Unite Investigates: Renationalising energy – costs and savings

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1 Foreword by Sharon Graham: We can take back control of our energy

Sharon Graham, Unite General Secretary

It's time to end the chaos in our energy network which allows profiteers to flourish while workers and communities are left in the cold.

In this report *Unite Investigates* moves beyond the slogans and rhetoric to explore exactly how the energy network can be brought under public, democratic control.

The report assesses the costs and benefits of nationalisation by considering each of the key sectors of the broken energy system, from the companies supplying our homes right back to oil and gas production in the North Sea. It exposes the costs of continuing to leave this critical infrastructure in the hands of profiteers.

The picture could look very different if the UK had an energy system which functioned to meet our needs, not prioritise profiteering

Taking back control of our energy could have saved UK consumers £45 billion in the last year alone. That's £1,800 per household.

Had the energy system been under public control in 2021 the savings would have been sufficient to avoid the massive hikes to bills in 2022.

Household energy bills have been one of the biggest contributors to high inflation. The ability to freeze those bills would have meant that inflation was at least 4.1% lower.

As well as the cost-of-living crisis, publicly owned energy is part of the solution to the climate crisis. The money is there to transition the industry and create well-paid, secure jobs. We must recover profits from the multinationals who've been granted licences to print money by the government, and from the billionaire owners of the distribution and supply networks.

Public, democratic control which makes energy affordable while sustaining decent work. The question is no longer can we afford to nationalise, it is how long can we afford not to?

It's time to pull the plug on the energy profiteers. This report shows how it can be done.

2 Why take back control of our energy?

The energy system is crucial national infrastructure that affects the lives of every person in the UK. But in its current form it is systematically failing. Instead of meeting our needs, it prioritises profiteering by private companies.

Taking back control of the UK's energy supply could have several major benefits:

- **Ending sky-high prices driven by rampant profiteering.**

Profiteering by private companies has contributed hugely to skyrocketing energy prices that have triggered the cost-of-living crisis. To give an idea of the scale of profiteering, the Treasury has estimated that UK gas producers and electricity generators may make £170 billion in "excess profits" from the current energy crisis over two years.[1] Our own research (see Section 9) estimates that the energy sector made nearly £45 billion in profits in 2022.

  - If that money hadn't gone into company profits, **UK energy bills could have been cut by over £1,800 per household in 2022.** Longer term savings from renationalising energy supply could be considerably more.
  - Cutting energy bills would also have meant much lower inflation rates than we have suffered in the last year. For example, just **freezing bills at summer 2021 levels would have meant inflation was at least 4.1% lower overall**.

- **Securing supply.**

The current chaotic system is highly vulnerable to risks including: enormous price fluctuations in global energy markets; geopolitical events such as the war in Ukraine; or rising interest rates. This market fragility has already led to the bankruptcy of several energy suppliers. It raises the threat of national blackouts, and increases the costs to consumers when the government has to bail out bankrupt firms.

  - By taking the energy system under public control, we could prioritise investment in sustainable energy generation to ensure the UK's energy supply will be independent and secure now and in the future.

- **Enabling a worker-centred just transition.**

Despite receiving millions in low-carbon and renewable subsidies, tax breaks and exemptions, private energy companies choose to line their pockets rather than make the required transition to a green energy system. Alongside other G20

countries, the UK's energy production remains "dangerously out of sync" with the Paris Agreement limits.[2]

- Public, democratic control of the energy system by communities and workers is urgently needed if we are to have any chance of actually meeting environmental commitments. And, crucially, to ensure this happens in a way that guarantees the jobs, pay and conditions of energy workers.

2.1 This report maps out the UK energy supply chain, the companies that own it, and key issues for renationalisation

In this report:

- We provide an overview of the UK's energy supply chain – looking at four key sectors from retail supply right back to oil and gas production in the North Sea.
- We identify the companies that currently profit from it – and their ultimate owners including global investment firms and foreign governments.
- We estimate potential costs of nationalising each of the four key sectors. In each case we provide a market value of the sector as well as a valuation of their equity or assets, shorn of imagined future profits.
- We briefly consider financial and legal issues arising from these approaches (to be expanded in future research).
- We estimate energy system profits in the last two years – money which could have been saved by nationalisation.
- We look at the impact that saving could have had on inflation.
- We briefly highlight and critique some potential "Plan B" policy alternatives to nationalisation.

2.2 Key finding 1: fully renationalising the UK's energy supply could cost £90.3 billion

We have calculated two sets of estimates for the costs of renationalising the four key energy sectors. "Equity book value" estimates are based on the principle of compensating the current owners for what they have invested. "Market value"

estimates are based on current share prices – which incorporate markets' expectations of future profits.

As discussed in the methodology section below, there is a strong argument for not using market value – because this is inflated by the very profiteering we are trying to address. Equity book value is thus our preferred basis; but we also include market value estimates for comparison purposes.

The table below presents the final estimates – see sections 3 to 7 below for detailed analysis.

Estimates of renationalisation cost	Equity Book Value estimate	Market Value estimate
Supply	£3.5 billion	£3.5 billion
Transmission & Distribution	£33.8 billion	£62.2 billion
Generation	£38 billion	£66.2 billion
North Sea Oil & Gas	£15.0 billion	£64.2 billion
TOTAL	**£90.3 billion**	**£196.1 billion**

2.3 Key finding 2: nationalisation could have saved UK consumers nearly £45 billion in 2022 – over £1,800 per household

In Section 9 of this report we estimate the profits made by the energy industry in 2021 and 2022. This money represents massive amounts paid by consumers and pocketed by energy companies. If the industry was nationalised, these profits could be redirected to social purposes. For example, they could be used to lower household energy bills, to fund transition investment, or to help pay the costs of nationalisation.

To illustrate the levels we are talking about: we estimate the total net profits across the energy system will be nearly £45 billion in 2022; if this amount were redistributed amongst all household energy consumers, this would represent over £1,800 per household.

2022 will be an exceptional year for energy prices and profits. But even in 2021 – a more "normal" year – they made over £14 billion in profit (see Section 9).

2.4 Key finding 3: using some of that saving to freeze energy prices at summer 2021 levels could have cut inflation by at least 4.1%

In Section 9.5 we analyse what returning those profits back to households could have meant for the "cost of living crisis". If the energy system had been nationalised in 2021, and its profits retained, the saving would have been more than sufficient to freeze household bills at summer 2021 levels – avoiding the massive energy bill hike since then.

As household energy bills have been one of the biggest contributors to the current inflation shock, freezing them would have had a major dampening effect on inflation. In fact, it would have meant that inflation was at least 4.1% lower in the last year.

3 Overview of the UK energy system

3.1 The four key sectors in the energy supply chain: North Sea oil and gas; generation; networks; supply

We can break down the UK electricity supply chain into three main stages:

- **Generation:** electricity is generated in gas-fired power stations (40% of electricity generated in 2021), using wind and solar energy (25%), nuclear power (15%) or other means. A small amount of electricity is imported through interconnector cables.[3]
- **Transmission** and **Distribution**: high voltage national transmission networks take electricity from generation plants to regional distribution networks, which bring it to customers' doorsteps.
- **Supply**: in the current market system supply companies buy electricity on the wholesale market from generators, and sell it on to household and business customers through retail bills.

Natural gas plays two key roles in the energy system: as the biggest input into electricity generation; and as a major direct energy source for domestic heating, as

well as industrial uses. Like electricity, the gas system includes national **Transmission** and regional **Distribution** networks; and **Supply** companies.

