generated should then be sold through special forms of Power Purchase Agreements (PPAs) tailored to the specific nature of the investment projects.

- Medium-scale utility clean energy projects should be supported by contracts with marginal non-domestic consumers, such as groups of small businesses and public entities situated near the generation plant.
- Smaller local energy projects should provide cheaper electricity to communities of domestic consumers in partnership with licensed retailers.

To achieve faster and replicable results, GBE should focus on medium-sized onshore generation projects. Acquiring generation assets nearing the end of their policy support could prevent capacity losses while accelerating GBE's path to full operational status.

A GOVERNANCE STRUCTURE ALIGNED WITH GBE'S MANDATE

GBE's governance structure should be compatible with the operating model and facilitate the realisation of its policy objectives.

- Long-term full public ownership by the UK government is a necessary requirement for preserving favourable financing conditions.
- GBE's accountability can be strengthened by including in its governing bodies representatives from devolved governments, local authorities and workers in the electricity sector.
- GBE's financial model should embrace profit sustainability rather than profit maximisation and all profits should be reinvested internally.
- GBE can establish positive working relations with various private sector players, with the potential of creating markets for them that would not otherwise exist.
- GBE's support for domestic clean energy supply chains could emerge indirectly as a natural outcome of its operating model, as the provision of cheaper electricity through PPAs helps lower energy costs for businesses.
- Collaborations with other public entities should not replace GBE's own role, but only occur when they complement its function in delivering on the mandate.

THE EVOLUTION OF GBE IN THE UK ELECTRICITY SECTOR AFTER 2030

As 2030 approaches, GBE should be recapitalised and granted autonomous borrowing powers, similar to other leading publicly owned electricity companies. To enable GBE's expansion in investment capacity, a deconsolidation of its balance sheet from the public sector, or changes to fiscal rules, will be necessary.

After 2030, greater and autonomous borrowing powers would be essential for GBE to achieve systemic scale across various areas of the UK electricity system. Beyond reaching a minimum 5 per cent of national electricity generation, GBE should be allowed to diversify into distribution as an independent operator, addressing growing demand for connections and internalising distribution costs. GBE could also play a key role in offshore transmission by partnering with developers to provide solutions for delivery of this critical infrastructure. Looking further ahead, GBE could coordinate the centralisation of transmission networks in Britain through a new publicly controlled national grid company, ending the UK's unique situation of a fragmented, privately owned transmission network.

1. REINSTATING THE MANDATE AND PRIORITIES OF GREAT BRITISH ENERGY

1.1 GREAT BRITISH ENERGY PROMISED TO DELIVER SECURE, MORE AFFORDABLE AND CLEAN ENERGY

The creation of Great British Energy (GBE) is a cornerstone policy of the new Labour government. It embodies the recognition that direct public investment is vital to achieving a just transition in the UK power sector (Environmental Justice Commission 2021).

GBE is a publicly owned company with a clear mandate to deliver secure, clean and cheaper electricity to the UK.[1] This mandate remains as relevant today as it was at the peak of the 2022 energy crisis, when GBE was first conceived.

This year will be crucial for establishing an effective operating model and governance structure that would allow GBE to deliver well before 2030. Given the long-term ambition to turn GBE into a national champion in the electricity sector, what is decided today will ultimately determine whether GBE will become a central player in shaping electricity markets, much like other well-established publicly owned companies worldwide.

1.2 GBE CANNOT DO EVERYTHING

Acknowledging that **GBE cannot simultaneously achieve multiple, competing policy objectives** is a basic principle of policymaking, as famously described by Nobel Prize economist Jan Tinbergen (1952). Clean energy installation, reduction of bills and enhancement of energy security are inter-related and instrumental to GBE's foundational mandate. Policymakers need to be aware that deviations from these core objectives could lead to trade-offs that are difficult to reconcile (see table 1.1 for an overview). Alternative policy measures or entities might be more appropriate to directly target other objectives.

1 While GBE will legally operate across the UK, the report primarily focuses on Great Britain due to its historical separation from the Northern Irish electricity sector, which remains institutionally and technically integrated with the Republic of Ireland.

TABLE 1.1 AN ASSESSMENT OF GBE'S DIRECT OBJECTIVES

GBE's direct objectives	Assessment	
Clean energy installation	Is critical to achieve **reduction of electricity bills** and **increased energy security**.	**Instrumental**
Reduction of electricity bills	**Clean energy installation** is a supportive but not sufficient condition.	
Increased energy security	Domestic **clean energy installation** is essential to reduce electricity and fossil fuel imports.	
Job creation	Is an *indirect* by-product of **clean energy installation**, as the GBE's investments in new clean energy projects will stimulate collaborations with pure-play developers and contractors to deliver them. But it cannot be a *direct* objective, or it may imply higher costs impairing **reduction of electricity bills.**	**Partly consequential but potentially conflicting**
Support to clean energy supply chains	Can be done *indirectly* as clean energy supply chains could benefit from **clean energy installation** and **reduction of electricity bills** lowering energy costs of recipient businesses. Complementary *direct* support could come in the form of lower financing cost from the National Wealth Fund (NWF).	
Development of clean energy technologies	Is not the *direct* responsibility of an energy company and could impose higher costs playing against **reduction of electricity bills**. Other organisations (eg Catapult ORE and Innovate UK) are better suited.	**Potentially conflicting**
Returning dividends to the shareholder	Works against **clean energy installation** as it reduces capacity for reinvestment. As higher returns are directly proportional to higher prices, maximising profitability to distribute higher dividends to the public shareholder might also conflict with **reduction of electricity bills**.	**Contrary**

Source: Authors' elaboration.

1.3 GBE IN A NUTSHELL

The government defines GBE as "a new, publicly owned and operationally independent clean energy company" (DESNZ 2024a). The Great British Energy Bill introduced in parliament on 25 July 2024, together with its accompanying Founding Statement (DESNZ 2024b), provide further specifications.

GBE is conceived as more than just a financial vehicle, since it will "own, manage and operate clean energy projects" and it will engage in "the production, distribution, storage and supply of clean energy" – that is non-fossil fuel electricity generation. The government pledged to capitalise GBE with £8.3 billion of "new money" over this parliament,[2] of which £3 billion has been earmarked to support local and community-owned renewable energy projects through the Local Power Plan (LPP).

2 Through its autumn budget 2024, the government has so far allocated £125 million to GBE in the 2025/26 financial year (HMT 2024). These resources would come from the National Wealth Fund (NWF), though details of how this will happen have not yet been specified.

1.4 PURPOSE OF THIS REPORT

This report defines an operating model and governance structure for GBE that will effectively support the accomplishment of its foundational mandate within this parliament. The report then looks at GBE's evolution beyond 2030, as it moves towards becoming a national champion in the UK electricity system. It offers a broad range of practical recommendations for policymakers and other stakeholders, drawing on historical examples and comparative analysis of leading publicly owned electricity companies.

2. PUBLIC OWNERSHIP IS CRUCIAL TO DELIVER CLEAN AND CHEAPER ELECTRICITY

GBE reintroduces elements of public ownership into one of the most privatised electricity systems in the world (Prag et al 2018). However, this was not always the case. The modern British[3] electricity sector has been shaped by successive phases of nationalisation and privatisation, accompanied by processes of centralisation and fragmentation. Table 2.1 presents a historical timeline of these transformations.

2.1 THE BRITISH ELECTRICITY SYSTEM THROUGH HISTORY: CHANGES IN OWNERSHIP IMPLIED CHANGES OF POLICIES

GBE will become operational almost exactly 100 years after the establishment of the Central Electricity Board (CEB), a publicly owned company introduced by the Electricity (Supply) Act 1926 (Hannah 1979). The CEB was created to serve a clear policy purpose: to develop and operate a new national transmission grid, making Britain the first country in the world to possess an integrated electricity system (Millward 2005).

In the aftermath of post-war reconstruction, the growing electricity demands of British industry necessitated a massive, capital-intensive expansion of installed generation capacity. Between 1947 and 1972, installed electricity capacity increased from 13 to 70GW (DESZN 2024c). This was achieved through direct public investment, following the nationalisation of remaining elements of the electricity system and the creation of vertically integrated monopolies (Kelf-Cohen 1973). Several other nations, including France, Italy and Sweden, followed a similar path in those years (Toninelli 2000).

Initially trialled in Scotland,[4] the full nationalisation of Britain's electricity sector was implemented under the Electricity Act 1947. This led to the institution of the British Electric Authority (BEA) – renamed Central Electricity Generating Board[5] (CEGB) in 1957 – a public corporation responsible for generation and transmission in England and Wales. Distribution and supply were organised under 14[6] regional 'boards'.

3 A brief overview of the Northern Irish electricity system is provided in the box Northern Ireland's electricity sector, below.

4 With the establishment of the North of Scotland Hydro-Electric Board in 1943.

5 By the late 1980s, the CEGB was the second largest power generation company in the world after Électricité de France (EDF). It had over 70 generation plants with 52GW of installed capacity. Unlike other electric utilities in Europe, it was also profitable (Bolton 2022). In 1989 it employed more than 47,000 employees – with the area boards employing an additional 82,000 (Electricity Council 1989).

6 Twelve in England and Wales, two in Scotland under vertically integrated companies (South of Scotland Electricity Board and North of Scotland Hydro-Electric Board).

TABLE 2.1 THE EVOLUTION OF ELECTRICITY PLAYERS IN GREAT BRITAIN

Year	Supply	Distribution	Generation	Transmission	Regulation	Balancing
Early 1900s	Local generators					
	Local generators					
1926	Local generators					
	Local generators			**CEB**		
1943	**North of Scotland Hydro-Electric Board**					
	Local generators			**CEB**		
1947	**North of Scotland Hydro-Electric Board**					
	Area Boards		**British Electricity Authority**			
	Area Boards		**British Electricity Authority**			
1955	**North of Scotland Hydro-Electric Board** **South of Scotland Electricity Board**					
	Area Boards		**Central Electricity Authority**			
1957	**North of Scotland Hydro-Electric Board** **South of Scotland Electricity Board**					
	Area Boards		**Central Electricity Generating Board**			
After 1990	SSE Scottish Power				**Office of Electricity Regulation**	
	Regional Electricity Companies		PowerGen National Power Nuclear Electric	National Grid		National Grid
After 2001	Several suppliers & Big Six[1]	Scottish Power SSE	Several major power producers[1]	Scottish Power SSE	**Office of Gas and Electricity Markets**	National Grid[2]
		12 regional DSOs		National Grid		
After 2024	Several suppliers & Big Six	Scottish Power SSE	Several major power producers + **GBE**	Scottish Power SSE	**Office of Gas and Electricity Markets**	**National Energy System Operator**
		National Grid (4) UK Power Networks (3) Northern Powergrid (2) SSE (1) Scottish Power (1) Electricity North West (1)		National Grid		
Year	Supply	Distribution	Generation	Transmission	Regulation	Balancing

Source: Authors' elaboration. Notes: Publicly owned entities are highlighted in bold. Blue-coloured areas refer to Scotland, red-coloured areas refer to England and Wales, green-coloured areas refer to Great Britain. [1]SSE and Scottish Power with a dominant albeit diminishing share of supply generation and supply within Scotland. [2]Applies to Scotland only after 2005, when British Electricity Trading Transmission Arrangements came into force.

However, when policy priorities shifted, the UK became an early pioneer in the privatisation and liberalisation of its electricity sector (Bolton 2022). The then government asserted that, together, these reforms were aimed at reducing costs for businesses and households by promoting greater efficiency and competition within the sector (IEA 2002).

The Electricity Act of 1989 paved the way for the privatisation of the CEGB starting in 1990 (Littlechild 2000). This process involved separating transmission activities – which were assigned to the newly created National Grid Company – from generation activities – which were divided between two new companies: PowerGen (E.ON until the 2016 divestment to Uniper) and National Power (now RWE). National Power later spun off its nuclear activities into Nuclear Electric (now EDF).

