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Nuclear Energy
Rise, Fall and Resurrection

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Abstract:
This paper charts the rise, fall and potential resurrection of the civilian nuclear power industry over the past fifty years in the UK. The role of actors, interests, institutions and ideas are explored using Baumgartner and Jones's *punctuated equilibrium* model of agenda-setting. The study provides some validation of their theory, which posits that the interaction between policy image (how a policy is portrayed) and policy venue (the institutions with jurisdiction over the issue) serves as a mechanism for promoting stability and change in the political system. However, weaknesses are identified in the model's ability to incorporate external events, international dimensions, and the role of social norms and cultural values. In conclusion, the paper calls for a more constructivist epistemological approach in future agenda-setting research.

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1 Introduction

From its inception, the issue of civilian nuclear energy in the United Kingdom has been an emotive one. Born as a project motivated by nationalism in the aftermath of the Second World War, Britain became the first country in the world to build a large-scale nuclear power station at Calder Hall, Cumbria, in 1956. Powerful images and rhetoric followed the development of the debate, from the early euphoria surrounding the launch of the civilian project, to the fear and mistrust characterising understandings of the technology in the 1970s and 1980s.

Interestingly, the language and imagery pervading the discussion of the 1950s has begun to permeate current discourses, and (arguably) helped re-establish the high profile of nuclear energy on the public agenda once more. It is again being forwarded by proponents as both the key to domestic energy security *and* a 'green' technology[1] with the potential to solve the environmental concerns of the day (air pollution in the 1950s, climate change today). Moreover, media reports (often highly polarised) on the subject have "turned from a trickle to a torrent – and suddenly nuclear is big news again" (Leake and Box 2005). *The Sun* declares, it's "Time for Blair to Nuke Britain," while opponents warn "Capitulation to the Nuclear Lobby is a Politics of Despair" (Polly Toynbee in *The Guardian* 2005).

In light of this apparent renewed media interest in nuclear power – together with a recent spate of energy-related consultative exercises initiated by the government – this paper seeks to explore the forces underlying the agenda-setting process. More specifically, the study aims to empirically test Baumgartner and Jones' agenda-setting model (1993) by applying it to the case of civilian nuclear power in the UK over the past half-century. The theory's central tenet is that the *interaction* between (a) the way a policy is portrayed (*policy image*), and (b) the institutions with jurisdiction over it (*policy venue*), provides a mechanism for inducing both stability and change in the political system. A critical case study approach is employed to verify the model's theoretical claims, and an empirical investigation is conducted to explore whether and how the interplay between actors, interests, institutions and ideas has influenced agenda-setting and policy-making processes.

To outline the structure of the paper, the following section introduces the theoretical framework supporting the "punctuated equilibrium model." Section 3 presents the study's methodological approach, and Section 4 sketches an historical account of the development of the nuclear issue. Analytical results are presented in Section 5, and a 'post-analysis' critique appears in Section 6, which highlights the strengths and weaknesses of the theory and examines the implications of the study's findings for future agenda-setting research.

2 Theoretical framework

2.1 Agenda-setting

The term "agenda-setting" was coined by McCombs and Shaw (1972) in their study of public opinion in the run up to the 1968 US Presidential election campaign. The importance of the pre-decision phase, however, had already been highlighted a decade earlier by Schattschneider, who claimed "the definition of the alternatives is the supreme instrument of power" (1960: 68). Cobb and Elder's early studies also stressed the power of the "pre-political" phase, stating that "pre-decisional processes often play the most critical role in determining what issues and alternatives are to be considered by the polity and the probable choices that will be made…the critical question becomes, how does an issue or demand

[1] In terms of air pollution and greenhouse gas emissions.

become or fail to become the focus of concern and interest within a polity?" (1972: 12). Downs' work on "issue-attention cycles," attempts to answer this question by suggesting that agenda-setting and public policy follow a cyclical pattern that is driven by government responses to public concern (1972). His pluralist perspective was typical of much of the early literature on issue-definition and agenda-setting, which Considine (1998: 297) categorises as *outside-initiative* models due to their 'bottom-up' approach and emphasis on the role of non-state actors (McConnell 1966, Downs 1972, Cobb et al. 1976). In contrast, Considine describes Cook et al.'s mobilisation hypothesis (1976) as an *inside-initiative* model because agendas are determined by political elites. Finally, he classifies the more recent intergrated theories as *contingency models* (Cook 1981, Kingdon 1984, Cook and Skogan 1990, Baumgartner and Jones 1993, Rocheforte and Cobb 1994). He goes on to explain that the prevailing new understanding "appears to reject any precise theory of directionality in agenda setting and claims instead that this process occurs as a somewhat unpredictable disturbance to an existing equilibrium, precipitated when actors from both inside and outside government converge" (Considine 1998: 297-8). Furthermore, he elaborates, "an 'interrupted equilibrium' approach appears now to have become the accepted view of agenda-setting, perhaps because it is the most elastic of the available generalisations concerning these variables and can accommodate the rich diversity of activity typically found in case studies" (Ibid.: 298).

2.2 The punctuated equilibrium model

It is partly for the reasons outlined by Considine that Baumgartner and Jones' theory of agenda-setting was selected for application in this study. Not only is it considered to be an innovative contribution to the policy studies literature (Plein 1994, John 1998), but its synthesis of pluralist, elitist and even social constructivist elements make it well-suited for application to an issue such as nuclear energy, where interest group activity, the mobilisation of bias and societal perceptions have all played a major role in the policy process. Furthermore, the model's comprehensive and dynamic approach, integrating diverse elements such as ideas, institutions, interests, individual agents and socio-economic factors, leads John to conclude that it "comes close to an ideal way of analyzing public policy" (1998: 177). The remainder of this section outlines the central features of the punctuated equilibrium model.

2.2.1 Stability and change

Baumgartner and Jones' point of departure is the presence of both stability *and* change in policymaking. They highlight the limitations of traditional accounts that emphasise stability (Lindblom 1959, Wildavsky 1984), as well as more recent approaches stressing social learning (Heclo 1974, Hall 1993, Sabatier 1988) and continual change (Kingdon 1984). Instead, they "depict a political system that displays considerable stability with regard to the manner in which it processes issues, but the stability is punctuated with periods of volatile change" (Baumgartner and Jones 1993: 4). They support Riker's claim that "disequilibrium, or the potential that the status quo be upset, is the characteristic feature of politics" (1980: 443).

2.2.2 Policy subsystems and monopolies

Like Sabatier (1988, 1991), Baumgartner and Jones point to the importance of policy subsystems in policy choice and implementation. They share with Majone (1989) and Sabatier (1988: 129-69) the understanding that ideas and beliefs 'undergird' policy positions and political structures, and act as the 'glue' holding policy subsystems together. The authors are unique, however, in integrating the study of subsystems with agenda-setting models, which they accomplish by making pivotal the *interaction* between institutions *and* ideas (Baumgartner and Jones 1993: 5). They begin with the assumption that the goal of every policy subsystem is to dominate the public agenda by constructing a "hegemonic

interpretation of a policy problem or solution" (Howlett 1997: 4). This is ultimately achieved by the creation of a policy monopoly – an institutional arrangement with formal and informal rules that is founded on "a powerful supporting idea" (Baumgartner and Jones 1993: 7). As long as those participating in the policy system continue to share the same values, the policy monopoly remains stable. However, "the generation of new ideas makes many policy monopolies unstable in the long-run" (Ibid.: 4). It is for this reason that Baumgartner and Jones reject the existence of a general equilibrium in politics, but do not rule out partial equilibria, "enforced through institutional structures such as policy subsystems" (Ibid.: 18).

2.2.3 Positive and negative feedback

Another feature central to the dynamism of Baumgartner and Jones' model is the role of negative and positive feedback in politics. The former is characteristic of conservative theories of policymaking, which predict "an initial disturbance becomes smaller as it works its way through time" (1993: 6). It prevails during periods of stability as "privileged groups give up a small degree of power when attacked" (Baumgartner and Jones 1993: 16). Positive feedback, on the other hand, occurs when "small disturbances become amplified, causing major disruptions as they operate across time" (1993: 6). Inspired by Arthur (1988, 1989, 1990), Kaufman (1976), and Casstevens (1980), Baumgartner and Jones describe how bandwagon effects can trigger rapid change as fresh ideas take hold, new proposals and participants enter the policy process, and new points of stability are established. This "lurching behaviour of agendas" is reinforced by the "feast or famine" nature of media attention (Baumgartner and Jones 1993: 20). As periods of stability tend to follow rapid change, "many systems are characterized by long periods of negative feedback and short bursts of positive feedback" (1993: 18).

2.2.4 Interest, apathy and issue definition

Drawing on the work of Schattschneider (1960), Baumgartner and Jones assume that actors with a vested interest will always be more active than those with little at stake (Baumgartner and Jones 1993: 8). They argue that the creation and destruction of a policy monopoly "is almost always associated with a change in intensities of interest" (Ibid.). This is typically brought about by "a new understanding of the nature of the policies involved" (Ibid.). Apathy is a crucial source of instability because "so long as the possibility exists of mobilizing the previously indifferent through the redefinition of issues, no system based on the shared interests of the interested is safe" (1993: 19). There is therefore every incentive for the "losers" to enlarge the scope of conflict by transforming the indifferent to interested parties (Schattschneider 1960). They achieve this by redefining old issues to their advantage and attaching their policy to strong symbols, such as progress, national identity and economic growth (Baumgartner and Jones 1993: 11). This can also have repercussions in terms of institutional arrangements. A wave of enthusiasm for a new policy, which Baumgartner and Jones call a "Downsian mobilization," can lead to the creation of supportive institutions (Baumgartner and Jones 1993: 88). However, when the scope of conflict is expanded in reaction *against* the status quo, it can lead to the dismantling of existing institutional structures, termed a "Schattschneider mobilization" (Ibid.: 89). Issue definition thus drives the agenda-setting process and can also induce institutional change as new understandings of policy issues enter the public agenda and offer the potential to disrupt partial equilibria.

2.2.5 Policy image-venue interaction

To add the final piece to the theoretical jigsaw, Baumgartner and Jones introduce the concepts of policy image and venue, claiming that it is the *interaction* between them that generates positive feedback and causes disequilibrium in politics.

A policy *image* is "how a policy is understood and discussed" (1993: 25). Because public policy problems are usually complex, they will often be explained to citizens in "simplified and symbolic terms" (Ibid.: 26). This ties in to Stone's concept of "problem definition," which she describes as "the active manipulation of images of conditions by competing political actors" (1989: 299). The role of policy *images* is therefore critical to expanding issues to the previously apathetic: "Those wishing to mobilize broad groups attempt to focus attention on highly emotional symbols or easily understood themes" (Baumgartner and Jones 1993: 30). Furthermore, "buttressing policy ideas are generally connected to core political values which can be communicated directly and simply through image and rhetoric. The best are such things as progress, participation, patriotism, independence from foreign domination, fairness, economic growth – things no one taken seriously in the political system can contest" (Ibid.: 7). As we shall see later, many of these themes have been central to the nuclear energy debate

Institutions and groups with jurisdiction over a given issue are known as policy *venues*. Different venues can be "home to a different image of the same question," for example, environmentalists might associate nuclear power with danger and environmental degradation, while industry enthusiasts might link the issue to technological innovation and economic progress (Ibid.: 31). Changes in institutional authority over a particular issue can change over time and "may be manipulated by strategic entrepreneurs" as part of the agenda-setting process (Ibid.: 5, Riker 1980). If "losers" can generate controversy over the issue, "the venue of decision-making authority is more likely to change," but if they fail and a consensus is established, "policy niches" (such as subgovernments) can emerge, reinforcing stability (Baumgartner and Jones: 34).