In this report we look at the likely costs of taking back control of all these stages of the energy supply chain: generation, transmission/distribution and supply. We also look at one other key area:

- **North Sea Oil and Gas**

The UK's North Sea oil and gas industry remains crucial to the country's energy supply chain. The majority of natural gas entering the UK network comes from the North Sea via pipelines.[4] In 2021, 42% of the UK's gas supply was produced domestically – that is, in the UK North Sea (UK Continental Shelf), although this was only the second time on record that indigenous production fell below 50%.[5]

The other half of the gas supply is imported. The bulk of imports come from the Norwegian North Sea – 64% of imports in 2021.[6] Around 28% of imports arrive by ship as Liquified Natural Gas (LNG).[78] The main LNG supplier in 2021 was Qatar (39% of UK LNG imports), followed by Russia (22% of LNG imports in 2021 – this level will have fallen substantially in 2022). Other LNG sources include the US, Algeria, Trinidad & Tobago and Peru.[9]

It is clearly out of the question (in the 21st century) for the UK to expropriate other country's fuel supplies. But taking back control of the UK North Sea – or at the very least setting up a more equitable and sustainable system for distributing its wealth – is a feasible consideration. A new democratic energy plan for the UK North Sea could make an important contribution towards reducing the costs of UK energy, ensuring security of supply, and also enabling a just transition away from fossil fuels.

As oil and gas production are inextricable, in this report we have looked at the North Sea industry as a whole.

3.2 The energy system is owned by multinational companies and foreign states

The UK energy system is now predominantly owned and controlled by companies of two kinds:

- private companies, particularly multinational corporations;
- corporations owned by foreign states.

There are legal requirements for the separation of companies in the generation, transmission/distribution and supply sectors. However, in practice many are owned by the same parent companies. There is particular overlap between the main generation and supply companies; a number of these also own distribution companies.

3.21 Electricity generation: dominated by multinationals including EDF, RWE, and SSE

The bulk of electricity is fed into the transmission network from over 400 major power plants (plus over 900 smaller ones), which are operated by over 50 companies.[10] These sell electricity to suppliers on the electricity wholesale market. Despite the substantial number of firms, there is high concentration amongst the biggest companies, as the table below shows:

Top 10 UK power plant owners

Parent companies	capacity (MW)	main fuel types	Ultimate owners
EDF Energy	12143	nuclear, coal, gas, wind	French state[11]
RWE Npower	10893	gas, wind	PLC, listed in Germany and US (largest shareholder currently BlackRock)[12]
SSE Group	7346	wind, gas, hydro	PLC, listed on London Stock Exchange (LSE)[13]
Uniper UK	6655	gas, coal	Currently PLC with Finnish government major shareholder; German Federal Government recently announced plans to buy 99%[14]
Orsted	4311	Wind	50.01% Government of Denmark; PLC, listed Nasdaq Copenhagen[15]
EPUKi	4124	gas, coal, oil	EPH, Czech energy group majority owned by billionaire Daniel Kretinsky[16]
Drax Power	3280	biofuel, hydro	PLC, listed on LSE, largely owned by global institutional investors[17]

Vitol	3252	Gas	Privately management-owned holding company registered in Netherlands[18]
Scottish Power	2624	Wind	Owned by Iberdrola, Spanish PLC, biggest shareholders are Qatar and BlackRock[19]
Intergen	2560	Gas	Jointly owned[20] by Sev.En Energy (owned by Czech billionaire Pavel Tykac)[21] and China Huaneng (owned by Chinese state)[22]

Source: Digest of UK Energy Statistics (DUKES) list of power stations in the UK, with owners and capacity, as at end May 2021[23]

3.22 Transmission and distribution: networks are run as monopoly concessions

The transmission and distribution networks are strong examples of "natural monopolies". Privatisation schemes in these sectors did not attempt to create any form of competitive markets: instead, companies are simply granted monopoly concessions to run national or regional grid infrastructure. These are regulated by Ofgem.[24]

National Grid PLC owns the gas transmission network across Britain and the electricity transmission network for England and Wales.

In Scotland, there are two other electricity transmission companies: Scottish Hydro Electric SHE, owned by SSE plc; and Scottish Power Transmission SPT, owned by Scottish Power.[2526]

In the distribution system, there are 14 licensed electricity Distribution Network Operators (DNOs), owned by just six companies; and eight Gas Distribution Networks (GDNs), owned by four companies.[27]

Northern Ireland has a separate regulatory system and company structure.[28]

Electricity DNOs and owners

Parent company	Regional operators	Ultimate Owners
National Grid PLC	As well as the national transmission grid, National Grid PLC owns: Western Power Distribution (West Midlands) plc; Western	PLC listed on LSE. 5 biggest shareholders (start 2022) were US-based investment funds Capital Group, BlackRock and Vanguard;

Parent company	Regional operators	Ultimate Owners
	Power Distribution (East Midlands) plc; Western Power Distribution (South Wales) plc; Western Power Distribution (South West) [29]	plus government funds of Abu Dhabi and Norway.[30]
Electricity North West Limited	Electricity North West Limited	Private consortium including Kansai (Japanese energy company), CIC (Chinese state investment fund), Equitix (London-based investment fund)[31]
Northern Powergrid	Northern Powergrid (Northeast) Limited; Northern Powergrid (Yorkshire) plc	Berkshire Hathaway[32] (US conglomerate controlled by billionaire Warren Buffet[33])
UK Power Networks	London Power Networks plc; South Eastern Power Networks; Eastern Power Networks plc	CK Group[34] (global conglomerate controlled by family of Hong Kong billionaire Li Ka-Shing[35])
SP Energy Networks	SP Distribution plc; SP Manweb plc	Scottish Power, which is owned by the Spanish PLC Iberdrola[36]
Scottish & Southern Electricity Networks	Scottish Hydro Electric Power Distribution plc; Southern Electric Power Distribution plc	SSE PLC[37]
Cadent Gas Ltd	Gas Distribution Networks (GDNs): North West; West Midlands; East Midlands; S Yorkshire, E of England and N London	Quadgas – a consortium of Macquarie, Hermes, state of China (CIC investment fund), state of Qatar (through QIA investment fund), Dalmore Capital, Amber Infrastructure[38]
Northern Gas Networks	NE England GDN	CK Group; with a minority stake owned by SAS

Parent company	Regional operators	Ultimate Owners
		Trustee Corporation, Australian government employees' pension fund[39]
Wales & West Utilities	Wales and SW England GDN	CK Group[40]
SGN (Scotia Gas Networks)	Scotland GDN; Southern England GDN	Consortium of 3 Canadian investment funds: Brookfield, Ontario Teachers' Pension Fund, Omers Pension Fund.[41]

Source: Ofgem[4243] and Cadent Gas[44]

3.23 Supply: a "Big Six" – composed of four legacy suppliers and two newer entrants – dominate after the recent collapse of small suppliers.

Supply companies buy electricity generated by the generation companies at the wholesale price and sell it to household and business customers at a retail price (subject to Ofgem's price cap for households). There is substantial overlap between electricity and gas suppliers: in the domestic market, "dual fuel" customers who buy both from the same supplier make up the majority of the market. [45]

A handful of companies dominate. Back in 2011 the top six suppliers controlled almost 100% of the domestic energy market. This has now dropped to around 80%. But the number of smaller licensed suppliers has fallen recently – from a peak of 62 in 2018 to just 17 today – as several went bust and their customers were transferred to the big players, who acted as "suppliers of last resort".[464748]

Four of the original "Big Six", sometimes called the "legacy suppliers", still retain leading positions. These are British Gas (whose parent company is Centrica), Scottish Power, E.On and EDF. All of these are also major electricity generators. [49] They have been joined by OVO, which took over SSE's supply business in 2020, and Octopus Energy, which took over Bulb in October 2022, to create a new "Big Six".[5051]

Domestic energy suppliers

Supplier (parent company)	Electricity market share % Q4 2021	Gas market share % Q4 2021	Ultimate owners
Centrica (British Gas)	19.6	28.2	PLC (listed on LSE), biggest shareholders are global investment funds[52]
E.ON	17.6	14.7	German PLC[53]
OVO	13.7	11.3	Private UK company, owned (at least 75%) by Stephen Fitzpatrick[54]
EDF	11.5	9.6	French state[55]
Octopus Energy	10.7	11.1	Owned by private UK investment company Octopus Capital, with other global private equity investors[56]
Scottish Power	9.2	8.0	Subsidiary of Iberdrola – Spanish listed PLC, biggest shareholders are Qatar and BlackRock
Bulb Energy	5.2	4.6	Due to be taken over by Octopus after collapse and government support[57]
Shell Energy	4.7	5.0	Subsidiary of Shell, UK-Dutch PLC[58]
Utilita	2.7	2.7	Private UK company, owned (at least 75%) by Bill Bullen[59]
Other Small Suppliers	4.7	4.8	

Source: Ofgem[60]

3.24 North Sea: 20 companies control over 80% of production through low-tax licenses

- **The North Sea licensing system**

The oil and gas in the UK North Sea is technically the property of "The Crown". However, under the current system companies are given considerable rights to exploit all oil and gas they find in geographical zones transferred to them through license agreements.