The regional boards were rebranded into Regional Electricity Companies (RECs) and subsequently privatised. These initially retained both supply and distribution[7] functions until the 2000 Utilities Act mandated their legal separation under a single entity. Additionally, the 1989 bill established the regulator for the sector across Britain; this later became Ofgem under the 2000 Utilities Act. In Scotland, the two main companies were privatised in 1991. South of Scotland Electricity Board became Scottish Power, while North of Scotland Hydro-Electric Board evolved into today's SSE.

However, despite its promised intentions, in recent years the fully privatised and liberalised electricity system has failed to lower electricity bills.[8] It would not have secured the necessary investments in clean energy generation without targeted government support.

NORTHERN IRELAND'S ELECTRICITY SECTOR

The electricity sector in Northern Ireland was established separately from the rest of Britain, particularly following the Electricity (Supply) Act (Northern Ireland) 1931. This legislation introduced the Electricity Board for Northern Ireland, a non-profit public corporation responsible for the generation, distribution and supply of electricity in the region. Integration with the Republic of Ireland's electricity system began in 1970, when a cross-border transmission connector was inaugurated between Northern Ireland and the Republic of Ireland (Bloomfield 2022).

Since 1992, the Northern Irish electricity system has undergone privatisation and unbundling but has remained integrated with the Republic. The transmission and distribution networks in Northern Ireland are now owned by NIE Networks, a subsidiary of ESB, the Republic's state-owned electricity provider. ESB is also the second largest generator (DESNZ 2024d) and supplier (Utility Regulator 2024) in Northern Ireland. Northern Ireland has its own regulator, the Utility Regulator, separated from Ofgem and from the Republic of Ireland's CRU. Its system operator, SONI, is a subsidiary of the Republic of Ireland's state-owned transmission grid, Eirgrid.

7 RECs were obliged to allow other suppliers to operate within their regional distribution areas.

8 Electricity prices decreased in real terms between 1995 and 2003, but this was primarily driven by the lower cost of natural gas.

2.2 STRUCTURAL ISSUES IN THE WHOLESALE ENERGY MARKET PREVENTS GOVERNMENT-SUPPORTED INVESTMENT IN CLEAN ENERGY GENERATION LOWERING ELECTRICITY BILLS

Last year was a remarkable year for British electricity. After 142 years, in 2024 coal ceased to be used in UK power generation. Wind became the leading source of electricity generation, surpassing gas for the first time, while renewables collectively accounted for more than 51 per cent of total electricity generation (NESO 2025a). It was only 2.5 per cent in 2001 (DESNZ 2024c). This surge in renewable energy installation is due to a series of strategic market-shaping policy measures (Jennings et al 2020) – see box for a review.

GOVERNMENT SUPPORT FOR RENEWABLE ENERGY INSTALLATION

Renewables Obligation (2002-2017)

The Renewables Obligation (RO) was a revenue-stabilisation scheme requiring licensed suppliers in the UK to source an increasing share of their electricity from renewable sources. This was achieved by purchasing Renewables Obligation Certificates (ROCs) from accredited generators, who received additional revenue from selling the ROCs, on top of the electricity sold in the wholesale market. With the introduction of the Feed-in Tariffs (FIT) scheme in 2010, support was limited to generating stations with a capacity above 50kW. In 2017, the scheme closed to new capacity. By 2022, the RO scheme supported 31.8 per cent of the total UK electricity supply (Ofgem 2024a).

Feed-in Tariffs (2010-2019)

The Feed-in-Tariffs (FIT) was a revenue stabilisation programme for small-scale renewable installations with a capacity below 5MW. Under the FIT scheme, licensed suppliers were required to make fixed payments to accredited generators for both electricity consumed on-site and electricity exported to the grid. The scheme supported generators for 20 years. In 2019, the FIT scheme closed to new applications. In 2023, 8.3 TWh of renewable electricity was generated on the FIT scheme, enough to power 3 million typical households for a year (Ofgem 2024b).

Contracts for Difference (2014-)

Contracts for Difference (CfD) is a price-stabilisation mechanism that guarantees developers of renewable projects with a flat indexed rate for the electricity produced over 15 years. Capacity is allocated in different rounds of reversed auctions where participants bid for a strike price – with the generators compensated or having to pay back depending on whether the wholesale price is lower or higher than the strike price. Both offshore and onshore technologies (with capacity higher than 5MW) are currently eligible for CfD. In 2023, CfD generation accounted for 7 per cent of total electricity produced in the UK (House of Commons 2024).

Beyond reducing CO_2 emissions, a larger share of renewables generation should have a positive impact on electricity bills, due to the lower lifetime generation costs[9] of renewables (Lazard 2024). This holds true even considering the supplementary policy cost of subsidising renewables. However, average domestic electricity bills remain higher than they were before the 2022 energy crisis, having doubled over the past 10 years (DESNZ 2024e). UK electricity prices have steadily risen in real terms since 2003 (DESNZ 2024f).

9 Measured as the levelised cost of electricity (LCOE), which estimates the net present cost of electricity generation of a typical generator over its lifetime.

This can be largely attributed to the dynamic of wholesale costs (see box). Within the current structure of the UK wholesale market – created after the New Electricity Trading Arrangements (NETA) in the 2000s and the Electricity Market Reform (EMR) in 2013 (Liu et al 2022) – cheaper renewables almost never set the wholesale price (Grubb 2022; Brown et al 2023). Due to the merit-order and marginal price-setting mechanism, the marginal generator[10] is typically a gas-fired power plant, where operating costs ultimately depend on fuel prices. For instance, in 2021, while natural gas and renewables each accounted for 39.9 and 39.8 per cent of total electricity generation respectively (DESNZ 2024d), the wholesale electricity price was determined by natural gas prices 97 per cent of the time (Zakeri et al 2023). Over the past 15 years, wholesale electricity prices have tracked natural gas prices (Ofgem 2025a).

THE MAKE-UP OF UK ELECTRICITY BILLS

Wholesale costs remain by far the most significant and variable component of electricity bills, as they are largely determined by changes in natural gas prices. Their share of total electricity bills has varied, from 48 per cent in 2015 (Acha et al 2016), to 29.1 per cent in 2021 (Ofgem 2021), to over 70 per cent in early 2023 (Ofgem 2023).

Network charges are the second largest cost component, ranging from 23.3 per cent in 2021 (Ofgem 2021) to less than 10 per cent in early 2023 (Ofgem 2023), depending on fluctuations in wholesale costs. Distribution charges typically account for twice as much as transmission and balancing charges combined (National Grid 2018).

Policy costs cover the costs incurred by suppliers to deliver electricity and the expenses associated with supporting low-carbon generation, energy efficiency and vulnerable customers. Other costs are marginal (below 10 per cent) and consist of VAT and the profits assumed by suppliers.

Both policymakers and the general public agree that GBE will be successful if it contributes to reduce electricity bills (Common Wealth 2024). The operating model for GBE, as outlined in chapter 5, has the potential to reduce electricity bills by internalising and containing wholesale and some network costs.

2.3 A PUBLICLY OWNED COMPANY COULD OVERCOME THE CURRENT LIMITATIONS OF THE ELECTRICITY MARKET

Within the current privately owned electricity system, and without reforms to decouple gas from electricity prices (Grubb et al 2022), an even greater share of renewables will not, on its own, lead to a generalised reduction in electricity bills. Even in a distant future, where renewables with price-fixing mechanisms such as CfDs dominate electricity generation, the need for potentially costly dispatchable energy might prevent renewable generation from setting wholesale prices.

A publicly owned entity, benefitting from lower financing costs and a less stringent profit imperative, can undertake additional investments in clean energy generation and pass on the resulting lower costs by selling electricity directly to end consumers via long-term contracts, bypassing the wholesale market (see chapter 5).

10 The marginal generator is the generator providing the most expensive, final unit of power required to balance grid demand with available supply at any given time.

3.
GBE CANNOT BE COMPARED TO EXISTING PUBLICLY OWNED COMPANIES BUT SHOULD LEARN FROM THEM AND EVENTUALLY BECOME LIKE THEM

The government has stated that GBE will learn from European publicly owned electricity companies and become the UK's "publicly owned domestic champion" (DESNZ 2024b). This chapter presents insights gathered from a comparative study of some of those publicly owned electricity companies. **GBE is unlikely to function as a typical publicly owned electricity player until it becomes fully operational and a central player in the UK electricity sector. To facilitate this evolution, GBE should continue to learn lessons from existing models of similar publicly owned organisations.**

3.1 PUBLICLY OWNED NATIONAL CHAMPIONS HAVE THEIR ORIGINS IN PRE-EXISTING ORGANISATIONS WHILE GBE HAS BEEN MADE FROM SCRATCH

As reported in table 3.1, publicly owned electricity companies have emerged from one of three sources: the legacy of former state monopolies or municipally owned utilities; the diversification (and sometimes transformation) of state-owned fossil fuel companies, or the nationalisation of previously privately owned companies. GBE is a novelty, as it will gradually emerge from investing its allocated resources to become an operating player in the electricity system alongside existing ones.

TABLE 3.1 ORIGINS OF KEY PUBLICLY OWNED ELECTRICITY COMPANIES

Origin	Country	National public ownership	Regional or municipal public ownership
Former state monopolies or municipally owned utilities	Austria	Verbund	
	Czechia	ČEZ	
	Finland	Fortum	
	France	EDF	
	Germany		EnBW, Stadtwerke München
	Ireland	ESB	
	Italy	Enel	A2A, Hera, Iren, ACEA
	Japan	TEPCO	
	Norway	Statkraft	
	South Korea	KEPCO	
	Sweden	Vattenfall	
	Switzerland		Axpo, BKW, RePower, EKZ
	US	TVA	NYPA, BPA
Diversification from state-owned oil & gas companies	Denmark	Ørsted	
	France	Engie	
	Italy	Plenitude	
	Norway	Equinor	
	Poland	Orlen	
Nationalisation or re-municipalisation	Germany	Uniper	Hamburger Energiewerke, BEW Berliner Energie und Wärme
Created anew	UK	GBE	

Source: Authors' elaboration.

3.2 PUBLICLY OWNED ELECTRICITY COMPANIES TAKE DIFFERENT CONFIGURATIONS

There is no universal blueprint for publicly owned electricity companies. They exist in many forms, shaped by each country's history and economy. Acknowledging this diversity is essential to GBE's long-term evolution (see chapter 7). Table 3.2 shows a simple taxonomy based on key characteristics of these companies.

TABLE 3.2 DIFFERENT CONFIGURATIONS OF PUBLICLY OWNED ELECTRICITY COMPANIES

Characteristics		Major examples							
		Enel	EDF	TVA	Ørsted	EnBW	Vattenfall	ESB	Axpo
Public ownership	100% publicly owned		✓	✓			✓	✓	✓
	Majority listed	✓			✓	✓			
Internationalisation	Largely domestic			✓		✓		✓	
	Moderately internationalised		✓				✓		✓
	Largely internationalised	✓			✓				
Generation of assets	Almost 100% renewables				✓				
	Balanced mix	✓	✓			✓	✓		✓
	Mostly conventional			✓				✓	
Distribution	Operate in distribution	✓	✓			✓	✓	✓	✓
	Not involved in distribution			✓	✓				
Transmission	Operate in transmission			✓		✓			
	Own shares in transmission grid		✓					✓	✓
	Not involved in transmission	✓			✓		✓		
Supply	Operate in supply	✓	✓			✓	✓	✓	✓
	Not involved in supply			✓	✓				
Corporate structure	Part of multisectoral entity			✓					
	Diversified in other services	✓	✓			✓	✓		
	Mostly specialised in electricity				✓			✓	✓
Territorial level	National	✓	✓		✓		✓	✓	
	Regional with national impact			✓		✓			✓
	Municipal								

Source: Authors' elaboration.

