Scientific Research Publishing

Open Journal of Political Science, 2022, 12, 578-611
https://www.scirp.org/journal/ojps
ISSN Online: 2164-0513
ISSN Print: 2164-0505

Nuclear Power Policy in the UK since 2010: Multiple-Elitism or Neo-Pluralism?

Asmaa Kaddour-Trea

School of Psychology, Politics and Sociology, Canterbury Christ Church University, Canterbury, UK
Email: asmakadd29@gmail.com

How to cite this paper: Kaddour-Trea, A. (2022). Nuclear Power Policy in the UK since 2010: Multiple-Elitism or Neo-Pluralism? *Open Journal of Political Science, 12,* 578-611.
https://doi.org/10.4236/ojps.2022.124032

Received: September 8, 2022
Accepted: October 10, 2022
Published: October 13, 2022

Abstract

This study presents an analysis of nuclear power policy in the UK since 2010, associated with the Coalition government and successive Conservative government policies to address climate change and to deliver affordable and clean energy. From the analysis of semi-structured interviews with elite participants and the policy documents, this study explores in detail nuclear power policy in the UK since 2010. It applies two theories of policy process to explore the policy continuity and change in this area: multiple-elitism and neo-pluralism. In this case study continuity is a feature in nuclear power policy domain. The case study reveals battles between environmental NGOs, business groups and the government to change policy directions. Countervailing power associated with neo-pluralist theory emerged significantly to oppose special interests emphasised by multiple-elite theory. This countervailing power appeared in different forms: the emergence of social movements in nuclear power policy area, and the communication between different actors on the issue of nuclear power in an issue network. Nuclear power emerged as a privileged technology in the energy mix. It enjoyed government and business support, and key elite positions were found to advocate for this technology despite some opposition. Overall, a combination of multiple-elitist and neo-pluralist features were found in the policies pertaining nuclear power policy in the UK since 2010.

Keywords

Nuclear Power, Multiple-Elitism, Neo-Pluralism, Countervailing Power, Issue Network, Social Movements

1. Introduction

The growing concern over climate change played a role in framing the energy policies in favour of a low-carbon energy sector. By the beginning of the 2000s,

these policies started focusing on the decarbonisation of the electricity sector. Alongside natural gas, technologies such as nuclear power and renewables were being considered to meet the targets of reducing emissions, particularly the Kyoto Protocol target set in 1997[1]. In the context of reducing carbon emissions, nuclear power secured a privileged position. It was supported by successive Labour governments and later by successive Conservative governments, as they thought it would bridge the gap in security of supply and reduce emissions.

In the first half of the decade of the 2000s, interest in nuclear power was revived under the so-called "nuclear renaissance" (Johnstone, 2010). This mainly influenced the Energy Act and the Planning Act of 2008, which contained legal procedures for the operation and the decommissioning phases of new nuclear power plants. The Acts signalled the need for restoring the nuclear power option to deal with the issue of electricity consumption. The need for the nuclear option in the energy mix continued under the Coalition government. The latter, in effect, introduced procedures that would help the operation of nuclear power in the electricity market. This made nuclear technology commercially attractive, however, local concerns over its impact on the environment also surfaced. The environmental NGOs began to raise the issue of the harmful effects of nuclear power, especially following the Fukushima disaster in 2011[2].

This study analyses the main issues of nuclear power, notably the expansion of nuclear new builds. Informed by elite level interviews and policy documents, in this case study I focus on the period 2010-2020, to describe and explain energy and climate change policies pertaining to nuclear power. I look first at the expansion of nuclear new builds and its implications. This includes a study of policy continuity and change since the Labour government's decision to revive the nuclear industry. Second, I examine the role of environmental NGOs, government institutions, and businesses in nuclear power. Through my analysis I identify the main themes linked to the theories of neo-pluralism and multiple-elitism that are relevant for understanding developments in nuclear energy policy. As such, I study the nuclear power agenda focusing on the role of interest groups and the government's response. Hence, I explore the concept of influence to understand the policy process through key questions. Specifically, I ask: how has nuclear power been revived since the Conservatives came to power? Did the policies present continuity or change? How did interest groups achieve policy outcomes?

[1]The Kyoto Protocol set an international commitment of reducing emissions by 5% below the 1990 levels by 2012. During the first Kyoto commitment (2008-2012), the UK agreed to reduce 12.5% of greenhouse emissions as a part of the EU burden-sharing agreement. This agreement required the EU to reduce 8% of greenhouse emissions, which would be broken down into different national targets (Bohringer, Hoffman, & Lange, 2005).

[2]Fukushima disaster in 2011 in Japan was caused by an earthquake followed by a tsunami, leading to leakage from the reactors due to the failure of the cooling systems. The nuclear disaster caused fires, explosions, contaminated hundreds of thousands of tonnes of water, and more than 140,000 people were evacuated from the area (Murakami et al., 2020).

2. Nuclear Power Revival: Policy Continuity and Change since 2010

Interest in nuclear power was revived in the first half of the decade of the 2000s as electricity supply became a serious matter. First, there was a National Grid failure in 2003[3], leading to an electricity cut in South London; and second, the dispute between Russia and Ukraine over gas supply between 2006 and 2009 brought the issue of energy supply onto the agenda[4]. In 2006, the issue of the energy security was articulated by the then Prime Minister Tony Blair, in a speech to the trade association, the Confederation of the British Industry (CBI). The Prime Minister mentioned that the UK would become heavily dependent on foreign imports of gas, mostly from the Middle East, Russia and Africa (Wintour & Adam, 2006). Further, the issue of carbon emissions was also considered, as nuclear power emits less CO_2 in its life-cycle (see **Figure 1**). This was highlighted in a review report produced in 2006, on the energy challenge. The review clarified the challenge and the need to reduce emissions through low-carbon energy, and estimated that around 25 GW will be required of new electricity generation over the next two decades (Department of Trade and Industry, 2006). According to the review, the retirement of the existing coal and

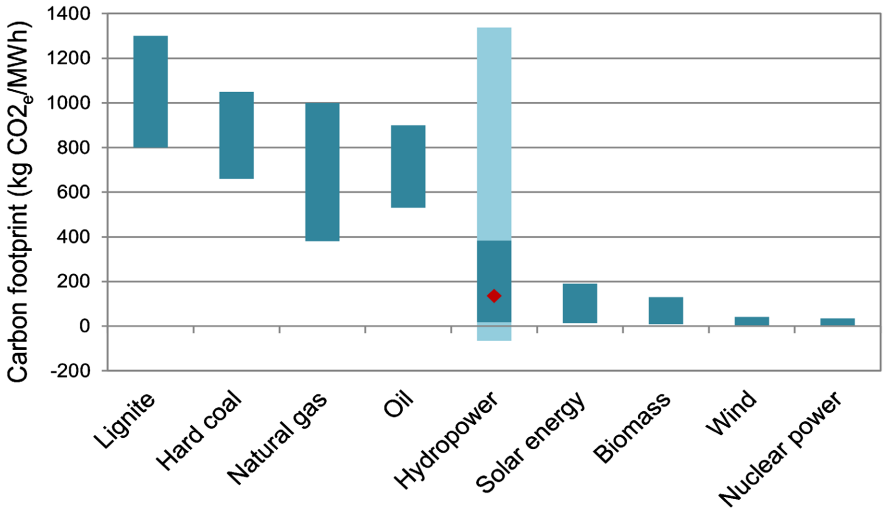


Figure 1 shows that nuclear power produces the same amount of CO_2 emissions equivalent per electricity unit as offshore and onshore wind and one third of CO_2 equivalent per electricity unit compared to solar energy (Scherer & Pfister, 2016) (**Figure 2**).

Figure 1. Carbon footprints of various energy sources.

[3]In 2003, the National Grid, a private company that transmits electricity power connecting power stations in the UK, failed to supply South London leading to a power cut for an hour and a half. Hence, 60% of rail services, including 250 sets of traffic lights, were affected by the blackout. It was discovered that there was a fault in the system due to an oil leak (Ofgem, 2003).

[4]The crisis between Russia and Ukraine erupted when Ukraine rejected the request of Russia to pay $250 per 1000 cubic metres of gas in 2009 (Parliament & House of Commons, 2009) (p. 67). Russia, as a result, cut off the gas supply to Ukraine leading to a gas crisis and shortage in some European countries had to shut industrial plants and schools. In 2009, both countries reached an agreement, Ukraine had to pay the bills at $268.5 per 1000 cubic metres and the EU acted as a guarantor (Kirby, 2014)(p. 3).

nuclear power plants would affect electricity generation and therefore substantial new investment would be required (Department of Trade and Industry, 2006).

Further, in May 2007, the government released *Meeting the Energy Challenge: A White Paper on Energy*. The Paper discussed the technologies used to generate electricity and clarified that electricity supply was reliant on a limited number of technologies, which would pose problems to the security of supply (Department of Trade and Industry, 2007). The White Paper mentioned, "There would also be a risk of higher costs to the UK economy: by excluding nuclear as an option, our modelling indicates that meeting our carbon emissions' reduction goal would be more expensive" (Department of Trade and Industry, 2007). These claims were backed by the White Paper, *Meeting the Energy Challenge: A White Paper on Nuclear Power*, released in January 2008, under the Gordon Brown premiership. The Paper confirmed the government's support for the construction of new nuclear power plants, which would play an active role in the energy mix alongside other technologies (Department of Business, Enterprise & Regulatory Reform, 2008). It also stated that the energy companies would fund the new constructions, including the costs of decommissioning and waste management (Department of Business, Enterprise & Regulatory Reform, 2008).

The support for the nuclear power option was crystallised with the introduction of the Planning Act and the Energy Act in 2008. The Acts set procedures for operation and decommissioning as part of the process of nuclear expansion[5]. With regards to the selection of sites, the government nominated Hinkley Point C, Oldbury, Sellafield, Sizewell and Wylfa, as well as Bradwell, Braystones, Hartlepool, Heysham, and Kirksanton (Gray, 2010). Further, the government established the Office of Nuclear Regulations (ONR)[6], the Office for Nuclear Development (OND)[7], and the Infrastructure Planning Commission (IPC)[8] to lead the nuclear power programme.

Although nuclear power seemed a clean option to solve climate change and the problem of the electricity supply, it should be noted that the nuclear option has adverse effects. Nuclear power can damage human health and the environment due to radiation exposure, widespread contaminated air and water, and radioactive waste. According to Friends of the Earth (2020), "The nuclear waste

[5]The Planning Act emphasised the need for new nuclear power infrastructure, which would be addressed through the National Nuclear Policy Statement (EN6). The Energy Act clarified that prospective operators of nuclear power stations should have a Funded Decommissioning Programme (FDP). FDP stipulates that the costs of decommissioning, management and disposal of wastes would be funded by the generators (The Energy Act, 2008).

[6]ONR is responsible for nuclear safety and security in the UK. It provides regulations for nuclear industry, such as a regulatory approach for nuclear radiation, generic design assessment for nuclear power plants, and decommissioning process (Office for Nuclear Regulations, 2020) (p. 4).

[7]OND was created to remove barriers to nuclear investment in nuclear new builds. It is made up of civil servants, and expert staff from the industry. Its task is to remove obstacles for companies to do business in nuclear power (BEIS, 2020a).