Licenses are granted in occasional licensing rounds, regulated by the body now called the North Sea Transition Authority (NSTA). Licensees must show that they have the technical and economic resources to exploit the field. Often several qualifying companies apply for a given license and they may each be awarded a share. The license holders may share investment in the costs of exploiting the field but typically one company (which may not always be a license holder) will carry out practical operations as the "operator".

Unlike many other government concessions, North Sea licenses are not auctioned or sold to companies. Instead, companies are granted long term rights to explore for fuel, then drill and sell it, in return for an annual rental fee based on each square kilometre the license covers at that date.[61] This annual charge is minimal: in the latest agreements, the total levy paid for *all licenses* was £32.88 million, a fraction of the profits gleaned from them.[62]

The theory is that the UK government instead takes a share in the profits on oil and gas sales through taxation.

In practice, the UK government has given companies extremely generous tax breaks, so that very little of the profits have come to taxpayers. In the last three decades nominal marginal tax rates on North Sea profits have varied between 30% and 75%; but major subsidies for capital and decommissioning costs mean that companies never pay anything like these levels. In fact, the effective tax rate from 1990 to 2017 was only 18% (Boué 2020).[63]

This compares very poorly with how other countries have managed their oil and gas assets, including in the North Sea. For example, Norway operates a broadly similar licensing system to the UK, based on the government sharing in profits through tax. But the country gets a much higher share: in the same period (1990-2017), Norway's effective tax rate was 48% (Boué 2020).[64] We look further at this issue below.

The companies

There are 258 companies with production and exploration licenses in the UK Continental Shelf (UKCS), many of which are subsidiaries of larger groups.[65] The NSTA consolidates these license holders into 118 parent companies licensed to produce oil and gas in the UKCS.[66]

However, in reality just 20 parent companies – operating through 82 license-holding subsidiaries – control the bulk of all currently productive oil fields.

We used NSTA production data from October 2021 to October 2022 to identify the most productive fields. We then linked this data to the equity holders to come up with a list of the 20 major parent companies responsible for 81.3% of production in the last year.[67][68]

Top 20 UK North Sea Oil and Gas Producers, Oct. 2021-Oct. 2022[69]

Parent Company	Production share Oct 2021-Oct 2022 (%)	Ultimate Owners
Harbour Energy Plc[70]	13.62	PLC (UK), major owner EIG Partners (US based private equity fund)[71]
TotalEnergies Upstream UK Limited	10.72	PLC (France)[72]
BP Exploration	9.71	PLC (UK)[73]
Shell Plc	7.03	PLC (UK and Netherlands) [74]
NEO Energy Group Ltd	6.36	Main owner is HiTec Vision, Norwegian private equity firm[75]
Ithaca Energy	5.57	Owned by Delek Group, Israeli PLC[76]
Spirit Energy	3.81	Private joint venture. Majority owner is Centrica (69%), also Stadtwerke München Group (SWM)[77]
CNOOC International	3.31	60% Chinese state owned; PLC listed in Hong Kong and Shanghai[78]
Enquest Plc	2.99	PLC (UK)[79]

Parent Company	Production share Oct 2021-Oct 2022 (%)	Ultimate Owners
Apache Corporation	2.98	APA Corporation, PLC (US)[80]
Taqa Europa B.V.	2.95	98.6% owned by Emirate of Abu Dhabi, 1.4% publicly traded[81]
Perenco Oil & Gas	2.11	French private company owned by Perrodo family[82]
Repsol Sinopec Resources	1.86	Joint venture between Repsol (Spanish PLC)[83] and Sinopec (PLC, but 69% owned by state-owned China Petroleum Corporation)[84]
Equinor ASA	1.84	Norwegian PLC, 67% owned by Norwegian state[85]
Korean National Oil Corporation	1.78	Government of Korea[86]
Neptune E&P	1.1	UK private company. Major investors include private equity funds CVC and Carlyle, and Chinese state wealth fund[87]
CNR International	1.05	Canadian Natural Resources, PLC (Toronto)[88]
Ineos Industries	1.02	Ultimate parent is Ineos Limited, a private company registered in Isle of Man. Major shareholder is UK tax-exile billionaire Jim Ratcliffe[89]
Centrica Storage Holdings	0.77	Centrica (UK PLC)
Hurricane Energy	0.7	UK PLC[90]
Total share	81.28	

3.3 The system is riddled with profiteering and market failures

Extremely high profit rates are being made across the UK energy system, largely enabled by failures of markets and regulators. A few key points:

- **Immense profits have been made all along the energy supply chain.**

Overall, the Treasury has reportedly forecast that UK gas producers and electricity generators could make "excess" profits of up to £170 billion over two years.[91]

- **Oil and gas companies have made extraordinary windfall profits due to leaps in global oil and gas prices.**

The top 10 global oil companies made £174.5 billion between them in 2021 – up 37% on 2019. Nine of the top ten UK North Sea producers have reported their 2021 profits; they made a combined £41.4 billion in 2021, up 50% on 2019.[92]

These companies have benefited from windfall profits so large that BP's CEO has described the company as a "cash machine".[93] These profits are being passed on to shareholders in huge dividends and share buybacks. For example, Shell spent an astonishing $26 billion on dividends and share buybacks for its shareholders in 2022 – over 7 times more than its investment in renewables.[94]

- **Windfall gas profits are a major factor pushing energy price jumps.**

The UK wholesale electricity price is highly influenced by the price of natural gas – the biggest input fuel. This means that the massive windfall profits of oil and gas companies have been a major factor pushing electricity bill inflation. [95]

- **UK electricity generators have made massive "excess profits" due to spiking wholesale electricity prices.**

The wholesale electricity price – the rate at which generators sell their energy to the grid – jumped nearly five times higher in 2021.[96] This was initially triggered by increased gas costs – and those giant profits for oil and gas companies. Yet gas is responsible for less than half of electricity generation, meaning that other (non-gas) generators had a "windfall": their sales price also rose, while their costs basically stayed the same. UK Treasury officials estimated in May 2022 that UK electricity generators could have made more than £10 billion in "excess profits" due to this.[97]

- **The transmission and distribution networks have been making massive profit margins for years.**

The supposedly "regulated" monopolies granted to National Grid PLC and regional distribution operators are effectively state-licensed cash machines. The electricity and gas distributors made a combined £6.3 billion in 2021.[98] According to analysis in the Financial Times, they have been making long-term operating profit margins of over 40%.[99]

4 Methodology: how can we estimate costs of nationalising energy sectors?

4.1 Equity book value approach

This is based on the principle of compensating the current owners for what they have invested. As David Hall and Vera Weghmann (2019)[100] write:

"(…) compensation should be based on the principle of returning to shareholders their actual investment in the company, as reflected by the value of net assets/shareholder equity on the company balance sheet." (Hall and Weghmann, 2019, p. 7.)[101]

Where this means nationalising a whole company (for example, a subsidiary that owns the relevant resources), this should be represented in company accounts by the equity book value of the firm: the value of all net assets (assets minus liabilities) on its balance sheet, which is equivalent to its net worth, or shareholders' equity.