The main results can be summarised as follows.

- Ownership can range from being 100 per cent public to involving a degree of partial privatisation, where the company is listed on the national stock market and the government retains a majority (or controlling) stake.
- Almost all national publicly owned companies are investing abroad in new generation assets, with varying degrees of internationalisation. In some cases, they have acquired existing companies in generation, distribution and supply.
- In generation, some companies are entirely – or nearly – focused on producing clean energy,[11] while some are still heavily involved in fossil fuel generation.
- Often, publicly owned generation companies own significant portions of the medium-to-low voltage distribution network.
- In some cases, the vertical integration extends to transmission networks, either through direct operation of the grid, or as a mediated shareholding relation.
- Most of them have a separated division that supplies electricity to end consumers, although this is not always the case.
- Their corporate structure can vary considerably. Some may operate as divisions within multisectoral groups offering other utility services, while others have expanded into ancillary services like electric vehicle mobility. In certain cases, they have stayed focused primarily on electricity provision.
- We observe different levels of geographical operation, often aligned with the administrative level of the public authorities that are the main shareholders: national, regional or municipal. Municipally owned electricity companies maintain a dominant local presence. They usually own the local distribution network and supply a substantial share of electricity, often generated by their own capacity, within the regions they serve.

3.3 PUBLICLY OWNED ELECTRICITY COMPANIES PLAY A DOMINANT ROLE IN THEIR COUNTRIES

Beyond the municipal level, national and regional companies – owned by central or local governments – are players with a national systemic impact, even when operating primarily within regional territories.[12] Major publicly owned companies account for shares of national electricity generation ranging between just under 20 per cent to 74 per cent. In many cases, their shares of national distribution and supply are even larger. In the long term, possibly after 2030, if GBE aims to become a "publicly owned domestic champion" (such as those reported in table 3.3), it will need to reach at least a minimal scale (see chapter 7).

11 In companies such as Ørsted, or in the specialised subsidiaries of Enel and Eni (Enel Green Power and Plenitude respectively), the 100 per cent renewable nature is the outcome of deliberate decisions by the management. In other cases, such as with Statkraft and Axpo, clean energy generation results from their legacy hydroelectric plants.

12 For example, EnBW, based in Baden-Württemberg, is Germany's third largest electricity producer. The TVA, which operates across seven states in the Tennessee Valley, is the fourth largest electricity generator in the US. Furthermore, both companies operate electricity networks in their regions.

TABLE 3.3 NATIONAL SHARES OF GENERATION, DISTRIBUTION AND SUPPLY OF MAJOR PUBLICLY OWNED ELECTRICITY COMPANIES

		National share of:			
Company	**Country**	**Generation**	**Distribution**	**Supply**	**Installed capacity[1]**
Enel	Italy	18%	85.1%	34%	26GW
EDF	France	74%	95%	51.2%	93GW
Vattenfall	Sweden	45%	40-50%	~60%[2]	15.3GW
Ørsted	Denmark	19%	-[3]	-[4]	3GW
ESB	Ireland[5]	27%	100%	40%	~4GW
Axpo[6]	Switzerland	31.5%	28.5%[7] and 4.8%[8]	3.9%[9]	6.8GW
EnBW	Germany	5.2%	6%	7.3%	12.2GW
TVA	US	3.2%	2.5%[10]	4.1%	32.1GW

Source: Authors' elaboration on companies' annual reports for the year 2023. Notes: [1]Generation capacity within the country of origin. [2]Figure relative to 2022. [3]This was around 11 per cent before 2019, when Ørsted divested its distribution assets. [4]This was around 20 per cent before 2019, when Ørsted divested its supply division. [5]Relative to all-island. [6]Figures refer to the 2022/23 period. [7]Relative to the cross-regional high-voltage distribution grid NL3 (36-150 kV). [8]Relative to regional medium-voltage distribution grid NL5 (36-1 kV). [9]Through its subsidiary CKW. [10]Refers to the high-voltage transmission system.

3.4 IMPLICATIONS FOR GBE

Publicly owned electricity companies are dominant players in their respective countries, meaning they influence their domestic electricity systems through their planning, investment and commercial decisions. **While public ownership is essential for incorporating public policy objectives, their systemic impact ultimately depends on their scale and presence across various segments of the electricity sector.**

Given its origin, scope and available resources, GBE will not be able to achieve the same systemic scale and diversification soon. Until it resembles these examples abroad in nature and scale, any comparison remains challenging.

In the interim, GBE should adopt an operating model and governance structure suited to its novel status as a newly established entity. Existing publicly owned companies can nonetheless offer valuable insights to guide GBE's evolution toward becoming a typical publicly owned systemic player after 2030. GBE must be able to function as an operating electricity company – not only to accelerate its transition into a systemic national champion but also to fulfil its foundational mandate.

4. A PUBLIC DEVELOPER OPERATING CLEAN ENERGY ASSETS AND SELLING DIRECTLY TO CONSUMERS

4.1 GBE SHOULD NOT BE REDUCED TO A PUBLIC FINANCING ENTITY

Support from public financing entities, such as the European Investment Bank (see box), is often relevant to deliver clean energy investment projects. Their publicly owned nature provides an implicit guarantee against uncertainty, while their lower lending rates reduce the financial costs of projects.

PUBLIC FINANCING ENTITIES LENDING TO CLEAN ENERGY PROJECTS

The publicly owned European Investment Bank (EIB) is a key player in financing European renewable energy projects, electricity networks and energy efficiency investments. Between 2019 and 2023, the EIB financed €30 billion in renewable energy projects (EIB 2024). Notable examples include a €1 billion loan to Iberdrola in 2023 for a €1.7 billion overall investment in 2.2GW of solar and onshore wind projects across Europe, as well as a €1.2 billion green loan to RWE for its 1.1GW offshore wind farm in Denmark.

Before Brexit, the EIB played a crucial role in financing UK energy projects, including most transmission links with offshore wind farms such as Walney 1 and 2, Sheringham Shoal, Greater Gabbard, London Array, Gwynt y Môr and Humber Gateway. In 2016, the EIB provided more than 20 per cent of the total cost of the Beatrice offshore wind farm through a £525 million loan.

With the EIB ceasing operations in the UK after 2020, its function in supporting private investments in clean energy generation and networks should be supplemented by similar public financing institutions, including the National Wealth Fund (NWF).

However, more affordable public financing alone, even in the form of minority equity stakes, will not have the impact GBE is intended to.

1. While public financing can reduce overall investment costs, other financing parties may consider the associated returns too uncertain or unstable without guarantees on the level and stability of revenues (Christophers 2023).
2. Even if the project is financed and completed, public financing without operational control of the generation assets cannot reduce electricity bills for consumers if the electricity produced is sold into the wholesale market,[13] as explained in chapter 2.

13 This could occur if the wholesale price were entirely determined by CfD-backed generation. However, as recalled in chapter 2, this is rarely the case.

To overcome the hurdle of uncertain profitability expectations and to reduce electricity bills for end consumers through internalisation of costs and revenue stabilisation, GBE must become a fully-fledged public developer.

4.2 CRUCIAL ADVANTAGES AND IMPLICATIONS OF GBE AS A PUBLIC DEVELOPER

A public developer can be defined as a publicly owned entity that both invests and "manages the resulting assets on behalf of the public" (Lala and Feygin 2024). The potential advantages of GBE as a public developer in electricity generation are:

1. **Lower cost of financing.** Provided they can generate consistent positive cashflows, government-backed public developers can secure financing at a lower cost than other corporate entities,[14] benefitting from the government's stronger credit rating. This is critical for renewable energy projects, which need substantial upfront investment, incurring high financing costs (IEA 2022). In its initial phase, GBE will be in a similar position, as it is financed with government resources. However, in the long term, when it can finance itself through bond issuance (see chapter 7), GBE will still enjoy cheaper borrowing, provided it generates positive returns.
2. **No external pressure to maximise profitability at the project level.** A public developer using its own internal resources can bypass the subjective preference of private financial entities to prioritise investments with higher expected returns[15] at the project level, particularly during periods of higher interest rates. As is often the case with US public developers, GBE would not necessarily need to rely on external project financing that must be repaid from the individual project's cashflow. By fully deploying internal resources to finance its clean energy projects,[16] GBE could adopt a portfolio approach, strategically balancing investments in projects with system-level importance but varying rates of return (Brusseler 2023), if the overall portfolio generates sufficient returns to cover its financing costs.
3. **The ability to bypass the wholesale market by selling electricity directly to end consumers at a fixed price.** A public developer that fully owns and operates generation assets can sell electricity directly (or indirectly) to targeted end consumers through long-term contracts. This is the only way GBE can deliver more affordable electricity under the current structure of the wholesale market. The lower cost of renewable generation can be passed on to specific categories of consumers if GBE sells the electricity produced on a cost-plus-margin basis. By setting and stabilising revenues through long-term contracts, GBE could better control and regulate its overall expected profitability, further reducing investment uncertainty.

Despite its limited resources, GBE can leverage the advantages of its status as a public developer to drive investment in clean energy projects and simultaneously help reduce electricity costs. However, precisely because GBE benefits from state-backed finance and a more favourable risk profile, it should operate somewhat separately from other players in the sector. While the CfD scheme is best suited to support private investment in large-scale renewable projects, GBE should adopt an autonomous operating model and governance structure that align with its foundational mandate.

14 By comparison, within the US context, the TVA's cost of financing (average blended interest rate) in 2023 was 4.92 per cent, while Baa-rated corporate bond yields averaged 5.87 per cent (Moody's 2025).

15 The expected equity internal rate of return in Europe for solar PV is currently above 8 per cent (IEA 2024a).

16 Avoiding external project financing can also speed up project development and shorten the commissioning time of renewable energy projects (see chapter 5 for further elaboration).

5. THE OPERATING MODEL OF GBE TO DELIVER ON ITS MANDATE BEFORE 2030

Over the coming years, GBE must adopt an operating model that is consistent with its goal of delivering secure, clean and cheaper electricity. This should allow GBE to provide tangible benefits for businesses and communities in a relatively short period.

5.1 FUNDAMENTAL FUNCTIONS OF GBE'S OPERATING MODEL

GBE's operating model should be driven by two fundamental functions:

- **Invest in additional generation assets.** It is crucial that GBE invests in clean energy projects where private players are less likely to participate. GBE should directly build additional capacity in national clean energy generation, rather than merely financing projects that would still be delivered under existing mechanisms (such as CfD). GBE should be able to assess the additionality of its investments based on whether they have enabled an increase in renewable capacity beyond baseline expectations.
- **Sell electricity to targeted end consumers via long-term contracts.** GBE will not succeed in providing consumers with cheaper electricity if this is sold into a wholesale market where gas sets the price. Without long-term contractual arrangements with end consumers, and absent price-fixing mechanisms (such as CfD), even a publicly owned player like GBE would be exposed to the volatility of wholesale prices (Brusseler et al 2024). GBE can proactively target and coordinate potential end consumers to offer them favourable contractual conditions, which would, in turn, be essential for GBE to commit its investment.

Based on these, GBE's activity can be divided into two areas. First, electricity produced by utility-scale plants and sold directly to special groups of industrial, commercial or public end consumers (section 5.2). Second, electricity produced by smaller plants and sold indirectly through retail partners to local communities of domestic consumers under the proposed Local Power Plan (section 5.3).

5.2 UTILITY-SCALE GENERATION FOR GROUPS OF NON-DOMESTIC ELECTRICITY CONSUMERS

GBE's investment in utility-scale clean energy generation should be backed by commercial deals with specific categories of end consumers.17 These could be structured as a particular version of corporate Power Purchase Agreements (PPAs). PPAs involve a generator selling their electricity directly to one or more end consumer via long-term contracts.

17 In the US, the publicly owned TVA sells power via long-term contracts to electric utilities as well as to "large commercial and industrial loads and federal agencies with loads larger than 5,000 kilowatts" (TVA 2024).