In sum, "images and venues are closely associated with each other. Policymakers attempt to both manipulate the dominant understanding of the issues with which they deal and influence the institutions that exert jurisdiction over them" (Ibid.: 35). However, what is critically important is that it is the interplay between these processes that drives forward the punctuated equilibrium model: "Issue definition and institutional control combine to make possible the alternation between stability and rapid change that characterizes political systems" (Ibid.: 16).

Relevant actors and relationships	**Anticipated actor behaviour**	**Anticipated policy outcomes**
Policy subsystems (individuals, experts, groups, government officials and politicians, media)	Subsystem construction of hegemonic policy images. Struggle between subsystem members and non-members to alter images, change venues and affect institutional structures and subsystem composition.	Pattern of construction and deconstruction of policy images and subsystems results in a stepped or "punctuated" equilibrium pattern of policy change featuring lengthy periods of little or incremental change and infrequent periods of rapid or major change.

Figure 1: Key elements of Baumgartner and Jones' punctuated equilibrium model, adapted from Howlett (1997: 8).

3 Methodology

3.1 Methodological approach

Baumgartner and Jones use a combination of quantitative and qualitative methods in their cross-sectional analysis of environmental, agricultural and urban policy in the US.[2] This study, however, takes a qualitative methodological approach,[3] and reduces the scope of the investigation to a single issue: UK nuclear energy policy. A "critical case study" research design is chosen due its applicability to studies where "the researcher has a clearly defined hypothesis or theory to test and the case study is designed so wider generalizations can be drawn" (Burnham et al. 2004: 54). It thus suits the objectives of this research, which are to test the punctuated equilibrium model and explore the broader implications of the findings. In addition, a longitudinal approach is taken to allow the issue to be tracked over time and explanations for their rise and fall to be identified. This follows the recommendations of Downs (1972) and Sabatier (1991: 149), who advocate longitudinal analysis in policy research, and follows in the example of Baumgartner and Jones, who use the approach in their study.

The central justification for taking a qualitative approach is that the nature of Baumgartner and Jones' theory lends itself well to qualitative methods. As the authors profess, the model is not designed to establish causal relationships between the variables or to make predictions, but rather to provide explanatory power and identify patterns of association (Baumgartner and Jones 1993: 269). Indeed, it is for this reason that Baumgartner and Jones themselves use qualitative analysis extensively in their study. Any theory that is underpinned by images, ideas and values would be difficult to verify using quantitative tools alone, as they are notoriously poor at capturing human cognitions and understandings. This point is echoed by Howlett (1997), who applies Baumgartner and Jones' model to the issues of nuclear energy and acid rain in Canada. Using a purely quantitative approach,[4] he finds that the empirical evidence does not support the existence of punctuated equilibrium policy dynamics in Canada during 1977-1992. He nevertheless goes on to suggest that "if a punctuated equilibrium process is a more qualitative than quantitative construct, its nuances might escape the quantitative analysis…set out above." Furthermore, he admits, "it is conceivable that construction of a database which would capture the qualitative aspects of the punctuated equilibrium model might generate better results" (1997: 28). A qualitative approach is therefore taken, combining secondary data analysis and semi-structured interviews.

3.2 Research methods

3.2.1 Secondary analysis

Empirical data was collected from secondary sources, such as academic publications, official records, media reports, government policy documents, and websites. As comparatively little had been published academically on nuclear energy policy in the UK since the early 1990s, secondary qualitative data was supplemented with the findings from five semi-structured elite interviews.

[2] Including nuclear power policy.

[3] Although some public opinion poll data is also used.

[4] Howlett (1997) analysed time-series data based on the frequency of mentions of nuclear energy and acid rain on government and public agendas. His focus was on the *level* of media and congressional attention rather than its *tone*.

3.2.2 Semi-structured interviews

Semi-structured interviews have been described as a useful research method for revealing the motivations and perceptions of respondents (Flick 2002). Elite interviews have the added benefit of providing "immense amounts of information that could not be gleaned from official published documents or contemporary media accounts" (Lilleker 2003: 208). Five semi-structured interviews were therefore conducted with leading representatives in the nuclear and environmental lobbies to supplement the secondary qualitative data (see Figure 2). Although a larger sample would have been desirable had time and resources been permitting, it was hoped that the high profile of the five interviewees would serve to add "textural depth as well as empirical strength" to the study (Ibid.).

Interviewee	Position	Organisation	Interview type
Tony Juniper	Director ,	Friends of the Earth	Face-to-face
	Vice-Chair (FOE International)	(England, Wales & N. Ireland)	
Jean McSorley	Nuclear Campaign Coordinator	Greenpeace UK	Telephone
Adrian Bull	Head of Energy Policy Studies	British Nuclear Fuels	Face-to-face
Miranda Kirschel	Corporate Affairs Manager	Nuclear Industry Association	Face-to-face (joint)
Simon James	Communications Manager	Nuclear Industry Association	Face-to-face (joint)

Figure 2: Interviewees

The sample was chosen after careful consideration of the organisations and individuals involved in the nuclear debate. Representatives from the "pro-" and "anti-" nuclear campaigns were chosen due to their prominent position within their organisations and their active role in nuclear power policy and communication. Tony Juniper is the Director of Friends of the Earth (FoE)[5] and Vice-Chair of FoE International and therefore holds one of the most prominent positions within the UK environmental movement. Jean McSorley is the Nuclear Campaign Coordinator for Greenpeace UK. Her experience of anti-nuclear campaigning spans three decades and three continents.[6] Adrian Bull is Head of Energy Policy Studies at British Nuclear Fuels Limited (BNFL), and has worked for the company in technical and policy positions for 22 years. Miranda Kirschel is Corporate Affairs Manager for the Nuclear Industry Association (NIA) – the trade association of the UK nuclear industry – and coordinates the All Party Parliamentary Group on Nuclear Energy. Simon James worked briefly for the UK Atomic Energy Authority, but currently holds the position of Communications Manager at the NIA. A joint-interview was held with Kirschel and James due to the overlap in their roles at the organisation.

Interviews were conducted in London between 3rd and 11th August 2005, and ranged in length from half an hour to an hour. Owing to the different backgrounds of the respondents, it was judged to be inappropriate and too constraining to standardise interviews. Instead, a more flexible, "semi-structured" approach was taken (Burnham 2004: 206). An interview guide with a (prioritised) list of topics was used to steer the discussion, though the order in which the questions were asked, and their precise wording, were not determined in advance (Devine 1995: 138). All interviews were recorded with the permission of interviewees, and

[5] England, Wales and Northern Ireland

[6] Jean McSorley founded the local anti-nuclear group, *Cumbrians Opposed to a Radioactive Environment*, where she worked as the Campaign Secretary for ten years. More recently, she has headed the Greenpeace nuclear campaign in Australia and led the nuclear and energy campaign for Greenpeace International in Asia.

transcriptions were produced soon afterwards. Edited transcripts – and later a final draft of the paper – were given to interviewees so that they could confirm that their comments and opinions had been recorded and understood correctly.

3.3 Research validity

A key concern of the study was to safeguard its research validity. It was for this reason that secondary qualitative analysis was supplemented with (albeit limited) primary qualitative analysis in the form of elite interviews. This adheres to the principle of triangulation, which "entails using more than one method or source of data in the study of social phenomena" (Bryman 2004: 275). Findings from secondary analysis could thus be verified by outputs from semi-structured interviews. It is argued that the study's methods to a large extent meet both quantitative and qualitative evaluation criteria for research validity, as summarised in Figure 3.

Evaluation criteria	Explanation	Meeting evaluation criteria
Quantitative criteria	*Source: LeCompte and Goetz (1982) cited in Bryman (2004: 273)*	
1. External reliability	Can study be replicated?	Systematic record of the research process was kept to allow a similar procedure to be carried out again
2. Internal reliability	Is there inter-observer consistency?	Author was the only interviewer
3. Internal validity	Do researcher's observations and theoretical ideas developed match?	Secondary analysis was supplemented with elite interviews (including follow-up contact) to help the researcher connect observations with theory
4. External validity	Can findings be generalised?	Broad patterns were identified to enable wider generalisations to be made
Qualitative criteria	*Source: Lincoln and Guba 1985; Guba and Lincoln 1994, cited in Bryman (2004: 273-6)*	
1. Trustworthiness	Comprised of four criteria below:	
a. Credibility	Did researcher understand interpretations of respondents?	Respondent validation was carried out at the end of the project
b. Transferability	Is research transferable?	Detailed records of the research process were kept. Transparency enables methods to be evaluated and repeated
c. Dependability	Are methods reliable?	
d. Confirmability	Have personal values swayed results?	Researcher strove to be reflexive and aware of personal values, but acknowledges findings will be a reconstruction
2. Authenticity	Wider impact of research?	To test Baumgartner and Jones' punctuated equilibrium agenda-setting model and suggest areas for improvement

Figure 3: Achieving research reliability and validity

3.4 Ethical considerations

Burnham et al. present five basic ethical principles that should guide research: avoidance of harm, avoidance of deception, right to privacy, right to confidentiality, and consent (2004: 253). This study respected these principles by:

- Informing potential participants about the nature of the research before they were invited to participate
- Making participation voluntary
- Respecting participants' right to privacy

- Seeking consent before recordings of interviews were made
- Protecting confidentiality by asking for their consent before their comments were published
- Providing participants with feedback and access to findings
- Inviting participants to take part in respondent validation exercises where appropriate

3.5 Key variables

As already indicated, the study attempts to test whether the variables and mechanisms outlined by Baumgartner and Jones prove useful in explaining agenda stability and change in the political system.[7] The indicators under investigation by this study are introduced in turn and form the basis for the analytical framework in Section 5.

3.5.1 Media coverage

Baumgartner and Jones believe that the media play an important role in allocating public attention to an issue and "reinforcing tendencies already apparent in other areas of the policymaking system" (1993: 104). The authors predict that different elements of an issue will be highlighted during periods of high and low attention, and expect shifts in emphasis to coincide with changes in "tone" (i.e. negative/positive slant). For example, if an issue associated with economic growth and technological progress is suddenly overshadowed by health risks, a surge in attention is likely to follow, and the nature of that attention is likely to be predominantly negative. Baumgartner and Jones employ quantitative indicators to measure the *level* and *tone* of media attention, which they argue serve as a good gauge of agenda status or "the systemic agenda" (Cobb and Elder 1983). They count press articles and code their content according to their positive or negative leanings.[8]

The qualitative approach taken by this study seeks to trace the main trends in the volume and nature of media reports on nuclear energy over time using secondary source material. This is an admittedly subjective exercise that relies on other commentators' interpretations of events, but is nonetheless valuable because it enables defining moments in media coverage to be identified. It also has the advantage of allowing television and radio programmes to be taken into account, which is arguably an important consideration given that 79 per cent of UK respondents reported television to be one of their main sources of information on "energy issues and related technologies" in a European survey in 2002 (Eurobarometer 2002: 60).[9]

3.5.2 Venue access

Baumgartner and Jones trace shifting institutional venues, primarily by measuring the intensity of congressional activity in a specific policy area. They gather quantitative data on congressional hearings to establish the level of attention paid to a given issue over time (number of hearings), the tone of that attention (enthusiastic or critical), and the venue of the attention (which committees and subcommittees held the hearings). Where data is available they also adopt what they describe as an "eclectic approach," including qualitative assessments, in order to examine indicators for: federal executive branch activity, state and

[7] The only variable excluded from the analysis is "nature of the problem," which Baumgartner and Jones primarily reserve for social policy issues.

