

ELECTRICITY SUPPLY IN GREAT BRITAIN: 1919 to 2023

A Brief History of the Industry with a Proposed New Model for the Future.

SECTION 1: Summary

The Historical Background of how the Electricity Supply developed in Great Britain from 1919 to the present day is covered briefly in Section 2. The UK government's involvement was needed at various stages to ensure that a functioning system was in operation to provide an electricity supply for the whole of Great Britain. Northern Ireland has an independent supply.

Prior to 1926, GB electricity supply was provided by private companies and by local authorities. Following the 1926 Electricity Act, the electricity system was managed by a government body, the National Grid was created, and the sizes of the generating units was increased. This resulted in significant cost reduction and much greater reliability.

In 1947 the electricity system was nationalised, this arrangement served the nation well and reduced the Standard Price of Electricity in 1989 to the lowest level in history. [Ref. 9] Since 1990, the electricity system has been privately owned. This paper highlights government decisions that have affected the industry and what impact there has been on the system which has developed in different ways after 1990 to meet new and demanding requirements. Although the price of electricity remained reasonably stable, and decreased slightly, between 1992 and 2003 it rose steadily thereafter until 2022. Between 2018 and 2022 the Standard Price of Electricity doubled and rose to a level not seen since 1936. [Ref. 9]

This paper shows that the privatisation model was not up to the task of providing an electricity system to meet the nation's needs or comply with the government's international climate emergency agreements. The conclusions in respect of the privatised industry include:

- A) Currently the security of the GB Electricity Supply System, as a consequence of the high proportion of intermittent generation sources in the system, is deteriorating with increased risk of blackouts and at best the need to implement load shedding.
- B) The government has failed to understand that "the market" is not an appropriate way to design and manage an integrated real time electricity supply system. Private investment in generating plants and transmission lines has resulted in high borrowing rates and this has, in part, resulted in high electricity prices. The increase in intermittent supplies from renewable sources and the subsequent cost have not been fully addressed to date.
- C) To meet the government's own Net Zero target for the Energy Sector, and the electricity industry in particular, the electricity system as being run at present, has no chance of achieving this target by 2050.

Privatisation has been referred to as the "British electricity experiment" and this paper clearly shows that this experiment has failed and what is equally serious is that successive governments have failed to recognize this fact which has resulted, to a large extent, in the electricity price almost doubling since 2018 and resulting, to some degree, in damage to the UK economy.

A postscript has been added with a Proposed New Model for governance of the electricity industry outlined. This is for the Government to take urgent action in the national interest, referred to as the "trilemma" i.e. *Security of Supply, make electricity affordable and reduce emissions*. The establishment of a National Energy Authority is proposed as a dedicated statutory body to improve the electricity system and make it possible for the UK government to meet its international obligations in respect of lowering emissions.

SECTION 2: Historical Background 1919 to 1989

2.1 Electricity Developments :1871 - 1989

The first UK electricity generating station in Godalming, Surrey, England was built in 1871. Private companies and local authorities started building generating plants thereafter.

In 1918 the UK Government formed a committee of enquiry to investigate the provision of electricity in the country. The resulting *Williamson Report* stated that the cost to the customer – was much greater than would be the case if larger interconnected units were used. Under the 1919 Electricity Act, Electricity Commissioners were appointed to specify the arrangements, but the Act did not provide sufficient authority for the recommended changes to be made.

By 1926 it became clear that government action to control electricity supply was badly needed. The *Weir Report* stated that “great expenditure is being incurred in many directions, and it is our view that expenditure is not being employed to best advantage, not only is waste taking place, but further obstacles are being placed in the way of rapid and efficient development along the right lines.” Their recommendations to increase the sizes of the generation plant and to interconnect them with a 'gridiron' was accepted. In 1926, the Central Electricity Board was formed. The purpose of the Board was to implement the recommendations of the Electricity Commissioners who were strongly technical and had no business interests in the electricity market. This combination of an independent technical group to recommend what should be done and a government body to implement their proposals worked well. The Board had control but not ownership of the production and supply. The Electricity Commissioners formed a technical and strategic unit which considered all the relevant issues when making decisions i.e. they used a systems engineering approach. The National Grid was established and fully operational by 1938.