[8]IPC was a non-departmental body responsible for the decisions made for national infrastructure. It was abolished in 2012 (BEIS, 2020b).

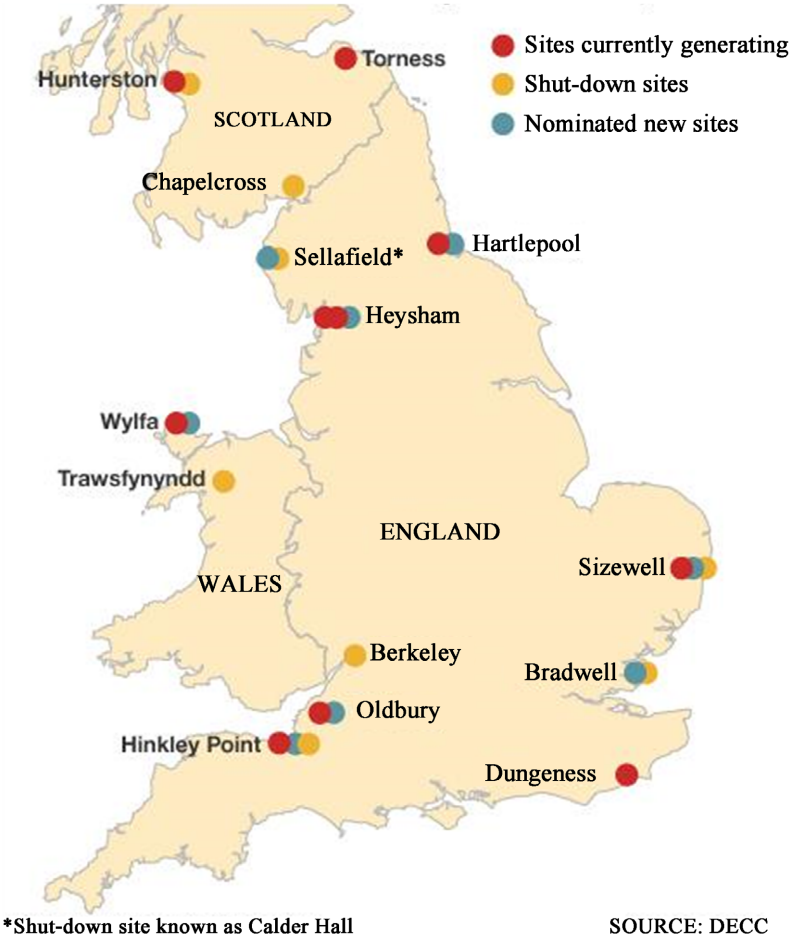
debate is a big one; there is also the risk of catastrophic impacts, and a poor record of building power plants on time and budgets". Further, there is the issue of nuclear weapon proliferation; for instance, the first commercial reactor at Hinkley, the Magnox A plant announced in 1956, had also operated for military production purposes. The anti-nuclear campaign group, Stop Hinkley (2016a), explained, "With the current confusion over Hinkley's latest promised reactor, the military history of the site should not be forgotten" (p. 3). This led environmental NGOs and anti-nuclear campaign groups oppose the nuclear option in the energy mix, which I shall discuss later.

Despite the dangerous effects of nuclear power, the interest in nuclear power continued when the Coalition government came to power in 2011. As seen in **Table 1** (see below), the National Policy Statement (NPS) on nuclear power, produced by the DECC in 2011, clearly shows the continuity of the nuclear power policy. The statement emphasised the need for policies to decarbonise electricity before 2025 through nuclear power (DECC, 2011a). It stated, "Given the urgent need to decarbonise our electricity and enhance the UK's energy security and diversity of supply, the Government believes that new nuclear power stations need to be developed significantly earlier than the end of 2025" (DECC, 2011a). The deployment of the new nuclear power programme by end of 2025 was already identified in the Labour government's White Paper on nuclear power entitled, *Meeting the Energy Challenge: A White Paper on Nuclear Power,* published in 2008, and in the 2009 Nuclear National Policy Statement (DECC, 2009). The DECC (2009) argued: "All the nominated sites will need to be assessed under the SSA[9] [the Strategic Site Assessment]. This will include assessing whether a site is credible for deployment by 2025" (p. 3).

The National Policy Statement (NPS) produced by the DECC in 2011 also mentioned a list of potentially suitable sites for deployment, with slight changes to the original list introduced by the Labour government. The NPS removed Braystones and Kirksanton and confirmed the remaining eight sites from the list provided by the Labour government in 2008 (DECC, 2011a) (see the map in **Figure 2**). Further, between 2012 and 2016, nuclear power continuity was asserted when EDF announced a ten-year life extension of the existing nuclear power reactors. More specifically, in 2012, EDF announced a seven-year life extension for Hinkley-Point and Hunterston (Jowit, 2012). Moreover, in 2014 and 2015, Dungeness and Sizewell B were offered licence extension of ten years, respectively. In 2016, EDF announced a five-year life extension for Heysham I and Hartlepool, and a seven-year extension for Heysham II and Toreness (Farrell, 2016).

Further, the private sector played a significant role in the continuation of the "nuclear renaissance". It endorsed the government's decision to revive nuclear power in the energy mix. As such, CBI and the trade association, Nuclear Industry Association (NIA) believed that nuclear power would contribute to Britain's

[9]The Strategic Siting Assessment (SSA) was established to identify sites in England and Wales that are potentially suitable for the nuclear deployment programme by end 2025 (DECC, 2011a).



The figure shows established and new nominated sites for new nuclear power stations (DECC, 2012).

Figure 2. Sites of existing and proposed nuclear power stations in the UK.

need for clean, secure, and affordable electricity (Parliament & House of Commons, 2013). Their support was translated in their interaction with the government and the producer groups, most notably EDF in the Hinkley Point C project. Their support for the nuclear option was communicated by reports, letters, annual briefings, their response to consultations, and attracting media attention (see below). They justified their support with the need to decarbonise the electricity sector, provide energy security and investment. They saw that the nuclear programme would substantially increase workforce supply (NIA, 2012). Business groups were significantly involved in the process. The government relied on business and industry to deliver policies that were set under the new nuclear power programme (J. Diggle, personal communication, January 20, 2020). In this context, the expansion of nuclear power required the private sector to cover the costs of the nuclear new builds. According to Chris Huhne (2010), the Minister of Energy and Climate Change in 2010, "The coalition agreement is clear the new nuclear can go ahead as long as there is no public subsidy".

Alongside the private sector, the government's support for the new nuclear

power programme was also related to climate change. During an interview with the Liberal Democrat and the former Minister of Energy and Climate Change (2012-2015), Ed Davey (personal communication, March 4, 2020) commented:

> The conservative side of the Coalition was keen on nuclear power I was less keen. However, because it was a zero-carbon power, I wasn't fundamentally against it, because it could contribute to reducing global emissions.

As we can see above, given the continuity of nuclear revival between successive Labour governments, the Coalition and the successive Conservative governments, it is also possible to identify significant policies changes since 2010. As we shall see, there is a clear policy change in nuclear power under the Coalition and the successive Conservative governments, which aimed at improving the development of nuclear power. In 2011, the Coalition government introduced an energy White Paper entitled, *Planning our Electricity Future: A White Paper for Secure, Affordable and Low-Carbon Electricity.* The paper revealed the government's commitment to transform the electricity sector under the Electricity Market Reform (EMR) (DECC, 2011b). The paper clarified, "The Electricity Market Reform will put in place the institutional market arrangements to deliver the scale of change in the power sector needed to meet the UK's carbon budgets" (DECC, 2011b).

The transformation of the electricity market was justified by the need for policies to secure affordable and reliable sources of energy. As mentioned in the paper, demand for electricity was expected to double by 2050 (DECC, 2011b). Further, electricity prices were estimated to increase dramatically by 2050, due to the implementation of environmental policies (DECC, 2011b). To solve the problems in the electricity sector, the EMR would provide an investment of £110bn by 2020, and reduce the impacts of higher bills on consumers in the future (DECC, 2011b). The EMR brought in a new measure to promote nuclear power, namely Contracts of Difference (CfD) (DECC, 2011b). It was thought that these CfD would increase the confidence of the investors and pave the way for other nuclear power projects (National Audit Office, 2017).

The CfD mechanism was launched in the Energy Act 2013, to encourage low carbon electricity generation (The Energy Act, 2013). The new provision would be required for all technologies, notably nuclear power and renewables. At its heart is the mechanism of the Strike Price to stabilise the revenues of investors and reduce the energy bills of consumers. The mechanism sets a Strike Price that provides a fixed price over the life of the contract. Further, the Coalition government replaced the Infrastructure Planning Commission (IPC) in 2012, which was responsible for examining national infrastructure applications, with the Major Infrastructure Planning Unit (MIPU) (DECC, 2011b).

The arrangements that were made to facilitate the new nuclear constructions were reflected in the Hinkley Point C project. According to the EDF Chief Executive Vincent de Rivas (Harvey, 2012): "it's very clear that we will not be able to make our final investment decision without a Contracts for Difference and

without a robust legal framework for this contract" (para. 6). Hence, as the government considered nuclear power to be low-carbon energy like renewables, the industry was offered state aid (Harvey, 2012). In 2012, the government authorised EDF Energy and its partner China General Nuclear (CGN) to build two EPR reactors at Hinkley Point C (Bolton & Hinson, 2020). This project would operate with a strike price of £92.50/MWh linked to price inflation over 35 years (National Audit Office, 2017). The strike price aimed to guarantee the €19 bn investment for both EPR reactors to EDF. However, some of the Lib-Dem MPs described the agreement as hidden subsidies (Martin, 2014). The Lib-Dem group leader at the European Parliament, Fiona Hall (Martin, 2014) argued "If it looks like a subsidy and smells like a subsidy, it is a subsidy" (para. 20). The strike price has clearly shown that nuclear power policy has moved against the earlier commitment that nuclear power would not be subsidised. The Hinkley Point C project was planned to be completed by 2023. This date was extended to 2025. It was only in 2016 that the Conservative government under the Theresa May premiership gave it the final approval (Hinson, 2020).

In 2017, the May government published a green paper, *Building our Industrial Strategy*, introducing the New Sector Deal (BEIS, 2017a). The Deal was established to support technologies for electricity generation through government leadership. For nuclear power, the government published a statement clarifying the measures of the Deal in 2018. The statement mentioned proposals consisting of key commitments such as 30% reduction of costs for the new builds by 2030, savings of 20% of costs for decommissioning, supporting the Small Modular Reactors' (SMRs)[10] technology, and a range of proposals to support investment and workforce (BEIS, 2018a). The Deal was welcomed by energy industries, the trade association, the Nuclear Industrial Association (NIA), and the trade union, Prospect.