Corporate PPAs are increasingly common in the UK, growing from five deals in 2015 to 18 in 2024, with a total of 88 in operation (Wind Europe 2025). However, they face significant barriers to further development (Christophers 2023):

- Most PPAs do not bring additional investment in generation capacity – for example, 18 of the first 26 corporate PPAs in the UK until 2019 involved existing generation assets backed by RO support (DLA Piper 2019).
- Private corporate PPAs are constrained by the limited number of reliable large-scale energy consumers that private generators would consider as trustworthy off-takers for long-term deals (Bird & Bird 2023). These contracts typically rely on long durations (over 20 years) and on large quantities of purchased power. As confirmed by our stakeholders, the UK's industrial structure, consisting mainly of small and medium-sized companies, limits the potential for traditional PPA deals with private generators.
- This imbalance between the scarcity of creditworthy off-takers and the abundance of generators seeking bankable deals places significant monopsony power on the few eligible consumers, to the detriment of generators' revenues and ultimately their willingness to sign those deals.

GBE could intervene to address these challenges. With lower financing costs and profit-neutrality, GBE could absorb higher levels of uncertainty and target marginal off-takers that are typically excluded from traditional PPA deals. These may include groups of smaller businesses and public sector entities. In addition to actively bundling them together to diversify and mitigate risk, GBE could offer them shorter-term deals lasting five to 10 years, possibly on a rolling basis.

While private generators could continue to specialise in remaining large deals – as they have been doing in the UK[18] – GBE could focus on targeting smaller, residual consumers. If GBE is able to expand the pool of off-takers with reasonably priced contracts, the resulting expansion of the market would also help reduce the monopsony power of large off-takers, enabling private generators to negotiate more profitable deals.

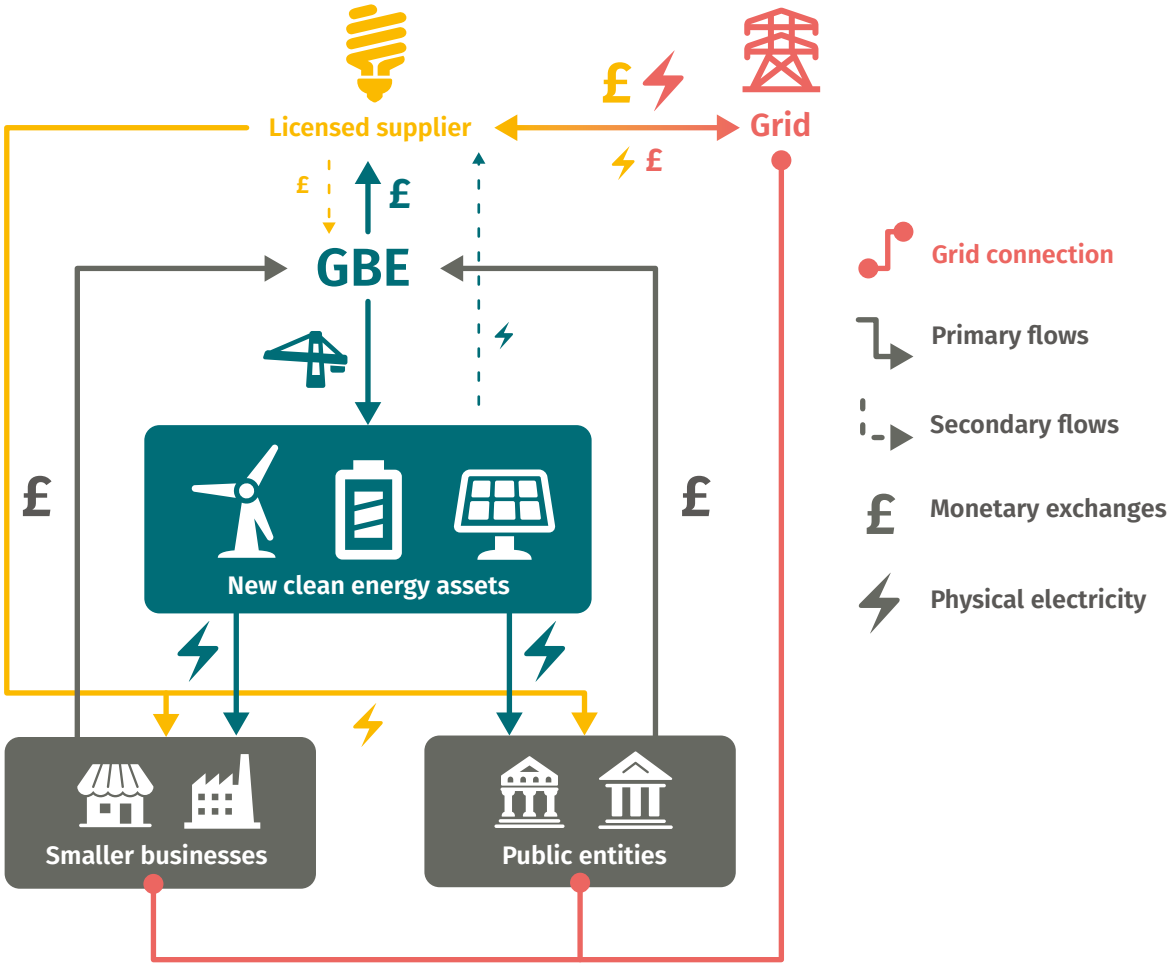
GBE's potential consumers could represent a significant share of national electricity consumption. Non-energy-intensive industries[19] – dominated by relatively smaller production units (ONS 2024) – account for 18.3 per cent of total UK electricity consumption. Another 6.9 per cent is consumed by commercial shops. The public sector (excluding public lighting) represents a further 4.1 per cent. In 2023 these accounted for 29.3 per cent of total UK electricity consumption, approximately the same as the whole domestic sector (DESNZ 2024d).

18 The average size of individual PPA deals in the UK has increased from 30MW in the years 2015-2019 to 54.4MW in 2020-2024.

19 These include: mechanical engineering; electrical engineering; manufacturing of vehicles; food and beverage; textile; paper and printing, and other industries.

FIGURE 5.1 GBE'S OPERATING MODEL FOR ITS UTILITY-SCALE INVESTMENTS IN CLEAN ENERGY PROJECTS

GBE's investments in new clean energy assets backed by private wire PPAs



Source: Authors' elaboration.

GBE should prioritise private wire PPAs (see figure 5.1). In the case of private wire PPAs, generation sites provide electricity directly to the off-takers who are located in close proximity. Private wire PPAs allow the bypassing of some network-related charges, offering cost advantages to both parties and accelerating project development, as they do not need to wait for grid connection. Larger projects, with off-takers located further away (see section 5.4), may require a distribution connection and related costs, which GBE could potentially internalise and contain in the future (see chapter 7). While the electricity generated by GBE's power plant will be sold directly to the off-takers, a second PPA deal with licensed suppliers will ensure continuity of electricity supply to the consumers. This balancing arrangement will also provide the opportunity to sell excess electricity generated by GBE into the wholesale market, if the power plants are connected to the grid (Solar Trade Association 2016). Pairing generation plants with storage capacity could increase their load factor, extending the volume of cost savings enjoyed by consumers.

Sleeved PPAs could be a secondary option for GBE. Sleeved PPAs, the prevailing type in the UK (Bird & Bird 2024), do not require geographical proximity between the generator and the off-taker. In this arrangement, a licensed supplier is responsible for delivering electricity from the point of generation to the consumer. Sleeved PPAs do not provide savings on network charges and are typically indexed to wholesale prices. GBE could use them under two circumstances: first, when acquiring existing generation assets already connected to the grid with expiring subsidies (see section 5.4 for further details); second, in the case of GBE joining a larger – potentially offshore – project with a minority stake, where the generated electricity is backed by PPAs[20] and generation capacity is allocated according to the relative ownership of the generation assets. In such cases, one or a few larger 'anchor tenants' would sign PPAs with the majority owner (i.e. GBE's partner), while GBE would seek to sign deals on the same pricing terms with smaller, often aggregated, corporates or public entities.

5.2.1 PPAs allow GBE to drive further demand for clean electricity

Under this operating model, GBE would effectively act as a market-shaping entity in the electricity sector. By activating demand for directly sourced electricity from marginal off-takers, GBE would create an additional pull factor for investment in renewable capacity that might not otherwise materialise. Moreover, by specialising in private wire deals and acquiring expiring subsidised assets, GBE could speed up the installation process and avoid losses of existing capacity.

5.2.2 Direct sales can reduce prices directly and indirectly

GBE's PPAs could directly lower electricity bills for the recipient off-takers. As mentioned earlier, by targeting marginal UK businesses through special PPA deals, GBE's approach could provide a significant contribution towards reducing industrial electricity prices, which have been on average 50 per cent higher than the International Energy Agency (IEA) median from 2014 to 2023 (DESNZ 2024i). Specifically, GBE's PPAs could reduce overall energy costs and enhance the competitiveness of particular supply chains (see section 6.6).

Furthermore, GBE's addition of electricity supply – primarily off-grid or through embedded generation,[21] where generation capacity is connected to the distribution network rather than the transmission grid – will have the complementary effect of reducing overall electricity demand from the transmission grid. This could relieve pressure on the balancing mechanism and increase the likelihood of cheaper renewables setting wholesale prices. Any rise in embedded (or off-the-grid) electricity generation would not be recorded by the balancing operator National Energy System Operator (NESO) as an increase in supply outside the transmission network, but instead as a decrease in demand (NESO 2025c).

5.3 LOCAL CLEAN ENERGY PROJECTS FOR COMMUNITIES OF DOMESTIC CONSUMERS

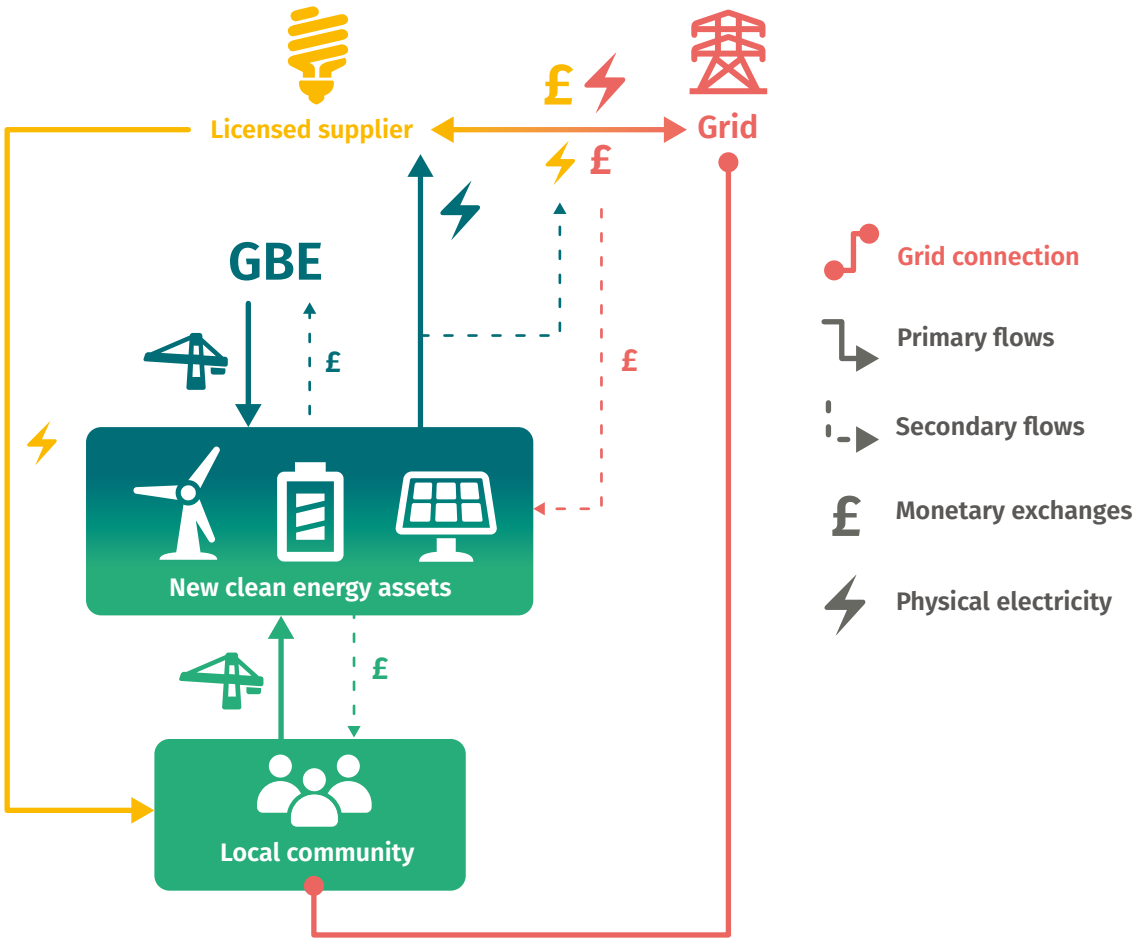
GBE is intended to play a decisive role in local clean power generation through its Local Power Plan (LPP). Forty per cent – £3.3 billion – of total allocated resources is earmarked for small and medium-scale renewable projects to develop up to 8GW of 'community' energy.