2.2 Nationalization of the Electricity Industry

At the end of the Second World War, it was recognised by the UK Government that the electricity infrastructure needed rebuilding with huge investment. A loan agreement was signed on 6th December 1946 whereby the US granted the UK a line of credit of \$3.7 billion [equivalent to \$1,100 billion in 2014, at an interest rate of 2% per annum. This facilitated the funding of both the National Health Service and nationalisation of the electricity industry. In 1947 electricity production and supply was nationalised by Clement Attlee's government. The Central Electricity Generating Board [as it became a few years later] for England and Wales was established. The South of Scotland Electricity Board and the North of Scotland Hydroelectric Board were established in Scotland. These Boards were engineering led with research centres and they developed and commissioned world leading nuclear power plants as well coal fired plants, hydro plants and hydro pumped storage plants. All these plants were designed and built by UK private consulting engineers, manufacturing firms and civil engineering contractors.

SECTION 3: Privatisation of the Electricity Industry: An analysis.

3.1 In December 1990, the 12 regional electricity boards which formed the Central Electricity Generating Board [CEGB] responsible for the supply and distribution of electricity in England and Wales were privatised. In Scotland, the two regional vertically integrated boards (responsible for generation, transmission, distribution and retail) were privatised. In England and Wales the regional boards were replaced with two boards and one nuclear company [initially state owned.] The National Grid Company [NGC] was established as a separate company. In Scotland the two vertically integrated companies were sold as separate companies.

To understand the background to the privatisation of the electricity industry it is necessary to grasp the political situation at this time. In 1979 the Conservative government came to power with a manifesto pledge to reverse economic decline, roll back the frontiers of the state and reduce the power of organised labour.

The government introduced clear guidance for private companies to provide electricity to consumers in the Electricity Consumers' Council in 1982. The White Paper, *Privatising Electricity*, in which the government laid out its plans was published in February 1988. The electricity utilities were all privatised by 1990, with the exception of the nuclear plants which were privatised in 1995.

Initially these generating companies were Power Gen and National Power in addition to the National Grid. The nuclear component within National Power was removed and vested in a state owned company, Nuclear Electric. In 1995 the major assets of Nuclear Electric and Scottish Nuclear were merged including the UK's most advanced nuclear plants to form a new private company, British Energy. In 1991 the two Scottish boards were privatised and became Scottish Power and Scottish and Southern Electricity and operated their own Grid Control Centres. The NGC controlled the Scottish/English inter-connector power transfer. In 1990 electricity output was approx. 305,000 GWh/y, as shown below:-

FUEL TYPE	OUTPUT GWH/y	AVERAGE OUTPUT GW
Coal	220000	25.1
Oil	24000	2.7
Nuclear	60000	6.8
Other sources	6000	0.7
Imports	15000	1.7
TOTAL	325000	37.1

(No pumped storage included.)

It is significant at this date that all the nuclear plants were in operation [providing approx. 20% electricity] and the price of electricity was at its lowest price in history. [Ref. 9] It should also be noted that the government had not allowed gas to be used as a fuel for electricity generation but this restriction was removed in 1992. The dramatic "dash for gas" from 1992, [when there was zero output from gas generators,] resulted in approx. 30% of electricity generation by 2000. This also resulted in the Price of Electricity decreasing slightly during the period 1994 to 2002 and the price in 2003 was similar to what the price had been in 1990.

3.2 The period 1990 to 2003

The electricity industry structure was established in 1990 with privately owned generating companies. The National Grid Company, initially collectively owned by the privatised Regional Electricity Companies was regulated and large customers were free to buy from the wholesale market. This market took the form of a mandatory gross Electricity Pool, into which all supplies were offered. This electricity was centrally dispatched with a System Marginal Cost [SMC] set by the marginal price offered by the most expensive unconstrained generator supply to which was added a capacity payment.

By 2000 the sources of generation supplying the grid had changed dramatically. With the combination of long-term gas contracts, regulated pass-through and performance guarantees on CCGT plants all reduced risk which allowed the Regional Electricity Companies [REC] to sign contracts which enabled them to exploit their independence from centralized generation. Coal Fired Generation had declined by about 20% by 2000 and increasing amounts of coal were being imported as a result of the decline of the coal industry in the UK. Gas generation was now a major supplier of electricity increasing to approximately 35% output by 2004. Nuclear continued to supply nearly 20% output by 2004 and this was considered the minimum capacity to provide base load electricity to the system.

