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Modernity and the Development of Energy Policy in Great Britain

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Bakalářská práce se bude zabývat vývojem, respektive proměnami energetické politiky v zemích Velké Británie od počátku modernity. V teoretické části autor vysvětlí patřičné pojmy a stručně charakterizuje příčiny a následky (historické, technologické, filosofické, ekonomické, náboženské, sociologické atd.) zásadních změn v oblasti energetiky. Praktická část se opak bude orientovat více na současnost a na základě rozborů primárních zdrojů se pokusí zmapovat a zhodnotit diskusi, která nyní zaznívá ve věci energetické politiky, ekologičnosti či udržitelnosti.

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## **ANNOTATION**

This bachelor thesis deals with modernity and development of energy policy in Great Britain. The theoretical part examines the historical, technological, sociological, economical and legislative context of energy policy from the year 1880 to the Paris Agreement in 2015. The practical part focuses on contemporary Great Britain energy policy based on the analysis of primary sources written by Anthony Giddens, Nigel Lawson, Alex Chisholm and John Woodliffe.

## **KEYWORDS**

energy policy, Great Britain, climate change, climate scepticism

**NÁZEV** Vývoj energetické politiky Velké Británie od počátku modernity

## **ANOTACE**

Tato bakalářská práce je zaměřena na vývoj energetické politiky ve Velké Británii od počátku modernity. Teoretická část je zaměřena na vysvětlení patřičných pojmů a historických událostí, sociologie, ekonomie, technologie a práva, které ovlivnili vývoj energetické politiky od roku 1880 až do Pařížské dohody 2015. Praktická část zanalyzuje 4 texty, podle kterých je zmapována diskuze v nynější energetické politice ve Velké Británii.

**KLÍČOVÁ SLOVA** energetická politika, Velká Británie, klimatická změna, klimatický skepticismus

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## **LIST OF ABBREVIATIONS**

AC – Alternating current

BEIS – Department for Business, Energy & Industrial Strategy

CCC – Committee on Climate Change

CCA2008 – Climate Change Act 2008

CEA – Central Electricity Authority

CEGB – Central Electricity Generating Board

CO – Carbon dioxide

COP – Conference of the Parties

DC – Direct current

EU – European Union

GB – Great Britain

GWPF – Global Warming Policy Foundation

IPCC – Intergovernmental Panel on Climate Change

OECD – Organisation for Economic Co-operation and Development

SNP – Scottish National Party

UK – United Kingdom

UNFCCC – United Nations Framework Convention on Climate Change

## **Introduction**

Energy policy, more specifically electrification has changed drastically the way of life. The thesis deals with the development of energy policy and energy industry in Great Britain. The thesis describes the development over the course of 140 years. The theoretical part introduces important legislations and events while giving a background of the situation. It starts from the year 1880 with the instalment of the first public power station in London. This development is followed by passing important bills which affected the development of the energy industry. The development in the first half of the 20<sup>th</sup> century is focused on technology advancements which allowed wider electrification whereas later legislations are focused more on the security, cost and ecology. The theoretical part uses primary literature together with the UK government website and institutional websites to give a basis for the practical part. The practical part of the thesis uses 4 texts included in appendices to illustrate the development and contemporary situation in the UK's energy policy. Two articles are chosen for the representation of two distinct approaches regarding climate. The first one is the article by Anthony Giddens called *The politics of climate change*. The second one is called *The Trouble with climate change* written by Nigel Lawson. The Contemporary policy is described by observing speech by Alex Chisholm who is Permanent Secretary for the Department for Business, Energy and Industrial Strategy. This observation is also supported by the last Appendix by John Woodliffe named *Environmental Awareness and United Kingdom Energy Policy*. Practical part also includes manifestos and discussion of political parties. This contributes to the analysis of contemporary tendencies and rhetoric by the Conservative, Labour, Liberal, Green or Plaid Cymru political parties in the UK. The conclusion will evaluate current discussion in policy, ecology and sustainability occurring in Great Britain.

## 1. UK modernity milestones in energy policy

The day must come when electricity will be for everyone, as the waters of the rivers and the wind of heaven. It should not merely be supplied, but lavished, that men may use it at their will, as the air they breathe. In towns it will flow as the very blood of society. Every home will tap abundant power, heat and light like drawing water from a spring. And at night it will light another sun in the dark sky, putting out the stars. There will be no more winter, summer will be eternal, warmth will return to the old world, melting even the highest snow.<sup>1</sup>

Emile Zola wrote this quote in 1901. This text sets an appropriate tone for the first chapter.

It shows one point of the view from the beginning of the 19<sup>th</sup> century. This text seems like it is almost celebrating electricity. Something that from today's point of view is so common people tend to not think about it. This part of the thesis won't cover every milestone in the United Kingdom's history, but it will focus on milestones important for this thesis taking into account sociological, historical, political and ecological aspects.

First of all, as the name of the thesis is *Modernity and the Development of Energy Policy in Great Britain*, it is essential to define the term modernity. Anthony Giddens, an important English social philosopher who is more profoundly described later in the thesis, describes modernity as:

At its simplest, modernity is a shorthand term for modern society or industrial civilization. Portrayed in more detail, it is associated with a certain set of attitudes towards the world, the idea of the world as open to transformation by human intervention; a complex of economic institutions, including the nation-state and mass-democracy. Largely as a result of these characteristics, modernity is vastly more dynamic than any previous type of social order. It is a society – more technically, a complex of institutions – which unlike any preceding culture lives in the future rather than in the past.<sup>2</sup>

Modernity can be also observed in Zygmunt Bauman's book *Liquid Modernity*.

The society which enters the twenty-first century is no less 'modern' than the society which entered the twentieth; the most one can say is that it is modern in a different way. What makes it as modern as it was a century or so ago is what sets modernity apart from all other historical forms of human cohabitation: the compulsive and obsessive, continuous, unstoppable, forever incomplete modernization; the overwhelming and ineradicable, unquenchable thirst for creative destruction (or of destructive creativity, as the case might be: of 'clearing the site' in the name of a 'new and improved' design; of 'dismantling', 'cutting out', 'phasing out', 'merging' or 'downsizing', all for the sake of a greater capacity for doing more of the same in the future - enhancing productivity or competitiveness).<sup>3</sup>

Both descriptions suit the modernity in the context of energy shaping in Great Britain. Bauman's description of modernity as never-ending and incomplete modernization of

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<sup>1</sup> Émile Zola, *Travail*, trans. Ernest Alfred Vizetelly, (London: Chatto & Windus, 1901), 368.

<sup>2</sup> Anthony Giddens, Christopher Pierson, *Conversations with Anthony Giddens: Making Sense of Modernity* (Cambridge: Polity Press, 1998), 94.

<sup>3</sup> Zygmunt Bauman, *Liquid Modernity* (Cambridge: Polity Press, 2000), 28.

industries with competitiveness could be a metaphor for the free-market competition after the privatisation or “a new and improved design” could be linked to new technologies in generating facilities. Giddens approaches modernity in a slightly different way to Bauman. He describes the complexity of contemporary institutions within society and the idea of the world transformed by men while envisaging future. The complexity of institutions is also a modern characteristic, which can be observed by the following acts and establishments later in the thesis.