In some cases, the calculation is more complicated because the assets to be compensated do not map directly to companies: e.g., the lowest level subsidiary company involved also owns other assets that are not relevant. In the sections below we explain how we have adapted this approach for different sectors.

One further question is how to approach the companies' debt. We may assume that the companies' relevant existing debts would be carried over and honoured in full. Over time, these debts could be refinanced through government borrowing. This would imply a lower interest rate than current company borrowing, and so a reduction in costs from nationalisation.

However, there is also the issue of what the impact on government interest rates would be from increasing public debt in this way. We discuss this below (Section 3.4).

4.2 Market value approach

An alternative principle is that companies should be paid what their resources are currently valued by the markets. This may be equated theoretically with the expected net present value of the companies' future profits from exploiting the resource. In practice, that equation involves unrealistic assumptions about, e.g., the "rationality" of markets. Yet it is fair to assume that market prices are broadly linked to investors' profit expectations.

In the UK energy sector, those future profits are highly dependent on regulatory conditions and government guarantees, including long-term monopoly concessions and subsidies for investment and decommissioning. As we saw above, companies across the energy sector have been making "excess" profits, enabled by factors such as market concentration, monopoly licenses, and lax regulation. In brief: the UK government has effectively been giving energy companies licenses to print money – it's because of failed policy that these companies and their energy concessions have sky-high profits and therefore sky-high market values. Paying market value would mean once again paying for this failure.

Nevertheless, for comparison purposes we have also calculated market value rates for the energy sectors. This is most easily done where there are publicly listed companies whose market values can be calculated from traded shares. This is not the case in all sectors – in the sections below we explain alternative methodologies we have used to estimate market values.

4.3 The CBI approach

In responding to the Labour Party's 2019 plans to renationalise industries including energy distribution and water, the Confederation of British Industry (CBI) published its own costings. The methodology involved adding a 30% mark-up to the Regulated Asset Value (RAV) or the Regulated Capital Value (RCV) of the companies.[102] The CBI publications take their RCV figures from Ofgem and the water regulator Ofwat – the explanation below is from an Ofwat publication on water company valuations:[103]

"The RCV starts with a direct measure of the value placed on each company's capital and debt by the financial markets following privatisation. This initial RCV is calculated as the average of the market value of each water and sewerage company for the first 200 days for which the shares were listed, plus the total value of debt at privatisation. A proxy for the initial market value was used for the

water only companies that were not privatised in 1989 (and hence no market information was available). This initial value was taken as the opening value of the RCV for 1990."[104] The initial value is subsequently increased every year in line with the RPI and investment into the asset stock, but accounting for depreciation.

On top of the RAV/RCV measure, the CBI applied a mark-up of 30%, which was "based on historical takeovers and market to asset ratios of publicly listed companies."[105]

There are several issues with this approach. First, it faces the same criticism as the market value approach discussed above: it incorporates profit expectations that are based on government support. Second, the RCV includes companies' debt, although there is no reason to pay out all the debt when a company is nationalised. Third, there is little justification for adding a mark-up on top of this valuation approach that is already based on market values, other than increasing benefits to shareholders.

4.4 Government borrowing and interest rates

There are two ways in which nationalisation would be likely to affect the overall level of public debt:

- If the government takes on the companies' existing debts – as we have assumed in our equity book value approach.
- If the government funds compensation payments through new borrowing – as opposed, e.g., to using proceeds from a wealth or windfall tax.

Taking on company debt could represent a technical increase in the government's reported Public Sector Net Debt. This is because, unlike the European Union, the UK government typically includes the debt of publicly owned corporations within this calculation (although it has made exceptions, notably in the bank bailouts following the 2008 financial crash).[106]

However, it is important to distinguish debt of "public corporations" from that of central government.[107] The key point is that central government borrowing has to be funded through overall government income; whereas public corporations have their own assets and revenue sources. So long as the nationalised companies are solvent, their debts would continue to be funded through their own business activities and create no additional burden on government expenditure.

In the second case, if the acquisition was funded by new borrowing this could have an impact on central government finances, and potentially on interest rates as investors account for this. Further research would be needed to analyse likely impacts. It could be argued:

- this would be a one-off cost – unlike a typical rise in government spending or unfunded tax cut – so would not create borrowing commitments for future years.
- the increase in debt would be matched by an increase in assets on the other side of the government's balance sheet, reflecting the fact that the newly-acquired assets are self-financing, generating revenues to cover their costs and generating a surplus.[108]

4.5 Legal issues

Nationalisation would happen via an Act of Parliament. Existing law does not set principles for compensation – thus, Parliament would have freedom in determining compensation methodologies and levels.[109]

Legal precedent supports the argument that it is not necessary to pay market value. When Northern Rock was rescued by the UK government in 2008, shareholders were awarded zero compensation, even though the share price was £0.90.[110] Shareholders brought compensation cases but the UK government was vindicated by the High Court, the Court of Appeal and the European Court of Human Rights (ECHR). The ECHR ruling upheld the following principle:

"Legitimate objectives in the 'public interest', such as those pursued in measures of economic reform or measures designed to achieve greater social justice, may call for less than reimbursement of the full market value."[111]

The Court of Appeal ruling validated the Government's argument, which was that Northern Rock's share price was only due to state support: "the business is shown to be worthless without the support put in by government".[112]

This point is highly relevant for the energy sector – where we would similarly argue that energy companies' high market valuations are only due to the support they get from the government in terms of subsidies, monopoly licenses, and friendly "regulation".

However, there is still a significant possibility that companies could sue the UK for increased compensation under investor protection treaties. We look further at this issue below in Section 8.

5 How much would it cost to nationalise the UK's energy suppliers?

5.1 There are currently 17 licensed energy supply companies

This is the current list of electricity and gas companies licensed by Ofgem:

List of UK Energy Supply Companies[113]

Supplier
British GAS Trading Limited
EDF Energy Customers Limited
OVO Group LTD
Scottishpower Energy Retail Limited
SSE Energy Supply Limited
Npower Commercial GAS Limited
Octopus Energy Limited
Bulb Energy LTD
Npower Limited
Shell Energy Retail Limited
Utilita Energy Limited
E.On Energy Solutions Limited
Npower Northern Limited
E.On Next Energy Limited
Shell Energy UK Limited
Npower GAS Limited
Npower Yorkshire Limited

5.2 Book value estimate: £3.5 billion

As legally required, all of these are UK registered limited companies – although in many cases with non-UK parent companies. We can calculate the equity book value looking at their published accounts filed with Companies House. [114]

Six of these companies have larger liabilities than assets.[115] In these cases, we have used a value of zero for the up-front cost of nationalisation.

Summing the total equity value of these 17 companies **results in a total of £3.5 billion.** [116]

5.3 We can estimate market value at £3.5 billion based on 2020 transactions – but the collapse of the energy retail market means this is probably a huge overestimate

None of the 17 supply companies are publicly-listed companies, preventing a simple measure of market capitalisation.[117] However, in line with recent research by the TUC, the market value of energy suppliers can be calculated from recent market transactions.[118]

Based on Ovo Energy's £500m purchase of SSE's energy supply business in January 2020, the TUC estimated an average cost per customer.[119] Using that figure, we could estimate a total cost of purchasing the entire energy supply sector, which covers 24.5 million households according to Ofgem's latest tariff data, at £3.5 billion.[120][121]

However, since 2020 the energy retail market has collapsed. Six of the 17 companies made losses in their most recent accounts and the UK government was forced to bail out Bulb Energy in July 2022.[122][123] **£3.5 billion is therefore likely to be a massive overestimate of the current market value of the supply sector.**

6 How much would it cost to nationalise the UK's energy network companies?

6.1 Book value estimate of energy network companies: £33.8 billion

There are 23 electricity and gas transmission and distribution companies, several of which are owned by the same parent companies.[124]

As with the suppliers, it is straightforward to reach a book value estimation by summing the equity value of these 23 companies, based on their latest published accounts filed with Companies House.