3.3 The period 2004 to 2013

This period saw significant changes to the criteria which had to be considered. Not only was security of supply and the price of electricity important but in addition carbon dioxide emissions were required to be reduced significantly. In 2003 electricity generation was approx. 370,000 GWh/y. The mix was approx. as follows:-

FUEL TYPE	OUTPUT GWh/y	AVERAGE OUTPUT GW
Coal	129000	14.7
Oil	6000	0.7
Nuclear	77000	8.8
Gas	134000	15.3
Other sources	9000	1.03
Imports	15000	1.7
TOTAL	370000	41.23

“Other sources” includes Wind, Hydro and non CCGT gas and thermal renewables.
(No pumped storage is included)

By this date, consumption fell with deindustrialization and increased demand efficiency and this produced spare capacity. Nuclear was providing approximately 20% of demand and imported electricity increased. The “dash for gas” resulted in a huge increase in CCGT plants and it would continue to maintain a high share of output in the coming years with coal output being required to reduce to almost zero by 2022.

After 2001 the market evolved towards the Big Six generating companies plus retailers. These companies were: Centrica, SSE plc, npower, E.ON, Scottish Power and EDF Energy. The market power of companies before 2000 led to an increasing gap between cost and price in the Electricity Pool which triggered the government to replace the Electricity Pool with the *New Electricity Trading Arrangements [NETA]* in 2001 when the price-cost margin collapsed under the weight of competition and excess capacity. Despite evidence that transmission constraints requiring expensive redispatch could be exploited by generators, in 2005 the retrogressive principles of NETA were expanded to incorporate in *British Electricity Trading and Transmission Arrangements [BETTA]* creating a single Great Britain electricity market. The National Grid Company acted as National Electricity Transmission System Operator [NETSO] for GB, owning transmission south of the border but acting as an Independent System Operator in Scotland. A paper by Michael Grubb and David Newbery, [2018] *Electricity Market Reform and Energy Transition*, gives information on the history of the industry up to this date. [Ref. 1]

By 2001, gas generation was producing more than 30% of GB electricity and over the next 16 years increased its share to approx. 40% of GB electricity. No new nuclear plants were commissioned and built over this period and with existing plants due for decommissioning nuclear output decreased to less than approx.18% by 2013. In a paper by David Newbery and Michael Pollitt [1997] “The Restructuring and Privatization of the UK Electricity Supply” they ask, “What were the costs and benefits ?” They considered this was an important question to ask as the CEGB's “.... *restructuring was a key part of the 'British electricity experiment' which has provided a model for power sector reform around the world.*” [Ref.2] I am not aware of other countries adopting this model but to be fair to the authors it was too soon, seven years, to pass judgement. Reference to this statement will be made in the conclusions.

There was an increasing gap between cost and price in the Electricity Pool and in 2001 the government replaced the Electricity Pool with New Electricity Trading Agreements [NETA.] This was not a satisfactory solution. “*In practice, the balancing mechanism was so flawed that it required many hundreds of painful negotiations to approximate an efficient balancing market.*” [Ref. 1]

In 2003 the Standard Price of Electricity [SPOE] was approx. 11p/kWh but the price increased to approx. 33 p/kWh in Oct. 2022. This represents an increase of 300% over 19 years.

The UK energy policy had been in turmoil for most of the post 1997 period when the Labour Party came to power, with arguments over the role of coal, gas, renewables and especially nuclear power. There were four energy White Papers from 2003 to 2011, the last being the precursor to Electricity Market Reform [EMR] introduced by the Conservative government in 2013. The uncertainty this created did not lend itself to encouraging private investors because it introduced constraints on, and interventions in, future electricity markets. There is a question as to whether “the market” worked in the form that markets are understood to work.

Over this period there were Economic Affairs Committee hearings in both the House of Commons and the House of Lords which addressed energy issues, and in particular electricity issues. Perhaps the most relevant evidence presented to the House of Lords Economic Affairs Committee was a Memorandum submitted by Colin Gibson a former Power Network Director of the National Grid Group in June 2008 [Ref. 6]. This Memorandum explained the extra costs of fitting renewable sources of energy into the GB system and the technical limits of renewable energy and pointed out that support and subsidies for renewables were provided by electricity consumers.