In the same year, the Conservative government launched a consultation on the criteria for siting, which required a new National Policy Statement (NPS) EN6 for the deployment of new power stations between 2026-2035 (BEIS, 2018b). The nuclear power stations would deploy over 1 GW of single reactor electricity generating capacity (BEIS, 2018b). Hinkley Point C was excluded from the list of suitable sites for deployment as it already had its development consent (BEIS, 2018b). Further, in the 2019 and the 2020 consultations, the government introduced the Regulated Asset Base model (RAB) as a new framework to fund nuclear power. The model was established following the collapse of financial support for the Moorside plant (Sellafield) and the suspension of the Hitachi plant at Wylfa in 2019. Under the model, the energy company would recover all its spending on the nuclear projects through increasing consumers' bills and would be offered government subsidies in order to guarantee longer return (Ambrose, 2019). The RAB

[10]The high costs of large power reactors led to the need for small electricity grids under about 4 GWe. SMRs are built independently, and their capacity is added incrementally when required. These small units operate under 300 MWe. They are considered as a much more manageable investment than investment in big nuclear projects (BEIS, 2016).

model was supported by the private sector. In 2019, the CBI published a letter to the government to achieve progress and implement the model (J. Diggle, personal communication, January 20, 2020).

Whilst the support for nuclear power technology has continued since 2010, policy change and reforms have also been apparent following the establishment of the EMR 2012, the New Sector Deal 2017 and the proposed RAB model 2019 (see Table 1 below). Now, it is worth moving on to explore the policy outcomes through the theoretical framework of neo-pluralism and multiple-elitism.

3. Analysing Interest Groups' Mobilisation in Nuclear Policy Area

Having provided a detailed view of the nuclear power policy continuity and change, now I move on to explain the main theoretical framework used in this study. Multiple-elitism and neo-pluralism guide the empirical analysis of nuclear power policy in the UK since 2010. I will identify the concepts that help us explore interest groups influence in the policy area to clarify if nuclear power policy operated in a closed system of multiple-elitism or a relatively open system of neo-pluralism. Let us explain both theories before moving to the analysis.

3.1. Theoretical Framework: Multiple-Elitism and Neo-Pluralism

Multiple-elitists see that public policy is fragmented into hundreds of policy areas controlled by coalitions of elites under the mechanism of sub-government (McFarland, 2004). It replaces the view of a single elite controlling a policy area,

Table 1. Nuclear power policy since 2006.

Nuclear power policy under the New Labour government	Nuclear power policy continuity under the coalition government and successive conservative governments.	Nuclear Power policy change and reforms under the coalition and successive Conservative governments.
2006 The Energy Challenge Review (report). 2007 White Paper on Energy 2007—Meeting the Energy Challenge. 2007 Planning for a Sustainable Future—White Paper. 2008 Meeting the Energy Challenge: A White Paper on Nuclear Power. 2008 Energy Act Chapter 32. 2008 Planning Act Chapter 29. Meeting the energy challenge: A white paper on nuclear power 2008. 2009 the Road to 2010: Addressing the Nuclear Question in the Twenty First Century.	2011 Planning Our Electricity Future: A White Paper for Secure, Affordable and Low-carbon Electricity. 2011 National Policy Statement for Nuclear Power Generation EN6 Volume I of II.	Electricity Market Reform 2012. Energy Act 2013. 2017 Building our Industrial Strategy Green Paper. 2018 Consultation on Siting Criteria and Process for New Power Stations' Deployment between 2026-2035. 2019/2020 RAB Model for Nuclear: Consultation on a RAB Model for New Nuclear Projects. National Policy Statement for Nuclear Power with Single Reactor Capacity over 1 Gigawatt beyond 2025.

The Table shows the policies enacted by the Labour and the Conservative governments to revive the nuclear power sector for electricity generation. Under the Coalition and successive Conservative governments, more policy changes have been enacted to improve the performance of the sector (Author).

as portrayed in the elite theory, with the idea of several separate groups sharing similar interests and aims of mutual benefit. These groups control the direction of policy, limit the access of new groups and exclude potential troublemakers who do not accept the rules of the game (Gray, 1994). The sub-governments can control the agencies that represent the interest of the general public and prevent the implementation of policies that would serve the benefit of general constituencies (McFarland, 2004). This sub-government, which is often called an iron triangle, consists of few congressional committees (few legislators), executive agencies (few bureaucrats), and interest organisations representing producers (Lowi, 1969).

McFarland (2004) summarises multiple-elitism with the phrase "interest groups stasis" as the economy would weaken by the control of a massive system with various elites spread across policy areas. Some elites would offer support to one another to gain concessions in the form of tax codes, subsidies, regulations for prices, etc. This would harm the economy in the long run as the coalition between interest groups, legislators and government's agencies would increase budget and spending in several policy areas due to the trading of mutual benefits. As a result, citizens would be victimised due to the pressure of interest groups who also block regulations that serve the general constituencies. As the empirical studies showed the presence of multiple elites in several policy areas in the 1960s and 1970s, other studies emerged in the 1980s, which describe the presence of issue networks rather than sub-government and anti-interest groups stasis informed by countervailing power.

Neo-pluralism stipulates that policy areas better describe an open system, incorporating several interest groups seeking policy reforms. The theory believes that the policy process can include several forms of countervailing power that check policies and raise issues to the policy agenda, most notably, through social movements and issue networks. Neo-pluralism also informs the strand of research that emerged following multiple-elitism. The theory identified several examples that show the system to be relatively open to interests competing for policy change. This contradicts multiple-elitism, which views the political system as extremely controlled by a minority of groups that form sub-governments in a policy area. In this context, the concept of countervailing power through social movements and issue network will inform the application of neo-pluralism in nuclear power policy area (see **Table 2**).

Neo-pluralism is a theoretical framework that came about as a result of research studies conducted by classical pluralism and multiple-elitism. It revived the pluralist study of Robert A. Dahl (1961) and was a reaction to the sub-governmental coalition of the multiple elitist theory. Neo-pluralism expands the pluralist description of the participation of interest groups in policy areas into a range of actors, including interest groups, political parties, social movements, governmental agencies and public opinion (Hicks & Lechner, 2005). Neo-pluralists analyse policy outcomes by studying the policy process stages to understand how

such outcomes are achieved. Neo-pluralism believes that when the state supports influential business groups in society, it becomes more bureaucratic. Here, the economically powerful groups exert influence on the state. The state, in turn, can form interests or be biased towards particular interests and therefore hardly remains neutral (Arora & Awasthy, 2007).

The position of business groups in neo-pluralism originates from the ideas of Lindblom (1977). His study clarified that these groups enjoy a privileged position. Lindblom (1977) investigated power of business groups in U.S, China and Russia and identified that these groups dominated the economic and political life. However, this did not indicate the absence of governmental authority. Both businesses and the government share a common goal of sustaining economic growth. On the one hand, the government is dependent on votes; on the other hand, voters are dependent on employment from those companies. Importantly, whether business groups lobby for their private interests or not, they remain privileged in achieving the desired policy outcomes because they provide employment and investment, which leads the government to take the business interest into account.

Wilson (1980) believes that the political arena becomes more informed by regulatory behaviour where motivated regulatory officials influence the course of policies. He puts bureaucrats into categories: politicians ambitious for elective office, careerists motivated with bureaucratic concerns, and professionals responding to the interest of the wider community outside their agency. The political arena also includes special interest lobbyists motivated by competitive advantage or special benefits, public interest advocates for reforms, and journalists aiming at a front-page story. For McFarland (2004), the complex participation of several types of groups is characterised by opposing views about an issue and autonomous participation of units of the state. As already seen in multiple-elitism, government agencies are dominated by business groups, which leads to economic decay. In neo-pluralism, theorists found that the producer groups are checked by countervailing power. This includes situations where producer groups are checked by citizen groups or producer groups checking other producer groups with different interests, or producer groups colluding with citizen groups to check other producer groups (McFarland, 2004).

The countervailing power can emerge from social movements or issue networks. Social movement is often perceived as a reaction to the elite model that controls the political system and excludes the interest of the wider public (Martin, 2015). Social movements could include producer groups, citizen groups, or professional groups with an interest contrary to the dominant group (McFarland, 2004). Another source of countervailing power is issue networks. As multiple-elitists predicted the existence of sub-governments led by iron triangles across policy areas, studies of individual issues discovered that iron triangles were found in few areas and sub-governments were open to opponents of producer groups (Godwin, Ainsworth, & Godwin, 2013). The neo-pluralists

concluded that Lowi exaggerated in describing sub-governments as being closed to the producer groups and bureaucrats, and they suggest that sub-governments may not be as biased to favour producer groups (Godwin, Ainsworth, & Godwin, 2013). Heclo (1978) proposed "issue network" as a system that could better describe the political system; he argued:

> Iron triangles and sub-governments suggest a stable set of participants coalesced to control fairly narrow public programmes which are in the direct economic interest of each party to the alliance. Issue networks are almost the reverse image in each respect. Participants move in and out of the network constantly. Rather than groups united in dominance over a program, no one, as far as one can tell, is in control of the policies and issues. (…) Powerful interestgroups can be found represented in networks but so too can individuals in or out of government who have reputation for being knowledgeable (pp. 275).

As explained, multiple-elitism sees that the policy process includes a coalition of interest groups. These interest groups form sub-governments to achieve policy reforms that would serve their special interests. However, neo-pluralism stipulates that policy areas better describe an open system, incorporating several interest groups seeking policy reforms. The theory believes that the policy process can include several forms of countervailing power that check policies and raise issues to the policy agenda, most notably, through social movements, and issue networks.

Multiple-elitism and neo-pluralism have applied their ideas to analyses of the policy process of environmental and energy policies (e.g. Baumgartner & Jones (1991); Fudge, Peters, & Woodman (2016); Godwin, Ainsworth, & Godwin (2013); Hamm (1986); Hayden (2002); Sayre & Kaufman (1960)). The academic literature attempted to explore specific concepts associated with the theories or apply a single concept to explore the policy processes. For example, in nuclear power policy area, Baumgartner and Jones (1991) studied the rapid change in nuclear policies in the U.S. in the twentieth century. The study identified that policies go through a long period of stability and a short period of dramatic reversals. Baumgartner and Jones (1991) clarified that in a pluralist political system, the multiple-elitist system of sub-government can be created, but at the same time, other political institutions can serve as a route towards destruction or alteration of policy sub-government. Both authors recognise that this change in public policy can lead to a transition from 'iron triangle' to 'issue network'. The sub-government of nuclear power included the private sector and small groups of executive and legislative branch officials. This analysis focused on the application of multiple-elitism highlighting the concept of sub-government in nuclear policies. Baumgartner and Jones (1991) saw that policy reforms were slow at the beginning of the programme, but nuclear committees shifted towards considerable reforms and amendments. Reforms in this sense reflect alteration of the sub-government, which resulted in a dramatic reversal of the political system to an

open system based on policy change and reforms contrasted to incremental and slow policy change controlled by sub-government.

Similarly, Cox, Johnstone and Stirling (2016) explored deep incumbency in the nuclear power policy area in the UK in 2003-2006. This theme demonstrates the government's constant support for the nuclear industry. Among the findings are that the decision on nuclear power new build in the UK was made 'behind closed doors' (Cox, Johnstone, & Stirling, 2016). In framing this argument, the authors reviewed indicators of network interaction between elite individual actors. These indicators included, for instance, senior politicians, prominent individuals who were involved in Hinkley Point C Strike Price, the French nuclear utility EDF, and individuals who reportedly emphasized their importance in the policy turnaround between 2003 and 2006. Those elite actors were nuclear lobbyists involving powerful elite actors around civilian and nuclear power interests both in government and nuclear industry. This observation demonstrated the multiple-elitist feature related to the formation of a closed network of elite participants in the policy process associated with strong government support for the nuclear industry.