20 EnBW's He Dreiht offshore wind farm is a notable example of an offshore project backed by large corporate PPAs without relying on government subsidies (EnBW 2024).

21 Embedded generation already accounts for 23 per cent of generation capacity in Great Britain (NESO 2025b).

FIGURE 5.2 GBE'S OPERATING MODEL UNDER THE LOCAL POWER PLAN

GBE's partnership with local communities and licensed suppliers to deliver local clean energy



Source: Authors' elaboration.

The two fundamental functions of GBE's operating model could be tailored to the specific needs of the Local Power Plan.

1. **GBE could co-invest with the local community** – organised into a public or cooperative entity – providing the necessary equity financing that local and community energy projects often lack.
2. **Electricity should be sold to domestic consumers who are members of the community** through the intermediation of a licensed supplier under a special type of hybrid PPA contract.

TABLE 5.1 BENEFITS OF PARTICIPANTS IN LOCAL POWER PLAN PROJECTS

Participant	Benefits
Local community (domestic consumers)	• Obtains the necessary equity capital from GBE to invest into a local power generation asset • Cheaper electricity through local generation plants with long-term prices at cost factor averaging down total electricity bills • Possibility of small revenues from its share of excess electricity sold into the grid
GBE	• PPAs with retailers and revenues from its share of excess electricity sold into the grid allow positive returns (albeit small) on the project to materialise
Private pure-play developers	• A guaranteed backlog of orders from joint local community-GBE projects
Private retailers	• Revenues from long-term contracts (with GBE's guarantee) and from selling their share of excess electricity generation into the grid • Visibility in supporting local clean energy projects
UK electricity system	• Additional clean power investment in marginal areas and reduction of pressure on the grid and on the balancing mechanism

Source: Authors' elaboration.

Under this model (see figure 5.2), members of the local community will be both the generator and the consumers. The local community-GBE project will sign a long-term PPA deal with a licensed supplier to supply electricity produced by its own generation assets to the community members. This would include a balancing function, with the retailer providing electricity through the grid at commercial prices, when the renewable generation asset is not operational. In cases of excess generation or lower demand, the retailer would be able to sell the surplus electricity to the grid and split revenues[22] with the local community-GBE project.

5.4 OWNERSHIP MODELS OF GBE'S CLEAN ENERGY GENERATION ASSETS

The logical consequence of GBE's utility-scale operating model is the full ownership of its generation assets. While joint ventures with GBE retaining a majority stake should not be ruled out by legislation, it is unlikely that a private player – who does not benefit from GBE's favourable financing conditions and lower profitability expectations – will invest in projects that have lower expected returns.

Under GBE's Local Power Plan operating model, as the community contributes to the overall financing cost of the project, it will become a minority shareholder. The shareholding composition between GBE and the community will vary depending on the project and may be subject to change.

Minority stakes represent equity financing – with the limitations outlined in chapter 4 – and would not allow GBE to operate as a public developer of clean energy assets. An exception could be if GBE becomes a minority partner in a larger project fully backed by corporate PPAs. Here, GBE could sell electricity generated

22 On a 50/50 basis, or with different arrangements depending on local conditions.

by the asset – proportional to its shareholding – through its own special PPAs with residual off-takers.

However, this may not be the most efficient use of GBE's resource. While GBE's involvement in the project could reduce counterparty risk for the off-takers, several limitations remain. First, it would be challenging to establish whether GBE is delivering additional projects. Second, it would be limited by the availability of off-takers. Third, there would be competition issues over whether GBE's financial support to the project represents an unfair advantage.

This final reason suggests GBE's involvement as a minority shareholder to competitive auctions, such as CfDs, should be ruled out on the basis that it could discourage other bidders, since GBE enjoys better financing conditions and a lower profit sensitivity.

TABLE 5.2 GBE'S DIFFERENT OWNERSHIP MODELS FOR CLEAN ENERGY GENERATION ASSETS

Ownership of projects	Type of project	Generation asset	Advantages	Disadvantages
100% ownership	Utility-scale with private wire or sleeved PPAs	Fixed asset	Strong additionality in new generation capacity or in preservation Maximisation of price reduction Fast realisation	Exclusive use of internal resources as a fixed limit to capital investment
50% or more	Local Power Plan under special PPAs with licensed suppliers	Special purpose vehicle	Realisation of local clean energy projects with necessary capital and technical expertise from GBE	Potentially lower returns for GBE
Minority ownership (below 50% but typically lower)	Utility-scale with sleeved PPAs and revenues stack	Special purpose vehicle	Reduction of the counterparty risk for off-takers	Limited scope for large-scale traditional PPA deals Low additionality of investment Competition issues

Source: Authors' elaboration.

5.5 GBE'S INVESTMENTS IN GENERATION AND COMPLEMENTARY TECHNOLOGIES

GBE's investment in generation assets should aim to increase the net installed capacity of clean energy. This entails investing in new projects while also ensuring the continued operation of generation assets approaching the end of their policy support period.

5.5.1 Investments in new onshore clean energy projects

In coherence with the operating model outlined above for both utility-scale and the Local Power Plan, **GBE should focus on the established generation technologies of onshore wind and solar photovoltaic (PV) systems, paired with storage.**

Firstly, onshore wind and solar projects typically[23] have average commissioning times that are about half those of offshore wind projects (Gumber et al 2024). By investing in medium-scale onshore projects that service PPA deals, GBE could have a significant share of its generating assets operational before 2030. In fact, it could take less than three years for medium-size onshore wind projects[24] and utility-scale solar PV[25] facilities in the UK to become operational after the planning application is submitted (DESZN 2024k). Under the Local Power Plan, which involves smaller scale projects, the construction timeline could be even shorter.

Second, while acknowledging the higher capacity factor of offshore wind, onshore renewable projects maximise the use of GBE's limited financial resources to deliver installation of capacity in GW terms, given their lower investment costs (per unit of capacity), as shown in table 5.3.[26]

TABLE 5.3 GBE'S INVESTMENT CAPACITY IN UTILITY-SCALE PROJECTS VARYING ON TECHNOLOGY TYPES

Type of technology	Average investment cost per GW of installed capacity in Europe	GBE financing capacity before 2030[3]
Floating offshore wind[1]	£6 billion	0.8GW
Fixed-bottom offshore wind[2]	£3 billion	1.7GW
Onshore wind[2]	£1.1 billion	4.6GW
Utility-scale solar PV[2]	£0.6 billion	8.4GW

Source: Authors' elaboration on Wind Europe (2023; 2022) and IEA (2023). Notes: GBE's estimated investment capacity before 2030 (£5 billion) assumes no need for external financing for its utility-scale clean energy projects. [1]Relative to 2022. [2]Relative to 2021. [3]Under the assumption that GBE's utility-scale financial capacity will amount to £5 billion.

The figures are consistent with NESO's estimates of the investment costs required by 2030, as calculated in table 5.4. While acknowledging the higher capacity factor of offshore wind, a combination of GBE's investments in onshore wind and solar PV projects could lead to 5.6GW of installed capacity. Allowing GBE to invest proportionally in all renewable generation technologies would reduce the amount of installed capacity to 2.9GW.

23 In OECD countries.

24 Examples of this – drawn from the Renewable Energy Planning Database (DESZN 2024k) – are Statkraft UK's Windy Rig Wind Farm (43MW of installed capacity), with planning application submitted in June 2019 and already operational in October 2021, or Muirhall Energy's Crossdykes (48MW of installed capacity), with planning application submitted in November 2018 and already operational in June 2021.

25 Examples of this include NextEnergy Capital LLP's Llanwern Solar Farm, the largest in the UK with 75MW of installed capacity, which has been operational since March 2021 after a planning application was submitted in late February 2018. Another example is Lightsource BP's The Grange Solar Farm, with 49.9MW of installed capacity, operational since April 2021, with a planning application submitted in August 2019.

26 Investment costs would increase with the inclusion of energy storage systems. For instance, the estimated cost of a solar-plus-storage could be up to 70 per cent higher for a utility-scale project (Ramasamy et al 2023). On the other hand, these additional costs would be compensated by revenues generated from the extended operational activity of the power plant.

TABLE 5.4 GBE'S INVESTMENT CAPACITY IN UTILITY-SCALE PROJECTS UNDER NESO'S PREDICTIONS

	All renewables[1]	Onshore renewables[2]
Average annual investment costs	£20.8bn	£8.1bn
GBE's share[3] of annual investment cost	4.8%	12.3%
Net addition of installed capacity by 2030	+61.2GW	+45.9GW
GBE's financing capacity	2.9GW	5.6GW

Source: Authors' elaboration on NESO (2024). Notes: Estimated under the 'New Dispatch' scenario. [1]Solar, onshore wind, offshore wind, tidal. [2]Solar, onshore wind. [3]Calculated using the £5 billion (£1 billion annual average) allocated for utility-scale projects.

Third, because onshore projects enjoy lower levelised costs of electricity[27] (IRENA 2024), they allow cheaper electricity prices to be passed on to end consumers through long-term fixed contracts. The recent AR6 auction set higher CfD administrative strike prices for offshore wind (176 £/MWh for floating and 73 £/MWh for fixed-bottom) compared to onshore wind (64 £/MWh) and solar PV (61 £/MWh) (DESNZ 2024j).

Specialising in smaller onshore projects may lead to GBE operating too many projects to manage effectively, given its initial limited personnel. However, this should be a temporary issue and could potentially offer an opportunity for a faster learning curve in delivering and operationalising a clean energy project. Several factors could support this process. First, GBE will initially collaborate with pure-play developers (as contractors), which means it will primarily need project planning and marketing capabilities – areas that can be scaled-up more easily. Second, as explained in chapter 4, GBE could finance project development using its own resources, thus eliminating the time-consuming search for external project financing on a case-by-case basis.

Finally, given the exclusive deal-by-deal nature of its investments in new clean energy projects, GBE should promote the parallel deployment of battery energy storage systems (BESS). Pairing GBE's renewable power plants with energy storage systems would diminish the off-takers' dependence on energy supplied via the grid (IEA 2024b), thereby increasing reliance on self-produced cheaper electricity. While utility-scale projects require in front of the meter (FTM) large-scale battery storage systems (IRENA 2019), Local Power Plan sites can be supported by smaller behind the meter (BTM) batteries (Rezaeimozafar et al 2022).