### **1.1. Instalment of the first public power station**

The first important point for this thesis is the year 1880 where a vast amount of technologies and improvements occurred in the illuminative industry. There was a development of self-regulatory lamps or invention of incandescent bulbs by scientists and engineers like Edison, Swan, Max and Lane-Fox.<sup>4</sup> This, together with the *Electric lighting act 1882*, mentioned in the next paragraph, contributed to the progress in the electrification of the United Kingdom. One of the milestones is the instalment of the first public power station in the United Kingdom named Holborn Viaduct power station or Edison Electric Light station. On the 2 of January, E.H. Johnson, who was representing Thomas Edison, obtained permission to light the Holborn Viaduct. “The station formally opened for inspection on 11 April 1882. Equipped with 1,000 incandescent lamps (but with a capacity for 2,200), the station lit streetlights from Holborn Circus along the Viaduct and Newgale Street to the vicinity of the General Post Office.”<sup>5</sup> “The Holborn Viaduct station was much more than a ‘try out’ for the American company and more than a pilot plant for the English company. The station was both a commercial-technological venture and an advertisement for the English company.”<sup>6</sup> However, the plant run at a loss as this was for demonstration and Edison’s company were initially offering the electricity for the price of gas.<sup>7</sup>

### **1.2. Electric lighting act 1882**

The next important milestone was new legislation following the construction of the first power plant together with enthusiasm created by it. “The interest created by the Paris and London exhibitions and the optimism generated by the Holborn Viaduct station contributed to heavy

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<sup>4</sup> The Electricity Council, *Electricity Supply in The United Kingdom* (London: The Electricity Council; 4th Edition, 1987), 20.

<sup>5</sup> Thomas P. Hughes, *Networks of Power, Electrification in Western society, 1880-1930* (The Johns Hopkins University Press, 1983), 55.

<sup>6</sup> Thomas P. Hughes, *Networks of Power, Electrification in Western society, 1880-1930* (The Johns Hopkins University Press, 1983), 55.

<sup>7</sup> M.A.C. Horne, *London Area Power Supply: A survey of London’s Electric Lightning and Power Stations*, 3.

speculation in the spring of 1882 in shares in various electrical manufacturing and supply (utility) companies. During two weeks in May, sixteen new companies appeared.”<sup>8</sup> Hughes states in his book *Networks of Power*, that:

In a nation whose government showed increasing concern for the welfare of the growing body of the electorate, it is not surprising that Parliament, the central bureaucracy, and the local authorities reacted to the intense activity and optimism in the electric lighting industry. Within two weeks of the formal opening of the Holborn station a select committee of the House of Commons was established, and from 25 April to 12 June 1882 it heard testimony on proposed central-station legislation.<sup>9</sup>

In the period after passing the bill, there were a lower amount of powerplants within This resulted in Great Britain having less new electric entrepreneurs, compared to other countries. The problem in Britain was that any new potential private company which wanted to set a new powerplant had to apply for a specific warrant from Parliament. Other countries dealt with this permission on the local level, not on the national level. Electricity newcomers had also problems with the instalment of electricity cables in the streets as they had no rights and possibilities due to legislation.<sup>10</sup> Full name of the new legislation taken from the UK government site is “*An Act to facilitate and regulate the supply of Electricity for Lighting and other purposes in Great Britain and Ireland.*”<sup>11</sup> The government also wanted municipalities to have power over lightning as they already had over the gas and water. This act was also meant to be a protection policy against the creation of monopolies.<sup>12</sup> After passing the act on the 18<sup>th</sup> of August, the government was able to authorise the new power plants within their territory. The act included a part where the Lightning entrepreneurs were obligated that their assets might be sold to the local municipal’s ownership after 21 years.<sup>13</sup> This was prolonged with subsequent Act in 1888 with a change from Liberal to the Conservative government to 42 years.<sup>14</sup> This novelization was an attempt to get new undertakers to the electricity market while improving other terms for companies such as that local authorities had to be consulted regarding the acquisition of powerplants, though unreasonable objection could be overruled. “Government ownership, as well as government regulation, was viewed sympathetically in the twilight of the Victorian era. However, government ownership meant ownership by the local governing

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<sup>8</sup> Hughes, *Networks of Power*, 57.

<sup>9</sup> Hughes, *Networks of Power*, 58.

<sup>10</sup> J.B. Williams, *The Electric Century, How the Taming of Lightning Shaped the Modern World* (Springer International Publishing AG, 2018), 32.

<sup>11</sup> UK Government “*Electric Lighting Act 1882*,” (45&46 vict.ch.56), 1882, 1.

<sup>12</sup> J.B. Williams, *The Electric Century, How the Taming of Lightning Shaped the Modern World* (Springer International Publishing AG, 2018), 32.

<sup>13</sup> The Electricity Council, *Electricity Supply in The United Kingdom* (London: The Electricity Council; 4th Edition, 1987), 27.

<sup>14</sup> Williams, *The Electric Century*, 32.

authority.”<sup>15</sup> This extension of the potential obligation period to 42 years gave private companies more incentive to develop new powerplants which might be economically reliable. As a consequence, around 40 power stations were built in the following decade and most urban areas began to receive their first electric supply.<sup>16</sup>

Another step forward was with a bill named Electric lighting act 1909. Full name of the legislation taken from the UK government website is “*An Act to amend the Acts relating to Electric Lighting.*”<sup>17</sup> This act took into consideration the need for reorganisation of supply accounting technical development in generation and transmission. The act also required consent from the Board of Trade for building new generating stations. This consent was still required in amendments by the Electricity Acts 1947 and 57.) The act also allowed the Board of Trade to give fringe orders that did not need to be approved by Parliament. This prohibited unauthorised entrepreneurs from competing with state-owned supply companies.<sup>18</sup>

### **1.3. Electricity (Supply) Act, 1926 – the National grid**

This chapter will discuss the impact of this act which made big changes to the supply of electricity. Full name of the act taken from the UK government site is “*An Act to amend the law with respect to supply of electricity.*”<sup>19</sup> This was a big step forward in the UK energy policy due to the unification the grid. According to the book *Energy Systems and Sustainability*, generating electricity in powerplants is one thing; Distributing electricity to the end customer is second. The decision to build a new high-voltage national grid in 1926 was seen as brave but it also has been seen as a wholesale interference from the state in the free market of electricity. Although it was essential for economies of scale in the generation of electricity, it was difficult for supply firms.<sup>20</sup> This probably had been important for generating companies as this enabled them to get bigger profit but difficult for supplying companies to cope. By the explanation from *Economies of Scale in Multi-Output Production*, economies of scale means that higher initial price in an acquisition may result in lower final price thanks to bigger production volume.<sup>21</sup> The idea of economies of scale for this particular part of an improvement in energetics is that as the scale gets bigger, the price falls lower for the customer, thus enabling more customers to afford electricity in future. According to *Electricity supply*, first Grid tower was erected on 14<sup>th</sup> of July

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<sup>15</sup> Hughes, *Networks of Power*, 59.

<sup>16</sup> “M.A.C. Horne, *London Area Power Supply: A survey of London’s Electric Lighting and Power Stations*, 7.

<sup>17</sup> UK Government, “*Electric Lighting Act, 1909*”, (9 Edw. 7. Ch.34.), 1909, 3.

<sup>18</sup> The Electricity Council, *Electricity Supply in UK*, 38.

<sup>19</sup> UK Government, “*Electricity (Supply) Act, 1926*”, (16&17 Geo 5. Ch.51), 1926, 1.

<sup>20</sup> Bob Everett, “Transmission and distribution,” in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 361-365.

<sup>21</sup> John C. Panzar, Robert D. Willig, “Economies of Scale in Multi-Output Production,” *The Quarterly Journal of Economics* 91, no. 3 (August 1977): 481–493.