3.4 The period 2013 to 2023.

By 2017, output had dropped to an average of 39 GW over the year from a much higher output of 43.4 GW in 2005. With Coal Fired Plants being closed there was an increasing reliance on Gas Plants [CCGT.] The dependence on Gas Generation was now being criticised by those promoting Wind Energy. This was very worrying as they did not understand that these Gas Generators were essential to maintain the National Grid supply when there was little or no wind and who thought that having more renewable sources would help to reduce the Standard Price of Electricity. A letter in the Professional Engineer, July 2015, raised concerns and stated “that we will require to import gas for electricity generation and heating for at least 40 years. How secure are these imports and what control have we got over their price.” [Ref. 7] This was a question which should have been addressed by government, and plans should have been in place to plan for the future to ensure gas supplies did not put the electricity security at risk and to keep the price of electricity as low as possible. Privatised energy companies were not in a position to make long-term plans and neither was “the market”.

Responding to a *Guardian* editorial calling for more state intervention, Ed Davey, Secretary of State for Energy at the time said,

“our reforms of electricity markets, both for clean energy and for securing supply, are significant state intervention in the free market.”

The privatised energy companies were now operating in what could be described as a “government controlled market” in collaboration with the office of gas and electricity markets [Ofgem] that determined the price of gas and electricity. By 2018 gas and electricity were being sold by a number of retail suppliers who offered consumers choices to get them to sign up to their company. The government encouraged this to give consumers the impression there was a free market. This situation was well described by Jesse Norman MP, in his book, “Adam Smith” [2018] thus:

“Information overload is a recognised and widespread human phenomenon: people, especially the less well-off, struggle to make choices when faced with more than a few options. At the limit, the difficulty and cost for the fallible, time pressed and often poorer human customers of searching for the best product becomes so high that they remain inert. So the basic recipe can be as simple as: create lots of different products that are hard to compare with each other; separate out those customers that can find the best deals from the much larger that cannot; and raise the prices for the latter. Ignore any relevant traditions or ethos of public service, brush off the inevitable opprobrium and customer complaints, and encourage regulators and the press to blame

consumers for being insufficiently active. Then enjoy large profits. The UK's retail electricity markets are a case in point.” [Ref. 8]

In Jan. 2015 the Select Committee of the House of Commons took evidence on energy policy. Initially oral evidence was given but subsequently additional written evidence to the questions proposed by the panelists was provided. Included in these answers was a Discussion Paper by Colin Gibson. [Ref. 8] “This paper offers, for the Generation and Transmission sectors, an alternative to either staying as a fully privatized industry or a return to a nationalized one.” It also made clear that there were a number of weaknesses “in the present arrangement” [of the electricity system in GB] and highlighted the following:-

1. *There is no body responsible for ensuring Security of Supply*
2. *NETA and BETTA did not recognise 'power capacity' as a separate commodity and do not provide for an overall optimisation, and,*
3. *There could be a conflict of interest in the different roles of the National Grid.*

Mr Gibson’s paper explained why there was a need for Long-term Planning and what should be put in place to achieve this and how reducing carbon dioxide emissions should be addressed.

The paper by Michael Grubb and David Newbery [Ref. 5] also highlighted the growing imperative “towards environmental and particularly decarbonisation and how this would be reflected through carbon pricing. The EU's Renewables Directive [2009/28/EC] raised the required share of renewable energy [not just for electricity] to 20% of final energy demand by 2020, each country agreeing to this target.” Their damning conclusion was:

“In conclusion, the electricity market was not well suited to delivering either secure or sustainable electricity – and even 'affordable' rang hollow politically as retail electricity prices continued to rise, while industry warned about the high financing costs from the multiple risks facing the sector. Britain's vaunted model of liberalization was seen to be failing on all three key Government objectives.”

This conclusion was reached in June 2018 and the situation was judged less than satisfactory then. It was to become much worse by Oct. 2022 with international gas price increases by approximately 300% resulted in a huge increase in the Price of Electricity. This risk was always present (see Ref.6), but no plans were in place to deal with such a contingency. All the private companies, including the National Grid worked on short term plans to look after their shareholders. There are currently proposals by the UK government to replace the System Operator role of the National Grid with a Future System Operator [FSO] as a publicly owned company and this may be in place by the end of 2023.