5.5.2 Investments in existing clean energy generation assets to speed up GBE's impact

GBE's role in supporting marginal clean energy generation with a system-level orientation could also imply investments in the acquisition of existing assets. As highlighted in chapter 2, publicly owned electricity companies are almost always established from pre-existing assets. **In GBE's case, the early acquisition**

27 According to IRENA (2024), the average levelised cost of electricity (LCOE) in 2023 for offshore wind, onshore wind and solar PV is estimated to be 0.075, 0.033 and 0.044 USD/kWh, respectively.

of generation assets could be instrumental in rapidly integrating experienced technical personnel and commercial expertise. This option could accelerate GBE's readiness to become an operational electricity company.

GBE's acquisition of existing assets could be targeted to minimise the loss of renewable generation capacity in the near future. Meanwhile, divestments conducted under market conditions could provide private sector operators with capital to fund future projects that would provide additional net capacity.

GBE could focus on acquiring assets that are nearing the end of their subsidisation under the RO scheme. If these assets retire at the end of the policy support, they could hinder progress toward achieving clean power by 2030, as recognised by the government (DESNZ 2024h). Between 2005/06 and 2010/11 2.6GW of onshore wind capacity and 1.2GW of offshore wind capacity were added under the RO scheme (Ofgem 2006; 2007; 2012), of which around 660MW and 180MW of onshore and offshore wind capacity were added in the first year. GBE could act as a buyer of last resort of these assets – acquired at a market-discounted value – and initially operate them by selling electricity into the wholesale market, with the intention of eventually transitioning into sleeved PPA arrangements.

Additionally, considering that renewable plants generally cease their operations after 25-30 years and require upgrading or replacement (IEA 2021), GBE could play a role in 'repowering' ageing renewable assets by acquiring them at a further reduced discounted value. In fact, while the average age of onshore wind farms in the UK was of 9.4 years in 2023, around 1.5GW of onshore wind turbines have been operating for over 15 years (Wind Europe 2024).

5.5.3 Limiting the size of new clean energy projects to accelerate GBE's impact

While onshore clean energy projects have variable dimensions and can reach capacities of hundreds of MW,[28] **GBE should focus on smaller sizes, where the returns associated with economies of scale are typically lower, particularly in solar PV.** However, since these projects would be driven by residual consumers – namely small businesses and local communities – they play a crucial systemic role in fostering affordable and clean energy. Smaller projects are also better suited to the business model of private wire PPAs and can be rapidly commissioned before 2030, allowing GBE to claim the results of its investments within a relatively shorter period.

While the size of each project should be evaluated based on the physical characteristics of the area and on the expected utilisation of the plant, a general distinction could be made between utility-scale and LPP projects:

- Utility-scale projects could have a minimum size of 5MW and be limited to 50MW in England and Wales, or 30MW in South Scotland and 10MW in North Scotland, to avoid mandatory transmission grid connections and associated costs.
- LPP projects could have dimensions of minimum 1MW[29] with no predetermined maximum limit.

28 For instance, the Viking Wind Farm, the UK's largest onshore wind farm, has total capacity of 443MW. While utility-scale solar PV plants are currently smaller, planning applications have been submitted for solar projects with capacities of several hundred MW. Notably, EDF Renewables' Longfield Solar Energy Farm, a nationally significant infrastructure project with a generation capacity of 500MW, received a development consent order (DCO) in June 2023 and secured a 299MW CfD in AR6, making it the largest solar PV project awarded in AR6.

29 According to previous estimates by Solar Energy UK and Wind Europe, in the absence of storage systems, 1MW of solar capacity could power approximately 300 typical households, while 1MW of onshore wind capacity could supply around 500 households.

6. A GOVERNANCE STRUCTURE CONSISTENT WITH GBE'S FOUNDATIONAL MANDATE

GBE will incorporate governance elements that define both its internal organisation and its external interactions. These must align with its operating model to support an effective delivery of GBE's foundational mandate. This chapter examines GBE's governance in the coming years, with a view towards its evolution beyond 2030.

6.1 LEGAL NATURE, OWNERSHIP AND REPRESENTATION ON THE BOARD

GBE is defined by legislation as a company "wholly owned" by the secretary of state. Whether it is classified as a non-departmental public body (NDPB) or as a public corporation, it will remain an arm's-length public sector entity.[30] Maintaining GBE's legal nature and public ownership structure, as is, is crucial.

GBE's classification as a public entity will preserve its public policy mandate and its preferential financing capacity – two closely interlinked and foundational features.

While a diffused ownership structure – in which devolved nations and local authorities hold minority stakes in GBE – could enhance democratic accountability, this model presents several challenges. Fiscally constrained local governments would need to inject capital into GBE, unless the central government allocated shareholding portions for free, effectively resulting in a capital transfer.

If changes led to GBE losing its status as an arm's-length entity of the more creditworthy UK government, its preferable financing conditions could be compromised. In practice, the diffused ownership model does not apply to 'national' publicly owned companies, but only to regional ones.[31]

In principle, sharing accountability and oversight does not strictly require ownership stakes as long as the secretary of state ensures that devolved nations and local authorities are represented on GBE's board, possibly with veto power over certain issues. This applies also with respect to workers' representatives (see section 6.4).

6.2 RELATIONSHIP WITH THE PUBLIC SHAREHOLDER

The interaction between established publicly owned electricity companies and their public shareholders is typically limited to a supervisory role and the appointment of board members. This ensures that the company's strategy, developed independently by its management, remains aligned with national policy objectives. Public shareholders retain the ability to influence or veto critical decisions – either through persuasion or by voting in the general

30 At some point GBE should qualify as a public corporation, given that it will derive "more than 50 per cent of its production cost from the sale of goods or services at economically significant prices" (Cabinet Office 2016).

31 For instance, in the cases of Axpo in Switzerland and EnBW in Germany, neither of those regional companies enjoys the same financing condition of their respective federal governments.

assembly – but they do not interfere in the company's day-to-day management. This is vital to retain market confidence and certainty.

This is the model GBE should strive for in the long term. However, during these crucial early years, its operating model and strategy should be developed in close collaboration with the Department for Energy Security & Net Zero (DESNZ) to ensure GBE is well-equipped to deliver on its mandate. As GBE becomes fully operational, this relationship is expected to rebalance, allowing the company greater managerial autonomy. This transition will only be complete once GBE achieves financial independence (see section 6.3). In principle, **the public shareholder should retain a supervisory role and the ability to influence long-term strategic changes, ensuring the preservation of GBE's fundamental policy impact.**

6.3 GBE'S FINANCIAL GOVERNANCE

6.3.1 A financial model that maximises investments and minimises bills

GBE should embrace a financial management approach consistent with its objective to invest in clean energy and minimise the price of electricity sold, while ensuring positive returns over the long term. Two principles key to adopt would be:

1. **Profit-sustainability.** In the first years, GBE will not be able to generate enough revenues to cover its investment costs, as it builds its own clean energy assets. However, beyond the initial phase, GBE should strive for long-term financial sustainability, as this is essential for achieving financial autonomy and maintaining the favourable credit rating crucial to its unique operating model. While GBE will not need to maximise profitability, it should ensure that returns – though potentially lower due to its discounted electricity prices – cover its borrowing costs, and therefore maintain its credit rating.
2. **No cash dividends.** Once they materialise, GBE's profits should be reinvested internally, to expand the portfolio of assets, or be added to its reserves, enabling further borrowing for investment, rather than being externally distributed to the public shareholder. A fully operational GBE will be a revenue-generating entity partially capable of expanding through its own internal proceeds.

6.3.2 GBE's autonomous financial capacity and its relation to fiscal rules

GBE is currently unable to raise its own financial resources and must rely on capital endowments from the government. As a result, by the end of this parliament, GBE will have deployed its allocated resources. At that moment, reliance on internal cashflows from operations will still be limited and insufficient to allow GBE to further expand its remit.

By 2030, GBE will need to be either recapitalised or granted the ability to raise its own financing resources – or both, to continue investing in generation capacity and to diversify in other areas of the electricity system (see chapter 7). Providing GBE with autonomous borrowing powers through the issue of its own bonds is the natural progression for a fully functioning publicly owned electricity company similar to those surveyed in chapter 2.

Nevertheless, under the current classification of public bodies and fiscal rules in the UK, any external debt raised by GBE would contribute to the public sector net debt – currently measured as public sector net financial liabilities (PSNFL). Ultimately, this represents a major constraint in GBE's ability to expand its investment capacity.

While the new PSNFL rule allows for the netting out of liabilities when investing in illiquid financial assets, thereby having a neutral impact on the overall debt measure, GBE's balance sheets will mainly consist of non-financial physical assets. Unless a new fiscal framework is introduced for public sector net debt – such as the

public sector net worth (PSNW) measure – GBE's assets will not counterbalance its debt liabilities in accounting terms (Ebdon and Khatun 2021).

A more sensitive approach would be to legally de-consolidate GBE – and other publicly owned commercial entities – from the public sector balance sheet, as already happens in Europe and in the US with publicly owned companies. Financial prudence could be maintained through a borrowing cap, similar to the approach used with the TVA[32] in the US. Under this solution, fluctuations in GBE's outstanding debt would not be reflected in public sector net debt figures.

6.4 WORKERS' REPRESENTATION AND GOOD-QUALITY JOBS

GBE's workforce should be involved in the company's governance. Representatives of workers should be transparently involved in the company's activities and decision-making processes. Workforce representatives are also already involved in the governance of many of the UK's public bodies: for example, the TUC has a seat on the government's Industrial Strategy Advisory Council (DBT 2024). The recent appointment of the former TUC general secretary to GBE's start-up board is another step in the right direction. There should also be seats on GBE's board for workforce representatives from trade unions officials in the energy sector.

Involving workforce representatives in governance is already standard practice in publicly owned energy companies in other countries. In Germany's EnBW, the works council structure gives workers the opportunity to sit on and feed into an advisory committee which oversees the activities of the company's board.

GBE should also create good-quality jobs once it starts to own and operate energy assets. **The aspiration should be for GBE to become a model employer in the energy sector.** To achieve this, the government should give GBE an explicit mandate to create and support good jobs. As part of this mandate, the company should facilitate opportunities for workers to join trade unions and enter into collective bargaining agreements. Once the company has captured a sufficient share of the UK's energy generation capacity, this will allow GBE to set the expectation for best practice in the sector's labour market by maintaining good working conditions and standards.

6.5 RELATIONSHIPS WITH OTHER PRIVATE PLAYERS IN THE ELECTRICITY SECTOR

Far from crowding-out investments or discouraging initiatives by other players, **GBE's operations at the margin of the electricity sector could have powerful crowding-in and market-creating effects.** There are several players with whom GBE could establish working relations:

- **Pure-play developers (contractors).** The building of GBE's generation assets, particularly in the short term, will be performed by external pure-play developers – companies that are specialised in building clean energy assets. GBE could encourage the growth of local developers in the various areas where it will invest.
- **Independent Connection Providers (ICPs).** GBE's operating model of private wire PPAs will require the design and construction of the cable and associated high-voltage infrastructure. This will be carried out by resorting to specialised ICPs – companies responsible for planning, constructing and overseeing electrical infrastructure, including establishing new grid connections and modifying existing ones.

32 The TVA's bonds benefit from the US federal government's credit rating, enabling the company to conveniently borrow at low costs. The government has legally imposed a cap on the total capacity of borrowing to prevent excesses. TVA's outstanding debt is currently three times its revenues (TVA 2024).

- **Retail companies.** Retail companies specialising in selling electricity to industrial and domestic consumers will have an important intermediary role in GBE's PPAs under both utility-scale and LPP projects. In return for this role, retail companies will benefit from long-term and reliable revenue streams.
- **Other generation companies.** Beyond potential collaborations on clean energy projects, private generators can benefit from GBE's expansion of the market for corporate PPAs to residual off-takers, since this will reduce the monopsony power of large clients.
- **Suppliers of technical and material equipment.** While domestic UK suppliers of electric equipment and materials could benefit from GBE's additional investment, its ability to provide discriminate support is limited by cost considerations and by mandatory competitive tenders (see section 6.6).