Using this approach, **we estimate the cost of nationalising the transmission and distribution networks at just under £33.8 billion**.[125]

Company	Shareholders equity (£ billlion)
National Grid Electricity Transmission PLC	4.376
National Grid GAS PLC	4.062
Cadent GAS Limited	2.514
National Grid Electricity Distribution (West Midlands) PLC	2.129
National Grid Electricity Distribution (East Midlands) PLC	2.041
Eastern Power Networks PLC	1.667
Northern Powergrid (Yorkshire) PLC	1.628
London Power Networks PLC	1.613
National Grid Electricity Distribution (South West) PLC	1.493
Scottish Hydro Electric Transmission PLC	1.354
South Eastern Power Networks PLC	1.320
Southern Electric Power Distribution PLC	1.176
Northern Powergrid (Northeast) PLC	1.162
SP Transmission PLC	1.103
Southern GAS Networks PLC	1.100
SP Manweb PLC	984
National Grid Electricity Distribution (South Wales) PLC	959
SP Distribution PLC	871
Electricity North West Limited	864
Northern GAS Networks Limited	600
Scotland GAS Networks PLC	403
Scottish Hydro Electric Power Distribution PLC	360
Wales & West Utilities Limited	-
TOTAL for all transmission and distribution companies	**£33.78 billion**

6.2 Market value estimate for energy network companies: £62.2 billion

It is less straightforward to reach a market valuation – as only two of the parent companies are UK listed PLCs. These are National Grid PLC and SSE. Also, neither of these companies only has interests in transmission and distribution networks: for example, SSE is also a generator and supplier.

To estimate a market value figure for the sector we first estimated the share of the total market valuation of these two companies that is attributable to their transmission and distribution businesses, based on the contribution of those to total company profits.

Company	Total market value (£ thousands)[126]	Share of profits accounted for by network assets	Estimated market value of network assets (£ thousands)
National Grid	£33,200,000	59%[127]	£19,451,560
SSE	£15,600,000	48%[128]	£7,433,550

Next we calculated the ratios of shareholders' equity to market value for the two companies; and then calculated a weighted average of the two ratios. We then applied that ratio to the shareholders' equity for the remaining companies in the sector to arrive at a total market value estimate for the whole sector.[129]

Company	Shareholders' equity (£ thousands)	Market value (£ thousands)	Ratio of market value to shareholders equity
National Grid	15,059,900	19,451,560	1.29
SSE	2,890,200	7,433,550	2.57
Weighted average			1.50
Estimate for total sector	33,779,790	**62,234,053**	

Using this approach, we estimate the total market value of the UK's energy network companies to be £62.2 billion.

7 How much would it cost to nationalise the UK's energy generation system?

7.1 Book value estimate of UK generation assets: £38 billion

The latest Department for Business, Energy and Industry (BEIS) figures list 1313 power plants in the UK.[130] BEIS provides ownership data for these plants. However, calculating the equity book value of the generation companies is not straightforward. Many have complex ownership structures where shareholders' equity may be obfuscated by related party transactions, particularly financial support between subsidiaries and parents. We cannot then simply identify and sum equity of generation subsidiaries.

Instead, we have estimated the total value of the UK's plant, property and equipment (PPE) generation assets. In the case of larger companies, such as EDF, we have used breakdowns of their generation PPE assets from their UK company reports. Where possible we used the accounts of holding companies to calculate the value of generation assets – but in a number of cases we needed to analyse the accounts of subsidiaries including down to the level of individual power stations.[131]

In some cases where we could not identify the PPE generation assets for a particular company, we used estimates based on average PPE asset values for the type of energy produced (gas, wind, etc.). We first calculated an average asset value for that energy type subsector per MW of electricity, based on the companies for which we have data. Then we multiplied this by the total MW capacity of the company (for that generation type) according to BEIS figures.

In many cases, these companies' generation assets are financed by debt rather than equity. Following the equity book value methodology set out above, we then need to estimate the amount of a company's assets that is in fact financed through shareholder equity rather than debt. To estimate this we calculated the following ratio for the company:

Total shareholder equity / (total assets – current liabilities).

We then applied this to the company's PPE generation assets to get our final estimate.[132]

Based on these calculations, we estimate **the cost of purchasing the shareholders' equity in the UK's energy generation assets at £38 billion.**

7.2 Market value estimate: £66.2 billion

There are no listed companies that own only UK power generation assets. Instead, we need to work with the accounts of listed companies that include such businesses.

We looked at six of the largest listed companies (SSE, Scottish Power, RWE, Orsted, Uniper, and EDF) whose combined holdings comprise around 55% of all UK generation assets.[133] Using the contributions made to overall company operating profits, we estimated the share of company valuations attributable to particular types (sub-sectors) of generation: renewables, fossil fuels, and nuclear. We calculated a pound per GW valuation for each of their generation types.

Note that for some companies we only looked at their main type of generation business in the UK. Also, we have not broken down or separated out coal and gas power stations in the fossil fuel category. While coal's value is significantly lower than gas, it accounts for just 5% of fossil fuel generation capacity in our companies, limiting its impact on the average value.[134]

Billions of £s per GW installed capacity	Fossil Fuel	Renewables	Nuclear
SSE[135]	0.6	1.8	-
Iberdrola (Scottish Power)[136]	-	0.7	-
RWE[137]	0.2	-	-
Uniper[138]	0.01	-	-
Orsted[139]	-	2.7	-
EDF[140]	-	-	0**

AVERAGE	0.28	1.6	0**

*** See below on nuclear valuation*

We then extrapolated from an average of those figures to calculate a total market value of all existing generation assets in the UK. Using this method we estimate **a total market value of £66.2 billion for all UK power generation**.

	UK Capacity (GW)[141]	Market value (£ billions)
Renewables	33.7	55.2
Fossil Fuel	39.1	11.0
Nuclear	6.9	0**
TOTAL	79.7	66.2

*** See below on nuclear valuation*

Valuing the nuclear industry

We note that valuing the nuclear industry is particularly complex due to the role of decommissioning costs and energy price contracts. EDF, the UK's only nuclear operator, made operating losses of almost £600 million in 2021 because of high decommissioning costs on its existing assets.[142] Most of EDF's existing UK nuclear assets will also be decommissioned over the next five years.[143] Consequently, the market value of its **existing assets** is zero in our model.

EDF is in the process of building two new nuclear units (3.2GW total capacity) at Hinkley Point.[144] It is also leading the development of plans for a similar nuclear unit at Sizewell C – although some recent news reports have suggested this may be under review.[145]

These planned units will have significant value. However, almost the entirety of this value is based on a government guaranteed energy price over 35 years.[146] We are thus, as discussed in the methodology section above, in a situation where market values are largely created by government support – and this valuation would evaporate in the case of nationalisation. Given this issue, and continuing political uncertainty over new nuclear plans, we have not tried to include these assets in our calculation.

8 How much would it cost to nationalise North Sea oil and gas?

8.1 Book value estimate: £15 billion

As we saw above (Section 2), 20 major companies control some 81% of productive oil licenses in the UK North Sea. Our starting point was thus to look at the North Sea assets of these 20 companies – we then adjust the total figure to account for the remaining share of the smaller licensees.

However, as with electricity generation, we can't simply use the equity book value of these 20 companies. Many of them have other assets outside the North Sea; and many of them have complex inter-company financing relationships between a range of parents and subsidiaries.

So, similar to our approach in electricity generation, we looked in detail at these companies' accounts – looking at multiple subsidiaries where necessary – to identify as far as possible the book value of just their North Sea productive assets (PPE + right of use assets).[147]

In some cases company accounts did not give sufficient information to isolate their North Sea assets. We then estimated this figure using the share of the companies' revenue attributed to North Sea operations.