[8] Baumgartner and Jones focus on articles featured in the *Readers' Guide* and *New York Times Index* (see 1993: 50-1), and draw heavily on Weart's classification methods (1988).

[9] The corresponding figure for the press is 56 per cent (Eurobarometer 2002: 60).

local level actions, financial outcomes and public opinion data (Baumgartner and Jones 1993: 52-3).

This study uses qualitative empirical analysis to explore changes in institutional jurisdictions over nuclear energy during the past 50 years. Venue shifts are tracked so that trends and turning points can be identified.

3.5.3 Policy outputs

The variable "policy outputs" seeks to capture changes in the "structure of policymaking." Baumgartner and Jones argue that alterations in the policymaking structure (e.g. the dismantling of US Atomic Energy Commission) and expenditure patterns can be crucial indicators of policy change[10]. The approach taken by this paper is to provide an account of how UK government policy created the institutions that established a nuclear policy monopoly, and then gradually dismantled them in response to changing image-venue interactions.

3.5.4 Changes in institutional structure

The final variable under examination is the changing institutional and political environment. Baumgartner and Jones examine changes in the interest group system, Congressional procedures and the relations between federal and state governments. As they stress the importance of the growth in the environmental movement in changing the contexts policymaking, this variable is the focus for my study.

4 History of civilian nuclear energy

This section outlines the development of civilian nuclear power from the post-war period to the present day.[11] As space does not permit a detailed account of events, the following chronology is restricted in focus to presenting the central issues in the debate, introducing the main institutions and actors involved, and summarising key policy outputs.

4.1 Nuclear euphoria: 1945-1975

4.1.1 The rise of nuclear

It was America's refusal to grant the British access to its nuclear technology after the Second World War that prompted Prime Minister Clement Attlee to initiate plans to develop the first British nuclear bomb in 1945 (Gowing 1964, 1974). The decision was made without public consultation, Parliamentary debate or even full Cabinet discussion (Greenaway et al. 1992: 121). The first nuclear power plant was commissioned at Calder Hall in 1953. The following year, the United Kingdom Atomic Energy Authority (AEA) was established; it was to remain "at the heart of nuclear decision making until the early 1970s" (Saward 1992: 79). Its unique status made it powerful: it was financed by government, but escaped "the formal system of control" normally imposed on departments of state (Ibid.: 118). The Authority was given sole responsibility for informing government about nuclear energy issues and enjoyed jurisdiction over areas such as reactor research and design, management training, procurement of

[10] They also occasionally explore changes in the activities of government officials.

[11] See Williams (1980) and Hall (1986) for more extensive accounts.

materials, fuel manufacture and advising the electricity boards – who commissioned the reactors (the Central Electricity Generating Board and the South of Scotland Electricity Board). Operational activities were contracted out to four industrial consortia in rotation, "despite a pretence of competition" (Saward 1992: 90).

Although Calder Hall had been enthusiastically presented as the world's first commercial electricity generator, its primary function was to produce plutonium – a vital ingredient of the military programme. As later revealed by Geoffery Lloyd, the then Minister of Power, "although the output of electricity would be considerable, it would be more or less a by-product" (Hall 1986: 43). The design of the plant therefore centred on its military rather than civilian functions, and consequently, little attention was paid to capital and electricity generation costs. As a result, the type of reactor chosen – the British Magnox – was effective at producing plutonium rapidly from natural uranium, but was 50 per cent less efficient at generating electricity than its coal-fired counterpart (Gowing 1974).

The Suez crisis of 1956 caused fears to spread about looming fuel gaps and mounting foreign energy dependency, which was heightened further still by the unprecedented introduction of oil rationing. And so, in 1957, on the advice of the AEA, the government trebled its original 1955 nuclear construction programme from four to twelve plants, representing an increase in production capacity from 2,000 to 6,000 MW (megawatts).

Almost from the outset the AEA had developed an interest in pursuing its own design, and used its close proximity to government to ensure that all stations eventually built under the first programme followed the Magnox blueprint, despite initial plans to consider a new variant after the first eight stations had been finalised (Williams 1980: 18-19). The government did not appear discouraged by technical problems due to over-optimistic forecasts by scientists, cost hikes owing to the inexperience of industrial consortia or widespread completion delays. The AEA's hold over a government heavily reliant on its advice was fast becoming apparent: "the Government, by its decision to establish the UKAEA, created an in-built nuclear power lobby. The establishment of institutions dependent on nuclear power, meant that energy policy came to be seen as synonymous with nuclear power policy" (Greenaway et al. 1992: 123).

4.1.2 The second programme

Nevertheless, controversy was beginning to emerge surrounding the issues of reactor design, cost and electricity generation efficiency. The former was to prove the most persistent and divisive, with a major dispute beginning in 1955 and spanning the following two decades (Greenaway 1992: 124). While the initial battle was between the AEA's Magnox and the American Light Water Reactor (LWR), by the time preparations began for the second programme, the two models had been superseded by the British Advanced Gas-Cooled Reactor (AGR) and the US Pressurised Water Reactor (PWR)[12] respectively. Both used enriched uranium, but were said to differ in terms of their cost, efficiency and safety.

In 1964, the Conservatives announced plans for a second programme to build 5,000 MW of generating capacity, and the following year, the new Labour Government enthusiastically extended the proposed project to 8,000 MW as part of its "technological revolution" (Ibid. 126). Choice of reactor design was once again a sensitive issue, with the AEA supporting the British candidate, a growing band of dissenters within the Authority backing the American PWR, and the Chairman[13] of the CEGB preferring a third, Canadian, alternative. Nevertheless, the will of the AEA prevailed, and no doubt owing to its "heavy

[12] The PWR is a type of LWR.

[13] Sir Christopher Hinton, who was formerly head of the AEA.

involvement…at every stage" the CEGB eventually announced its 'independent' decision to commission the AGR based "solely on its merits" (Hall 1986: 91).

As construction work began, however, further problems emerged. Costs spiralled to twice the original estimate and every plant appeared to demonstrate some technical variation because different industrial consortia were given responsibility for building individual reactors. Consequently, construction was delayed, costs escalated, and the capacity target fell to 6,000 MW: "The result was severe damage to the morale of the entire British nuclear establishment" (Ibid. 92).

4.1.3 The third programme

Far from being deterred from nuclear power by the AGR fiasco, the Conservative Party began preparing for a third programme soon after re-entering government in 1970. Once again, the options were the AGR and the PWR, but added to the list were the old Magnox and the AEA's newly-developed Steam Generating Heavy Water Reactor (SGHWR). The Vinter Committee was set up in 1972 to offer advice on reactor design. Its members included civil servants, the UKAEA and the Chairmen of the electricity boards. It concluded that the competition was "extremely finely balanced," and made two main recommendations: that a more commercial successor to the AGR be developed by the AEA, and that the industrial consortia be unified into one organisation (Williams 1980: 201). The government accordingly amalgamated the five existing consortia into the National Nuclear Corporation (NNC), which was half owned by the General Electric Company (GEC), and the remainder spilt between the AEA and British Nuclear Associates. It also established the Nuclear Power Advisory Board to serve as the Vinter Committee's more permanent replacement.

In the meantime, support for the PWR had been snowballing. The GEC, the CEGB and the Chief Scientific Advisor at Department of Energy (Dr. Walter Marshall) all boasted the superior export potential and construction simplicity of the American prototype (Greenaway et al. 1992: 127). Parliamentarians, on the other hand, were "hostile to the PWR" and expressed dismay over the CEGB's willingness to defer to American technology (Hall 1986: 123).

With the Tories preoccupied by striking miners and an economy paralysed by the oil crisis, it wasn't until Labour came to power in 1974 that the third nuclear programme was finally unveiled (Greenaway et al. 1992: 128). To the surprise of many, the new Secretary of State, Eric Varley, announced the government's modest programme featuring the widely unpopular SGHWR reactors. His decision received a mixed response from the AEA, a lacklustre reception from the CEGB, and downright anger from GEC, who reduced it's ownership of the NNC from 50 to 30 per cent in protest (Ibid.). Ultimately, Varley's decision had been a response to growing public, parliamentary and expert fears concerning the safety of the PWR (which had not been approved by the Nuclear Installations Safety Inspectorate) and acquiescence to "strong voices within the Labour Movement calling for support of British technology" (Hall 1986: 125).

4.2 Nuclear fear 1975-2003

4.2.1 Nuclear doubts emerge

It is claimed that it was not until 1975 that the British nuclear debate began to develop some momentum (Williams 1980: 289). Around this time a flurry of events and reports emerged questioning the benefits of the country's nuclear programme. It also coincided with the establishment of the anti-nuclear and environmental movements in the UK.

It can be argued that the events surrounding British Nuclear Fuel Limited's (BNFL) application to build a thermal oxide fuel reprocessing plant (THORP) at the Windscale

nuclear site proved a crucial turning point in the history of the nuclear energy debate. BNFL had been created in 1971 to take responsibility for fuel procurement and processing from the AEA. In 1975, it submitted an application to the government for permission to extend the site so that it could reprocess increased volumes of spent fuel from abroad.[14] The following October, the Daily Mirror ran the first of two front page articles claiming that the UK was becoming the "World's Nuclear Dustbin" (Williams 1980: 289). There followed a heated public debate on the proposal, and the government eventually bowed to pressure to hold a public inquiry. Although the findings of the subsequent inquiry (HMSO 1978)[15], which approved BNFL's application, signalled a defeat for the anti-nuclear movement, it had provided the opposition with a vital focal point for its activities and, perhaps more importantly still, had supplied its first public platform. Williams declares it was "easily the most important instance of direct contact between the two [pro- and anti-nuclear] sides" (1980: 299). Further weight still was given to the opposition when the well-respected Royal Commission on Environmental Pollution published a report drawing attention to the threat a potential plutonium economy posed to civil liberties (1976)[16].

With this backdrop, Tony Benn arrived at the Department of Energy in 1976 and scrapped the unpopular SGHWR. He remained nonetheless committed to the third nuclear programme. As far as government and industry was concerned, the main bone of contention remained *which* reactor to build and not *whether* further reactors ought to be built in the first place. And so, against the wishes of the GEC, the AEA, and civil servants – who favoured the PWR – Benn announced his intention to build two AGRs (preferred on safety grounds), with a view to investigating the merits of the PWR at a later date (which now had qualified approval of the Nuclear Installations Inspectorate for use in Britain) (Greenaway et al. 1992: 129). All work on the PWR, however, was cancelled by Benn in 1979 following a potentially disastrous accident at one of Pennsylvania's Three Mile Island PWR reactors. The fact that his demand was ignored by civil servants, who expected an imminent change of government, was testimony to the institutionalised power wielded by nuclear interests at the time.

4.2.2 The fourth programme

When Margaret Thatcher led the Conservatives into office in May 1979, the nuclear industry finally received a boost at a time of deep crisis. As Thatcher's biographer Hugo Young put it, nuclear power was "one of the Prime Minister's particular obsessions" (cited in Greenaway: 131). And so, in 1982, the government launched a fourth programme to build ten PWR reactors to provide further capacity of 15,000 MW (Greenaway 1992: 130). Security of energy supply was forwarded as the central motivation for the initiative, however, the minutes of a Cabinet meeting held shortly after Thatcher's arrival at Downing Street suggest that there might have been other political incentives: "a nuclear programme would have the added advantage of removing a substantial portion of electricity production from the dangers of disruption by industrial action by coal miners or transport workers"[17] (cited in Hall 1986: 173).