Hayden (2002) studied licencing hazardous waste facilities in the U.S. following the world's first environmental policy to protect the environment, the National Environmental Policy Act (NEPA), in 1969. The decision that licenced hazardous waste facilities was an outcome of sub-government influence in the policy-making process. The study found that the sub-government dominated by powerful corporations could hire experts and economists. This sub-government controlled the economists, who failed to guide decision-makers and the court. The corporate elites control information and therefore possess the power to impose risk on the uninformed public. In this vein, information exchange seemed an important concept in exploring multiple-elitism in the policy area. Hayden (2002) suggests that in the case of hazardous waste, the corporate interest groups in sub-government dominate the decision process about the definition of the problem as they are the entity that controls data collection and analysis.

None of the above academic literature applied multiple theories to multiple cases to see what can be learned. The application of both theories of multiple-elitism and neo-pluralism is a unique approach in the analysis of energy and climate change policy, and sets it apart from the existing academic literature. The theories provided several concepts and themes that reflect multiple-elitism vs neo-pluralism to analyse the policy process. The following themes were developed: 1) sub-government vs competition of several interest groups; 2) policy reforms serve the special interest (of the sub-government) vs regulations and reforms that serve the general interest; 3) the wider public is often unorganised vs the existence of organised groups led by countervailing power such as social movements, and issue networks; 4) information is blocked by elites vs information circulation checked by the countervailing power (See also **Table 2**). These themes helped identify the focus of the theories and thereby categorise the data.

Table 2. Summarised concepts of multiple-elitism and neo-pluralism.

Concepts	Multiple-elitism	Neo-pluralism
Dynamics of interest groups interaction	Sub-government	Competition within issue network
Benefits of policy reforms	Serving special interest	Serving general interest
Degree of public organisation	Unorganised	Organised (countervailing power)
Information circulation	Blocked	Circulated

Source: Author.

With the help of concepts drawn from multiple-elitism and neo-pluralism, I attempt to study the role of a range of actors in the policy outcomes of the nuclear power sector. As discussed above, the theory of multiple-elitism offers the concept of sub-government to refer to a closed system that lacks democratic interaction between a wide range of actors in a policy area. By contrast, the theory of neo-pluralism emphasises the concept of issue networks to refer to a relatively open system that includes many producer and citizen groups. As producer groups tend to have a superior position, citizen groups act as a countervailing power to check their influence and mobilisation. The countervailing power operates to block the business groups' co-optation of policies to serve their private interests. In the light of these ideas within multiple-elitism and neo-pluralism, I attempt to understand how interest groups achieved the policy outcome and if interest groups operated in a closed system (multiple-elitism) or a relatively open system (neo-pluralism).

3.2. Method of Data Collection

In studying power and influence in policy areas, case studies have been the preferred mode. For instance, research theorised by Dahl (1961) and Lindblom (1977) had applied the techniques of a case study to explain the political process. Dahl defined the political process in terms of power as causation, whereby a unit of individuals causes change in the behaviour of others. This understanding of power dictated that the history of political events could be studied by conducting interviews, collecting documents issued by political participants, reading newspapers and official records, and directly observing political meetings if possible (McFarland, 2004).

Pluralists applied case study as their research strategy because they believed that power could not be generalised to other policy areas without empirical confirmation (McFarland, 2004). Scholars who continued to study groups in the political system applied similar research procedures. Their research is known as multiple elitism as they found that coalitions of elites existed in policy areas. A case study approach in pluralist research has continued to be the main procedure to understand the political system. Recently, in applying the neo-pluralist approach to understand interest groups' influence, Godwin, Ainsworth and

Godwin (2013) conducted case studies, relying largely on interviews with lobbyists, archival data and comment letters. They saw that case studies allowed them to understand lobbying strategies, changes in the policy process, and causal relationships.

The main method of data collection informing the development of case study in this research is semi-structured interviews with 30 elite actors in policy areas of interest (NGOs, politicians and businesses). They are an important source of data to learn more about climate change policy matters and to discover their personal views, experiences and thoughts. Semi-structured interviews are used by researchers to collect data from key informants and therefore gather new, exploratory data and validate findings through checking respondents' feedback about research results.

Policy documents were the main source of data after semi-structured interviews. They were used to learn more about policy details. They also provided a way to track continuity and change of policies in each energy technology. Policy documents helped me understand the programmes for promoting decarbonisation in the electricity sector. They also provided an official record of the government's arguments and claims justifying its decisions and policies. Policy documents were also used as a source of gathering numerical data in the form of different charts on trends in the energy sector. Newsletters and newspapers were also used as a secondary source to learn more about an event, trace its political development, examine the issue in the context of its time, and gain a quick view of a wide domain of knowledge (Wright, 2014). In this vein, I analysed the following policy documents: BEIS (2017a, 2017b, 2017c); BEIS (2018a, 2018b, 2018c) and BEIS (2019a, 2019b); Department of Trade and Industry (DTI) (2006, 2007); Department of Business, Enterprise & Regulatory Reform (2008); DECC (2011a, 2011b, 2013a, 2013b, 2015); National Audit Office (2017); NIC (2013a, 2013b, 2013c, 2014, 2018, 2019).

The study analysed semi-structured interviews and policy documents by applying the concepts of the theories of multiple-elitism and neo-pluralism showed in **Table 2**. Here, this study explored interest groups mobilisation to identify if the policy area can best describe multiple-elitism and/or neo-pluralism.

3.3. Analysis of Groups' Mobilisation in Nuclear Power Policy Area since 2010

It is worth mentioning that in this section we will be exploring the concepts of 1) degree of public organisation, 2) interest groups' dynamics, 3) information exchange and 4) benefits of policy reforms. In the concept of degree of public organisation, I will explore if the countervailing power exists in the policy area through social movements. In the concept of interest groups' dynamics, we will be looking at whether data shows the features of the multiple-elitist system of sub-government or/and neo-pluralist features of interest groups competition in a relatively open system called issue network. Given that multiple-elitism and neo-pluralism provided two distinct concepts in the policy process, it is worth

exploring the following indicators to clarify which theory can best describe the nuclear power groups: participants in the policy area, political and financial support among members. Further, to explore the concept of information exchange, I will look at if the information was restricted by policy elites, and if the countervailing power gets involved to check information and bring onboard its views. I later discuss the government's response and policy outcomes. Overall, I investigate whether the policy area was a closed multiple-elitist system of sub-government with shared interests, information, political and financial support among members, or a neo-pluralist system of issue networks open to several members, including the countervailing power with opposing interests, who exchange knowledge in the policy area. Let us consider each one of them.

A) Degree of public organisation: environmental NGOs have voiced concerns over nuclear power technology. Generally, the anti-nuclear movement comprised several groups throughout the UK, such as Friends of the Earth, Greenpeace, Friends of the Earth Scotland, World Wildlife Fund (WWF), and Earth First, all of whom supported anti-nuclear campaigns and included anti-nuclear concerns among their broader agenda. The movement also embraced environmentalists, scientists, journalists, political parties, politicians, and anti-nuclear weapon groups, notably Trident Ploughshares[11]. Perhaps, the most prominent national anti-nuclear group in the UK is Campaign for Nuclear Disarmament (CND), which includes 84 anti-nuclear local member groups around the UK (CND, 2021). It was established in 1958, and it has since been consistently campaigning against nuclear weapons. This group supports nuclear disarmament and opposes nuclear power use for electricity production.

Further, the anti-nuclear movement also included anti-nuclear campaign groups who demonstrated their opposition to the technology at the local level, most notably Stop Hinkley and Shutdown Sizewell. Some of these newly established groups that were formed to resist the recent nuclear renaissance are: Heysham Anti-Nuclear Alliance (HANA), Blackwater against New Nuclear Group (BANNG), Stop New Nuclear Power Network, Nuclear Free Local Authorities (NFLA), Kick Nuclear, South West against Nuclear, and Shepperdine Against Nuclear Energy. Moreover, other anti-nuclear campaigning groups raised more specific concerns, such as supporting renewable energy as an alternative technology opposing nuclear waste and the radioactive effects of nuclear power on human health and the environment. They are namely Bradwell for Renewable Energy, Campaign against Nuclear Storage and Radiation (CANSAR), and Cambrians Opposed to a Radioactive Environment (CORE).

To illustrate, in 2016, Stop Hinkley joined a protest against EDF by forming a multi-bannered demonstration at King's Square, outside the old EDF office (Stop Hinkley, 2016a). This demonstration attracted local media. The campaigners submitted a letter to EDF, explaining the increased debt of EDF that

[11]Trident Ploughshares is an anti-nuclear weapon group that was established in 1998 to support nuclear disarmament in a nonviolent way. The group is a member of the Extinction Rebellion and the Stop New Nuclear network (Trident Ploughshares, 2016).

amounted to £25 bn, which would affect the financing of a massive project such as Hinkley Point C. The letter also discussed the reactors of Flamanville in Normandy and Olkiluoto in Finland, which have a similar design as the reactors in Hinkley. These reactors were facing construction problems. The letter stated, "Flamanville is currently 6 years late and around 7.2 bn euros over budget. Olkiluoto is expected to be 10 years behind schedule and 5.5 bn euros over budget" (Stop Hinkley, 2016a). Stop Hinkley (2016a) believed that EDF's commitment to build two EPR reactors in Hinkley in 9 years would be difficult, as the construction time of the other reactors in Flamanwille and Olkiluoto was estimated between 10 and 15 years.

Further, one month before the new Conservative government led by Theresa May could give the go-ahead to Hinkley Point C, Greenpeace joined Stop Hinkley in a campaign to block the decision. Greenpeace commissioned a public opinion poll, which showed that 44% of the general public opposed Hinkley Point C, and only 25% supported the project (Stop Hinkley, 2016b). Campaigners of Stop Hinkley and Greenpeace launched a petition in September, gathering 300,000 signatures. The petition was taken to Number 10, Downing Street, demanding that the new Prime Minister Theresa May cancel the project. However, in October 2016, the Hinkley Point C project was approved. The Labour Party and environmental NGOs criticised this decision and highlighted the issue around investment and security (R. Hall, personal communication, July 13, 2020). They saw that it would alter national security as the project was backed by the Chinese state nuclear firm, CGN (R. Hall, personal communication, July 13, 2020).

Unlike, environmental NGOs and local campaign groups, business groups were active in lobbying to support the government's decision for nuclear power revival. More specifically, there are energy companies that supported the revival of the nuclear power expansion. Perhaps the most visible supporter is EDF and its partner CGN in the Hinkley Point C project, which was given the go-ahead in 2015. In order to get the government's approval for its application, EDF engaged in public consultations through newsletters, a website, broadcast and media coverage, meetings with local authorities, community groups, and local organisations. According to EDF (2011), "The company has engaged with 6480 consultees, held 34 public exhibitions, attended 67 meetings with local authorities and other stakeholder groups, and attracted 109,000 unique visitors to its project websites" (p 6). The consultation was held over two years, between 2009 and 2011, processing 33,000 comments which were broken down into 1200 topics that required a response from EDF (EDF, 2011). The topics included the environmental impact of nuclear power, the impact of nuclear radiation on health, and waste management. EDF stressed the need to take on board the recommendations provided in the consultation to improve its proposals.