Again, as with generation, a significant proportion of these companies' productive assets are financed by debt rather than shareholder equity. As a result, we applied the same formula to estimate the real value of these assets:

Shareholder equity / (total assets – current liabilities)

We made these calculations for the 20 biggest companies, then extrapolated to a total estimated value of North Sea oil and gas company assets based on their 81% share of total production.

Using this methodology, we estimate the equity book value of the existing productive assets in the UK North Sea at £15.0 billion.

8.2 Market value estimates: vary massively depending on oil prices, with a "medium price" estimate of £64.2 billion based on current policy approach

A little over half of the 20 major companies are listed companies (at least partially). However, the large majority of these are multinationals whose North Sea operations are only a small part of the business. Thus we cannot use overall market capitalisation to estimate values of their North Sea subsidiaries.

Instead, we developed a model based on estimating the market value of all estimated oil and gas resources contained within UK fields. Rather than starting with company accounts, this requires:

- NSTA production and cost projections – to estimate future potential production, and how much it would cost to exploit;
- Oil and gas price scenarios – to estimate sales and profits on that production;
- A discount rate for future cash flows based on industry estimates.

The model for calculating the market value of the oil and gas reserves is based on five steps:

1. **Projecting annual production rates – 2050 and 2036 horizons**

We used projected annual production figures from the NSTA to break down production rates for crude oil and natural gas liquids (NGLs) and (net) natural gas. We modelled two time horizons: a long term horizon of 2050, modelling effective depletion of current estimated UKCS oil and gas resources;[148][149] and a 2036 horizon, which may be more realistic if current licenses are not renewed and/or the UK enacts climate pledges.

It is important to note that these scenarios are based on the current NSTA projections for barrels of oil equivalent (BOE) production. These projections are based on a rationale of maximum extraction of North Sea oil and gas resources, without setting any limits relating to climate goals. It can be argued that this contradicts stated government climate policies and international agreements.

- Further research: model with alternative production levels linked to specific climate goals/scenarios.

2. **Oil and gas price scenarios – low, medium and high scenarios**

We modelled low, medium, and high price scenarios for both crude oil and natural gas. For crude oil we used Brent crude oil futures contracts to provide market estimates for 2023-2029 as the medium price scenario.[150]

For natural gas, we used UK Natural Gas future contracts for 2023/24 as both the medium and high price scenarios for the next two years, with prices then falling to longer-term (medium and high) values for both.[151] These prices could then be adapted to different price scenarios and to calculate projected revenues over the period.

3. Projected production costs

We used the NSTA's projected production costs until 2027, which include exploration and appraisal, capital expenditure, operating and decommissioning costs. For modelling beyond 2027 we used these as the foundation to estimate an expenditure per barrel of oil equivalent (BOE) going forward, and also included an estimate of non-production linked costs.[152]

4. Discount rate

We set an initial (real) discount rate of 8.5%. This was based upon a review of industry discount rates, and on Harbour Energy Plc's WACC (weighted average cost of capital) with an adjustment (by us) for inflation.[153] (Harbour Energy is the biggest producer, and the largest company with a primary focus on the North Sea.) In practice multiple discount rates are utilised in order to adjust for the varying probabilities and risks associated with reserves that are not yet proven but merely probable or possible (i.e. lower probability and higher risk). However, this is unnecessarily complex for a basic model.

5. Calculate the pre-tax surplus

The pre-tax surplus is calculated by deducting total expenses from total forecast revenue in each price scenario. We then discounted and aggregated these forecast yearly cash flows, for the periods to 2050 and 2036.

- **Pre-tax surplus: 2050 Horizon**

In the low price scenario, our model shows that production costs will significantly exceed revenues, resulting in a modelled pre-tax loss of -£61.4 billion across the UKCS.[154] *Note: in reality, under such pricing conditions oil and gas producers in the UKCS would reduce or cease production, and/or demand significantly greater government subsidies. Losses would be reduced by tax credits, including the repayment of past tax bills.*[155]

In the medium price scenario, our model forecasts a pre-tax surplus of £78.3 billion from now until 2050.

In the high price scenario, our model predicts a pre-tax surplus of £187.9 billion until 2050.

- **Pre-tax surplus: 2036 Horizon**

In the low price scenario, our model forecasts a pre-tax loss of -£56.5 billion from now until 2036. *Again, in practice under this scenario we would expect that losses would be reduced by production cuts and government subsidies.*

In the medium price scenario, our model forecasts a pre-tax surplus of £75.5 billion from now until 2036.

In the high price scenario, our model predicts a pre-tax surplus of £171.0 billion until 2036.

6. Accounting for tax and subsidy

As discussed in Section 2 and below, the theoretical basis of the North Sea licensing system is that "The Crown" – the legal owner of the oil and gas – shares in the benefits of exploiting this resource through taxation. In practice, North Sea taxation is highly complicated and unstable – continually subject to ad hoc changes by successive governments. Headline marginal tax rates are offset by substantial tax allowances which effectively subsidise much of capital investment and decommissioning costs.[156]

Over the period 1990-2017 marginal tax rates on North Sea profits have fluctuated between 30-75%. But after applying investment allowances and other tax breaks, the effective tax rate over this period was 18%.[157]

In the table below, we estimate market valuations based on the assumption that the effective tax rate remains constant at 18%. This is arguably realistic given the current political climate. No political party currently advocates major reform of the North Sea licensing and taxation system and marginal exploration and decommissioning costs are rising. We could thus expect governments to continue to heavily subsidise these through large tax deductions.

In the sub-section below we look further at the issue of the North Sea taxation regime.

Post-tax market value of North Sea oil and gas	2036 horizon	2050 horizon
Low price scenario	-	-
Medium price scenario	£61.9 billion	£64.2 billion
High price scenario	£140.2 billion	£154.1 billion

This table gives us effective estimates of what the UK might expect to pay oil and gas companies if it compensated them for the full expected present value of North Sea oil and gas reserves, minus the share currently going to the nation in tax.

On a medium price scenario, and sticking to the current plan of extracting the maximum possible with no concern for climate agreements, we estimate the value at £64.2 billion.

8.3 The majority of the UKCS's pipeline infrastructure would be taken under public ownership by nationalisation of the oil and gas company's assets

NSTA data suggests that around 63% of the active pipeline infrastructure remains under the ownership of the traditional oil and gas companies discussed above.[158] These companies report pipeline infrastructure as part of their oil and gas PPE assets, e.g., Harbour Energy lists pipeline infrastructure as part of its oil and gas PPE.[159] The value of their pipeline infrastructure is therefore included in our previous PPE calculations. Thus the compensation estimates above also include taking ownership of 63% of the pipeline infrastructure in the UKCS.

In recent years, some of the major oil and gas companies have disposed of their pipeline assets to independent investment companies, which now account for the remaining 37% of total pipeline infrastructure.[160] More research is needed to determine a market value for the independent midstream companies.

- Further research: Develop methodology for valuing the midstream companies.

9 What legal risks does nationalisation of the energy sector raise?

9.1 The UK state has the power to override any investor-state dispute settlement (ISDS) claims from investors

The nationalisation of companies' productive assets will open up any future government to legal challenges over compensation levels, particularly through investor-state dispute settlements (ISDS).