6.6 TARGETED INDIRECT SUPPORT TO DOMESTIC CLEAN ENERGY SUPPLY CHAINS

GBE is intended to play a key role in supporting domestic clean energy supply chains, alongside other public sector entities such as the National Wealth Fund, as previously advocated by IPPR (Gasperin and Dibb 2023). Nevertheless, **GBE cannot perform this function directly as a discriminatory purchaser of technical equipment.**

GBE is limited by its modest investment scale. GBE's financing capacity of £8.3 billion over five years constitutes only a marginal share of the £20.8 billion average annual investment required for renewables[33] until 2030, as estimated by NESO (2024). In any case, the ability to favour UK supply chains in procurement is constrained by competition principles governing public tenders. Nonetheless, even if local content discrimination in procurement were permitted,[34] there is a risk that it could lead to higher equipment or material costs. This, in turn, might erode GBE's already narrow margins, jeopardising its financial sustainability, or resulting in higher electricity prices.

GBE could best fulfil this mandate in a targeted indirect way. As recommended elsewhere (Stonehaven 2024), **GBE's support to the clean energy supply chain could materialise through the very provision of cheaper electricity.**[35] This would allow recipient businesses, particularly those exposed to international competition, to improve their cost competitiveness by directly reducing their energy costs. Their financing costs could also be indirectly positively affected, as these businesses might enjoy an ESG (environmental, social and governance) credit premium in relation to their consumption of renewable energy.

6.7 RELATIONSHIPS WITH OTHER PUBLIC ENTITIES

Collaborations with other public entities should facilitate, not substitute or duplicate, the tasks that GBE is meant to carry out. They should occur only when they are instrumental in supporting GBE's objectives.

While the partnership with The Crown Estate could facilitate GBE's localisation of its onshore utility-scale projects, the association with Great British Nuclear does not offer advantages to either of the two differently purposed organisations (Alvis 2024).

33 Under the 'New Dispatch' scenario and excluding the £13 billion annual average investment needs related to networks.

34 Similar to the recent introduction of Sustainably Industry Rewards (SIRs) for the next round of CfD auctions (DESNZ 2024l).

35 Paradoxically, the very companies that manufacture equipment for offshore wind in port locations do not directly benefit from the cheaper electricity generated by the nearby offshore wind farms.

GBE could instead coordinate with the National Wealth Fund to strengthen support for clean energy supply chains. Specifically, NWF financing of companies signing PPA deals with GBE would represent an implicit public guarantee of creditworthiness for GBE and offer a complementary strategic support to businesses operating in clean energy supply chains. However, in the area of investment in generation assets, GBE must dispose of autonomous internal financing capacity, which should be allocated swiftly. The NWF could instead play a crucial role as a public financing entity for non-GBE clean energy projects, effectively replacing the function that the EIB played in the UK before Brexit.

Finally, investment in basic and applied research on clean energy technologies, as well as testing, should be left to dedicated entities: universities, the research eco-system of Innovate UK and Catapult. GBE could consider when to establish collaborations with them to capitalise on their research findings and to explore new areas of technological experimentation.

7.
GBE BEYOND 2030

While previous chapters focused on how GBE could fulfil its mandate in the coming years, overcoming the challenges of limited resources and its start-up phase, this chapter explores GBE's potential evolution beyond that date.

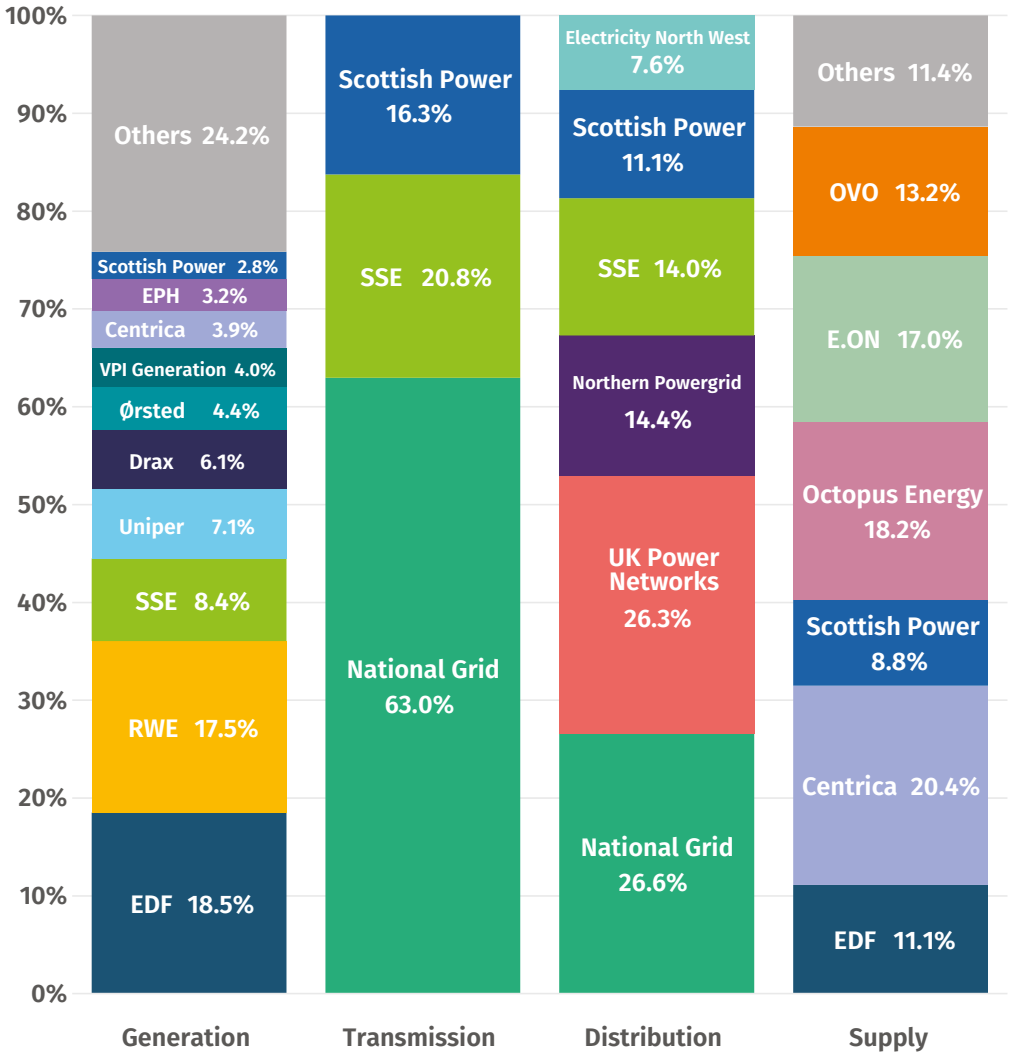
While GBE's focus in the years leading up to 2030 will be on generation, its future diversification into other areas of the electricity sector should be considered as a way of expanding its impact within the UK electricity system. Expanding GBE's range of activities would bring it closer to its European publicly owned counterparts, most of which display a vertically integrated organisational structure. Despite their strict legal and operational separation – required by the unbundling process driven by the European Union's three Energy Packages (1996, 2003 and 2009) – generation, distribution (and sometimes transmission) and supply activities are typically consolidated under a single holding entity, which maintains centralised control over the group's financial resources.

The diversification of risk, coupled with the implicit synergies and learning opportunities deriving from leveraging internal capabilities across all segments of the electricity system, have been identified as a strategic advantage by some of the publicly owned companies interviewed.

The following sections explore GBE's potential to achieve a similar strategic advantage in the post-2030 UK electricity system, ensuring it continues to deliver on its foundational mandate as a truly systemic national champion.

FIGURE 7.1 FEW PLAYERS DOMINATE THE BRITISH ELECTRICITY INDUSTRY WITH HIGHER COMPETITION IN GENERATION

Market shares of key companies in the electricity generation, transmission, distribution and supply segments within Great Britain (year 2023)



Source: Authors' elaboration on Ofgem's figures and companies' annual reports.

7.1 GENERATION: GBE'S FOCUS TO ACHIEVE SYSTEMIC DIMENSION WITH A 5 PER CENT NATIONAL SHARE

The number of generation companies, or Major Power Producers (MPPs), operating in the UK has steadily increased since privatisation,[36] rising from six in 1989 to 56 in 2023.[37] However, the number of MPPs producing at least 5 per cent of total generation has only slightly reduced down to six in 2023.[38] Despite this, their share of total generation capacity[39] has fallen by 14 percentage points since 2011, reaching 55 per cent in 2023 (DESNZ 2024g).

36 Major Power Producers (MPPs) are companies whose main purpose is the generation of electricity.

37 Of which three were in Northern Ireland.

38 The discrepancy with earlier figures arises because this refers to the UK as a whole, whereas figure 7.1 illustrates the shares of wholesale electricity generation specifically within Great Britain.

39 The combined generation market share of the top six MPPs decreased by only 5.4 percentage points, from 70 per cent in 2011 to 64.6 per cent in 2023.

To be a significant player in the UK electricity sector, GBE should aim to join the club of MPPs that account for at least 5 per cent of total generation. This would remain modest in scale compared to other nationally relevant publicly owned companies (as shown in table 3.3) and to other established players in the UK, such as EDF Energy, RWE and SSE. However, it would provide GBE with the minimum relevant scale to start gaining a systemic impact within the UK electricity system.

While this is unlikely to occur before 2030, the target should not be postponed much further into the future. In fact, an estimate based on installed capacity – rather than actual generation – suggests that GBE would need to reach 8.5GW of installed capacity to account for 5 per cent of national installed capacity in 2030. If the £8.3 billion allocated to GBE is fully deployed in the coming years and projects proceed without major obstacles, the 8.5GW figure is consistent with our calculation of GBE's investment capacity based on the cost estimates from chapter 5. As shown in table 5.4, GBE's utility-scale investments in onshore generation could deliver 5.6GW of capacity, while an additional 3GW of local power capacity could reasonably be developed through the LPP.

TABLE 7.1 GBE'S NEEDED INSTALLATION EFFORT TO BECOME A SYSTEMIC PLAYER IN ELECTRICITY GENERATION BY 2030

Current capacity	Installed capacity	Share of national
Renewables[1]	56.6GW	53.8%
Total installed capacity	105.3GW	-
NESO 2030 scenario	**Installed capacity**	**Share of national**
Renewables 2030	117.8GW	69.5%
Total installed capacity 2030	169.4GW	-
GBE's installation cases	**Installed capacity**	**Share of national**
Baseline	8.5GW	5%

Source: Authors' elaboration from NESO (2024). Notes: Using as a reference for 2030 the more conservative 'New Dispatch' scenario. Figures are relative to Great Britain, while GBE is mandated to operate across the UK. [1]Refers to solar and wind (offshore and onshore). [2]Refers to total capacity minus interconnectors and storage.

By 2030, with a reformed electricity market aligning wholesale prices to cheaper generation cost of renewables, and after GBE's financing powers are reinforced as proposed in section 6.3, GBE could transition from the operating model outlined in chapter 5 to one more akin to its established publicly owned counterparts. At that stage, any additional investment in renewable capacity would directly contribute to lower electricity prices, and GBE could begin selling directly into the wholesale market – provided that stabilisation mechanisms are in place to prevent prices from falling below profitability levels.

With greater autonomous and financing powers, GBE could expand its investment capacity to develop larger onshore projects and offshore wind farms in collaboration with other players, as electrification demand continues to rise.

7.2 TRANSMISSION: GBE'S FUTURE ROLE IN OFFSHORE CONNECTIONS AND IN REFORMING THE NATIONAL NETWORK

Transmission is, like elsewhere in Europe, a highly regulated area of the electricity system governed by licensed monopolies. However, the UK stands out due to its fragmented and entirely privately owned transmission system (see box below).