The first power station was to be built at Sizewell in Suffolk. In keeping with the promise made by the Secretary of State for the Environment[18] following the Windscale Inquiry, a full public inquiry was to be held into the development plans. The subsequent Sizewell Inquiry

[14] Including Japan and Italy.

[15] Also known as the Parker Report after Mr. Justice Parker who led the inquiry.

[16] Also known as the Flowers Report, after the nuclear physicist Sir Brian Flowers who led the Royal Commission's inquiry.

[17] Minister for Energy, David Howell

[18] Peter Shore

turned out to be the second largest public inquiry to date,[19] running from January 1983 to March 1985. While it gave the public an unprecedented right to participate in the decision-making process (Greenaway et al. 1992: 130), the opposition believed it had been a "meeting of closed minds" (Kay 2001). The CEGB's construction plans were approved with only "minor gestures to the opponents" (Ibid.). Significantly, however, Sizewell B was to be the last nuclear reactor built or ordered in the UK. Although further reactors had been planned,[20] building work was suspended in the late 1980s in preparation for privatisation of the industry.

Meanwhile, a major accident at the Chernobyl nuclear plant in the Ukraine in 1986 led to multiple fatalities and widespread radioactive contamination and raised further fears over the safety of nuclear technology.

4.2.3 Privatisation

As the centrepiece of the Conservative Party's 1987 election manifesto, Thatcher's privatisation plans served to politicise the nuclear industry further still. The 1988 White Paper proposed that electricity generation and supply be decentralised and removed from public ownership (Department of Energy 1988). This proved understandably unpopular with CEGB, whose centralised control was due to be devolved to regional suppliers owned by PowerGen and National Power. The latter was initially given control of the nuclear plants, but after questions were raised over the economic viability of the stations, the government eventually removed the nuclear industry from its privatisation plans, and created a public company, Nuclear Electric, to run the AGRs and Sizewell B (Greenaway et al. 1992: 132).[21]

4.2.4 Nuclear moratorium

Although Saward may well have described mid- to late 1980s in Britain as "a time of nuclear bullishness," there was scarce evidence to suggest the industry's fortunes had improved (1992: 97). Privatisation had required greater transparency and led the UK to become "the first country in the world to investigate the full cost of nuclear power" (Thatcher 1993: 685). A moratorium on new nuclear build was therefore declared pending a five-year review (Wakeham cited in Stenzel 2003). When the Department of Trade and Industry published their findings in 1994, it reaffirmed the government's commitment to privatisation and reiterated that the nuclear generating industry should be transferred to the private sector as soon as practicable (DTI 1994). In keeping with this sentiment, British Energy (previously Nuclear Electric) was privatised in 1996; it has been struggling financially ever since.[22]

Following Labour's second successive General Election victory in 2001, Tony Blair announced a major review of UK energy policy. After considering a total of 400 submissions,[23] the Performance and Innovations Unit (PIU)[24] proposed that renewables form the cornerstone of future government policy, and necessary measures be taken to keep the nuclear option open (PIU 2002: 11-12). In the post-September 11th 2001 climate, however, fears were beginning to grow that nuclear reactors could be a terrorist target.

[19] The largest public inquiry held was into Heathrow's Terminal 5.

[20] For example, Hinkley Point C in Somerset, Wylfa in Angelsey and Sizewell C in Suffolk.

[21] Though the Magnox stations remained under government control.

[22] Nuclear Energy took over the nuclear power stations owned by Nuclear Electric and Scottish Nuclear. See DTI (2005) for a comprehensive history of the company's financial record.

[23] For a full list see PIU 2002 (pages 171-9).

[24] The PIU is a sub-department of the Cabinet Office, which now forms part of the Prime Minster's Strategy Unit.

In response to the call for a long-term energy strategy, an even broader stakeholder consultation was launched in May 2002. Just over a year, later the Government's Energy White Paper, *Our Energy Future – Creating a Low Carbon Economy*, was published (DTI 2003), revealing ambitious medium- and long-term carbon dioxide emissions reduction targets for the UK. It was, however, slightly less positive towards nuclear energy, claiming "its current economics make it an unattractive option for new, carbon-free generating capacity and there are also important issues of nuclear waste to be resolved" (2003: 12, Para. 1.24). While it was not prepared to consider new nuclear build now, it would nevertheless "keep the option open" (2003: 44, Para. 4.3).

Meanwhile, in July 2002, the DTI produced a White Paper, *Managing the Nuclear Legacy: A Strategy for Action*, which announced the intention to establish a new public body, the Nuclear Decommissioning Authority (NDA), to take responsibility for decommissioning.

4.3 Nuclear resurrection?

Although government policy has not changed since the publication of the Energy White Paper in 2003, there are growing indications that the nuclear energy debate is in the process of being reopened. A recent surge in media coverage has generated renewed interest in the nuclear issue, and evidence points to increased parliamentary activity and a higher frequency of industry conferences and events (McSorley 2005). Some also argue that public opinion is moving in a less anti-nuclear direction (Bull 2005, *The Economist* 2005, Knight 2004). Perhaps most importantly, the frame of reference for the debate appears to be shifting, at least superficially. While concerns over nuclear waste, accidents, health risks, economic costs and environmental hazards remain in people's minds, nuclear energy is – for the first time in over two decades – increasingly being presented as a potential *solution* to rather than a *cause* of public problems (Bull 2005). Political instability in oil-rich nations, (the related) high energy prices and energy gap fears have raised concerns over energy supply security. Rising carbon dioxide emissions causing climate change have also lead to calls for greater investment in carbon-free technologies. On both counts, nuclear energy has been portrayed by the industry as part of the solution.

While this paper does not seek to examine the relative merits of nuclear power or to predict whether a change in policy might occur at some date in the future, the following section uses the theoretical framework outlined in Section 3 to explore the extent to which the interaction between policy venues and images can account for the changes in nuclear energy policy over the past 50 years.

5 Analysis

As outlined in Section 3, four key variables are used to trace the changing image and institutional venues underlying the development of nuclear power. Each variable is analysed over the three sub-periods identified in Section 4: (1) 1945 to 1975, (2) 1975 to 2003, and (3) 2003 onwards. As will be demonstrated, these phases represented periods when changes in media attention, institutional venues, public opinion, policy outputs and the environmental interest group system coincided.

5.1 Media coverage

The following section demonstrates how the media's tendency to consider one side of an issue at a time reinforces the "lurching behaviour of agendas" and contributes to the creation of disturbances in partial equilibria in politics (Baumgartner and Jones 1993: 20). Key trends and turning points are identified for each time period.

Phase 1: A wave of enthusiasm

According to Hall, the absence of media scrutiny of the nuclear energy issue in the early post-war period was glaring: "the way the British press dealt with this vitally important issue was woefully inadequate" (1986: 30). Indeed, when the editorials covered the issue at all, they rarely questioned the government's position, and some went so far as to even defend the state's lack of transparency: "immediate demands of the Government's attitude towards national security justified the creation of these monopoly powers" (Ibid.).[25] The problem was confounded by the lack of Parliamentary debate and the "wall of silence" imposed by the Atomic Energy Act, the Official Secrets Act, and D-notice arrangements (Ibid.).[26]

However, coverage of the opening of Calder Hall in 1956 epitomised the wave of euphoria that swept across the UK in the height of Phase 1. Without a doubt, the event inspired awe and enthusiasm in the British press, who "extolled the peaceful uses of nuclear power" (Hall 1986: 32). The *Daily Telegraph* declared, "Calder Hall has started a new age," *The Economist* claimed, "nothing will ever be quite the same again," and *The Times* described the project in particularly warm terms, as "courageous," "magic," and one that "deeply stirs the imagination" (Ibid.). In short, the media reflected the positive image pervading British society at the time. Nuclear energy heralded a new era of hope; of clean, cheap and reliable energy; of safe, high-tech jobs; of economic growth and national pride; and importantly, signalled an end to air pollution, health problems and the hazardous manual labour associated with mining.

Phase 2: A tide of fear

By the 1970s, the level of media attention received by nuclear power had increased considerably, and the tone of coverage was starting to show a marked deterioration. Safety had been a growing concern ever since the first major nuclear accident had occurred at Windscale in 1957, but it wasn't until 1975 that the integrity of the nuclear image began to seriously falter. If it wasn't enough that *The Guardian* and Independent Television reported the deaths from cancer of two Windscale employees early that year, the *Daily Mirror* followed up a few months later with two arresting front page headlines drawing attention to BNFL's THORP application. The first labelled the UK, the "World's Nuclear Dustbin," and the second read, "Sign here for Japan's Atom Junk" (Williams 1980: 289). Considerable press exposure followed: *The Sunday Times* repeated *Nature*'s calls for caution on the issue of British reprocessing, *The Economist* and *The Financial Times* voiced concerns that indecision could endanger potential Japanese contracts, and *The Times* called for a public inquiry (Ibid.: 295). Indeed, Williams identifies the period between 1975 and 1978 as a turning point in media activity, claiming that for the first time there were "innumerable" radio and TV debates, plus several major public seminars and hearings (1980: 337-8). Not only did coverage follow key events (such as the publication of the Flowers and Parker Reports)[27], but the media also published stories intended to generate a wider discussion on the nuclear energy issue, which amounted to "an impressive level of sustained media interest" (Williams 1980: 300).

When the Windscale Inquiry was eventually called in 1977, it received extensive mass media coverage, and even led to the publication of books on the subject by journalists (*The Guardian* 1978, Breach 1978). The event also firmly established the media as a central forum for public debate. For example, when witnesses were dissatisfied by the way the inquiry had

[25] *The Times* on the Atomic Energy Act

[26] The D-notice system prevented the press from covering topics that might jeopardize national security (Hall 1986: 30).

[27] Reports published by the Royal Commission and Windscale Inquiry respectively (outlined in Section 4).

been conducted, they sent a letter to *The Times* to publicise concerns that their evidence had been "misunderstood, misrepresented, distorted or ignored" (Hall 1986: 162).

The two-year Sizewell Inquiry[28] introduced further negative dimensions to the evolving image of nuclear power. To add to the safety and civil liberties concerns already associated with the PWR reactor, "most important of all: the inquiry ensured that the economics of the nuclear programme…were in the forefront of public scrutiny" (Hall 1986: 183). Although the cost dimension had always lurked in the background, the Sizewell Inquiry, combined with preparations for privatisation of the industry later that decade, brought them decidedly to the fore.

Media coverage in the 1970s and 1980s was dominated by reports of nuclear accidents abroad and investigations into the health risks associated with nuclear energy in the UK. A prime example falling into the latter category was the 1983 Yorkshire Television production, "Windscale: The Nuclear Laundry." The programme revealed that child leukaemia rates among Sellafield families were twelve times the national average, which led to media and public demands for an investigation (Dalquist 2004: 22). Furthermore, large-scale accidents abroad, such as Three Mile Island (1979) and Chernobyl (1986), had a particularly adverse impact on media coverage and the images associated with the nuclear debate (Bull 2005, McSorley 2005). The incidents caused media attention to rise overnight and introduced an overwhelmingly negative tone to the debate. Post-Chernobyl reporting, for example, typically featured "depressing" and "black" visual images, and the number of risk-related articles rose sharply (Boholm 1998, Braxton et al. 1999, Wåhlberg and Sjöberg 2000: 35). Conspiracy theories appeared in some media reports claiming that the nuclear authorities were "concealing important risk information from potential victims" (Ibid.). Nuclear sympathisers, meanwhile, lamented the deterioration in the quality of the reporting that followed the event, "selective and misleading reporting of the dangers of radiation started before Chernobyl but then became even worse" (Brenwin 1994).