Further, the producer group, EDF, was also a significant member of the trade association, the Confederation of Business Industry (CBI). This business interest group admitted that it has created a strong relationship with the government

appointed committee, the Climate Change Committee (CBI, 2019). The group has been advocating for decarbonisation of electric power and transport, heat and energy efficiency and all the pathways leading to net-zero targets (J. Diggle, personal communication, January 20, 2020). CBI believed that while there are generous subsidies for wind power, the national planning statements are urgently needed to build new nuclear plants (Macalister, 2009). The CBI engaged mostly in direct lobbying. In 2009, it submitted a report to the government calling for the construction of six or eight new plants. It justified its proposal on the grounds of low carbon electricity and low electricity prices. The latter was estimated to rise to 30% by 2020 (Macalister, 2009). CBI believed that while there are generous subsidies for wind power, the national planning statements are urgently needed to build new nuclear plants (Macalister, 2009). The CBI's recommendations were accepted by the Climate Change Committee; in its 2010 report it declared that "It is difficult to reach the CBI's goal of making 80% of electricity generation by 2030 without the use of new nuclear power" (Committee on Climate Change, 2010).

Alongside the CBI, the Nuclear Industry Association (NIA) also backed the revival of nuclear power. The NIA is a trade association that represents 260 companies. Its approach was entirely based on a direct lobbying strategy, which took the form of annual briefings, annual conferences, responding to consultations, letters, and personal meetings. Its main goal was to support the nuclear power programme and to ensure that its interests were properly articulated and included in the nuclear agenda. Furthermore, the NIA chairman, Tim Stone, is co-chair of the Nuclear Industrial Council Forums (NIC). The government held meetings with energy companies, trade associations, and trade unions to structure the policy framework and to engage a number of stakeholders in the discussions on the nuclear power programme. The NIC was introduced to serve as a platform for nuclear discussions and agreement between the industry and the government led by the DECC and later by the BEIS (see below). Members of the NIA also attended the NIC meetings between 2013 and 2019 [see NIC (2013a, 2013b, 2013c, 2014, 2018, 2019) in list of references below].

Whilst business interest groups and environmental NGOs had different views about the nuclear option, the government set up a forum to allow for detailed discussion on the issues. This forum, however, did not bring both groups together. Instead, businesses met with the government at the Nuclear Industry Council (NIC) forum and the environmental NGOs met at the Nuclear Non-Government Organisation Forum. The NIC forum included energy companies, trade associations, and trade unions on a platform for discussions and agreement with the government, led by the DECC and later by the BEIS. The Nuclear Non-Government Organisation Forum included campaigners and environmental NGOs presenting their local communities' concerns. Both forums often included scientists who joined the discussion and shared their findings. This leads us to explore interest groups dynamics in the policy area.

B) interest groups dynamics and interaction: we see in **Table 3** that different

groups attended the NIC forum, notably energy companies; the nuclear research centre, Nuclear Advanced Manufacturing Research Centre (NAMRC), owned by the University of Sheffield, professionals from Young Generation Network, which is a professional body that focuses on nuclear safety, nuclear security and application of nuclear technology; trade unions, such as Independent and Prospect; the trade association, Nuclear Industry Association; government agencies; and scientists such as Professor Andrew Sherry and Professor David Delpy.

The NIC's members were interested in supporting the new nuclear programme. According to the BEIS (2017b), "The NIC is the main body to facilitate co-operation between the nuclear industry and the government. Its overreaching role is to tackle long-term challenges facing the industry and to help realise future opportunities through strategic decision-making" (p 1). Therefore, the members discussed issues related to nuclear power infrastructure, Research and Development (R&D), costs, investment, skills, and jobs creation (see Table 3). The members had to engage with the government's stakeholders by submitting reports on their findings. In 2013, the NIC focused on discussing the

Table 3. NIC members and issues discussed (2013-2019).

NIC Attendees	Issues discussed
Industry: Nuclear Industrial Association (NIA) Young Generation Network	Implementation of Supply Chain Action Plan to maximise job opportunities.
Nuclear Advanced Manufacturing Research Centre (NAMRC) SNC-Lavalin Jacobs Magnox	Nuclear Industrial Strategy (publication process of consultation document, work force numbers and Electricity Market Reform regarding the price for investors and price for consumers).
NNL	Negotiating Cost reductions for new builds.
EDF Energy UKAEA Britain's Energy Coast Business Cluster Prospect	Proposing a Nuclear Workforce Model after EDF and Trade Unions reached an agreement (NWM provides data about the long-term forecast of skills and supply of big companies).
Sellafield Westinghouse Unite	Business capability (discussing investment, information, and equipment among UK companies).
Hydrock	Providing comments on Trade and investment.
Cavendish Nuclear Rolls-Royce (Submarines) Independent	New Sector Deal (backed by EDF and Prospect) agreement and approval.
China General Nuclear (CGN) Corporation	Calls for lowering risks to investors.
Government: Department of International Trade Nuclear Decommissioning Authority (NDA) Ministry of Defence	Initiating Public Understanding (creating a pool for nuclear experts, developing nuclear narratives, and opening visitor centres).
Department of Business, Energy, and Industrial Strategy (BEIS) Office for Nuclear Regulation (ONR) Environment Agency	Fund Decommissioning Programme (FDP), this includes costs of plans for decommissioning, waste disposal, and management.

Source: Collected by Author (for NIC forums see reference list).

Supply Chain Action Plan established by the Minister of State for Energy, John Hayes, in 2012. The NIC (2013a) discussed the Action Plan considering skills, investment in Small Modular Reactors (SMRs), trade and investment, waste management, cost reduction, business capability, and workforce numbers. With regards to business capability, a Supply Chain Capability Group, led by Jason Smith from Rolls Royce, was established to identify what capabilities the UK needs to develop and compete for business (NIC, 2013b).

This interaction between the government and the business groups leads us to explore political and financial support, as we have seen, the government supported the revival of nuclear power through rhetoric and designing policies to promote the technology. The Secretary of State for Energy and Climate Change during the Coalition government, Chris Huhne (2011), claimed: "Nuclear power can play an important role in the future of our energy security provided there is no public subsidy. We have done everything we can to make sure it is safe, regulated, secure and affordable. Now our partners in the private sector must rise to the challenge and deliver it". The government's support was confirmed in the 2011 Nuclear National Policy Statement (EN6), which clarified that: "The government believes that energy companies should have the option of investing in new nuclear power stations" (DECC, 2011a).

In this regard, policies such as the Contracts for Difference (CfD) via the Electricity Market Reform and the New Sector Deal were designed to attract investment in the technology. EDF, who recommended sharing with the government the costs of risks at the early stage of construction, set an agreement with the government on the Strike Price for the Contracts for Difference (CfD) for Hinkley Point C. Therefore, the Coalition government offered a strike price of £92,50 MWh, reducing it to £89. 50 MWh for 35 years, if EDF achieved a Final Decision on Investment (FID)[12] for Sizewell C (BEIS, 2018c). Moreover, EDF was guaranteed £2 billion in loans for Hinkley Point C to be available between 2018 and 2020 under the infrastructure (financial assistance) Act 2012. These loans would assist energy industries to come forward with investment.

However, the anti-nuclear groups saw that the political and financial support for nuclear power gave the technology a privileged position. According to the anti-nuclear groups, "nuclear power appears to be given privileged position within the energy market, in the form of subsidies and foreign funding" (BEIS, 2018d). At the Nuclear Non-Governmental Organisation Forum, they pointed out that Hinkley Point C was guaranteed a price for 25 years and the same for Wylfa and Moorside, although they did not look feasible (BEIS, 2018d). A similar remark was made by Professor Andy Browers (BEIS, 2019a) in the 2019 forum, who pointed out that "based on economics it was difficult to understand the rationale for nuclear beyond Hinkley Point C. It was deemed that some could argue there is no role for nuclear, especially in the

[12]FID is the final decision achieved by the board of investors to undertake the construction of a project. This is based on the subsidies received of the construction and the approval of the government (BEIS, 2018c).

mid-2030s" (p 6).

As can be seen, nuclear power policy area included different views among the government, business groups and environmental NGOs. While environmental NGOs opposed the government's decision to revive nuclear power programme, businesses supported nuclear power in the energy mix. Environmental NGOs led social movements and interacted inside the Nuclear Non-Governmental Organisation Forum to articulate their views. Meanwhile, business groups brought their views through briefings, reports and meetings at the NIC forums. This leads us to consider another concept of our theoretical framework, information circulation which reflects whether information was restricted or shared to the public.

C) Information circulation, information on nuclear power technology was shared among members of the NIC and was provided to the general public in the Supply Chain Action Plan following the Fukushima disaster in 2011. Under the Plan, information on nuclear power technology was put under a scheme called, Public Understanding of Nuclear Energy (PUNE), led by Professor Andrew Sherry. The scheme outlined the communication between the government and the public, emphasising the need for more initiatives to engage the public across the sector. The DECC [n. d., quoted in NIC (2014), para. 34] claimed, "The most trusted people to give messages about nuclear power are scientists and academics". In this context, the then Secretary of Energy and Climate Change, Ed Davey, (personal communication, March 4, 2020), clarified that the Liberal Democrats within the Coalition government pushed the nuclear industry to be more transparent about the costs of nuclear projects. E. Davey (personal communication, March 4, 2020) reflected:

> We spend about a billion pounds in nuclear decommissioning and nuclear management costs clearing up for electricity that was generated several decades ago. In other words, the nuclear industry over a few decades ago is making us pay now that is an immoral policy; it is one of the reasons why nuclear industries are hiding their true costs. Therefore, the Liberal-Democrats within the government forced the nuclear industry to be more transparent about its true costs.

The scheme also highlighted the role of new media such as Facebook as a means of communicating with people (NIC, 2013c). It also required EDF to open more visitors' centres to improve people's knowledge of nuclear power (NIC 2013c). The DECC [n. d., quoted in NIC (2013c)] argued, "The public perception of nuclear energy would have an impact on future developments, and it was therefore important to bring attention to the benefits in terms of the security of supply, low carbon and economic opportunities" (p 7). Moreover, information was also circulated to the Nuclear Non-Governmental Organisation Forum. The information included the Hinkley Point C agreement, nuclear safety procedures, and public engagement.

The Nuclear Non-Governmental Organisation Forum facilitated communication between anti-nuclear campaign groups, environmental NGOs and govern-

ment stakeholders. At the Nuclear Non-Governmental Organisation Forum, anti-nuclear local groups and environmental organisations, notably Stop Hinkley, Nuclear Free Local Authorities, West Cumbria North Lakes FoE, Friends of the Earth, Greenpeace, and scientists such as Professor Andy Blower and Professor John Harrison presented their views to the government's stakeholders, the DECC/BEIS and the Office of Nuclear Development (OND) (see Nuclear Non-Governmental Organisation Forum members in Table 4). The groups checked policy updates, the Hinkley Point C state aid case and EDF investment, and the contracts for Moorside, Sellafield Ltd, TEPCO, and Magnox (DECC, 2014). The groups also checked details on the Hinkley deal (DECC, 2014).