In contrast to the trend towards rationalisation under a single entity,[40] in the UK, National Grid is only responsible for the transmission network in England and Wales. Scotland is served by two companies: SP Energy Networks for the southern transmission network and Scottish & Southern Electricity Networks for the northern part. Northern Ireland's transmission grid, operated by NIE Networks,[41] is connected and synchronised with the Republic of Ireland's (see box).

EUROPEAN COUNTRIES WITH PUBLICLY OWNED TRANSMISSION GRIDS

Among 36 European countries that are members of the European Network of Transmission System Operators for Electricity (ENTSO-E), only Portugal and the UK have a fully privately owned transmission grid (see table 7.2).

The ownership model of transmission grids ranges from listed companies with a public majority stake to full 100 per cent ownership. In several cases, the transmission company is consolidated as a subsidiary of the national publicly owned electricity company.

40 In the past decades, Austria, Switzerland and Denmark concentrated their multiple transmission grids under a single entity. In Germany this has been under discussion until recently.

41 Paradoxically, Northern Ireland is home to the UK's only publicly owned transmission company, as NIE Networks operates as a subsidiary of ESB, the state-owned electricity company of the Republic of Ireland.

TABLE 7.2 THE OWNERSHIP STRUCTURE OF EUROPEAN TRANSMISSION COMPANIES

	Company name	Degree of public ownership
Albania	OST	100%
Austria	Austrian Power Grid	100% owned by Verbund (80% publicly owned)
Bosnia and Herzegovina	NOS	100%
Belgium	Elia	44.8% by municipal holding (listed)
Bulgaria	ESO	100% owned by publicly owned BEH
Croatia	HOPS	100% owned by publicly owned HEP
Cyprus	TSOC	100%
Czechia	ČEPS	100%
Denmark	Energinet	100%
Estonia	Elering	100%
Finland	Fingrid	53%
France	RTE	100% (of which 50.1% by publicly owned EDF)
Germany	TransnetBW	80% by publicly-owned EnBW – 20% KfW
	TenneT*	0% (Germany) [100% (The Netherlands)]
	Amprion*	0%
	50Hertz Transmission	20% KfW [80% Elia (Belgium)]
Great Britain	National Grid*	0%
	SSE Networks*	0%
	SP Energy Networks*	0%
Greece	IPTO	76%
Hungary	Mavir	100% owned by publicly owned MVM
Iceland	Landsnet	100% (93.2% government, 6.8% Reykjavík Energy)
Ireland	EirGrid	100%
Italy	Terna	30% (owned by state-owned Cassa Depositi e Prestiti))
Latvia	AST	100%
Lithuania	Litgrid	100%
Luxembourg	Creos	99.9% (75.5% by publicly owned Encevo – 24.4% by central and local authorities)
Montenegro	CGES	55% (listed)
Netherlands	TenneT	100%
North Macedonia	MEPSO	100%
Northern Ireland	NIE Networks	0% [100% by ESB (Republic of Ireland)]
Norway	Statnett	100%
Poland	PSE	100%
Portugal	REN*	0%
Romania	Transelectrica	81.1% (listed)
Serbia	Elektromreža Srbije	100%
Slovakia	SEPS	100%
Slovenia	Elektro-Slovenija	100%
Spain	Redeia	20% (listed)
Sweden	Svenska kraftnät	100%
Switzerland	Swissgrid	~100% by publicly owned municipal and cantonal utilities
Ukraine	Ukrenergo	100%

Source: Authors' elaboration. Notes: List of countries with members of ENTSO-E, plus Great Britain. Ownership details are provided in square brackets when the entity is foreign but publicly owned. *Fully privately owned transmission companies.

In recent years, the UK has also been suffering from significant curtailment of generation, particularly wind-powered, because of transmission bottlenecks[42] (Carbon Tracker 2023). To avoid disincentivising investment in new capacity, generators in the UK are compensated for the curtailed electricity, but the cost is passed on to consumers' bills.[43]

A fragmented transmission network complicates the coordination of investments in new lines and grid connection points, which are essential to expand grid capacity in a predominantly renewable electricity system (Common Wealth 2023). This complicates the delivery of £9.7 billion average annual capital investments for the transmission network, as estimated[44] by NESO (2024), that will be needed for a clean power system by 2030.

The establishment of NESO in 2024 as Great Britain's publicly owned system operator, along with the ongoing review of network planning to develop a Centralised Strategic Network Plan (CSNP), aims to address the lack of coordination and planning in the national transmission network. However, the UK will remain atypical with this planning and coordination function separated from investment (under the control of privately owned players).

Increased public ownership in the transmission grid could lower profitability margins[45] – deriving from lower transmission charges – and allows for the reinvestment of profits within the company.

Despite the challenges posed by the fragmented and privately owned nature of the transmission system, GBE has no role to play in this area without a new mandate and additional financial resources.

Beyond 2030, GBE could become involved in offshore transmission by collaborating with developers and taking responsibility for offshore transmission assets, ultimately becoming an Offshore Transmission Owner (OFTO). This would allow GBE to rebalance risk in favour of developers (Crawford-Percival 2024), while gaining ownership to a regulated, revenue-generating asset. In order to conduct this role effectively, GBE would need to be adequately capitalised, given the substantial costs of transmission assets.[46]

In the long term, GBE could become the instrument through which the British transmission networks are integrated under a single publicly controlled entity, similar to what has happened in some other European countries over recent years.

7.3 DISTRIBUTION: A STRATEGIC AREA FOR GBE'S MODEL OF DECENTRALISED INVESTMENTS

Distribution is also a regulated sector overseen by licensed monopolistic players. A distinction exists between Distribution Network Operators (DNOs), licensed to distribute electricity within specific areas of Great Britain, and Independent Distribution Network Operators (IDNOs), which build, operate and maintain local electricity distribution networks connected to DNOs' distribution networks across Great Britain.

42 Carbon Tracker estimated that curtailment from wind amounted to 6.5 TWh between January 2021 and April 2023, costing £1.5 billion to the end consumer.

43 An extra £40 to energy costs for households in 2023, according to Carbon Tracker (BBC 2023).

44 Under the 'New Dispatch' scenario.

45 National Grid Electricity Transmission's net profit margins averaged 21.2 per cent between 2014 and 2023 (Common Wealth 2023), whereas publicly owned transmission companies in Europe have operated with much smaller margins. In 2023, net profit margins were less than 15 per cent for Denmark's Energinet, 6.8 per cent for France's RTE, 8.2 per cent for Switzerland's Swissgrid and 1 per cent for Sweden's state agency Svenska kraftnät.

46 For instance, the final transfer value (FTV) of the transmission assets for the 950MW Moray East offshore wind farm amounted to £666.1 million (Ofgem 2024c).

The former are legacy companies from the 14 British area boards of the nationalised era, now consolidated into six main players through mergers and acquisitions over the years. These entities are all privately owned – another UK peculiarity[47] (Eurelectric 2020), as publicly owned entities in most European countries control significant portions, if not nearly all, of their national distribution networks (table 7.3). Additionally, in most European countries – unlike the UK and Germany – the responsibility for installing and owning smart meters, critical for a digitalised network with bidirectional electricity flows, is assigned to those publicly owned distribution players, resulting in much higher smart meter penetration rates[48] (ACER 2024).

IDNOs are considerably smaller and more diverse players compared to DNOs, though they operate under similar obligations regarding performance standards. Entering the distribution as a DNO requires acquiring the licensed company operating within a specific area, whereas any qualified business could obtain an IDNO licence, including generation companies.[49] Ofgem (2025b) has issued licences to 21 such IDNOs.

Many of the challenges affecting the development of transmission networks also apply to the distribution segment. Chief among these is the need for investment in new lines and substations to connect renewable energy plants. NESO (2024) estimates that 29 per cent of onshore wind and 90 per cent of solar capacity will need to be connected directly to the distribution network by 2030, costing an average annual £3.4 billion of capital investment.[50] While a significant portion of this investment will be made by DNOs, IDNOs could contribute additional capacity through a more distributed network comprising smaller generation units.

Secondly, distribution network costs[51] have an even greater impact on electricity bills – nearly twice as much as transmission and balancing costs combined (Acha et al 2016). While these charges are necessary to compensate distribution companies for the services they provide, they also extend beyond operational costs to include profit margins, which rank among the highest across all UK industries.[52]

For these reasons, there is a strong case for GBE to expand into electricity distribution after 2030 by obtaining a licence to operate as an IDNO. This opportunity arises not only from the need to alleviate the distribution connection backlog but also from the potential to reduce electricity bills for end consumers by internalising certain distribution costs and containing related charges. Diversification in distribution activities would require additional recapitalisation from the public shareholder, which could be compensated through interest payments derived from the revenue-generating distribution assets.

7.4 RETAIL: A SEGMENT OUTSIDE GBE'S SCOPE

The supply of electricity in Great Britain has been long dominated by the so-called 'Big Six' players, which account for almost 90 per cent of the domestic market share (figure 7.1). The supply segment is of lesser interest to GBE, as the government "does not intend for Great British Energy to be an energy retail company" (UK Parliament 2024).

47 Only Hungary and Bulgaria in the EU have fully privately owned distribution networks.

48 Italy and Scandinavian countries achieved nearly 100 per cent roll-out of smart meters several years ago, whereas in the UK only 62 per cent of households had smart meters installed by 2023.

49 As Vattenfall UK did in 2018.

50 Under the 'New Dispatch' scenario.

51 Distribution tariffs are divided into Distribution Use of System (DUoS) and distribution losses.

52 An estimate by Common Wealth indicates that British distribution companies paid out £8.2 billion in dividends between 2012 and 2021 (Brian Hager and Baines 2022).

While the UK electricity system may have little to gain from GBE's involvement in supply activities, even in the longer-term future,[53] it is worth noting that publicly owned electricity companies in Europe are often involved in both generation and supply segments, as part of their legacy as former vertically integrated state monopolies. In fact, several privately owned electricity companies in the UK operate as both generators and retailers, as demonstrated in table 7.3.

TABLE 7.3 KEY UK COMPANIES OPERATING ACROSS THE FOUR SEGMENTS OF THE ELECTRICITY SECTOR

Company	Generation	Transmission	Distribution	Supply
Scottish Power	✓	✓	✓	✓
SSE	✓	✓	✓	✗* (until 2020)
National Grid	✗	✓	✓	✗
NI Electric Networks	✗	✓	✓	✗
EDF UK	✓	✗	✗	✓
Vattenfall UK	✓	✗	✓[1]	✗
RWE	✓	✗	✗	✗
Uniper	✓	✗	✗	✗
Octopus Energy	✓* (recently)	✗	✗	✓
British Gas/Centrica	✓	✗	✗	✓
Drax	✓	✗	✗	✗
Ørsted	✓	✗	✗	✗
OVO	✗	✗	✗	✓
E.ON	✗	✗	✗	✓

Source: Author's elaboration. Note: [1]Licensed IDNO.

53 See Khan et al (2024) for a different take on the subject.

8. CONCLUSION

The creation of GBE could become the defining policy of the new Labour government, winning the hearts of UK citizens. For that to happen, policymakers must equip GBE with all the necessary ammunitions to deliver on its critical foundational mandate, without asking too much from it, especially in its early years. The timely allocation of earmarked resources, together with the implementation of a coherent operating model and governance structure will be crucial for GBE's success.

GBE can aim to become a "publicly owned domestic champion" in the electricity industry, similar to leading players across Europe. To achieve this, GBE must quickly learn to operate as a fully-fledged electricity company, without delegating its own functions to external collaborations or relegating itself to a modest financing role. With 2030 fast approaching, GBE must be ready to lead the UK into a more independent and decarbonised power sector that will deliver affordable electricity to businesses and households across the nation.

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