A shift had also occurred in the nature of media reporting. Jean McSorley of Greenpeace points out that throughout the 1980s it was predominantly environment correspondents who reported on nuclear issues, focusing on decommissioning, waste disposal, the potential for accidents and the need for nuclear energy, but in the run-up to privatisation of the late 1980s and beyond, business correspondents began to enter the debate, and introduced greater coverage of the financial risks and liabilities and problems with insurance (McSorley 2005).

Phase 3: The return of nuclear?

There is widespread agreement that media coverage of nuclear energy has not only increased in volume, but also shifted to a markedly more positive tone over the past two to three years (Leake and Box 2005, Bull 2005, Juniper 2005, The Economist 2005, Knight 2004). As Adrian Bull of BNFL put it, "since the Energy White Paper in 2003, we really have seen a lot of positive press coverage. The kind we could never have dreamt of before" (2005). He cites two front page *Independent* articles and a half-page feature in *The Sun* advocating nuclear power. The framing of the issue also appears to be changing, with nuclear increasingly being presented in the context of climate change and security of energy supply (Juniper 2005, James 2005, Kirschel 2005, Bull 2005). At the same time, Juniper and McSorley are quick to point out that the environmental movement has not yet mobilised on the nuclear issue and that proliferation, cost, waste and decommissioning concerns remain at the heart of the debate. They suggest that claims being made on behalf of nuclear are at present mostly one-sided, even in the quality press (McSorley 2005, Juniper 2005). The apparent "split" in the environmental movement over the issue has also been exploited as part of the industry's high-budget PR "charm offensive" (Leake and Box 2005). The industry has succeeded in raising the credibility if its case by associating itself with green heavyweights such as Gaia theorist

[28] Spanning January 1983 to March 1985

James Lovelock, Greenpeace co-founder Patrick Moore, and long-time FoE board-member (the late) Bishop Hugh Montefiore, who have all publicly proclaimed their support for nuclear energy.

In sum, therefore, policy entrepreneurs – the environmental movement in Phase 2, and the nuclear industry in Phases 1 and 3 – appear to emphasise certain aspects of the issue in order to maximise their potential support base and dominate the public agenda. There appears to be much truth in Baumgartner and Jones' assertion that "the set of images of public issues put forward in the media is determined by a mix of factual circumstances and by the interpretations attached to these circumstances by policy entrepreneurs" (Baumgartner and Jones 1993: 107).

5.2 Changing venues

Alongside the changes in image outlined above, there have been shifts in the institutional venues providing the focus for nuclear energy discussions and decision-making. This section follows the movement of the debate from private to public spheres, and changing public attitudes towards nuclear power.

5.2.1 Policy-making venues

Phase 1: Behind closed doors

As already described, the decision to develop a British nuclear programme was taken on the Prime Minister's initiative. When the AEA was established to advise the government on the issue, the effect was to ensure it retained a cloak of secrecy for decades to come. In the early years, Parliamentary scrutiny was near impossible. "The public interest" led to information being frequently withheld, costs being hidden and the number of debates in Parliament "could be counted on the fingers of one hand" (Hall: 1986: 29).

Select Committees served as best they could, but faced an uphill struggle to fulfil their scrutinising function. The Estimates Committee conducted the first parliamentary inquiry into the work of the AEA when its Industrial Group was investigated in 1958-9. However, following "great pains taken by the Authority to assist the Committee," it was said to be an "affable watchdog" (Williams 1980: 325). The AEA generally fell outside the jurisdiction of the Nationalised Industries Committee, but when the Committee conducted a report on it in 1962 and identified "serious defects in the existing structure and organization which may mean that money is not being spent to the best advantage," its findings fell on deaf ears (Hall 1986: 86). The Public Accounts Committee had somewhat more influence. It frequently investigated the AEA's finances and "usually offered valuable and searching criticism" (Williams 1980: 325).[29] Meanwhile the investigations of the Commons Select Committee on Science and Technology[30] "were of considerable value," but "far from adequate in getting full accountability" (Ibid.).

To make matters worse, limited scrutiny came from other Parliamentary quarters. Debates in the Commons were "a rarity," and "statements and answers to Parliamentary Questions were as usual under strict ministerial control" (Hall 1986: 74, Williams 1980: 327). By comparison, debates in the Lords were only slightly more frequent than in the Commons, and were little more than "interesting" and "informative" (Williams 1980: 327).

[29] For example, Williams describes that until the early 1960s the Committee "found the AEA's accounts to be at best mostly unintelligible, and strongly, and ultimately successfully, urged their reform" (Williams 1980: 325).

[30] The Science and Technology Committee was established in 1966 and had already published four reports on nuclear energy by the mid-1970s.

Phase 2: Into the public domain

The more open nuclear debate in the media from the mid-1970s caused a corresponding shift in the involvement of government institutions. For example, following the publication of the *Daily Mirror*'s first article in October 1975, Parliamentary Questions on the issue shot up from an average of one per month to eleven. As Williams describes, "by 1975 the 'private' politics of British nuclear had been overtaken by a distinctly 'public' politics" (1980: 18). It seemed that policy entrepreneurs had begun to "take advantage of favourable public attention and quickly move to ensure a quick assignment by government officials to an encouraging institutional venue" (Baumgartner and Jones 1993: 85). More specifically, the environmental lobby had sought to engage a previously apathetic public in the nuclear debate by drawing the issue out into the public arena, where they were more likely to be at an advantage.

Successfully pressing the government to hold a public inquiry over BNFL's THORP application marked a watershed for public involvement, but at the same time, represented a largely symbolic victory. The inquiry turned out to be less of a participatory process and more of a "politically attractive way of accommodating conflict" (Williams 1980: 313). Institutional biases clearly remained – the inquiry was set up at speed, making it difficult for the fledgling environmental movement to mobilise in time, and the "professional standing" of the Inspector's two assessors was called into question (Hall 1986: 163).

Evidence of increased activity in the legislature was also beginning to emerge. Two Commons debates were held over BNFL's THORP construction plans, the first in March 1978, following the publication of the Parker Report, the second two months later, when the Commons approved plans for THORP by a majority of 186 to 56.

Furthermore, when Thatcher's plans to build a PWR at Sizewell were announced, the public inquiry that had been promised took place. Despite the dice being loaded once again in favour of the government in terms of the expertise and resources at their disposal (Kay 2001), "with the Sizewell decision, the Government recognized, almost for the first time, the right of public participation in the decision-making process" (Greenaway 1992: 130).

Opposition from Select Committees, however, remained weak. The Select Committee on Energy "under its various titles has been the one forum of public debate that nuclear power has consistently received," however even its findings were frequently dismissed (Ibid.). In sum, "although the select committees of the House of Commons have provided one of the few public forums for discussing nuclear power policy, they have only limited effect on the course of that policy" (Ibid.: 138).

The energy policy review, commissioned by Tony Blair in 2001, signalled another important shift towards public venues and participatory processes in decision-making. For the first time, responsibility for investigating the long-term and strategic issues surrounding the policy had been taken out of the hands of the department with jurisdiction over it (the DTI). Instead, the task was given to the relatively newly established Performance and Innovations Unit (PIU), a small department within the Cabinet Office reporting directly to the Prime Minister through the Cabinet Secretary. With approximately half its staff drawn from outside Whitehall (PIU 2002: 168),[31] it could be argued that the policy venue had finally shifted outside the nuclear "policy subgovernment." Nevertheless, it should be noted that the Ministerial Sponsor was Brian Wilson, the Minster for Industry and Energy at the DTI.

In addition, a second consultation process was launched the same year by the Department for the Environment, Food and Regional Affairs (Defra), to explore proposals for developing a policy for managing solid radioactive waste.

[31] Members of PIU have backgrounds in private sector consultancies, think tanks, NGOs, academia and local government (PIU 2002: 168).

A further significant indication that policy processes were taking on a more participatory style emerged when the DTI launched a major stakeholder consultation in 2002 in preparation for the publication of the 2003 Energy White Paper. Having received 6,500 contributions from stakeholders and the public between May and Sept 2002, it represented "the most significant consultation on energy policy ever undertaken in the UK" (DTI 2005).

Phase 3: Back behind closed doors?

Since 2003, evidence suggests that policy entrepreneurs in the nuclear industry, together with civil servants at the DTI, have not only been mounting a concerted media offensive, but perhaps more importantly, are in the process of lobbying opinion leaders and politicians behind closed doors (Leake and Box 2005, McSorley 2005, Juniper 2005). Numerous meetings are reported to have taken place between industry representatives and analysts, corporate traders, the media and politicians (Leake and Box 2005). For example, in March, the Energy Industries Club gathered "top opinion formers" and "more than a hundred leading figures from the UK's energy industry" to hear Mike Alexander, (then) Chief Executive of British Energy, present his case for nuclear power as the "fuel of the future" (Ibid). At a second exclusive event, this time hosted by the leading British engineering firm, AMEC, "some of Britain's most senior business journalists" were assembled to listen to Sir David King (the government's Chief Scientific Advisor), Brian Wilson (the former Energy Minister) and Dipesh Shah (Chief Executive of the UKAEA) espousing nuclear power's merits as a solution to climate change and a means of securing energy supply. In both instances, "invitations were based on so-called Chatham House rules, meaning it was for 'background use only.' What they were meant to take home was a message: nuclear power is coming back" (Ibid.).

Civil servants at the DTI have also been active behind the scenes in promoting a revival of nuclear energy, which the Department believes would provide a powerful economic boost to engineering companies and scientific research units. Evidence of pro-nuclear briefings by senior officials include Adrian Gault's (Director of the DTI Energy Strategy Group) presentation to the International Energy Conference in June 2004,[32] and Joan MacNaughton's (Director General of the DTI's Energy Group) leaked confidential paper to the newly appointed Alan Johnson (Secretary of State for Trade and Industry) in May 2005 (Ibid.; Watts and Murray-Watson 2005).

Finally, scientific communities are also rallying around the nuclear cause, with the Royal Society, the Royal Academy of Engineers and the Institution of Civil Engineers "discreetly lobbying the government to look again at nuclear power" (Leake and Box 2005).

Whether these developments represent the beginnings of a venue shift away from the public arena and into private spheres remains to be seen.

5.2.2 Public opinion

From the outset, public understanding of the nuclear issue has been confused. As an archetypal technical issue, "those with an interest in restricting the debate" have benefited from explaining issues in "arcane and complicated ways" (Baumgartner and Jones 1993: 30). Robert Knight of MORI suggests, "familiarity with [energy] issues is low and, as in any area where scientific opinion is pivotal, public opinion is vulnerable to the introduction of new fears that they are unable to fully evaluate" (2004: 26). This gives the media an important role in influencing perceptions of risk, especially when the public have less experience or knowledge of the hazards (Williamson and Wayman 2005).