The NGOs also raised the issues of nuclear subsidy, Electricity Market Reform, waste management, and the Hinkley Point C deal. The forum highlighted the issue of waste management, the Geological Disposal Facility (GDF), and decommissioning financial arrangements. On these issues, the NGOs posed questions about public health, the nuclear legacy for the future generation, spent fuels and radioactive waste (DECC, 2010). Following the Fukushima disaster in 2011, the NGOs mainly discussed issues on nuclear security, the procedures of emergency planning, informing people of nuclear risks, and health issues (DECC, 2011c). According to the BEIS (2020c), "The purpose of the Forum is to provide a regular opportunity for representatives of the interested Non-Governmental Organisations to have direct access to government policy and engage with decision-makers including ministers" (para. 1). As can be seen, the discussion in the forums revealed two distinct platforms to communicate

Table 4. Nuclear Non-Governmental Organisation Forum members and issues discussed.

Nuclear Non-Governmental Organisations forum attendees	Issues discussed
Environmental groups:	Commenting on the funded decommissioning programme (NGOs were asked to give ideas and thoughts surrounding radiation).
Blackwater Against Nuclear Group (BANNG)	
Parents Concerned About Hinkley (PCAH)	
Communities Against Nuclear Expansion (CANE)	Questioning public engagement in the debate of site selection.
Bradwell for Renewable Energy (BRARE)	
Ayrshire Radiation Monitoring Group (ARM)	Calling the BEIS to send copies of terms and agreements between EDF and the government for Hinkley Point C to be able to review it.
Nuclear Free Local Authorities (NFLA)	
Stop Hinkley	
Greenpeace	Evaluating the Hinkley Point C consultation.
Save our Lake District	
West Cumbria and North Lakes FoE	Questioning the Nuclear Liabilities Fund (NFD), financial support if the developer goes bankrupt.
Government:	
DECC/BEIS	
Environmental Agency	Discussing the New Sector Deal and calling the government to have a Sector Deal for renewables.
Office for Nuclear Development (OND)	
	Discussing health issues, safety and security.

Source: Collected by the author (see DECC/BEIS NGOs forums in the list of references).

knowledge and expertise in the policy area of nuclear power. This leads us to ask questions: what can the interest groups' dynamics and interaction and financial support tell us about policy models as reflected in multiple-elitism and neo-pluralism, and what evidence do we have for either of these tendencies at the level of impact on government policy? Here, the nuclear industry's discussions with the government at the NIC included features from the multiple-elitist model of sub-government and the neo-pluralist model of issue networks. Firstly, from a multiple-elitist view, the NIC members shared an interest in nuclear power. We can recall from **Table 3** that the members belonged to the nuclear industry, which aimed to improve policies about nuclear power. In this context, the BEIS [n. d., quoted in NIC (2019)] claimed, "Discussions with industry and government had shown a degree of consensus that improved ways of working should be explored, in particular with a view to improving the UK's performance" (para. 8). Secondly, the same table shows that anti-nuclear power groups, who are a countervailing force against nuclear power, were not members of the NIC. Instead, their views were communicated in a separate forum, namely the Nuclear Non-Organisational Forum.

Third, as we have seen, political and financial support was provided to nuclear power to facilitate investment in the technology through strike price and loans. Dr William Blyth of Oxford Energy Associates told the Environment Audit Committee (2013), "Despite the Ministerial announcements as recently as October 2010 that there would be no subsidies for the nuclear new plant, it is apparent that several subsidies will, in fact, be in place, some explicit, some implicit, driven in large part by the rapid escalation in the estimates of capital costs for building new nuclear plants". This gave nuclear technology a privileged position. The Green Party MP, Caroline Lucas [quoted in Stop Hinkley (2011)], commented, "Companies such as the big six energy firms do not lend their staff to the government for nothing; they expect a certain degree of influence, insider knowledge, and preferential treatment in return" (p 1).

Whilst multiple-elitism expects that the privileged position of business groups would allow them to dominate a policy within a closed system of sub-government, the theory then clarifies that the co-optation of business groups in a policy area would lead to economic decay (see above). This was partly reflected in Hinkley Point C's costs. Hinkley Point C was expected to cost EDF £18 billion with a strike price of £92.52/MWh, making nuclear power an expensive option (See **Figure 3**). Moreover, the proposed Regulated Assets Based (RAB) model for future plants would expect consumers to pay high energy bills while power stations are being built. Although this model would help raise funds for nuclear constructions, environmental NGOs suggested that the new nuclear was unlikely to be value for money given the falling price of renewables and that RAB model for nuclear would provide preferential treatment to nuclear over renewables and affect market competitiveness (BEIS, 2019b).

Figure 3 shows that the onshore wind strike price is expected to be 23%

(£71/MWh in medium case) cheaper than Hinkley Point C by mid-2020. Also, gas turbines, large-scale solar and offshore wind are expected to be 22% (£72/MWh in medium case), 17% (£77/MWh in medium case), and 2% (£91/MWh in medium case) cheaper than Hinkley Point C respectively. This could expose taxpayers to losses if the government share the risks of the Hinkley Point C project with the nuclear industry (National Audit Office, 2017) (Figure 6).

The meetings between the energy companies and the government have also revealed features from the neo-pluralist model, such as the issue network. As we have seen, the issue network includes politicians, journalists, interest groups and academics to discuss policies. In this context, the academic community was present at the NIC to share expertise and knowledge. The BEIS (2017b) explained: "The NIC will work with the wider industry and the academic/research community to underpin those actions needed to realise industry and government's long-term vision for the sector" (p 1). Further, although the members of the NIC gathered to advocate for the role of nuclear power technology, the members worked to improve the sector by providing knowledge and information. The BEIS clarified that the members of the NIC were sharing their expertise rather than their organisations' interest. According to the BEIS (2017b), "Members have been selected to provide a breadth of knowledge and experience and will be expected to speak for their areas of expertise, rather than companies or organisations" (p 1). Meanwhile, information was not dominated by elites in the NIC. According to the DECC (2011d), "The Government should be sharing information as much as possible, although some information has security implications, but, where possible would err on side of publication as sensitive information can be enacted from reports" (p 3).

In terms of the anti-nuclear groups' meetings with the government at the Nuclear Non-Organisation Forum, the interactions revealed mostly features of

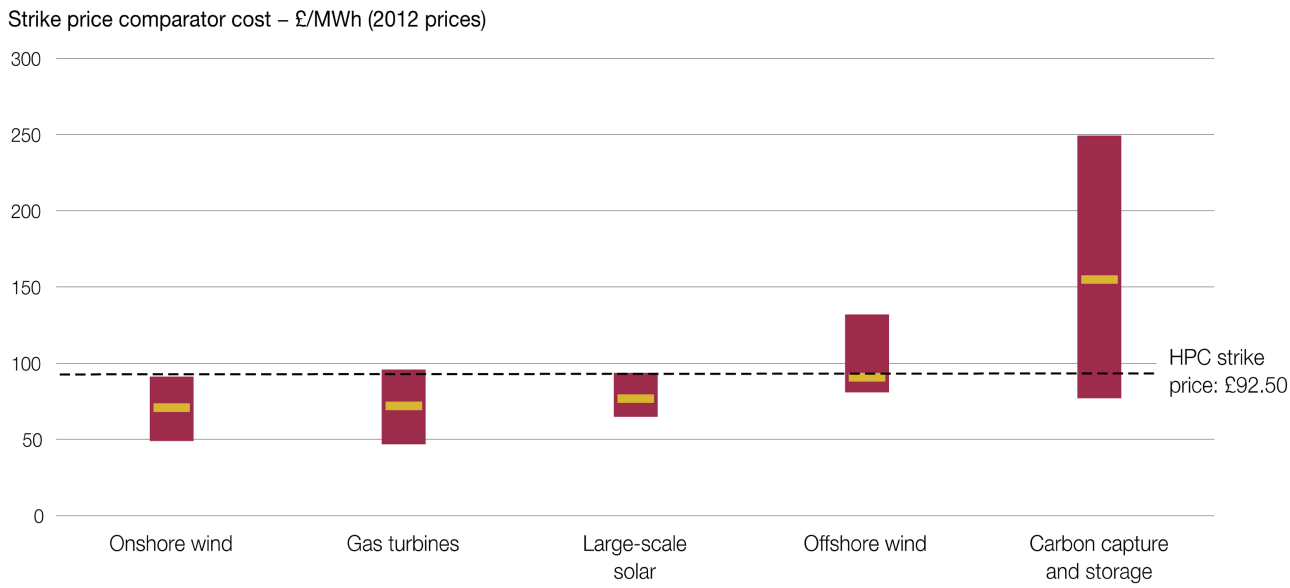


Figure 3. Expected strike price comparator costs for alternative large-scale power resources in the mid-2020s.

issue networks. The forum expressed distinct views on nuclear power. The government supported the expansion of nuclear power meanwhile anti-nuclear campaign groups and environmental organisations opposed it. The NGOs questioned why nuclear was part of the energy mix and argued that the future energy supply could be achieved without new nuclear plants (DECC, 2013a). They backed their argument with papers, such as "2030 Non-Nuclear UK electricity system" and an accompanying 'Report on Non-nuclear electricity scenarios to 2030', which questioned the costs for generation, accuracy and reliability of the technologies and scenarios on handling nuclear wastes (DECC, 2013a). In the 2018 forum, the NGOs mentioned, "The support for renewables has been reduced leading to additional imports of gas for energy production" (BEIS, 2018d).

The communication between the government and the NGOs also entailed sharing expertise and knowledge. In June 2013, the government set the Managing Radioactive Waste Storage (MRWS) as a framework to manage high activity radioactive waste through safe and secure geological storage. The NGOs were invited to a special workshop to share their suggestions and concerns about how the DECC should take forward the selection of sites for a geological disposal facility (GDF) (DECC, 2013b). The workshop took into account the possible issues that the participants could agree on to improve the process of site selection. As such, key NGOs participated in the workshop, most notably Greenpeace, Blackwater Against New Nuclear Group (BANNG), Communities against Nuclear Expansion (CANE), National Trust, and West Cumbria & North Lakes Friends of the Earth.

Moreover, as we have seen, groups at the Nuclear Non-Organisation Forum checked the policies and decisions on nuclear power discussed in the NIC, most notably Hinkley Point C. They called on the government to share information about the costs of the project with the public. For McFarland (2004), "[In a neo-pluralist system] power of producer groups (business groups or professional groups) was often checked by the power of the countervailing group such as citizen groups or business groups with different interest" (p 48).

In terms of D) benefits of policy reforms: despite the involvement of the local groups and environmental organisations in the nuclear forum and their protest outside the forum (see section above), their goal of blocking the expansion of nuclear power new builds was not achieved. According to the NGO representative Sean Morris [quoted in BEIS (2017c)] "NGOs are frequently asked about their opinions, those opinions are not acted on". In an interview with the Scottish Green Member of the Scottish Parliament, M. Ruskell (personal communication, March 4, 2020), commented:

> The UK government made active price support for nuclear power. (…) There is clear government intervention at the UK level. It is clear that the industries are being supported by the government and I don't see the views of mainstream NGOs who are against nuclear power being taken into account there.