Of most importance to nationalising the UK's energy sector is the **Energy Charter Treaty (ECT)**.[161] This charter states clearly that any form of nationalisation or expropriation of investor assets must be "Accompanied by the payment of prompt, adequate and effective compensation" that "shall amount to the fair market value of the investment".[162]

The Charter has been used by companies to bring ISDS claims against European governments in recent years. In 2021, Uniper sued the Netherlands government over its plan to phase out coal production by 2030.[163] Similarly, British oil company, Rockhopper, was awarded €180 million in compensation after the Italian government denied it an offshore drilling permit.[164]

However, France, Italy, the Netherlands, Poland, and Spain have all quit the Energy Charter Treaty, primarily over climate concerns but also with reference to ISDS claims.[165] Germany is also planning to withdraw.[166] The treaty protects investments for decades, regardless of whether a country withdraws; but these withdrawals highlight a strong move against it.[167]

This is underlined by the German government's July 2022 nationalisation of Uniper in a deal that was subject to Uniper withdrawing its lawsuit against the Netherlands under the ECT.[168] Moreover, in September 2021, the **European Court of Justice** (ECJ) ruled that investors from one EU member state cannot use the ECT to claim compensation from another member state, gutting the ECT's investor protection within the EU.[169]

Thus, while any nationalisation below market value may be subject to an ISDS claim, it may be possible for sufficient political will to override it. Indeed, were the UK to join other major European countries in leaving the ECT, it could cooperate with them to create an alternative European energy treaty that removed investor protections altogether.

- Further research: we will look at ISDS and the energy sector in more depth in a follow-up report.

10 The case for nationalisation: how much could it save us in energy bills?

10.1 A nationalised energy system could have saved UK consumers nearly £45 billion in 2022; the equivalent of over £1,800 per household

Profits across the UK North Sea, distribution and transmission networks, and energy generation totalled £59.2 billion for 2021 and 2022.

These high profits were the main cause of the recent massive hikes in people's energy bills. Had the energy system been nationalised at the beginning of 2021 – so removing these enormous profits – **that money could have been used to save UK households £581 on their energy bills in 2021, and £1,807 in 2022.**[1]

Alternatively, or in addition to some energy bill savings, this money could have been used to help cover the costs of nationalisation.

Estimated UK Energy Profits by Sector, 2021 and 2022

Sector	2021 Profits (£bn)	2022 Profits (£bn)
UK Continental Shelf (North Sea oil and gas)	12.2	30.2
Distribution and Transmission	3.8	3.8
Generation	-1.6	10.8
Total	14.4	44.8
Savings per household (£)	£581	£1,807

Data and calculations outlined below.

[1] These figures represent the total estimated industry profits in each year (2021 and 2022), divided by the number of household energy customers according to Ofgem. Thus these are the savings made if the full profit amount was used only to reduce consumer energy bills, e.g. we have assumed in this figure that commercial bills and investment levels remain the same. Obviously this is just one option for how that saving could have been distributed.

10.11 Note: reported Treasury estimates suggest the savings from eliminating energy profiteering could be even higher

A leaked Treasury report suggests that "excess profits" in the UK energy industry could be even higher than in our calculations. According to Bloomberg, the Treasury estimated that UK gas producers and electricity generators will make £170 billion in "excess profits" in 2022 and 2023. We have not been able to confirm these calculations as the report is not publicly available. One reason our figure is lower is that we use historic data from 2021, where the industry was still recovering from the pandemic and not yet making the obscene profit levels seen in 2022.[170]

10.2 A nationalised transmission and distribution system could save £3.8 billion a year

The UK's transmission and distribution companies have used their monopoly concessions to make an **average of £3.8 billion in net profits** between 2019 and 2021.[171]

As these profits are more stable than other sectors – and there has as yet been no change in the Ofgem pricing regime – we assume that this will continue through 2022, giving **an estimated total of £7.6 billion in the last two years**. As publicly-owned infrastructure, these profits could be used to dramatically cut consumer energy bills, and/or redirected into preparing our transmission and distribution network for a green energy system.

10.3 A nationalised generation system could have saved almost £11 billion in 2022

As outlined in Section 6.1, the UK's generation sector is extremely complex: many generation companies are the subsidiaries of larger companies, or are engaged in other non-generation activities. As a result, we were not able to use net profits from these companies to estimate the potential savings. Instead, we have produced an estimate based on the following steps:

1. **The share of electricity generation by type**

We used BEIS's 'Energy in Brief 2022' report to get the share of electricity generation by type, which is broken down into the following categories:

UK Electricity Generation by Type 2021[172]

Type	TWh	%
Coal	6.5	2.1%
Oil and other fuels	10.9	3.5%
Gas	122.7	39.8%
Nuclear	45.9	14.9%
Hydro	5.5	1.8%
Wind and solar	76.8	24.9%
Other renewables	39.9	12.9%
Total	308.2	100.0%

Source: BEIS, 'Energy in Brief 2022', p. 28.

We were then able to combine these data with energy prices and costs per MWh to calculate how much profit was generated by each type of generation.

2. Estimating the cost of electricity generation by type

We used BEIS's Levelised Cost of Electricity (LCOE) data to estimate the production costs for different types of energy generation.[173] BEIS provides estimates of the costs for different generation technologies, known as the Levelised Cost of Electricity (LCOE).[174] For our calculations, we have included fixed operating and maintenance costs, variable operating and maintenance costs, fuel costs, carbon costs, and capital expenditure and decommissioning costs to calculate total costs for the generation of each energy type. We have also revised BEIS's estimated costs in line with the input Producer Price Index and revised the fuel costs figures for gas and oil to reflect the actual prices for 2021 and 2022, which were significantly higher than the original forecasts.[175][176] It is also important to note that financing costs are included in these data – as explained in Section 3.1, these could be reduced by government refinancing.

3. The wholesale price of electricity and gas

We then took Ofgem's monthly electricity and gas prices for 2021 and 2022 to get average annual wholesale prices for energy generation.[177] These figures represent the wholesale prices that suppliers pay when buying gas or electricity to supply their customers. This is the largest component of a customer's energy bill.[178] Under

the current system the wholesale price is effectively dictated by the most expensive generator needed to meet the last increment of demand, which means that gas sets the price for all types of electricity-generating technologies, regardless of their production costs.[179]

However, Contracts for Difference (CfDs) with low carbon generation companies partially – but far from totally – offset their ability to profiteer from the high gas price (see below).

4. **Contracts for Difference (CfD) between the government and low carbon generators**

CfDs can act as both a subsidy and a cap, depending on the wholesale price. These contracts provide a 15-year price guarantee: when the market price is below the agreed CfD price, the government will pay the difference. The relationship is reversed when the market price is higher than the contract price: the generating company pays the difference to the government.[180] The originally agreed price is updated with CPI inflation.[181] Data from the government's CfD operating company, the Low Carbon Contracts Company, also shows the proportion of energy generated under CfDs: around 20% for wind and solar generators, and 17% for "other renewables".[182] We used an average of the contract prices for each energy generation type to calculate the price at which low-carbon generators were able to sell their energy.[183]

5. **Estimating generation profits from the revenue and costs**

Finally, we subtracted the adjusted generation costs from the estimated revenue to get pre-tax profit figures for 2021 and 2022; and then applied corporation tax at 19%.[184]

This showed a loss of £1.6 billion for 2021 and predicted profits of £10.8 billion for 2022. The loss across the sector in 2021 was driven by losses in gas generation, which suffered low electricity prices and depressed demand at the beginning of the year. However, other forms of generation remained hugely profitable. Wind and solar made £4.7 billion in profit. Indeed, despite contributing less than a quarter of the UK's energy needs, wind and solar energy generators will reap the rewards of higher wholesale prices without corresponding increases in costs, to make bumper profits of £11.5 billion across the two years.

A publicly-owned energy system would have enabled these profits to be returned to the public for **a total saving of £9.2 billion over the last two years.**

10.4 A nationalised UK North Sea could have saved over £30 billion in 2022 alone

As we outlined in Section 7.1, the complexity of companies operating in the UK Continental Shelf (UKCS) makes producing a simple profit figure from their accounts impossible. Instead, we have used NSTA data to calculate the savings from nationalisation.