Phase 1: Acquiescence

[32] Also see Jameson (2005)

During the first two decades of the post-war period, development of nuclear energy was presented as not only desirable, but necessary (Williams 1980: 17). It has been claimed that the key reason underlying the lack of politicisation of the issue in Britain was "the prevailing socio-political culture, which, broadly has encouraged trust in public authorities, and also consensus" (Ibid.: 264). The result was an absence of "significant dissent" throughout the 1950s and 1960s (Ibid.: 17). Furthermore, the issue was consistently presented as a technical matter "beyond the people and the politicians," as aptly exemplified by the AEA's Chairman: "The public doesn't and cannot be expected to understand the issues of nuclear power in other than the broadest terms" (John Hill cited in Greenaway 1992: 138). As such, the nuclear debate was much slower to capture the attention of the British public than it had been in the US, despite the fact that the first nuclear accident had occurred on British soil (Dalquist 2004: 20).

Phase 2: Emerging uncertainty

The 1974 mobilisation against the AGR led by FoE signalled the beginning of a new era of public engagement. The "mystique" of nuclear's scientific and defence background was beginning to arouse public suspicion, and the lack of transparency in policymaking caused considerable frustration (Williams 1980: 271). This sentiment was expressed clearly in a memorandum submitted by two leading FoE campaigners to the Science and Technology Select Committee at the time: "Democracy is dead when the people are told that they cannot understand or participate in the gravest public decisions" (Lovins and Patterson cited in Williams 1980: 262). With the THORP controversy and Windscale Inquiry following in close succession, "by the mid-seventies it was apparent to every reasonably informed member of the British public that nuclear had become highly controversial" (Williams 1980: 17).

The growth of the environmental movement, media interest and Parliamentary activity led to increased access to information and greater public participation. In 1976 alone, 600 letters and 12 petitions arrived at the Department of Energy, a rally in Trafalgar Square was held against the THORP project, and a petition to stop the development received 27,000 signatures[33] (Ibid.: 291, 295).

As Figure 4 demonstrates, the public had gone from a position where twice the proportion had been in favour of nuclear build in 1978, to one where opinion was evenly split between proponents, opponents, and the undecided, by 1980. Further, in 1981, opponents briefly outnumbered those in favour, which was likely the cumulative effect of the aftermath of the Windscale Inquiry, the Three Mile Island accident (1979) and Thatcher's decision to build the controversial PWR reactors (Dalquist 2004: 20). The transformation in public opinion was also in part owing to the anti-nuclear movement's success at keeping the debate alive by exposing industry activities such as deep-sea waste disposal and effluent build-up in the Irish Sea, and galvanising local opposition (Ibid.: 181-2).

Fears over nuclear were also fuelled by media outputs, such as Yorkshire Television's *Windscale: The Nuclear Laundry*, but more importantly still, by Chernobyl, which delivered a hard blow to public confidence in the technology. Nevertheless, Dalquist argues that compared to other nuclear nations, the British public were comparatively accepting of the industry during the 1980s and 1990s, at a time when public opinion in countries such as Germany, Sweden and the Netherlands had "hastened legislative decisions to formally phase-out nuclear power" (2004: 25). She attributes this to three key characteristics specific to the British case: prompt and skilful public relations exercises by the nuclear industry following nuclear accidents and health-risk scares; positive public perceptions of the trustworthiness of nuclear agencies; and a belief that nuclear power safeguarded UK energy independence (Ibid.: 22-3).

[33] In comparison, the petition in favour of THORP received only 18,000 signatures.

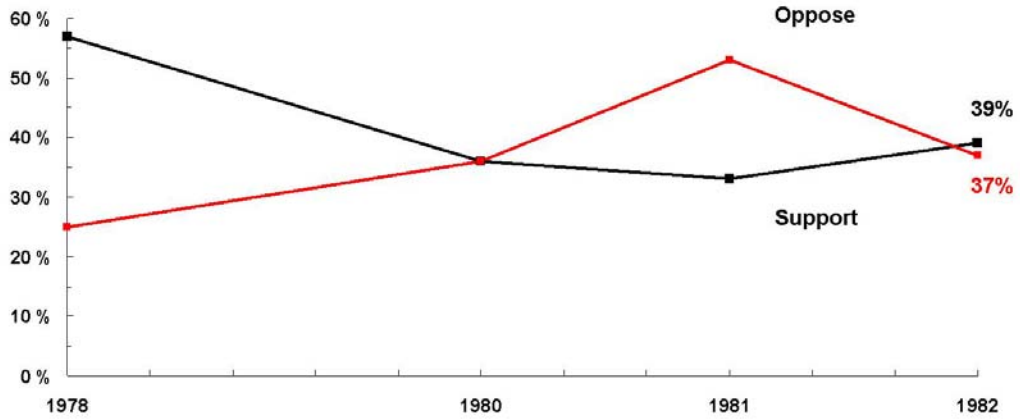

Figure 4: Public support for the construction of new nuclear plants 1978-82
Source: Dalquist 2004

Phase 3: Warming to nuclear?

The availability of opinion poll data over the past five years or so is in itself confirmation that greater attention is being paid to the public image of nuclear, with polls largely being commissioned by the industry itself. How the findings of the polls are interpreted, however, varies greatly according to who you ask. Adrian Bull at BNFL says, "We've got public opinion polling data showing that the public are much more – I wouldn't necessarily say supportive – but much more accepting of nuclear now than they have been in the past, particularly over the past five or so years" (2005). He attributes some of the change in the tone of coverage and public attitudes to the high profile of climate change within Blair's international agenda, highlighted by Britain's Presidencies of the G8 and EU: "there have been an awful lot of positive media stories about the climate change debate in general, virtually all of which have hooked at some point into looking at nuclear and at least have outlined that it is a carbon-free technology, albeit they might have listed some other issues as well. I just think that puts it into public consciousness a lot more" (Ibid.). McSorley of Greenpeace, however, denies that the public image of nuclear has changed in the mind of the public: "We have been tracking opinion polls very closely. Apart from the MORI poll for the NIA in December 2004, every one shows people against nuclear and/or new build" (2005). Juniper of FoE, however, concedes that the industry has "had a relatively good public relations pitch, in the last three years in particular" (2005).

Figures 5 and 6 demonstrate that there does appear to have been some movement in public opinion since the industry's PR campaign began in 2003, however public opinion remains divided, and a high proportion are undecided (Dalquist 2004, Knight 2003). Nevertheless, by the close of 2004, more people were reporting favourable than unfavourable attitudes towards nuclear energy and new build for the first time since continuous tracking of these questions began in the late 1990s. Negative associations mentioned by the public included risk of accidents, long-term disposal of waste, radiation and pollution; positive images included clean air, reliability of supply, and contribution to helping global warming (Knight 2003: 47).

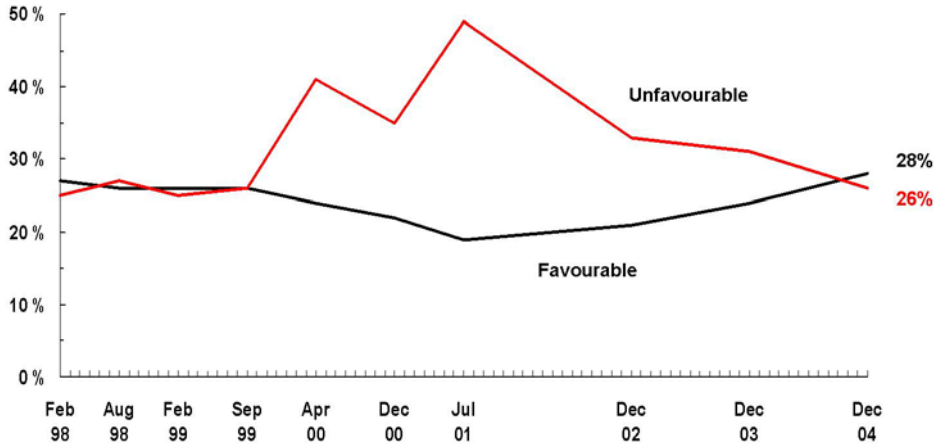

Figure 5: Public attitudes towards the nuclear industry/energy 1998-2004[34]

Source: MORI

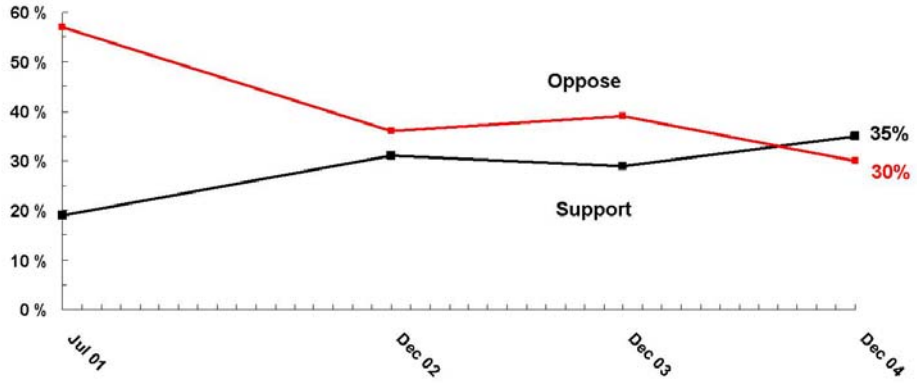

Figure 6: Support for new nuclear build to replace existing stations, Jul '01-Dec '04.[35] *Source: MORI*

Interestingly, it seems that context and framing of the nuclear issue, especially through the media, seems to remain a key determinant of public opinion. To illustrate this point, following the transmission of the BBC2 programme, *If...the Lights Go Out*, depicting life in Britain following a power cut, almost 76 per cent of BBC interactive users said they believed Britain should keep nuclear power option open. While the self-selecting sample of almost 9,000 respondents was unlikely to have been representative of the British public, it is significant to note that after watching a programme heavily featuring NIA representatives making the case for nuclear as a reliable energy source – behind the backdrop of power-cuts becoming a reality – the public's response should be so overwhelmingly pro-nuclear, which was out of kilter with the thrust of public opinion at the time.

[34] Based on the question, *How favourable or unfavourable are your overall opinions or impressions of nuclear energy/nuclear industry?* Approximately 2,000 respondents

[35] Based on the question, *To what extent would you support or oppose the building of new nuclear power stations in Britain TO REPLACE those being phased out over the next few years? This would ensure the same proportion of nuclear energy is retained*. Approximately 2,000 respondents.

5.3 Policy outputs

As proposed by Baumgartner and Jones, the rise and fall of the nuclear industry in the UK can to some degree be attributed to changes in policy outputs. The following account examines how government policy has restructured the institutions involved in nuclear policy-making, and led to the "construction and collapse of a policy monopoly" (1993: 59-82).

Phase 1: Construction of a policy monopoly

There is little doubt that when the government established the AEA to develop its nuclear programme in 1954, it created "an in-built nuclear power lobby" (Greenaway et al. 1992: 123). As the sole advisor to the government, the AEA's 17,000 staff fuelled "the first powerhouse of ideas," and "enjoyed wide outside support, amongst the public and media and within Westminster and Whitehall" (Williams 1980: 328). As was the case in the US, "the initial institutional arrangement of civilian nuclear power questions could not have been more favourable to the development of the industry. Institutions were purposefully designed to ensure control by those most strongly interested in advancing the technology" (Baumgartner and Jones 1993: 66). The AEA and CEGB's respective monopoly positions and proximity to decision-making processes led both institutions to regard themselves "part of government" (Williams 1980: 329). Furthermore, the unwillingness of government to question the decisions of the experts (Massey 1988: 66) led to "a decision-making legacy of 'secrecy and remoteness,'" where "even the Cabinet knew little" (Wynne 1982: 22-3, Saward 1992: 83). Politicians and civil servants lacked the scientific background to query the advice they received, and attempts by the Royal Commission to fill this gap were an "imperfect" substitute for an independent watchdog able to provide a thorough techno-economic evaluation of nuclear proposals (Williams 1980: 329). By 1961, the AEA staff had already more than doubled to 41,000 (Williams 1980: 328), and "within a decade and a half following its creation, the AEA and its scientists were the dominant force within a closed policy network" (Saward 1992: 83).