A number of small and medium sized firms were operating in the market leading up to 2022 but all of these firms [approx. 25 in number] went out of business when the wholesale cost of gas and electricity soared and action needed to be taken by the government to resolve matters. Public concerns were also being raised over the ownership of energy companies in Great Britain. Present ownership is difficult to be certain of but noted below are indications of how ownership in 2022 stands :-

1. Electricite de France [EDF] a public utility with majority owner ship by the French Government.
2. Scottish Power is 100% owned by Iberdrola [listed in Spain] a Spanish energy utility with Black Rock and Qatari Investment Authority as its major shareholders.
3. E.ON UK [bought Npower in 2019] Both were subsidiaries of E.ON SE [listed in Germany, Major shareholders: RWE AG, Capital Group [a US asset manager], and the Canadian Pension Plan Investment Board [a Canadian Crown Corporation.]]
4. Ovo Energy is privately owned [SSE is now part of Ovo.] The two major shareholders

are two giant US asset managers : Black Rock and Invesco.

5. Centrica, the parent company of British Gas, have major shareholders such as abrdn and Schrodgers as well as Bank of New York Mellon Corporation, a US investment bank.
6. National Grid Company: 60% of the National Grid is owned by foreign companies, mainly by an Abu Dhabi company. The NGC also hold a 40% stake in the Scottish Gas Network but some of the gas grid may have been sold to overseas owners.

It is ironic that many years after privatisation of the main energy firms in the electricity industry, these industries are largely owned by foreign governments or foreign investment funds. More specifically, around 50% of GB Offshore Wind assets are publicly owned but only 0.07% of them are owned by UK companies. The National Grid Company, a private company, is responsible for the UK Gas Network and in England and Wales the electricity network and consumers have no choice but to use these networks and the company are effectively a monopoly.

In Oct. 2017 the “cost of energy: independent review” by Professor Helm was published by the UK government. One of his conclusions was that the Price of Electricity was higher than it need be. No action was taken on any recommendations in this report as far as I am aware [Ref. 10].

Section 4 : Conclusions

Section 3 shows in general terms how the industry has evolved over the past 30 years. The article, “Restructuring and Privatisation of the UK Electricity Supply” [1997.] [see Ref.2] referred to the privatisation of the industry in 1990 as the “British electricity experiment, which has provided a model for power sector reform around the world.” After over 30 years of this “experiment” it is time to assess whether the strategic objectives are being achieved. These are often stated as being a: **“trilemma” Security of Supply, Affordable and Low Emissions.** What effect has the privatised arrangement together with government planning had on achieving these objectives?

Security of supply: the objective that the risk of supply failing to meet demand resulting in blackouts is at an acceptable level. This is a public good issue that the market does not address. Solar and wind generation that provide very little support for security of supply is being introduced while thermal generation [coal plants], that do support security have been closed without replacement. Gas generating plants fill this function in part and it is unlikely that these could be phased out in the near future. This strategy inevitably results in an increased risk to security of supply. Therefore government action could be considered negative to the Security of Supply and have failed to meet this objective.

Affordable: the objective that the price of electricity will not increase substantially due to changes in the generation mix. The main driver for privatisation was that the price would be minimised. The reason for the increases in price of electricity since 2003 are not well known or understood. The increased wholesale gas price has certainly been a factor. However, that the price of electricity increased significantly in Sept. 2022 while gas and electricity providers made high profits indicates that the market in electricity is not competitive. The present electricity system allows for the wholesale cost of gas to determine the price of electricity. A Review of the Electricity Market Arrangements is being considered but this may take two years. To establish a new method of pricing. The actions being taken by government are not adequately controlling the price of electricity which is now unaffordable.

Low Emissions: the objective that by 2050 we will achieve net zero emissions from the energy system as a whole. Since renewable energy is provided mainly via electricity, having low emissions from generating electricity is a critical issue. Low emissions is also a public good issue that a market will not address. Actions by government have made important contributions to reductions in emissions but the lack of planning, taking account of systems issues, has resulted in a situation where we are not on track to meet the low emissions objective for electricity production and use. The dependence on gas generation is not helping to meet this objective.

The dependence on market signals and failure to carry out long term planning for the electricity system based on systems engineering methodology has probably contributed to this failure. The privatisation model is therefore failing to meet the strategic objectives. A new model is urgently needed.