1928 near Edinburgh.<sup>22</sup> Everett et al. states, that Primary decisions regarding grid were that only AC stations could be connected to the grid and they had to share a common frequency, which was chosen to be 50 Hz. A number of power stations were operating at different frequencies and currents; thus, this may have been a fortunate event, that the standardization took place this early due to the long lifespan of electrical equipment. Last DC supply in London was disconnected in 1962 and a many other countries still suffer from this non-unification of electricity where they have various supply voltages and frequencies.<sup>23</sup>

The act also established The United Kingdom Central Electricity Board. Due to the establishment of this public body, the generation of electricity was concentrated to a limited amount of selected powerplants and interconnecting them to the National Grid. Another duty of the Board was to set a standard for generating frequency.<sup>24</sup>

Constructing National Grid was not only a demanding task for the engineers. So-called “way-leave” permissions to erect pylons and overhead cables on privately owned lands were hard to obtain. The Central Electricity Board had to persuade a number of aristocratic rural landowners of the benefits of the Grid. 5 years later after the erection of the first Grid tower near Edinburgh, over 4800km of 132kV transmission lines had been built. The National Grid enabled more flexible and stable network, especially if there was a failure on the side of generating companies.<sup>25</sup>

The initial task of the National Grid was to connect power stations in regions of England and Wales and to give a local backup. The Grid proved itself worthy in experiments during years 1936 and 1937 which showed that it is possible to run the whole national system on it together without any blackout or other disaster. From then it was clear that the demand will only increase and that there will be a necessity to increase the supply of electricity from the north to the south. In October 1938, all seven regions were permanently linked together to creating the biggest electricity network in the world at the time.<sup>26</sup>

Before the National Grid, all undertakers in the energetic field were creating an “energetic patchwork” taking into account the variety of currents, frequencies and voltages. As it is mentioned in the previous paragraph, unification and creation of National Grid was a big leap forward in the electrification process.

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<sup>22</sup> The Electricity Council, *Electricity Supply*, 47.

<sup>23</sup> Bob Everett, “Transmission and distribution,” in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 361–365.

<sup>24</sup> The Electricity Council, *Electricity Supply*, 45.

<sup>25</sup> Everett et al., “Transmission and distribution,” 361–365.

<sup>26</sup> Everett et al., “Transmission and distribution,” 361–365.

#### **1.4. Electricity Act 1947**

Another important milestone in this chapter is the Electricity Act 1947. This chapter will inspect how energy policy has changed after this legislation. Full name of the act is described in the paragraph below.

An Act to provide for the establishment of a British Electricity Authority and Area Electricity Boards and for the exercise and performance by that Authority and those Boards and the North of Scotland HydroElectric Board of functions relating to the supply of electricity and certain other matters ; for the transfer to the said Authority or any such Board as aforesaid of property, rights, obligations and liabilities of electricity undertakers and other bodies ; to amend the law relating to the supply of electricity ; to make certain consequential provision as to income tax ; and for purposes connected with the matters aforesaid.<sup>27</sup>

Consent of the Board of Trade, which is mentioned in the second chapter and amended in the 1909 Act, is still required for the erection of new generating stations.<sup>28</sup> However, the main purpose of this legislation was to bring all existing powerplants to the public ownership. Every existing undertaker in energetic supply industry of England, Wales and Southern Scotland was nationalised. Around 560 companies were put under state control. These undertakings were put under new statutory bodies - Electricity Boards appointed by the Minister of Fuel and Power. All generating assets and liabilities were transferred into a single state-controlled body. The retail distribution responsibility was divided into 14 Area Electricity Boards, 12 in England and Wales and 2 in Scotland. All boards belong to the British Central (Electricity) Authority(CEA). British Electricity Authority had the responsibility of distribution and generation together with central co-ordination and policy direction. Boards were directly responsible for co-ordinating each area.<sup>29</sup> The UK civil service tends to be more locally autonomous in comparison to EU civil service, therefore British Electricity Authority was the main controlling body and Boards were operating on local levels.<sup>30</sup> The act also enabled Scotland Hydro-Electric Board, which has been formed in 1943, to develop hydro-electric sources and to absorb companies. This Board became responsible for transmission and distribution throughout the north of Scotland.<sup>31</sup>

#### **1.5. Electricity act 1957**

Another mentionable legislation for this thesis came into effect on 1<sup>st</sup> January. It established The Electricity Council and replaced the Central Electricity Authority mentioned in the

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<sup>27</sup> UK Government, “*Electricity Act, 1947*”, (10&11 Geo 6. Ch.54), 1947, 1.

<sup>28</sup> The Electricity Council, *Electricity Supply*, 38.

<sup>29</sup> The Electricity Council, *Electricity Supply*, 60.

<sup>30</sup> Jan Fuka, “Introduction to Public Administration: Lecture 5” 7310R334: *Philology* (Pardubice: University of Pardubice).

<sup>31</sup> The Electricity Council, *Electricity Supply*, 60.



previous paragraph with the Central Electricity Generating Board.<sup>32</sup> The CEGB was responsible with the task to achieve economical generation and transmission of supplies in bulk to area boards for distribution. This board got all the responsibilities regarding generation and transmission from the previous legal body. More important for this chapter is The Electricity Council, which was formed to assist and co-ordinate policy for the whole industry instead of the CEA. Council's responsibilities according to the *Electricity Act 1957* were: "to advise the Minister on questions affecting the electricity supply industry and matters relating thereto" and "to promote and assist the maintenance and development by Electricity Boards in England and Wales of an efficient, co-ordinated and economical system of electricity supply".<sup>33</sup>

After Acts 1947 and 1957, electricity supply in Wales and England became a so-called vertically integrated system. The generation was carried only by a state-owned CEGB, sold to state-owned Area Boards. Customers had no other choice than buying electricity from local boards. A similar system was used in Scotland.<sup>34</sup>

This is also a period when another source of energy joined Great Britain's energy mix. The uranium was added to at that time used coal and oil with the instalment of the UK's first nuclear power station. "In the autumn of 1956 atomic energy will for the first time contribute directly to Britain's sources of industrial power when the nuclear power station at Calder Hall, in Cumberland, begins to feed substantial amounts of electricity into the Central Electricity Authority's grid."<sup>35</sup> The nuclear programme was led by the United Kingdom Atomic Energy Authority. The Atomic Energy Authority was responsible for the development of nuclear fusion power set by the *Atomic Energy Authority Act 1954*.<sup>36</sup>

## **1.6. Market Liberalisation – privatisation – Electricity act 1989**

Another important period is from the years 1980 during the Conservative government with Margaret Thatcher in the office as the prime minister. She is well known for the privatisation policy which has also affected the electricity industry. Mike Parker from the *Power Engineering Journal* states that this period has fundamentally altered the electricity supply industry. Before the privatisation, the electricity industry has seen itself as a public service, not taking into account any financial parameters. The main task of the electricity supply industry was to make electricity universally available. Privatisation has big importance in a political agenda where

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<sup>32</sup> The Electricity Council, *Electricity Supply*, 76.

<sup>33</sup> UK Government, "*Electricity Act 1957*", (1957 CHAPTER 48 5 and 6 Eliz 2), 1957, Reorganisation section 3.

<sup>34</sup> Bob Everett, "Running the System," in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 366–371.

<sup>35</sup> Kenneth Jay, *Calder Hall The Story of Britain's first atomic power station*, (New York: Methuen press 1956) 1.

<sup>36</sup> UK Government, "*Atomic Energy Authority Act 1954*", (1954 CHAPTER 32 2 and 3 Eliz 2), 1954, 1.

Margaret Thatcher saw the privatisation programme as an instrument against socialism and for example as the political objective of reducing the power of National Union of Mineworkers which had an important influence on this privatisation process and how it was carried through.<sup>37</sup> National Union of Mineworkers is affiliated to the Labour party and had around 400,00 members around the year 1950 compared to the 2020 year number which is 311.<sup>38</sup> In the *Power Engineering Journal*, it is described that Privatisation is not only a process of changing the ownership from national companies to private but also a major restructuring and setting up new regulatory regimes and legal instruments. It has represented a legislative and administrative achievement for the industry and government. The reorganisation led to no disruption of electricity supplies and the standards service may have improved.<sup>39</sup> The important legislation for this liberalisation is the *Electricity act 1989*. Full name of the act is cited in the paragraph below.