Nuclear policy entrepreneurs had therefore successfully presided over the creation of a policy monopoly, founded on the underlying premise that nuclear power was essential for national economic and strategic purposes. They had also succeeded in gaining political and financial support to construct nine Magnox power stations as part of the first programme, and five AGR plants as part of the second. As predicted by Baumgartner and Jones, the resulting "institutional legacy of agenda access" served to "structure participation so that a powerful subsystem remained relatively independent of popular control" for at least two decades to come (Baumgartner and Jones 1993: 83).

Phase 2: Collapse of a policy monopoly

During the 1970s, however, forces conspired to produce policy outputs that weakened the structure of the nuclear policy monopoly. Several of the AEA's tasks were removed from its jurisdiction and new commercial pressures were introduced to the industry: the Radiological Protection Division became the National Radiological Protection Board; the Production Group's fuel procurement and processing activities were devolved to BNFL; Radiochemical facilities became The Radiochemical Centre Limited; the Atomic Weapons Research Establishment was moved to the Department of Defence; and the Nuclear Installations Inspectorate joined the new Health and Safety Executive (Saward 1992: 94, Williams 1980: 329). As the wall of secrecy surrounding the industry began to fall, control over the agenda also deteriorated. Questions of safety, cost and civil liberties were no longer out of bounds, and public inquiries generated considerable dissent and opposition (O'Riordan et al. 1988). By the mid-1980s, the need for nuclear power had to be defended from attack by a growing anti-nuclear movement, a sceptical media and a wary public. By the time of the Hinkley Point Inquiry, energy source diversity had become nuclear energy's new rationale when strategic and cost arguments no longer cut ice.

The process of privatisation also led to further dismantling of the nuclear policy monopoly. As detailed in Section 4, the CEGB was divided, decentralised and privatised. The once-powerful AEA, meanwhile became "a shadow of its former self" and adopted a narrow research role (Saward 1992: 98).

Saward describes how "the industry, for a time at least, weathered the storm by processes of adaptation and retreat" (Ibid.: 97). This fits in with Baumgartner and Jones' concept of negative feedback, which characterises periods of stability in the policy-making process. Policy change occurs incrementally due to the dominant (but declining) policy subsystem defending its institutional legacy by moderating its strategy to minimise power losses. Examples of "adaptation and retreat" actions include, first, the strengthened role of the British Nuclear Forum as a pro-nuclear representative and information centre in 1976 when the debate reached the public domain and negative images began to emerge (Williams 1980: 270). Second, the response of the CEGB to criticism at the Sizewell Inquiry allowed them to "respond to weaknesses in their case exposed at the hearings" so that their case for the PWR was ultimately strengthened (Kemp 1986: 343). Third, public inquiries themselves "can serve as co-optive mechanisms" whereby opposing groups "enter the nuclear network; but they remain severely out-resourced, and their formal role is often token" (Saward 1992: 98). This appears to have been true of the anti-nuclear movement in its early days.

The final, but perhaps most important point to make is that while the nuclear policy monopoly was considerably undermined over this period, "nuclear power has remained a protected species" (Greenaway et al. 1992: 133). Policy outputs, in terms of the number of new plants commissioned, may not appear to have been particularly favourable, with so few plants actually constructed under the third and fourth nuclear programmes. However, it is worth noting that despite the lack of expenditure on nuclear new build, a significant proportion of the nuclear institutional legacy remains intact and retains its privileged status – protected, close to government and subsidised by the taxpayer. To illustrate this point, first of all, BNFL and the AEA are still owned by the DTI. The former runs an Energy Studies Unit, which maintains links to government and "provides advice and information to government, when requested, on nuclear and energy policy issues" (Bull 2005). Secondly, the two bodies responsible for waste management, the NDA and Nirex, are also publicly owned and funded. The former was launched in April 2005 to take on ownership and responsibility for the decommissioning of public sector nuclear sites (NDA 2005),[36] the latter is responsible for the long-term management of radioactive waste, and was made independent of the industry in April 2005.[37] Third, although British Energy was privatised in 1996, its survival has depended on the government's willingness to provide it with a credit facility and underwrite its liabilities.

Phase 3: Return of the nuclear lobby?

While the remaining structure of the nuclear industry pales in comparison to its previous prominent stature, policy outputs have nonetheless left it in a comfortable position in terms of insider contacts and access to public resources. This legacy has also left the industry well-placed to try to influence future policy outcomes.

The most important outputs to emerge in Phase 3 have been the publication of the Energy White Paper, stating the government's intention to keep the nuclear option open, and the establishment of the NDA. However, indications from the Minister for Energy, Malcolm Wicks that a decision will be made on the future of the nuclear industry during the course of this Parliament (McSorley 2005, Juniper 2005) have also served to further fuel the activity already generated by the nuclear lobby in the run-up to the General Election in anticipation of

[36] The NDA was established under the 2004 Energy Act

[37] However, it is funded by the NDA

an imminent decision on the subject (Leake and Box 2005). Media reports have suggested that "many months ago…some of the biggest firms in the nuclear business began a round of recruitment, taking on high-powered new media directors, political advisors and public affairs companies" (Ibid.). These firms apparently included none other than the publicly-funded NDA and Nirex, plus the financially struggling British Energy, whose PR campaign reportedly cost in excess of £1m (Ibid.). In addition, the NIA – which retains strong links with public bodies such as BNFL[38] – was re-branded in 2003; its website now runs under the banner heading "Nuclear: Climate Friendly Energy."[39] The same year, the Association co-founded the All-Party Parliamentary Group on Nuclear Energy, "to encourage and facilitate discussion among MPs and Peers from across the political spectrum with an interest in nuclear issues, and to provide a forum for the exchange of information and views between Parliamentarians and representatives of the nuclear and energy industries."[40] Given that the NIA have also secured responsibility for the administration of the Group,[41] the joint initiative arguably serves to re-institutionalise the links between industry and politicians.

In sum, there seems little doubt that the nuclear lobby is regrouping in an effort to launch itself as a 'green' alternative and a reliable energy source of the future. As Bull explains, "in terms of hooks to get people engaged…There are two strands of message which the industry has got. One is the environmental long-term message – we need to do this for the sake of future generations…and the other is a very short-term your-lights-could-go-out-this-winter message" (2005).

To apply Baumgartner and Jones' model to recent developments, therefore, it would appear that policy entrepreneurs within the nuclear industry are in the process of attempting a Schattscheider mobilisation – a move to redefine the terms in which the nuclear issue is being discussed in order to broaden its appeal to the public and politicians.

5.4 Changing institutional structures

Phase 1: A change in values

The anti-nuclear and environmental movements in the UK were slow to emerge in comparison with equivalent organisations in Europe and the US. Their growth was widely associated with a change in social values following a wave of post-war prosperity:

> "At the end of a period of rapidly increasing economic wealth, a generation who had, quite literally, never had it so good, found themselves affluent enough to challenge the desirability of unrestrained growth. They questioned the values of industrial society and the materialism that went with it" (Hall 1986: 137).

FoE, which was founded in 1970, was one of the first environmental groups to be established and "more than any other organisation was responsible for getting the bandwagon rolling" (Ibid. 138). The group's first campaign was a reaction to the CEGB's enthusiasm for the American LWR, which they believed to be unsafe. Two of their most influential members – Walt Patterson and Amory Lovins – wrote a paper for the Select Committee on Science and Technology, which was to have an encouraging impact: "The success and importance of this memorandum was that it managed to break into a realm that hitherto had been the prerogative

[38] Bull 2005

[39] http://www.niauk.org/

[40] http://www.allparty-nuclear.org.uk/

[41] "The administration of the Group is undertaken by Miranda Kirschel of NIA, organising the Group's programme of events, arranging speakers, venues, and appropriate visits for the Group" (Ibid.).

of the scientist and politician…for the first time, the anti-nuclear movement had established itself as an effective critic." (Hall 1986: 141)

Phase 2: The rise of the anti-nuclear movement

By 1976, FoE had amassed 8,000 members in 160 local branches (Williams 1980: 262). Early opposition to nuclear policy was fielded at the local level. As the government ran out of suitable publicly owned land on which to site nuclear reactors, environmental groups rallied local support and participated at planning permission hearings and local inquiries. Both FoE and the Conservation Society had been present at the Torness inquiry in Scotland, and when the development project was approved against the will of the public, they initiated the first direct action campaign at a nuclear plant – a hundred people camped for a weekend at the proposed site. The significance of the growth of the movement was that it demonstrated its opposition in a way unlike anything experienced in the UK before; rather than tacit "gentlemanly" lobbying, it promoted participation through demonstrations, local activism and the use of public relations and the media (Hall 1986: 138).

The movement continued to contest nuclear construction projects, but finally entered the national debate when it mobilised in response to the Windscale proposal.[42] When the inquiry was held, many environmental groups managed to secure legal representation, some in their own right, such as Friends of the Earth, others as part of an umbrella organization[43]. And when the inquiry failed to get the desired result, the movement contested not only the result, but more importantly, the validity of the inquiry process. While they had failed to influence nuclear policy, "FoE in particular demonstrated…it was possible for a group to have a significant impact on public policy despite lacking privileged access to the inner circle of British decision-making" (Williams 1980: 319).

In terms of Baumgartner and Jones' model, the anti-nuclear and environmental movement represented strategic actors undertaking a Schattschneider mobilisation against the status quo, namely, the nuclear industry's policy monopoly. They encouraged issue expansion by bringing new dimensions of the issue to the debate: "the agenda was enlarged largely through the efforts of anti-nuclear groups, to include, for example, public debate about the risks of radiation from nuclear installations and the desirability of the growth ethic underlying arguments for nuclear expansion" (Saward 1992: 95). In addition, cost calculations and the need for reprocessing were brought under question, safety issues were raised following the discovery of leaks and evidence of local contamination of the River Calder (Hall 1986: 149), and civil rights implications were brought to the fore by the publication in 1976 of *Nuclear Prospects: A Comment on the Individual, the State and Nuclear Power* (Williams 1980: 268).[44]

To strengthen the movement further, Greenpeace UK was born in 1977. Its focus on visually-powerful, and often dangerous, publicity stunts contributed to the strong negative images associated with the nuclear industry. One of its first actions was to film footage of a British ship dumping radioactive waste, which attracted international television news coverage (Greenpeace 2005). A second striking example was when four Greenpeace divers were contaminated by a radiation leak while attempting to block a discharge pipe at Sellafield nuclear reprocessing plant in 1983.[45]

[42] Among the environmental groups involved were FoE, Half Life, the Socialist Environment and Resources Association and the National Association for Freedom.

[43] Led by the Conservation Society.

[44] Published by FoE, the National Council for Civil Liberties and the Council for the Protection of Rural England.

[45] "BNFL was later found guilty, on four criminal charges, for the discharge" (Greenpeace 2005).