The NSTA produces data on historic income and expenditure for UKCS exploration, development, and extraction, allowing us to estimate operating profits for the overall industry. However, these data do not include financing and other administrative costs.[185]

To estimate these additional costs, we reviewed the accounts of 33 subsidiaries of the top 20 producers in the UKCS to get average annual finance and general operating costs not included in the NSTA data. As financing costs are linked to assets, we calculated the interest expense as a percentage of the PPE net book values outlined in Section 7.1. We then subtracted these costs from the profits figures derived from NSTA data and also applied an effective tax rate of 18% (see Section 10.4). Based on these figures for 2021, the industry made a **net profit of £12.2 billion**.[186]

However, while 2021 was a profitable year for UKCS companies, their profits are set to more than double in 2022. Based on the average Brent crude and UK gas prices for this year, and applying the methodology above, **forecast profits on the UKCS are set to hit £30.2 billion in 2022**.[187]

We thus estimate that, had the UKCS been nationalised over this period, **£42.4 billion in profits could have been returned to the public.**

10.5 Using some of the saved profits to freeze energy prices at summer 2021 levels could have cut inflation by at least 4.1 ppts

As we outlined in Section 9.1, the UK energy and North Sea extraction sectors are set to make **total profits of £44.8 billion in 2022** off the back of huge price increases. A nationalised system could have used some of these profits to freeze energy prices at the level of the summer 2021 price cap – before ballooning energy inflation. If consumer prices had been frozen at this point, we calculate this would have cost £25.2 billion, including the £7.6 billion the government will spend in 2022 on the Energy Price Guarantee (EPG).[188]

This price freeze could have saved each household £711 in 2022.[189] It could have also reduced the current inflation rate by at least 4.1 points – the contribution of electricity and gas to overall RPI inflation over the last year.[190]

In practice, the government has used borrowing to fund the EPG. Our analysis shows that the profits generated by the energy system could easily cover the cost of the EPG, or a much more substantial price freeze, and still leave billions in profit to spare.

10.6 Further research can be done on other sources of savings from nationalisation

The figures above estimate the savings we could make by eliminating corporate profiteering in the energy sector. But this is not the only possible way that nationalisation could save us money. For example, a nationalised energy industry could save by accessing borrowing at lower interest rates than private sector corporates. Further research can be conducted to estimate the extent of these savings.

11 Alternatives to nationalisation

In this section we highlight some possible "Plan B" alternatives for the four energy sectors. These might create limited improvements on the current system without costing as much as fully taking back control.

11.1 Supply: public supply company

An alternative to nationalising the existing supply companies is to set up a public supply company that would compete with private suppliers. This could:

- offer the lowest energy prices possible under government policy;
- act as a default supplier to any new households;
- act as a default supplier taking on customers of failed private companies; and
- take over failed companies so that TUPE transfers would apply to the workers.

The government failed to take advantage of this opportunity with the recent collapse of Bulb, where the rescue is estimated to have cost up to £4 billion – the same as nationalising the entire sector.[191]

While the Labour Party has proposed the creation of a public energy company, it has ruled out being involved in supply.[192]

Limitations

Supply companies are the least profitable, and arguably least important, part of the current system. This measure would at best have a small impact on the major problems of profiteering, energy security, and transition we are setting out to address. Due to the nature of the energy supply chain, one sector's loss are the other sector's profits. For example, high gas prices mean high costs for energy generation and supply firms, but high profits for extraction companies. For this reason, nationalising only a part of the supply chain exposes the government to risk from volatile fuel prices.

Combined with public ownership of generation (see Section 9.3), a democratically owned and controlled supply company could help resolve the major problems with the existing quasi-market pricing system. But on its own it would not be sufficient.

Furthermore, if a new company was set up instead of nationalising the existing companies, it would be likely to take time to attract customers from the Big Six, many of whom will be tied into contracts. As the companies' customer bases diminished, there would also be job losses at the existing suppliers if they are not nationalised.

11.2 Transmission and distribution: create an effective regulator

The massive profit margins enjoyed by the transmission and distribution operators could be addressed by radically tightening up regulation and price-setting in the sector. Ofgem, and the current regulatory system in general, is clearly failing.

One basic measure could be to end the fact that operators' licenses are guaranteed for 25 years, which Northern Powergrid cited to reassure investors during its £350 million bond issue in March 2022.[193][194] Removing this clause from operating licenses could immediately and significantly reduce the market value of the grid companies, laying the groundwork for future nationalisation.

Limitations

On its own, better regulation could reduce profits made by private shareholders but not eliminate them, as any private operator will require some degree of reward over and above their costs. Leaving these companies in private hands will severely limit the involvement of workers and communities in planning the

network capacity required in a decarbonised system, and ensuring the transition is a just one.

11.3 Generation: public energy company, purchase power agreements (PPAs)

- **Public generation company.** Creating a publicly owned generation company, which will not take over existing private sector assets, but invest in new renewable generation sites in competition with the private sector. The Labour Party had recently proposed a form of this idea with its Great British Energy company.
- **Public purchasing monopsony.** The UK government currently uses the 'Contracts for Difference (CfD)' scheme to support the development of renewable or low-carbon energy generation by protecting companies from volatile wholesale prices, such as the agreement with EDF for its new nuclear sites noted above.[195] In effect, the government therefore acts as a key risk-bearer in these investments. The UK government could expand its purchasing role to become a monopoly purchaser (monopsony) of all electricity. It could then use this market buying power to push electricity prices down instead of up.
- **Market pricing reform.** A large part of the current energy inflation crisis is caused by the wholesale electricity market pricing structure, in which one effective price is set for all generators, based on the marginal cost of the main input fuel (gas). European Union politicians have discussed regulatory interventions to reform this pricing system within the EU.[196]

Limitations

If the government did become monopoly purchaser *and* owned generation capacity, this would be a large step forward towards full nationalisation. However:

- Intervening only in this sector would still not address the huge profits of gas producers and the transmission and distribution companies.
- Control over the terms of a just transition would be limited to the parts of the network in public ownership.

- Unless all generation capacity is nationalised, it would still leave the ownership, control and profits (albeit reduced) of remaining domestic generation capacity in the hands of private shareholders.

The Labour Party's Great British Energy proposal suffers from shortcomings:

- Unless combined with a public purchasing monopoly, or significant market reform intervention, it will have no impact on the issue of distorted pricing in the wholesale market;
- At the small scale envisaged, it will have close to zero impact on the prevailing wholesale price of electricity set in this market, meaning effectively no difference to energy bills;
- By concentrating very limited resources on de-risking experimental forms of generation, GBE will be using public resources to underwrite and further increase future potential profits for the private sector.[197]

11.4 North Sea: tax like the Norwegians

During the period from 1990 to 2017 Norway's effective tax rate ("ETR") for North Sea petroleum production was 46% versus 18% in the UK.[198]

If UK taxation was changed to align with that of the North Sea operations within Norway's economic zone, then the tax take would increase by £30.7 billion in the medium scenario and £96 billion in the high price scenario in the period to 2050. The respective figures for the period to 2036 are £26.9 billion and £72.1 billion.

Any additional tax income could be invested in a national energy fund that could be used to protect bill-payers from high prices, and/or invest in protections and re-training for workers during the transition away from fossil fuel production.

Note: Norway's system for managing its North Sea oil and gas assets does not only involve a higher tax rate. The Norwegian government holds a "State Financial Interest" in every license: effectively, it is a partner in every oil field, involved in decision-making and profit sharing. It is also the main operator in many fields, through its 67% owned national oil company Equinor. This hands-on involvement is arguably necessary to ensure that private companies' interests align with the state in Norway's oil and gas exploitation – thus, partial nationalisation and effective taxation complement each other in the Norwegian model.

Limitations

Increasing taxation of the North Sea oil and gas companies would of course not address the major issues identified in other energy sectors. It would also fail to take control of planning the North Sea's future – and the future for workers in the industry.

12 References and calculations

All original data and sources are referenced in the endnotes. All calculations used in this report are available on request.

13 Acknowledgements

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