An Act to provide for the appointment and functions of a Director General of Electricity Supply and of consumers' committees for the electricity supply industry; to make new provision with respect to the supply of electricity through electric lines and the generation and transmission of electricity for such supply; to abolish the Electricity Consumers' Council and the Consultative Councils established under the Electricity Act 1947; to provide for the vesting of the property, rights and liabilities of the Electricity Boards and the Electricity Council in companies nominated by the Secretary of State and the subsequent dissolution of those Boards and that Council; to provide for the giving of financial assistance in connection with the storage and reprocessing of nuclear fuel, the treatment, storage and disposal of radioactive waste and the decommissioning of nuclear installations; to amend the Rights of Entry (Gas and Electricity Boards) Act 1954 and the Local Government (Scotland) Act 1973; and for connected purposes.<sup>40</sup>

This act repealed the previous *Electricity Act 1947*. This act provided the possibility of privatisation of the supply of electricity in Great Britain. It has replaced Central Electricity Generating Board legal body (CEGB) operating in England, Wales and in Scotland by the South of Scotland Electricity Board and the North of Scotland Hydro-Electric Board. The privatisation began in 1990 however, the legal body CEGB was still existing until 2001, when it was dismissed by *the Central Electricity Board (Dissolution) Order 2001*.<sup>41</sup> This act established a new licensing regime and a regulator for this industry the Office of Electricity Regulation, which was later merged into the Office of Gas and Electricity Markets. The Electricity market

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<sup>37</sup> Mike Parker, "The privatisation of the UK electricity industry: a case of unfinished business," *Power Engineering Journal* 11, no. 2 (April 1997): 47–50.

<sup>38</sup> Labour Party, "Report of the Forty-Fifth Annual Conference of the Labour Party," 77.

<sup>39</sup> Mike Parker, "The privatisation of the UK electricity industry: a case of unfinished business," *Power Engineering Journal* 11, no. 2 (April 1997): 47–50.

<sup>40</sup> UK Government, "Electricity Act, 1989", (Ch.29), July 1989, 1.

<sup>41</sup> UK Government, "The Central Electricity Generating Board (Dissolution) Order 2001", (2001 No. 3421), October 2001, 1.

was divided into four companies in the '90s after the break-up of CEGB. The market was re-distributed via “pool” onto three generating companies, PowerGen, Nuclear Electric, National Power and the transmission tasks to the National Grid Company.<sup>42</sup>

The main reason was to treat electricity as a free-market commodity since there was a considerable cross border trade with other EU countries. The Conservative government believed that the previous setting was bureaucratic and inefficient and private companies could perform better flexibility with lower costs. This privatization was seen as a role model for similar liberalization of other state-controlled systems in other states. The key ingredient was that power plants had to compete with each other.<sup>43</sup>

### **1.7. United Nations Framework Convention on Climate Change**

This chapter will focus on an important convention for contemporary energy policies in the UK and the world which is the United Nations Framework Convention on Climate Change (UNFCCC). Anthony Giddens states in his book *The Politics of Climate Change*, that almost everyone across the world must have heard the phrase “climate change” and should at least know a little about it. “It refers to the fact that the greenhouse gas emissions produced by modern industry are causing the earth's climate to warm up, with potentially devastating consequences for the future.”<sup>44</sup>

According to the book *Making Climate Change History*, UNFCCC “was the first international legal treaty written specifically to deal with the problem of climate change, and it has stood as the primary framework for inter-national climate change governance since its ratification in 1993.”<sup>45</sup> The parties to the convention acknowledge that “change in the Earth’s climate and its adverse effects are a common concern of humankind”<sup>46</sup> or that

human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth’s surface and atmosphere and may adversely affect natural ecosystems and humankind.<sup>47</sup>

The United Kingdom signed the Climate Change Convention on 12<sup>th</sup> June 1992 and ratified it one year later. These Conventions are important as almost every state or nations, including the

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<sup>42</sup> Bob Everett, “Running the System,” in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 366–371.

<sup>43</sup> Everett et al., “Running the System,” 366–371.

<sup>44</sup> Anthony Giddens, *The Politics of Climate Change*, (Cambridge: Polity Press, 2009), 1.

<sup>45</sup> Joshua P. Howe, “United Nations Framework Convention on Climate Change” (UNFCCC) (1992)” in *Making Climate Change History*, ed. Paul S. Sutter (University of Washington Press, 2017), 229.

<sup>46</sup> United Nations “United Nations Framework Convention on Climate Change,” FCCC/INFORMAL/84 GE.05-62220 (E), 200705, 1.

<sup>47</sup> United Nations “United Nations Framework Convention on Climate Change,” FCCC/INFORMAL/84 GE.05-62220 (E), 200705, 1.

UK, is participating in the latest problems regarding climate in energy policy. The latest Convention took place in Madrid 2019 and 2020 was scheduled to take place in Glasgow. According to the UK's independent public Committee on Climate change formed under the *Climate Change Act 2008* mentioned in next chapter or by the UNFCCC document, the UNFCCC overall aim is to achieve

stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.<sup>48</sup>

Negotiations in UNFCCC focus on four areas. The first one is on mitigating greenhouse gas emissions. These greenhouse gases are Carbon dioxide, Methane, Nitrous oxide, Hydrofluorocarbons, Perfluorocarbons, Sulphur hexafluoride.<sup>49</sup> The second one is adapting to climate change, the third reporting of national emissions and the fourth is the financing of climate action in developing countries.<sup>50</sup> The last two points are more thoroughly discussed later in the practical part of this thesis.

## **1.8. Kyoto Protocol**

As the report from the conference of parties informs us, the *Kyoto Protocol* was adopted in December 1997. The ratifications process was long, and it entered force in February 2005. There were 192 parties signed under the *Kyoto Protocol*. The *Kyoto protocol* applied to the countries who participated in the United Nations Framework Convention on Climate Change (UNFCCC). Committing industrialized countries tried to limit and reduce their emissions in greenhouse gases with agreed individual targets. UNFCCC then asked those countries to adopt policies and measures on mitigation and require periodical reports.<sup>51</sup>

The *Kyoto Protocol* is based on the principles of the convention and follows its annexes. It places heavier burdens on developed states under the principle of common but differentiated responsibility and respective capabilities<sup>52</sup> This recognizes, that developed countries are responsible for current larger emissions levels in the atmosphere, therefore it encourages these states to assist currently developing countries in greener targets.

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<sup>48</sup>United Nations “*United Nations Framework Convention on Climate Change*,” FCCC/INFORMAL/84 GE.05-62220 (E), 200705, article 2, 4.

<sup>49</sup> United Nations, “*Report of the Conference of The Parties on its Third Session*,” FCCC/CP/1997/7/ Kyoto March 25, 1998, Annex A, 28.

<sup>50</sup> United Nations “*United Nations Framework Convention on Climate Change*,” FCCC/INFORMAL/84 GE.05-62220 (E), 200705, 1.

<sup>51</sup> United Nations, “*Report of the Conference of The Parties on its Third Session*,” FCCC/CP/1997/7/ Kyoto March 25, 1998, 8-12.

<sup>52</sup> United Nations “*United Nations Framework Convention on Climate Change*,” FCCC/INFORMAL/84 GE.05-62220 (E), 200705, 1.