The UK Government is drafting a bill to establish a Future System Operator [FSO] body which will take over functions from the National Grid Company and draw up plans for energy. The proposed arrangements may be along the following lines:-

- Control of energy markets – Ofgem
- Planning of the energy system – FSO
- Operation of electricity and gas grids – FSO

This is certainly a step in the right direction and there is an interesting parallel with the creation of the electricity system nearly 100 years ago. The Act in 1919 seeking to create a grid but those appointed were not given sufficient authority to make the necessary changes. Another Act in 1926 provided for what was planned for the grid to be implemented. There is a concern that the Act establishing the FSO will not be worded giving this body the power to implement their plans. This Act should include the financial backing for their plans from either the private sector or Public Sector Borrowing. This could be a critical first step if done properly.

The government's proposed transition to electrification of transport and of residential and business heating over the next 30 years will require increased low or zero carbon electricity generation, perhaps requiring to meet a demand of between an average of 72 and 80 GW by the year in 2050. There are no signs that the government has recognised the scale of actions to be taken to ensure that this demand will be met or how the Energy Sector can be decarbonised by this date. The Intergovernmental Panel on Climate Change [IPCC] in 2020 stated:-

“Climate change is an existential threat to humanity. Without global action to limit greenhouse gas emissions, the climate will change catastrophically with almost unimaginable consequences for societies across the world.”

Actions by government has resulted in initial reductions in emissions with coal generation being phased out, but since then there has been an inadequate reduction in emissions, with a high dependence on gas generation. Increased renewable sources of generation over the past few years have resulted in increased risk to security of supply. This is clearly shown to be the case, one paper “Data on the effect of intermittency of wind generation in the GB electricity system.” [Ref. 13] gives an example of what occurs when there is little or no wind. The paper, “Reliability and resilience of the electricity system with high levels of renewables,” makes clear that the electricity supply is seriously at risk during periods of severe weather, [Ref. 14] i.e. little or no wind for several days. Storage is proposed as a solution but the cost in terms of finance and the physical environment have not been presented. These would only provide limited short term grid support, say a few hours, and not address the need for support for a week or more.

The government proposes, in 2023, to bring part of the National Grid Company into public ownership. This will form the Future System Operator [FSO] which is a step in the right direction. The government also is establishing a Great British Nuclear Energy Company in the hope this will resolve the problem of investment if government borrowing is part of the proposed. These decisions should only be taken after careful analysis using system engineering to make sure that they provide system resilience. In the March 2023 report from the Climate Change Committee [Ref. 11] state their concerns:

“The UK is 'strikingly unprepared' for the impact of the climate crisis” and “there had been' a lost decade' in efforts to adopt for the impact of global heating,” and “ had 'warned repeatedly' of poor preparation in the past and government action was now urgently needed to protect people, their homes and livelihoods.”

The CCC also highlighted the heatwave in 2022, when temperatures surpassed 40° C in the UK for the first time in recorded history. This resulted in an additional 3,000 people dying and 20% of hospital operations being cancelled at the peak of the heatwave. In the CCC report conclusions there were warnings for government and expressing urgent concerns:-

“The government is not putting together a plan that reflects the scale and the nature of the risks that face the whole country,” and “It means that we've got at least 30 more years of escalating hazards. Action is needed, and we need it now.” [Ref. 11]

The CCC report is covering all aspects of what the country needs to do to tackle climate change but there is the overriding requirement to transition to electrification of transport, residential and business heating to help deal with all issues. The key will be to establish a government body as a statutory body to replace the current governance model.

Section 5 Postscript.

It is a daunting task to achieve net zero in the energy sector by 2050 and the only way this may have any chance of succeeding is if the proposed Future System Operator [FSO] is empowered to plan the electricity system and implement these plans with the necessary infrastructure finance. It may be more effective to establish a National Energy Authority [NEA] [Ref.12] a statutory body responsible to the UK parliament, composed of a multi-disciplinary team tasked with planning the energy sector for the long term, i.e. at least 50 years ahead. The NEA require to be carefully formulated with competent engineers and multi-disciplinary staff. The NEA should incorporate the FSO and, with the exception of issues relating to national security, be transparent to the public and must be given the powers to ensure their plans are implemented.