Here, McFarland (2004) concludes that "Issue network is not a panacea to the problems of plural elitism [multiple-elitism] (…) top policymakers may ignore issue networks, out of either principle or ideology depending on one's point of view" (p 51). The ideology behind supporting nuclear power was reflected in the DECC's (2015) claims at the Nuclear Non-Organisation Forum 2015 that "The government policy is that nuclear power should be part of the energy mix in the future, alongside renewables and clean coal and gas. The former Secretary of State for Energy and Climate Change, Ed Davey [quoted in DECC (2015)], added: "If we do nothing, the light will go out, and the cost of electricity for our homes and our businesses will soar because it will become a scarce resource. We also know that we need to decarbonise the electricity and the longer we delay those decisions, the more painful and expensive they will be".

4. Concluding Discussion

Nuclear power policies in the UK have witnessed a continuity since the decision of the Labour government to revive the nuclear power technology. The sector was also marked by reforms and changes in terms of policies that aimed at improving the sector under the Coalition government and later by the successive Conservative governments. The decision to revive nuclear power was supported by the government because of an estimated electricity shortage linked to the electricity generation capacity. This estimation was based on the fact that nuclear power plants were ageing in the next few years. Additionally, alongside the electricity supply problem, there was the issue of climate change, which highlighted the need for alternative sources to fossil fuels, to achieve energy security and low carbon emissions. Hence, this perspective was advanced by the policymakers with financial commitments and policies to facilitate the process of nuclear renaissance.

Nevertheless, the nuclear case has been framed in terms of safety, security, and costs. On the one hand, this was enhanced by the anti-nuclear activists who opposed the nuclear option in the energy mix. They aimed to push for more regulations on safety and conservation. Thus, they followed tactics to gain a powerful status and have access to the government. On the other hand, the government pushed for the nuclear option in the electricity sector and excluded it from receiving public subsidies. This required agreements to be settled with nuclear power companies, who called for sharing costs of risks with the government. Here, the interaction between the actors of the nuclear power policy area revealed features of multiple-elitism and neo-pluralism. This was evident from the existence of a network of actors discussing policies and mechanisms to improve policy development in nuclear power. Let us review the concepts that appeared in the case study from **Table 2** perspective. In terms of dynamics of interest groups interaction, the nuclear power policy area included both sub-government and issue network features. The sub-government features appeared in business groups interacting with the government at the NIC, excluding

the environmental NGOs from the meetings. Whereas, the issue network characteristics appeared in the presence of environmental NGOs at the nuclear non-governmental meetings. The members of the forums discussed safety concerns, the Hinkley Point C deal, nuclear power waste, decommissioning, and public engagement in the process. Hence, characteristics of both theories present, with the sub-government system of multiple-elitism and issue network of neo-pluralism.

Further, benefit of policy reforms is another concept that appeared in the nuclear power case study. It reveals that policy reforms served the nuclear power interest. Policy reforms provided subsidies for the nuclear industry, such as the financial loans to EDF and a strike price for Hinkley Point C of £92.50/MWh. Hinkley Point C turned nuclear power into the most expensive option as it is expected to cost £18 billion. Nuclear power appeared as a privileged technology undermining the effects of the strike price on future consumers' bills and providing nuclear power special treatment over renewables. This is in line with the presuppositions of multiple-elite theory.

The interest in nuclear power resulted in social movements to block the new nuclear power programme. The data in nuclear power policy area clarified that despite the formation of sub-government in the policy area between the nuclear industry, and the government, environmental NGOs were continuously protesting the technology. Therefore, public were well organised as environmental NGOs organised campaigns and movements, where they informed the public about nuclear safety, nuclear waste and costs, and helped in forming alliances and networks to oppose the technology. We put this feature under the concept of public organisation, which is in line with neo-pluralism.

Information circulation is also a concept that appeared in the case study; we expected elites to block information in multiple-elitism or circulate information to the public in neo-pluralism. Although the nuclear power interest included policies that supported the technology, information about nuclear power was circulated to the public. As seen, the government ensured information communication with the public under the Public Understanding of Nuclear Energy (PUNE) scheme, led by Professor Andrew Sherry. Under the scheme information about nuclear waste, safety, and price would be shared with the public. Information was also shared with environmental NGOs at the nuclear non-governmental forum. Thus, we considered those features under the concept of information circulation, which indicated neo-pluralism.

Table 5 shows that the concepts discussed in the case study reveal a combination of multiple-elitism and neo-pluralism as both aspects of the theories are present with a slight emphasis on neo-pluralism (see Table 5).

Overall, the continuity and change of nuclear power policy in the UK since 2010 revealed a combination of multiple-elitism and neo-pluralism. Thus, both multiple-elitism and neo-pluralism seemed relevant in explaining nuclear policy process. We saw closed meetings between the government and businesses

Table 5. Theoretical concepts in nuclear power case study.

Concepts	Dynamics of interest groups interaction.	Benefits of policy reforms.	Public organisation.	Information circulation.
Theories of multiple-elitism and neo-pluralism in nuclear power policy.	Multiple-elitism/neo-pluralism.	Multiple-elitism.	Neo-pluralism.	Neo-pluralism.

The Table shows concepts that either revealed multiple-elitism or neo-pluralism in nuclear power.

excluding the countervailing power. This feature significantly appeared at the NIC meetings. Second, we expected that information circulation is either blocked or circulated to the public. The former is a multiple-elitist feature, and the latter is a neo-pluralist one. As our evidence showed that information was circulated to the public in nuclear power; we concluded that it is a neo-pluralist feature. Third, the countervailing power was present in an issue network, and social movements. Those features were revealed in the case where the countervailing power existed to advocate policy change in the policy area to cease the government's support of nuclear power.

Acknowledgments

I would like to say a special thank you to my supervisor, Dr. Matthew Ogilvie, for his dedicated support, guidance and continuous advice. I have been lucky to have a supervisor who cared so much about my work. I wish to thank the Open Journal of Political Sciences for giving me the opportunity to publish my work. I would like to thank all who participated in the study's interviews. Finally, I must express my gratitude to my family and friends for their unconditional support.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Ambrose, J. (2019). New UK Nuclear Funding Model Could Leave Taxpayers Liable. *The Guardian.* https://www.theguardian.com/environment/2019/jul/14/new-uk-nuclear-funding-model-could-leave-taxpayers-liable-edf-sizewell

Arora, D. N. D., & Awasthy, S. S. (2007). *Political Theory and Political Thought.* Har-Anand Publications.

Baumgartner, F. R., and Jones, B. D. (1991). Agenda Dynamics and Policy Subsystems. *The Journal of Politics, 53,* 1044-1074. https://doi.org/10.2307/2131866

BEIS [Department for Business, Energy and Industrial Strategy] (2016). *SMR-Techno Economic Assessment.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/665197/TEA_Project_1_Vol_1_-_Comprehensive_Analysis_and_Assessment_SMRs.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2017a). *Building Our Industrial Strategy Green Paper*. https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting_documents/buildingourindustrialstrategygreenpaper.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2017b). *Nuclear Industry Council: Terms of Reference*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/609898/NIC_-_Terms_of_Reference.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2017c). *BEIS/NGO Nuclear Forum Tuesday 18 July 2017.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/645960/BEIS_NGO_Nuclear_Forum_18_July_Minutes.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2018a). *Industrial Strategy: New Sector Deal.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/720405/Final_Version_BEIS_Nuclear_SD.PDF

BEIS [Department for Business, Energy and Industrial Strategy] (2018b). *Consultation on the Siting Criteria for new National Policy Statement for Nuclear Power with Single Reactor Capacity over 1 Gigawatt beyond 2025*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727628/NPS_Siting_Criteria_Consultation_-_Government_Response.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2018c). *Hinkley Point C*. https://www.gov.uk/government/collections/hinkley-point-c

BEIS [Department for Business, Energy and Industrial Strategy] (2018d). *NGO Forum Minutes*: *Friday 18 May 2018*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733213/FINAL_-_NGO_Forum_Minutes_-_2018_-_05_-_18.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2019a). *NGO Forum Minutes Wednesday 26th June 2019.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/831426/26_June_2019_-_minutes_of_meeting_.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2019b). *RAB Model for Nuclear: Government Response to the Consultation on a RAB Model for New Nuclear Projects.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943762/Nuclear_RAB_Consultation_Government_Response-.pdf

BEIS [Department for Business, Energy and Industrial Strategy] (2020a). *Office of Nuclear Development (OND)*. https://www.gov.uk/government/groups/office-for-nuclear-development-ond

BEIS [Department for Business, Energy and Industrial Strategy] (2020b). *Infrastructure Planning Commission*. https://www.gov.uk/government/organisations/infrastructure-planning-commission

BEIS [Department for Business, Energy and Industrial Strategy] (2020c). *Nuclear Non-Governmental Forum.* https://www.gov.uk/government/groups/non-governmental-organisation-forum#purpose-of-the-forum

Bohringer, C., Hoffman, T., & Lange, A. (2005). Assessing Emission Regulation in Europe: An Interactive Simulation Approach. *The Energy Journal, 26,* 1-21.

Bolton, P. & Hinson, S. (2020). *New Nuclear Power* (Briefing Paper 8176). House of

Commons Library.
https://commonslibrary.parliament.uk/research-briefings/cbp-8176/

CBI [Confederation of British Industry] (2019). *Committee on Climate Change Recommends Net-Zero Target by* 2050.
https://www.cbi.org.uk/articles/committee-on-climate-change-recommends-net-zero-target-by-2050/

CND [Campaign for Nuclear Disarmament] (2021). *Nuclear Power in the UK*.
https://cnduk.org/resources/nuclear-power-in-the-uk/

Committee on Climate Change (2010). *The Fourth Carbon Budget. Reducing Emissions through the 2020s.*
https://www.theccc.org.uk/wp-content/uploads/2010/09/CCC-4th-Budget-Book_with-hypers.pdf

Cox, E., Johnstone, P., & Stirling, A. (2016). *Understanding the Intensity of UK Policy Commitments to Nuclear Power* (Working Paper Series SWPS 2016-16). Science Policy Research Unit, University of Sussex.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2837691

Dahl, R. A. (1961). *Who Governs? Democracy Power in American City*. Yale University Press.