Participation in the early public inquiries produced a series of disappointing results for the environmental movement, a notable example being the Sizewell Inquiry, where "the gap between the two sides in knowledge and expertise was glaring" (Kay 2001). By the 1990s, however, environmental groups were better resourced and more experienced. The result was that they began commissioning research of their own, and tried to steer the debate in their favour by publishing their own policy proposals. Juniper cites the success of FoE to block planning permission for Nirex to build an underground laboratory to investigate the suitability of a deep disposal site at Sellafield in 1997 as a crucial psychological turning point in the nuclear debate (2005). He claims, "It was FoE that won that campaign – I think I can safely say that – it was our involvement in the public inquiry. On a very technical level we stopped them getting permission for this deep disposal site, and this was on very good geological grounds. At that point the momentum inside the British nuclear industry was fatally weakened and it went down to nothing."

Phase 3: A mature environmental movement

Since 1997, Juniper explains that FoE have pulled back their nuclear campaign and shifted the focus to climate change, energy efficiency and renewables. Although "nuclear is very much on the radar screen," it will not be until the debate enters a political phase that they plan to mobilise. Signs from the Treasury, Defra and Foreign Office indicate that nuclear is unlikely to get a warm reception from their quarters, on the grounds of cost, environmental and proliferation/security concerns respectively (Juniper 2005). This change in strategy has even led to a restructuring of the organisation, with the nuclear energy department now subsumed within the larger climate change unit.

5.5 Issue-venue interactions

In sum, Baumgartner and Jones' model proves useful in assisting the interpretation of the events leading to the construction and collapse of the nuclear policy monopoly in the UK, as illustrated by Figure 7.

In Phase 1, nuclear power had predominantly positive connotations. It was largely popular among the media, public, experts and politicians. Decisions were taken "in private" by the executive, with limited Parliamentary or media scrutiny. A Downsian mobilisation by nuclear proponents was successful in disrupting the status quo and establishing a supportive institutional framework. A process of positive feedback led to the creation of a powerful policy monopoly, which disrupted the partial equilibrium of the policy subsystem. Subsequent policy outputs served to reinforce the monopoly.

In Phase 2, forces conspired to dismantle the key institutions upholding the dominance of the nuclear policy subsystem. New actors entered the debate, such as the public, media and legislature. Policy entrepreneurs – the anti-nuclear/environmental movement – undertook a Schattschneider mobilisation, attempting to redefine the issue, engage the apathetic and expand their support base. Negative images were emphasised, and support for nuclear declined. The executive was forced to demystify the decision-making process and accept greater media and legislative scrutiny. A process of negative feedback led the policy subsystem to adapt and retreat. Policy outputs grew unfavourable to the policy monopoly and led to its decline.

At present, it is unclear whether Phase 3 represents the prelude to a second Schattschneider mobilisation or the end of Phase 2. While there is no conclusive evidence pointing in either direction, there is reason to believe that policy entrepreneurs within the nuclear industry are at least attempting to resurrect nuclear energy by reframing the issue in positive terms, as a solution to security of supply and climate change.

	1953-1975	1975-2003	2003+
Policy image			
Positive images	Cheap and clean energy Technological progress Economic growth Nationalism	Security of supply	Security of supply Climate change solution
Negative images		Safety and health concerns Environmental degradation Threat to civil liberties Mistrust Proliferation	Waste Safety Economic cost Terrorism Proliferation
Media	Pro-nuclear	Anti-nuclear	Mixed
Policy venue			
Venue	Private	Public	Public – and private?
Actors in decision-making process	Executive	Executive and legislature	Executive, legislature, stakeholders
Public opinion	Pro-nuclear	Anti-nuclear	Less anti-nuclear
Image-venue interaction			
Mobilsation type	Downsian mobilisation	Schattschneider mobilisation	Schattschneider mobilisation?
Policy entrepreneur	Nuclear industry	Environmental pressure groups	Nuclear industry
Policy outputs	Construction of policy monopoly	Collapse of policy monopoly	Policy network
	Two reactor-building programmes completed	Two programmes proposed (both downscaled), nuclear moratorium.	Nuclear option kept open…

Figure 7: Summary of image-venue interactions underlying the nuclear energy debate

6 Beyond Baumgartner and Jones

The concluding section of this paper provides a critique of Baumgartner and Jones' punctuated equilibrium model as a tool for analysing the development of nuclear energy policy in the UK. As demonstrated above, the framework is found to be useful, however the following section explores the weaknesses highlighted by the empirical case study, and raises questions about whether the model takes sufficient notice of the role of external events, the importance of the international economic and political system, and the role of values and social context.

6.1 External events

Baumgartner and Jones appear to reject the notion that national and international events and circumstances can provide external "shocks" to the domestic political system (Gourevitch 1986). They state that "during periods of positive feedback, the rapid diffusion of new ideas often appears due to the actions of one or a few actors or events, *when in fact its causes are more diffuse*" (1993: 242, my emphasis). While this may be true on some occasions, it is perhaps hasty to dismiss the possibility that events can reshape perceptions or redefine issues in their own right. There is little doubt that nuclear accidents, such as Three Mile Island, Chernobyl and even smaller radioactive leaks at Sellafield, have had a considerable impact on the image of nuclear power (McSorley 2005, Juniper 2005). As Bull notes, "the fact that people still remember the name [of Three Mile Island], even though nobody was killed or injured, just brings home to me what a challenge we have because in other industries, accidents that kill dozens of people will have been big news of the day, but 30 years on, people won't be able to name the facility that was involved. And yet we struggle with the public legacy of that factor" (2005). September 11th was another defining moment which introduced a new negative dimension to the image of nuclear energy.

It would therefore seem reasonable to assume that in some circumstances, issue expansion and image redefinition may occur in the absence of a policy entrepreneur. And equally, an entrepreneur may sometimes be frustrated by the lack of a defining event to enable issue expansion to take place (as was arguably the case for the nuclear industry during the 1990s) (Dalquist 2004: 25).

6.2 International political and economic arenas

It can also be argued that there is a "growing international dimension to the whole UK energy situation" (Bull 2005), which Baumgartner and Jones fail to make sufficient provision for in their model. International institutions and an increasingly global economy can affect the choices available domestically and also shape the way national problems are understood.

First, the importance of international institutions should not be underestimated. The European Union (EU), the UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the G8 all represent institutions that have had an impact on in the UK nuclear debate. The EU, for example, is increasingly a venue where the nuclear and environmental lobbies are active. McSorley (2005) explains that 80 per cent of UK environmental legislation comes from the EU, and therefore groups like Greenpeace spend time lobbying on issues such as the legality of government subsidies to the nuclear industry. James (2005), meanwhile, points out that the NIA work alongside international nuclear organisations, such as the European Atomic Forum (FORATOM) and the World Nuclear Association. Furthermore, the UNFCCC and Kyoto Protocol have brought climate change and greenhouse gas emissions to the domestic agenda, which has created further agenda-setting opportunities for domestic strategic actors. And there is little doubt that the UK holding the G8 and EU Presidencies has raised the profile of climate change, especially after Blair named it as one of his international policy priorities.

Second, the international economic and political climate also affects the availability and cost of alternative energy sources. Oil and gas prices in particular impact directly on the nuclear energy debate (James 2005, Bull 2005), for example, it is in the context of recent oil price hikes that *The Sun* published an article advocating nuclear power. Other important international factors include: the increased deregulation of domestic energy markets, the EU's carbon Emissions Trading System, the increasing foreign ownership of UK utilities, growing nuclear interests in the portfolios of British energy players, and the importance of

comparative energy prices in terms of the competitiveness of energy-intensive British industry[46] (Bull 2005).

Finally, cross-national policy spillovers may also affect the framing of the domestic debate and provide a convenient backdrop for policy entrepreneurs wishing to reframe the terms in which an issue is discussed. For example, Atlee's desire to begin a British nuclear programme in first place was in response to the US denying Britain access to its nuclear technology after the Second World War. Similarly, Thatcher's preoccupation with the nuclear industries in France and the US also doubtless had impact on her enthusiasm for nuclear at home. Further, it has been argued that if Bush's Energy Bill leads to a reactor building programme "it will undoubtedly have an affect on the argument here" (James 2005).

6.3 Norms, values and social environment

A social constructivist critique may suggest that the punctuated equilibrium model pays insufficient attention to social values, norms and perceptions. Rochefort and Cobb, who agree that issue definition lies at the heart of policy change, observe the role of cultural values in explaining how problems are constructed (1994: 4). Furthermore, Bosso goes on to explain that "if problem definition hinges on the social construction of reality, then culture, commonly held values, ideology, political socialization, and ideas all matter" (Bosso 1994: 183). Clearly, it would be unfair to claim that values and understandings don't play a role in Baumgartner and Jones' framework because ideas, values and ideologies are said to underlie policy systems and images (1993: 7). However, the authors' quantitative methods do not easily lend themselves to constructivist analysis. Further, if images are attached to values, but values are subject to change over time, then changing values and social context could be an interesting variable to explore. The rise of the environmental movement, for example, has been attributed to changing social values.

6.4 Conclusion

As Baumgartner and Jones themselves proclaim, "closely examining the validity of a theory in one context constitutes only a limited test of it…positive evidence offers only limited confirmation" (Baumgartner and Jones 1993: 60). This study therefore provides some validation of Baumgartner and Jones' theory, which is found to be useful in analysing agenda-setting and policy subsystems in the UK with respect to nuclear energy policy. The model's flexible, broad, integrated, and multi-dimensional approach make it a valuable tool, enabling rich empirical accounts to be drawn.

However, the findings of this study support the criticism made by John that "to explain policy change…the authors have to reach outside their model" (1998: 181). Indeed, this paper suggests that the model could be modified to better incorporate socio-economic factors, international institutions and external events. Baumgartner and Jones' theory does not preclude the integration of these variables as such, but the authors could be more explicit in factoring them in to their analysis. For example, the variable "policy venue" could be extended to include international venues, and it could be acknowledged that external events can have a re-framing effect on an issue.

Furthermore, it is argued that this study makes a case for taking a more constructivist epistemological approach to agenda-setting models, and promoting the use of qualitative methods. The research has demonstrated that a purely qualitative methodology can have considerable value, and suggests that the importance of cognitive processes in understanding social environments, images, ideas, and perceptions of risk could be better explored if an

[46] For example, comparative domestic energy prices in Britain and France will have a strong impact on the relative competitiveness of their energy-intensive industries, such as steel.

extensive constructivist approach were taken. Boholm, for example, suggests "qualitative interpretative approaches can add to our understanding of how risk messages are socially and culturally construed in modern society" (1998). A core weakness of a constructivist approach would be to attract further criticism from positivist commentators such as John, who propose that the punctuated equilibrium model is already too descriptive and lacks a causal mechanism (John 1998: 181). Nevertheless, I would argue that a more constructivist perspective would open up potential areas for research and bring new important dimensions to agenda-setting models. For example, the role of meta-paradigms could be explored, and cross-cultural case studies could be undertaken. In terms of the former, it could be argued that much of the nuclear debate has taken place within the "meta-paradigm" of economic growth. If the paradigm were to shift, however, towards sustainable consumption, for example, (as many environmental groups advocate), this could have an enormous impact on the framing of the debate and the way in which images are interpreted (i.e. whether they are understood as being positive or negative). A second possible research path could be to undertake a cross-country comparison of nuclear energy and agenda-setting processes using Baumgartner and Jones' model. International actors, institutions and discourses could be incorporated in the analysis, and countries could be chosen due to their supposed similar social values or cultural attitudes to nuclear power (e.g. France and the US) or on the basis of their differences (e.g. Japan versus Sweden).

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