Giddens states that “In 1997, at Kyoto in Japan, after tortuous negotiations, an agreement was drawn up by which the developed countries would cut their emissions by an average of 5.2 per cent over 1990 levels by the period 2008-12.”<sup>53</sup> “The final agreement meant that Kyoto received support from countries that were, between them, producing 61 per cent of world emissions.”

As part of this group, the UK percentage of reduction in greenhouse gases was 12,5% for the period of the *Kyoto protocol*. This group managed to reduce emissions by over 10% however other currently industrialising countries had higher emissions resulting in overall higher emissions globally.

### **1.9. Climate Change act 2008**

Another important act is the *Climate Change Act 2008*. The full name of the act taken from the UK government is:

An Act to set a target for the year 2050 for the reduction of targeted greenhouse gas emissions; to provide for a system of carbon budgeting; to establish a Committee on Climate Change; to confer powers to establish trading schemes for the purpose of limiting greenhouse gas emissions or encouraging activities that reduce such emissions or remove greenhouse gas from the atmosphere; to make provision about adaptation to climate change; to confer powers to make schemes for providing financial incentives to produce less domestic waste and to recycle more of what is produced; to make provision about the collection of household waste; to confer powers to make provision about charging for single use carrier bags; to amend the provisions of the Energy Act 2004 about renewable transport fuel obligations; to make provision about carbon emissions reduction targets; to make other provision about climate change; and for connected purposes.<sup>54</sup>

According to A. Daggas and Mac Dowell from the *Joule* magazine, this act mandated the reduction of United Kingdom greenhouse gas emissions by 80% relative to 1990 levels by the year 2050. The proliferation of low-carbon energy sources has been encouraged by newly implemented policies and legislation. Together with the *Paris Agreement*, which the United Kingdom has signed later, the *Climate Change Act 2008* requires deeper decarbonization to be achieved.<sup>55</sup> This act aims to enable the UK to become a low-carbon economy. Described by the book *The Low Carbon Economy*, low-carbon economy is a system that tries to minimize the output of greenhouse gasses while functions as a typical economic program.

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<sup>53</sup> Anthony Giddens, *The Politics of Climate Change*, (Cambridge: Polity Press, 2009), 187.

<sup>54</sup> UK Government “*Climate Change Act 2008*,” (2008 Chapter 27), 1.

<sup>55</sup> H.A. Daggash & Mac Dowell, “Structural Evolution of the UK Electricity System in a below 2°C World,” *Joule* 3, no. 5 May 15, 2019, 1239–1251.

It has become a long-term goal of states which aims to reduce the effects of global warming.<sup>56</sup> *Climate Change Act 2008* also allows ministers to introduce measures for achieving the reduction in greenhouse gases by setting a new legal body Committee on Climate Change.

The CCA2008 is also highlighted by Giddens in *Politics of Climate Change* “The fact that Britain is on track to meet its Kyoto commitments comes in some part from Prime Minister Margaret Thatcher's decision to privatize the large state energy monopolies. She was determined to face down the power of the unions, especially in coal-mining.”<sup>57</sup> This has also contributed to the increase in gas usage mentioned later in the thesis. “The switch from coal-fired to gas-fired power stations was driven by these aims, but also by the fact that gas was seen as the cheapest available source of energy.”<sup>58</sup>

### **1.10. Paris Agreement 2015**

Another important event for the UK energy policy and for the thesis is the *Paris agreement*. It is widely seen as an important event as the agreement was negotiated by 196 states during the 21<sup>st</sup> COP in France and sets out important targets regarding climate change. The *Paris agreement* aims at the reduction of CO<sub>2</sub> emission in order to stop global warming. The central aim is to strengthen the global response to lowering the greenhouse gases which are believed to be the main source of warming the earth. “With this end in mind, the purpose of COP21 is to get states to commit to some sort of legally binding agreement on climate change that will come into force in 2020.”<sup>59</sup> The UK was the 111<sup>th</sup> country that ratified the *Paris Climate Agreement*. The UK ratified the accord one year later after negotiations. Those, who believe that man should take an action to stop global warming may suggest that this could be seen as a victory in itself compared to the *Kyoto protocol* as lower emission targets apply worldwide, including developing countries.

## **2. UK energy policy**

This part of the bachelor theses will analyse documents related to the energy policies in the UK. It will inspect policies, rhetoric and tendencies which are occurring from the period after privatisation to today. It will try to analyse and map how the policy was changing and adapting to contemporary situations and trends.

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<sup>56</sup> Polina Baranova et al., *The Low Carbon Economy Understanding and Supporting a Sustainable Transition*, (Switzerland: Springer Nature 2017), 2–3.

<sup>57</sup> Giddens, *Politics of Climate Change*, 80.

<sup>58</sup> Giddens, *Politics of Climate Change*, 80.

<sup>59</sup> Luke Tomlinson, *Procedural Justice in the United Nations Framework Convention on Climate Change*, (Switzerland: Springer International Publishing, 2015), 1.

The first one is a speech (Appendix A) given by Alex Chisholm who is a permanent secretary at Business, Energy and Industrial Strategy (BEIS). Alex Chisholm is responsible for leading the department. This speech was given at the Utility Week Energy Summit. According to the Utility Week Energy Summit website:

Utility Week is an award-winning brand sitting at the heart of the energy and water industries. It was launched in 1994 in response to the growing regulatory and market complexity following utility privatisation. For 25 years, Utility Week has been the UK utility sector's unrivalled thought leader and source of news and comment on the business of Britain's electricity, gas and water companies. Utility Week provides authoritative analysis, impartial industry intelligence and insight. It has the trust and respect of utility chiefs, regulators and government.<sup>60</sup>

Utility week is a business-to-business platform in the energy and water industries. A similar event in Czechia is called "Dny teploty a energetiky". These types of events give insights on current discussions, trends, innovations and legislation. Not only entrepreneurs are attending but also representatives of government institutions. Analysing the speech from the Permanent Secretary of the UK department will assist the thesis to achieve its purpose and to analyse the current trends and the direction the energy industry is heading. To give a background for the BEIS department, the EU commission website description of BEIS mission is in the paragraph below.

The Department for Business, Energy & Industrial Strategy is a government department supported by 46 agencies and public bodies that was [sic] created in 2016 as a result of the merger between the former Department of Energy and Climate Change and Department for Business, Innovation and Skills.<sup>61</sup>

This department was created during Theresa May's Conservative government. Chisholm stated that this merge this "will help 21<sup>st</sup> century infrastructure" and that "Energy and climate change will continue in a single department ensuring efficient paths to carbon reduction."

and BEIS activities:

It is responsible for a number of UK Government policy areas such as business and industrial strategy, science, innovation, energy and climate change. The Department is in charge of developing and delivering a comprehensive industrial strategy and leading the Government's relationships with businesses, along with securing affordable and clean energy supplies to the country. In particular, it deals also with ensuring cutting-edge research, science and innovation within [sic] UK.<sup>62</sup>

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<sup>60</sup> "About UWE," Utility Week Energy summit, accessed March 13, 2020, <https://event.utilityweek.co.uk/summit/about/>.

<sup>61</sup> "The Department for Business, Energy & Industrial Strategy (BEIS)" European Commission, accessed March 13, 2020, <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/organisation/united-kingdom/department-business-energy-industrial-strategy-beis>.

<sup>62</sup> "The Department for Business, Energy & Industrial Strategy (BEIS)" European Commission, accessed March 13, 2020, <https://ec.europa.eu/growth/tools-databases/regional-innovation-monitor/organisation/united-kingdom/department-business-energy-industrial-strategy-beis>.