The National Grid Company would be better brought into public ownership as part of the NEA. Along with the FSO which will be publicly owned, would thus bring the whole national infrastructure network into public ownership. The NEA will need to be responsible for building and financing [from government borrowing] all new generating plants and the transmission network for the future. The Treasury could establish an Energy Infrastructure Fund [EIF] which would be “ring fenced” and which would have all capital costs and borrowings repaid from part of the electricity price of electricity generated by each company responsible for Operating and Maintaining of the various plant. This would mean that the EIF may get lower Public Sector Borrowing [PSB] rates as the repayment is not paid out of taxation. A decision will need to be made as to whether existing energy companies would be nationalised or alternatively allowed to continue as Legacy Plants. With PSB currently at such a high level it is unlikely that government would be keen to increase PSB to buy up all the energy firms in GB. All new NEA plants could be operated by the NEA or be franchised to existing energy companies to Operate and Maintain {O + M} them. The NEA would operate the Grid. All wholesale supplies of electricity would be monitored and controlled by the new FSO as part of the NEA and control of energy markets would be the responsibility of a reconstituted Ofgem. The Wholesale Cost of Electricity from all generating plants feeding the grid will be transparent and require to be monitored to ensure the lowest price of electricity for consumers. The FSO, within the NEA, will provide effective optimal planning and delivery of the total GB system and propose a Standard of Security of Supply to be endorsed by parliament similar to that used in GB prior to privatisation. The optimum mix would be established based on total system cost basis and address long-term plant mix in order to have acceptable security for prime sources of energy. The government had suggested that their aim was to supply 25% of electricity from nuclear by 2050 but this should be determined by the FSO, and not just for nuclear, but for the whole mix required by 2050 in order to meet emissions targets.

The tax on electricity needs to be addressed urgently. There is 5% VAT on Gas and electricity. The Price of Electricity has a Government Environment Levy of 12% and a Carbon Tax on Gas Generators which at present usage amounts to approx. 6%. Both of these taxes should be withdrawn. The Levy is punishing electricity which is the answer to climate change and Carbon Tax on Gas will not reduce its use as it is an essential component of the GB electricity supply.

Action is needed now. As a matter of urgency a parliamentary commission should be appointed immediately to establish a National Energy Authority, incorporating the proposed FSO. To achieve the long-term planning goals cross-party agreement should be in place to ensure that this statutory body will be empowered to continue to work free of any political interference from any change of government. As described in general terms above, with statutory powers and with the stated ethos to work in the national interest and for the public good the NEA would ensure “what was needed, where it was located and when it was to be operational” and had the infrastructure investment to ensure that the electricity grid was decarbonised by 2050. All these proposals should be urgently put in place and effective by end of 2024.

Charles Scott June 2023.

References :

- Ref. 1: UK Electricity Market Reform and the Energy Transition: Economic Lessons. EPRG Working Paper 1817. Section 2.2. Electricity Industry Structure 1990 -2001. Michael Grubb and David Newbery, June 2018.
- Ref. 2: Restructuring and Privatizing of the UK Electricity Supply -Was It Worth It? World Bank Group: David Newbery and Michael Porritt, Sept. 1997.
- Ref. 3: As Ref. 1: Section 2.3 The Electricity Industry Structure after 2001.
- Ref. 4: As Ref. 1: Section 2.4 Electricity Demand and the Retail Market.
- Ref. 5: As Ref. 1: Section 3 The Intellectual and Political Evolution of GB Electricity Market Reform.
- Ref. 6: House of Lords: Economic Affairs Committee [June 2008] Evidence as a Memorandum presented by Colin Gibson. [2008]
- Ref. 7: Professional Engineer, July 2015, [Reply to “View from Westminster”] Charles Scott.
- Ref. 8: “Adam Smith: What he thought and why it matters”: By Jesse Norman: ALLEN LANE. 2018: Chapter headed: Crony Capitalism: The Next Frontier.
- Ref. 9: Discussion Paper by Colin Gibson submitted to the Select Committee of the House of Commons. [2015]
- Ref. 10: “cost of energy: independent review” Professor Dieter Helm. 2017. Gov. publication.
- Ref. 11: Climate Change Committee report, March 2023.
- Ref. 12: Engineering for Energy: A proposal for the governance of the energy system in Great Britain: Institution of Engineers in Scotland strategy document: 2020.
- Ref. 13: Data on the effect of intermittency of wind generation in the GB electricity system: Iain MacLeod, Institution of Engineers in Scotland. March 2023.
- Ref. 14: Reliability and resilience of the electricity system with high levels of renewables. Colin Bayfield, Engineer-it. Feb. 2023.