DECC [Department of Energy and Climate Change] (2009). *Towards a Nuclear National Policy Statement*.
https://webarchive.nationalarchives.gov.uk/+/http:/www.berr.gov.uk/files/file49865.pdf

DECC [Department of Energy and Climate Change] (2010). *Minutes of the First NGO/DECC Forum*.
https://webarchive.nationalarchives.gov.uk/20121217181340/http://www.decc.gov.uk/assets/decc/what%20we%20do/uk%20energy%20supply/energy%20mix/nuclear/non-gov-org-forum/990-minutes-ngo-forum-28-sept-2010.pdf

DECC [Department of Energy and Climate Change] (2011a). *National Policy Statement for Nuclear Power Generation (EN-6): Volume I of II*.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47859/2009-nps-for-nuclear-volumeI.pdf

DECC [Department of Energy and Climate Change] (2011b). *Planning Our Electric Future: A White Paper for Secure, Affordable and Low-Carbon Electricity*.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48129/2176-emr-white-paper.pdf

DECC [Department of Energy and Climate Change] (2011c). *DECC Nuclear NGO Forum 29 March 2011*.
https://webarchive.nationalarchives.gov.uk/20121217181338/http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/nuclear/2131-minutes-of-the-3rd-deccngo-forum-290311.pdf

DECC [Department of Energy and Climate Change] (2011d). *Minutes of 4th DECC Nuclear NGO Forum Meeting 25 July 2011.*
https://webarchive.nationalarchives.gov.uk/ukgwa/20121217153819/http://www.decc.gov.uk/en/content/cms/meeting_energy/nuclear/forums/non_gov_org/non_gov_org.aspx

DECC [Department of Energy and Climate Change] (2012). *Map of Nuclear Power Stations in the UK.*
https://www.gov.uk/government/publications/map-of-nuclear-power-stations-in-the-uk

DECC [Department of Energy and Climate Change] (2013a). *Minutes of 8th DECC Nu-*

clear NGO Forum Meeting, 28th February 2013. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/200217/minutes_decc_ngo_forum_meeting_28_feb_2013.pdf

DECC [Department of Energy and Climate Change] (2013b). *Managing Radioactive Waste Safely: Review of the Sitting Process for a GDF.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/236747/NGO_workshop_write-up_FINAL.pdf

DECC [Department of Energy and Climate Change] (2014). *12th DECC and NGOs Meeting, 12 June 2014.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/337841/decc_ngo_forum_minutes_of_12th_meeting.pdf

DECC [Department of Energy and Climate Change] (2015). *Minutes of 14th DECC/NGO Forum 21st January 2015.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/427767/Minutes_of_14th_DECC_NGO_Forum.pdf

Department of Business, Enterprise & Regulatory Reform (2008). *Meeting the Energy Challenge a White Paper on Nuclear Power.* Department for Business, Enterprise & Regulatory Reform. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228944/7296.pdf

Department of Trade and Industry (2006). *The Energy Challenge: Energy Review Report 2006*. Department of Trade and Industry. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/272376/6887.pdf

Department of Trade and Industry (2007). *Meeting the Energy Challenge: A White Paper on Energy May 2007*. Department of Trade and Industry. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/243268/7124.pdf

EDF [Électricité de France] (2011). *Hinkley Point C: Development Consent Order Application*. https://www.edfenergy.com/file/1663/download

Environment Audit Committee (2013). *Written Evidence Commissioned by the Committee from Dr. William Blyth, Oxford Energy Associates.* https://publications.parliament.uk/pa/cm201314/cmselect/cmenvaud/61/61we03.htm

Farrell, S. (2016). EDF Extends Life of Four Nuclear Reactors. *The Guardian*. https://www.theguardian.com/business/2016/feb/16/edf-extends-life-of-four-nuclear-reactors-hinkley-point-decision

Friends of the Earth (2020). *Nuclear Energy: Our Position.* https://policy.friendsoftheearth.uk/policy-positions/nuclear-energy-our-position

Fudge, S., Peters, M., & Woodman, B. (2016). Local Authorities as Niche Actors: The Case of Energy Governance in the UK. *Environmental Innovation and Societal Transitions, 18,* 1-17. https://doi.org/10.1016/j.eist.2015.06.004

Godwin, K., Ainsworth, S., & Godwin, E. (2013). *Lobbying and Policy Making: The Public Pursuit of Private Interest*. SAGE. https://doi.org/10.4135/9781483349336

Gray, C. S. (1994). *Government beyond the Centre: Sub-National Politics in Britain*. Macmillan Ltd.

Gray, L. (2010). Eight Nuclear Power Stations Despite Clean-Up Concerns. *The Telegraph*. https://www.telegraph.co.uk/news/earth/energy/8070810/Eight-new-nuclear-power-stations-despite-safety-and-clean-up-concerns.html

Hamm, K. E. (1986). The Role of "Subgovernments" in US State Policy Making: An Exploratory Analysis. *Legislative Studies Quarterly, 11,* 321-351. https://doi.org/10.2307/439840

Harvey, F. (2012). UK Nuclear Plans 'Need Saving by David Cameron and Francois Holland. *The Guardian*. https://www.theguardian.com/environment/2012/jun/12/uk-nuclear-power-david-cameron?newsfeed=true

Hayden, F. G. (2002). Policymaking Network of the Iron-Triangle Sub-Government for Licensing Hazardous Waste Facilities. *Journal of Economic Issues, 36,* 477-484. https://doi.org/10.1080/00213624.2002.11506492

Heclo, H. (1978). Issue Networks and the Executive Establishment. In A. King (Ed.), *The New American Political System* (pp. 263-287). American Enterprise Institute.

Hicks, A., & Lechner, J. F. (2005). Neo-pluralism and Neo-functionalism. In T. Jonaski, A. R. R. Alford, M. A. Hicks, & M. A. Chwartz (Eds.), *The Handbook of Political Sociology: States, Civil Societies, and Globalization* (pp. 54-72). Cambridge University Press.

Hinson, S. (2020). *New Nuclear Power* (Briefing Paper No. 8176). House of Commons Library. https://researchbriefings.files.parliament.uk/documents/CBP-8176/CBP-8176.pdf

Huhne, C. (2010). *Annual Energy Statement.* House of Commons. https://hansard.parliament.uk/commons/2010-07-27/debates/10072741000005/AnnualEnergyStatement#868

Huhne, C. (2011). *The Rt Hon Chris Huhne MP Speech to the Royal Society: Why the Future of Nuclear Power will be Differen*t [Speech]. https://www.gov.uk/government/speeches/the-rt-hon-chris-huhne-mp-speech-to-the-royal-society-why-the-future-of-nuclear-power-will-be-different

Johnstone, P. (2010). The Nuclear Power Renaissance in the UK: Democratic Deficiencies within the 'Consensus' on Sustainability. *Human Geography, 3,* 91-104. https://doi.org/10.1177/194277861000300207

Jowit, J. (2012, May 21). Nuclear Reactor Reprieve Puts UK Energy Plans in Doubt. *The Guardian*. https://www.theguardian.com/environment/2012/may/21/nuclear-reactor-reprieve-energy-plans-doubt

Kirby, P. (2014). *Russia's Gas Fight with Ukraine*. BBC News. https://www.bbc.com/news/world-europe-29521564

Lindblom, C. E. (1977). *Politics and Markets*. Basic Books.

Lowi, T. J. (1969). *The End of Liberalism: Ideology, Policy and the Crisis of Public Authority.* Norton.

Macalister, T. (2009). CBI Calls for Up to 15 New Nuclear Power Stations. *The Guardian*. https://www.theguardian.com/business/2009/jul/12/cbi-nuclear-energy-white-paper#maincontent

Martin, A. (2014). The Coalition Government Policy on Nuclear Power: A Toxic Issue for the Liberal Demo-Crats? *Observatoire de la Société Britannique, 15,* 1-10.

Martin, D. G. (2015). *Understanding Social Movements*. Routledge.

McFarland, A. (2004). *Neo-Pluralism: The Evolution of Political Process Theory*. University Press of Kansas.

Murakami, M., Takebayashi, Y., Ono, K., Kubato, A., & Tsubokura, M. (2020). The Decision to Return Home and Wellbeing after the Fukushima Disaster. *International Jour-*

nal of Disaster Risk Reduction, 47, Article ID: 101538. https://doi.org/10.1016/j.ijdrr.2020.101538

National Audit Office (2017). *Hinkley Point C*. National Audit Office. https://www.nao.org.uk/wp-content/uploads/2017/06/Hinkley-Point-C.pdf

NIA [Nuclear Industry Association] (2012). *Capability of the UK Nuclear New Build Supply Chain.* Nuclear Industry Association. https://www.namrc.co.uk/wp-content/uploads/2013/04/NIA_capability_12.pdf

NIC [Nuclear Industry Council] (2013a). *Minutes of the First Nuclear Industry Forum* 27 *February* 2013. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/200149/uk_nuclear_industry_council_minutes_27_feb_2013.pdf

NIC [Nuclear Industry Council] (2013b). *Minutes of the Third Meeting of the Nuclear Industry Forum*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/266526/NIC_Minutes_13Nov2013.pdf

NIC [Nuclear Industry Council] (2013c). *Minutes of the Second Meeting*. Nuclear Industry Council. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/246060/NIC_Minutes_10th_July_13_meeting.pdf

NIC [Nuclear Industry Council] (2014). *Minutes of the Fifth Meeting of NIC*. Nuclear Industry Council. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/360668/NIC_-_July_2014_-_Minutes.pdf

NIC [Nuclear Industry Council] (2018). *Nuclear Industry Council Summary Meeting.* Nuclear Industry Council. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/777501/NIC_minutes_9_July_2018.pdf

NIC [Nuclear Industry Council] (2019). *Nuclear Industrial Council—Summary of Meeting September 2019.* Nuclear Industry Council. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/847933/NIC_minutes_23_September_2019.pdf

Office for Nuclear Regulations (ONR) (2020). *Aims and Objectives*. https://www.onr.org.uk/aims-and-objectives.htm

Ofgem (2003). *Preliminary Report into the Recent Electricity Transmission Faults Affecting South East London and East Birmingham*. Office of Gas and Electricity Markets. https://www.ofgem.gov.uk/sites/default/files/docs/2003/09/sectoralinvestigations-36_0.pdf

Parliament, & House of Commons (2009). *Russia: A New Confrontation?—Defence Committee.* https://publications.parliament.uk/pa/cm200809/cmselect/cmdfence/276/276.pdf

Parliament, & House of Commons (2013). *The UK's Nuclear Future.* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/168048/bis-13-627-nuclear-industrial-strategy-the-uks-nuclear-future.pdf

Sayre, D. W., & Kaufman, H. (1960). *Selected Examples of Line Administrators in Action*. Politics in the Metropolis.

Scherer, L., & Pfister, S. (2016). Hydropower's Biogenic Carbon Footprint. *PLOS ONE, 11,* Article ID: e0161947. https://doi.org/10.1371/journal.pone.0161947

Stop Hinkley (2011). *13,000 Signature Petition against Hinkley C Delivered to Downing*

Street.
http://stophinkley.org/archive/Newsletter/Dec%202011NL.pdf

Stop Hinkley (2016a). *Hinkley Point: Ministers Sign Go-Ahead for Nuclear Power Plant*.
http://stophinkley.org/archive/Newsletter/Oct2016.pdf

Stop Hinkley (2016b). *Newsletter August 2016*.
http://stophinkley.org/archive/Newsletter/2016Aug.pdf

The Energy Act 2008 (c.32).
https://www.legislation.gov.uk/ukpga/2008/32/pdfs/ukpga_20080032_en.pdf

The Energy Act 2013 (c.32).
https://www.legislation.gov.uk/ukpga/2013/32/pdfs/ukpga_20130032_en.pdf

Trident Ploughshares (2016). *Introducing Trident Ploughshares.*
https://tridentploughshares.org/introducing-tp/

Wilson, J. Q. (1980). *The Politics of Regulation.* Basic Books.

Wintour, P. & Adam, D. (2006). *Blair Presses the Nuclear Bottom*. The Guardian.
https://www.theguardian.com/environment/2006/may/17/energy.business

Wright, R. J. (2014). *Research Methods for Counselling: An Introduction*. SAGE Publications Ltd.