The second text is an article transcript from a speech by Anthony Giddens (Appendix B). Giddens was already referred to in the previous chapter in the theoretical part. Anthony Giddens is considered to be one of the most prominent sociologists. He has written more than 30 books and became one of the most referenced authors in humanities.<sup>63</sup> He is also a politician for Labour party as the member of the House of Lords. Giddens was a director of the London School of Economics from 1996 to 2003. His speech will assist the thesis's analysis in the sociological aspect. Giddens look at the political issues posed by climate change and stresses the fundamental importance and urgency of the problem for global civilization. A different viewpoint is covered by the article *The Trouble with Climate Change* (Appendix D) by Nigel Lawson, who is described later in the chapter Climate Scepticism.

The third article named *Environmental Awareness and United Kingdom Energy Policy* (Appendix C) is from an author John Woodliffe. It was published by Wiley on the behalf of Cardiff University. This article is from the *Journal of the Law and Society*. According to the description of online Wiley library, scope of this journal is:

Established as the leading British periodical for Socio-Legal Studies *The Journal of Law and Society* offers an interdisciplinary approach. It is committed to achieving a broad international appeal, attracting contributions and addressing issues from a range of legal cultures, as well as theoretical concerns of cross-cultural interest. It produces an annual special issue, which is also published in book form. It has a widely respected Book Review section and is cited all over the world. Challenging, authoritative and topical, the journal appeals to legal researchers and practitioners as well as sociologists, criminologists and other social scientists.<sup>64</sup>

This article is from the year 1990 and it will help the analysis and to take a scope to the period after privatisation together with de-regulations.

## **2.1. Rise of renewables**

In the third paragraph from the Appendix A, Alex Chisholm tries to introduce contemporary trends in current UK's energy policy.

And when we were formed, it was clear that in delivering this ambition we would need to look to one sector in particular – the energy market. The sector is in the midst of a transformation as the top-down model focused on centralised generation gives way to a new and more dynamic market. From the rise of renewables and small-scale generation, to the digital revolution and our smart meters programme, energy policy is evolving rapidly and challenging historic assumptions.<sup>65</sup>

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<sup>63</sup> Anthony Giddens, Christopher Pierson, *Conversations with Anthony Giddens: Making Sense of Modernity* (Cambridge: Polity Press, 1998) 1.

<sup>64</sup> "Wiley Online Library" Aims and scope, accessed March 14, 2020, <https://onlinelibrary.wiley.com/journal/14676478>.

<sup>65</sup> See Appendix A, p 53.



Alex Chisholm mentions in his speech a so-called “rise of renewables”. According to Mojmír Vrtek, professor at the Technical University of Ostrava, the broad global debate from mass media to high experts has concluded that using renewable sources of energy is beneficial on the global scale. He argues that the differences are in the views how quickly should countries developed and implement these renewable policies.<sup>66</sup> As it is mentioned in the theoretical part in the Climate Change Act 2008, the UK is ahead in comparison to other EU states in the speed of implementing policies. The UK has been first among EU states who has made a target which is enforceable by the government. This act sets the UK emission target and created a specific legal body to obligate and implement these measures.

Scientific understanding and public awareness of the linkage between energy and the environment have grown steadily over the past two decades, resulting in the demand for a framework of policy-making that seeks to balance and integrate both energy and environment objectives.<sup>67</sup>

In the statement in Appendix B by John Woodliffe, the discussion and acknowledgement for the impacts of energy use on the environment have been already growing from the 70s. Woodliffe express concerns across 11 areas including stationary combustions facilities which are releasing greenhouse gases. During the year 1991, only 1,5 per cent of electricity was generated from renewable sources, more specifically only from hydro-power stations. A survey of renewable technologies in the *Energy Paper 55* suggests, that the renewables could create a considerable environment for economic for the future.<sup>68</sup> 30 years later, these economic and ecological benefits are still presented by contemporary governments. This rhetoric may be used to create a favourable public opinion and to be appealing for voters. The Appendix B states, that the political parties have already come to a consensus in the ‘80s in the environmental policy debates.<sup>69</sup>

To illustrate this rise of renewables phenomenon mentioned by Alex Chisholm, a figure from the MyGridGB website is shown below. The MyGridGB is created by an energy specialist Dr Andrew Scrossland CEng, who is “a multidisciplinary energy specialist and does financing and engineering.”<sup>70</sup> His life goal is to decarbonise the UK. This website collects data from BM reports, except solar every 5 minutes. Solar data are collected from 4 different sources refined by the University of Sheffield. MyGridGB attempts to summarise this data from these sources.<sup>71</sup>

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<sup>66</sup> Mojmír Vrtek, *Renewable Sources in Energy Systems* (Tarnów: TANT Publishers, 2009), 17.

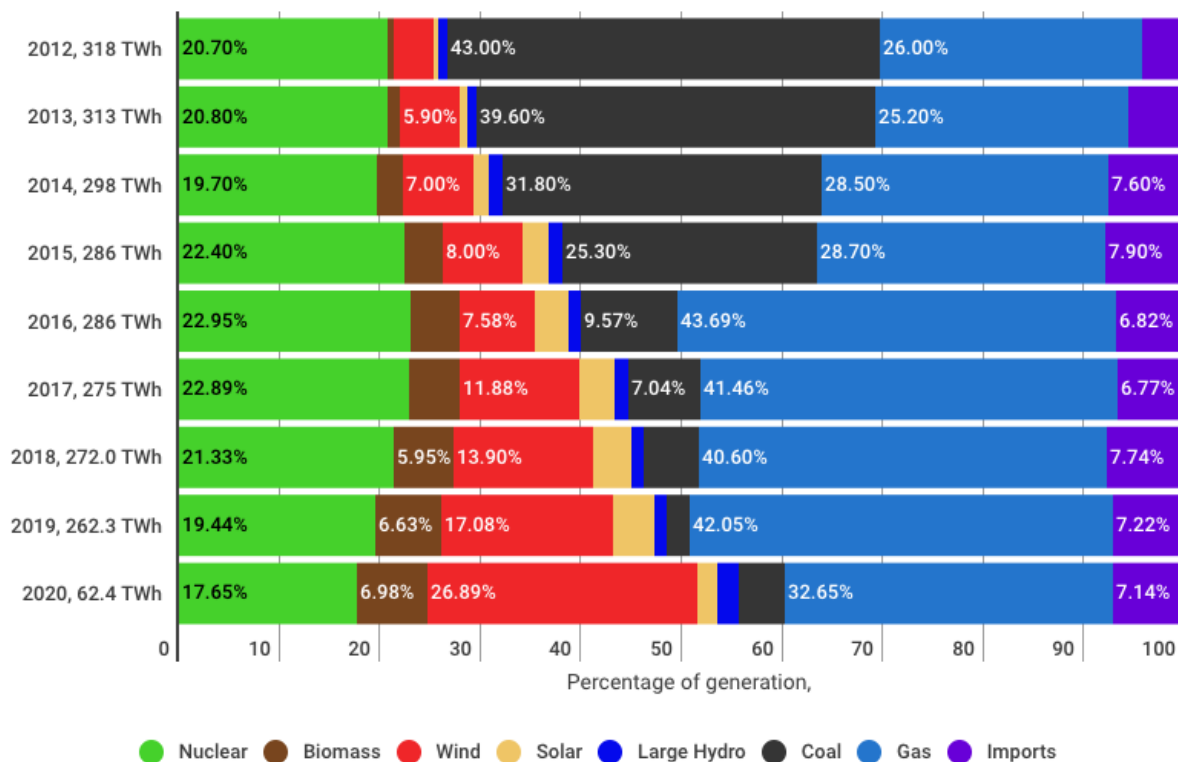
<sup>67</sup> See Appendix C, p 63.

<sup>68</sup> See Appendix C, p 68.

<sup>69</sup> See Appendix C, p 70–71.

<sup>70</sup> “About me,” MyGridGB, accessed March 19, 2020, <http://www.mygridgb.co.uk/about/>.

<sup>71</sup> “About me,” MyGridGB, accessed March 19, 2020, <http://www.mygridgb.co.uk/about/>.



**Figure 1.0 Energy Mix**

Figure 1.0 shows the contemporary United Kingdom’s energy mix and supports Alex Chisholm’s rise of renewables. This chart was taken on the 19<sup>th</sup> of March 2020.<sup>72</sup> The decline of coal used in generation can be observed. The usage of coal has lowered from 43% to 2.18% over 7 years. This reduction has been supplemented by gas and by the renewables. Biomass, Wind, Solar and Hydro generation has increased over 31% compared to 2012 levels. This transition also goes hand-in-hand with the carbon reduction set by CCA2008 as burning one tonne of coal releases almost 3 tonnes of carbon dioxide.<sup>73</sup> Low carbon trends can be seen by other industrialized countries in the world. For example, the former president of the United States of America Barrack Obama stated in his speech to congress that “The country that harnesses the power of clean renewable energy will lead the 21<sup>st</sup> century.”<sup>74</sup>

The generation of the renewables varies greatly across the United Kingdom. Majority of the wind electricity generation facilities are situated on the shores of British Isles. A large portion of wind generators is also constructed in Wales and Scotland and Northern Ireland

<sup>72</sup> “Figure 1.0,” MyGridGB, Percentage of Generation, accessed March 19, 2020, <http://www.mygridgb.co.uk/historicaldata/>.

<sup>73</sup> Bob Everett, “Coal,” in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 141–177.

<sup>74</sup> United States Congress, “Congressional Record, proceedings and debates of the 111<sup>th</sup> congress, first session” (Washington: United States Government Printing Office, 2009), 5454.

where the wind is more potent due to its geographical position. The north of the UK, mainly Scotland have over 80% of the Hydro-generation facilities. The south has a much higher amount of storage capacities and sun-collectors and biomass generating facilities. This is again due to its geographical situation where the south has a much bigger population density, therefore more potential distributors are available. Generating and storage facilities information were taken from the MyGridGB website.<sup>75</sup>

The coal, which was the main fossil fuel for the generation of electricity, has been declining rapidly in recent years. The coal has been one of the oldest technologies for burning to obtain heat and has been the most mined fossil fuels in the 20<sup>th</sup> century. However, its contribution is declining rapidly<sup>76</sup>

The British coal industry is on the defensive and its economic prospects after its contracts with the power-generating companies terminate in 1993 look bleak. In the autumn of 1990, the gas industry sponsored a series of newspaper advertisements and position papers by independent experts on key environmental issues, designed to show the industry's 'green' credentials.<sup>77</sup>

This anti-coal attitude can be observed in the Appendix C, where the gas industries are trying to achieve a better position with the industry's green credentials. This rivalry is created with the privatisation act 1989 where the generating and distributing firms were trying to compete with each other. "Coal, compared to natural gas, is producing up to twice the amount of carbon and its sulphur content can contribute to smog and acid rain".<sup>78</sup>

The competition and a fact that coal release more harming greenhouse gases, contributed to the decline of mine and usage of coal in the UK. This is also demonstrated in the figure 1.0 where the coal has been substituted by the renewables and by the gas. The gas portion in the energy mix also became more potent after the discoveries of gas fields in the North Sea, technical advancements in technology and desire to diversify supply after privatisation.<sup>79</sup>

On the basis of previous paragraphs, a policy towards renewables and lowering coal can be observed 30 years back. However, John Woodliffe suggests the turning point for renewable policy even earlier, to a review conducted by the Labour government in 1977 with James Callaghan as prime minister.

In retrospect, the turning-point may be seen to have been the energy policy review conducted by the Labour Government in 1977. It acknowledged that the traditional

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<sup>75</sup> "UK Renewable Energy Map," MyGridGB, accessed March 20, 2020, <http://www.mygridgb.co.uk/map/>.

<sup>76</sup> Bob Everett, "Coal," in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 141–177.

<sup>77</sup> See Appendix C, p 70.

<sup>78</sup> Everett et al., "Coal," 141-177.

<sup>79</sup> Bob Everett, "Oil and Gas," in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 213–244.

approach of United Kingdom governments to energy policy was 'rather insular' and called for greater attention to be paid to international considerations and the European Community. The goal of energy policy was 'to secure that the nation's needs for energy are met at the lowest cost in resources, consistently with security and with environmental, social and other objectives.'<sup>80</sup>

The UK does manage to cut almost all of its coal-based generation capacity and most-likely will achieve a coal-free energetics in future. The lowering coal policy is also meant to create new industries and new opportunities for growth in different a branch of the economy via creating new jobs and incentives. This is also supported by Alex Chisholm, who highlights the creation of new BEIS offices to achieve more economical objectives with energetics together.

Too often in the past the links between energy policy and economic policy have been too weak. The creation of BEIS offers a unique opportunity to bring those objectives together. What we do to secure our energy policy objectives should be delivering our Industrial Strategy ambitions – the world's most innovative economy, good jobs and greater earning power for all, modern infrastructure, the best place to start and grow a business.<sup>81</sup>

This green policy is also heavily supported by Anthony Giddens in the Appendix B in his speech *The Politics of Climate Change*. However, Giddens looks at this problem on a larger, more global scale. The text urges to implement measures and policies on the problem of climate change. "We have a limited window of opportunity in terms of time to do this. Dramatic climate transformations are creating risks, not just for our remote future but for our immediate future."<sup>82</sup>

Giddens presents advances that have been made in the science of climatology and that our understanding of the influences which are causing the global warm-up has become more robust. The text presents abnormalities in weather or unusual natural disasters. It also presents studies about climate change. For example, the latest study from the National Aeronautics and Space Administration which showed that the year 2014 was globally warmest since 1880. This warming of the atmosphere is just one of the many measures conducted.

These include satellite measurements from inner space; satellite measurements from further out in space; changes in the Arctic, particularly the warming of the oceans; the melting of the glaciers across the world; and the acidification of the oceans, among others.<sup>83</sup>

Attitudes towards the climate change policy could be divided into two groups. The first group could be environmentalist and people supporting green policy. Those who believe that climate change is human-induced and believe that there is a necessity to step in. And the second

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<sup>80</sup> See Appendix C, p 64.

<sup>81</sup> See Appendix A, p 55–56.

<sup>82</sup> See Appendix B, p 57.

<sup>83</sup> See Appendix B, p 57.

group with believe that climate change is natural and human activities does not intervene or contribute to warming up of the earth. Giddens has proposed a third view on this problem according to scientists.

Nature, they suggest, is like a wild beast. We humans are busy prodding it with sticks, with the result that it will react violently. It is an even more disturbing view of the implications of climate change than the view of straightforward ecological damage. Climate change policy is all about containing risk. The risks suggested by the third view must be taken seriously.<sup>84</sup>

Text by Anthony Giddens provides convincing and compelling arguments to support that climate change is humanly induced and that necessary instruments to address this problem are necessary. Giddens mentions previous less successful UNFCCC conventions which he called “fiasco” and that the UN is weak. The text was however conducted in the first month of the year 2015 and the COP21 took place later that year. This was a big milestone as this implements and legally bind the states to implement measures to keep the global warming temperatures 2 degrees Celsius compared to pre-industrial levels.

The text also introduced a problem where the UK was seen as a “free-rider” because it only contributes less than 2 per cent of total global emissions and the moral necessity of helping the developing countries. This free-rider problem is also widely noted by sceptics, who are mentioned later in the thesis.

Third, there is a fundamental ‘free-rider’ problem. Britain only contributes less than 2 per cent of total global emissions. Why, it can be – and is – argued, should the UK lead the climate change campaign? Every nation, or group of nations, could argue that they will not act until others do, which is effectively what happened at Copenhagen. The free rider issue is a big obstacle for the collective politics of climate change and there is no easy way of overcoming it. Finally, there are real issues around economic development. The rich countries have been responsible for most of the greenhouse gas emissions that have entered the atmosphere. Their very position of affluence has been created through their embrace of fossil fuels and other sources of climatic contamination. Hence, they should almost exclusively shoulder the burden of reducing emissions, even at a cost to their own economic position. The poorer countries should have the same chance to develop their economies that the industrial states have enjoyed. The rich part of the world, it can be said, cannot argue for the closure of avenues of development that they themselves have used to such effect.<sup>85</sup>

As it is mentioned in the previous paragraph, the *Paris Agreement* has already presented the obligations of developed countries to shoulder the burden of reducing emissions mentioned by Giddens. The articles 9,10 and 11 in the *Paris Agreement* deals with the finance, technology and capacity building support. “The *Paris Agreement* reaffirms the obligations of developed countries to support the efforts of developing country Parties to build clean, climate-resilient

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<sup>84</sup> See Appendix B, p 58.

<sup>85</sup> See Appendix B, p 59.

futures, while for the first time encouraging voluntary contributions by other Parties.”<sup>86</sup> It can be argued, that the fundamental free-rider problem is addressed as over 189 countries all over the world has become a party to it and signed the *Paris Agreement* 1 year after the speech by Anthony Giddens.

## 2.2. Shaping of Energy Policy

The previous chapter was dealing with the environmental policy, which plays an important role in energy today. In the speech, Alex Chisholm speaks about the current policy that the UK has. “In recent years, there has been much focus on the energy ‘trilemma’ of security of supply, cost, and decarbonisation. This has been portrayed as presenting trade-offs – and historically this has indeed often been the case.”<sup>87</sup>

Decarbonisation was discussed in the previous rise of renewables chapter. This chapter of theses will deal with the shifts in energy policy and energy approaches from the beginnings of the electrification. “In the UK at present, energy is treated as a freely traded free-market commodity. This is in line with the European Union’s programme on the harmonization of energy markets.”<sup>88</sup> Judging by the instalment of the first power station chapter, the contemporary conception of energy has changed drastically over the course of 100 years. From the instalment of the first generating facility for Holborn Viaduct mentioned in the first chapter, where the electricity was to power lamps and only a few chosen facilities, to powering almost everything in the developed and developing countries today. This transition contributed to making the electricity into a fundamental commodity in today’s society.

Going back to the beginnings of electrification. “*The electric Lighting Act 1882* was intended to favour the supply of electricity of electricity through the ‘municipal enterprise’ of local authorities, some of which already supplied gas, water and tramways.” After this support of the electrification by the government, around 40 small local power station gradually began to operate.<sup>89</sup> The generation was on the local level and there were various types of voltages and currents which were powering mostly street lighting together with few industries. Taking into account the part from the national grid chapter, the volume of generated electricity was low, and it needed centralized generation to apply the economies of scale to cut the costs for the future regular customers to be able to pay for the electricity bills. The national grid and the *Electricity Act 1926* contributed to cut the costs of bill and the possibility of supply for a wider

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<sup>86</sup> United Nations, “*Paris Agreement*,” (COP 21, Paris 2015), Articles 9–11, 13–16.

<sup>87</sup> See Appendix A, p 53.

<sup>88</sup> Bob Everett, “Costing Energy,” in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 465–503.

<sup>89</sup> “Horne, *London Area Power Supply*, 7.

range of customers in the upcoming decades up to the electrification of the last village in the UK. The centralized generation and distribution after the upcoming acts in 1947 and 1957 gave the government responsibility for the supply, generation and the electricity industry in the whole.

The government had ownership until the privatisation where the *Electricity Act 1989* repealed the previous ones. During the electrification process, the overlooking government and generation facilities did not pay that much attention to the emission and environment. Everett et al. states that, The UK depended almost entirely on coal and that diversity of supply with environmentalist goals is only the contemporary key aim of energy policy.<sup>90</sup> The electricity was not seen as a market commodity and the government was responsible for the whole supply up to the final retail sale.

A shift in the priorities of United Kingdom energy policy is evident from a speech in 1982 by the then Secretary of State for Energy, Nigel Lawson.<sup>91</sup> While detecting a growing public interest in the forms of renewable sources of energy and in the importance of conservation as levers on the demand side, he stressed that nuclear power remained a vital part of United Kingdom policy. He outlined the task of Government thus: ... to set a framework which will ensure that the market operates with a minimum of distortion and that energy is produced and consumed efficiently.<sup>91</sup>

According to this passage by John Woodliffe, the first shift to the energy market-based approach can be observed. Nigel Lawson, Baron Lawson of Blaby is a journalist and a Conservative politician who served in the cabinet of the Margaret Thatcher. Nigel Lawson's landmark speech is also mentioned in the speech by Alex Chisholm. The UK tends to incline to its primacy regarding the privatisation. "The UK has led the world in the transformation of the energy sector over the last 40 years." and that "The UK has been at the cutting edge of innovation in energy for the last 40 years. Through the 20th century, the term 'energy market' was a misnomer – with a consensus around centrally planned systems and firm state control."

Britain was at the forefront of the transition to a market-based approach. Nigel Lawson's landmark speech in 1982 summarised the change: as he said, "our task is to set a framework which will ensure that the market operates with a minimum of distortion and energy is produced and consumed efficiently".<sup>92</sup>

The difference between the two main political parties on the contemporary political scene in the UK can already be observed in the energy policy. The Labour party tends to a more regulated and state-owned industry whereas the Conservative party promotes a free market approach. The shift in the ownership of industry in 1947 act was also done by the Labour

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<sup>90</sup> Bob Everett, "What do we use Energy for?," in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 75–111.

<sup>91</sup> See Appendix C, p 64.

<sup>92</sup> See Appendix A, p 53.

government in charge of Clement Attlee as prime minister. The privatisation of the industry was done during the Conservative government with Margaret Thatcher as the prime minister. This trend can be seen again in the current policy of the Labour party with Jeremy Corbyn in leadership of the Labour opposition. *The Labour Manifesto 2019* states that “A new UK National Energy Agency will own and maintain the national grid infrastructure and oversee the delivery of our decarbonisation targets.”<sup>93</sup> It also states that “14 new Regional Energy Agencies will replace the existing district network operators and hold statutory responsibility for decarbonising electricity and heat and reducing fuel poverty.”<sup>94</sup> And lastly, it states that “The supply arms of the Big Six energy companies will be brought into public ownership where they will continue to supply households with energy while helping them to reduce their energy demands.”<sup>95</sup> This manifesto remotely resembles the nationalisation *Electricity Act 1947*. It should be noted that the difference is the topic of decarbonisation of electricity, heat and tackling the fuel poverty in comparison to the act 1947. According to the UK government website, the term fuel poverty is taking place in energy policy rhetoric from around the year 2010. The UK started measuring fuel poverty in this year.

Fuel poverty in England is measured using the Low Income High Costs (LIHC) indicator. Under the LIHC indicator, a household is considered to be fuel poor if they have required fuel costs that are above average (the national median level) or were they to spend that amount, they would be left with a residual income below the official poverty line.”<sup>96</sup>

“There are 3 elements in determining whether the household belongs to the fuel poverty – household income, household energy requirements and fuel prices.”<sup>97</sup> This term is frequently used for example in the Labour approach. *Labour manifesto 2019* promise to reduce fuel poverty by making housing energy efficient.<sup>98</sup> The two main political parties Labour and Conservative tend to agree on tackling and mitigation of the climate changes or fuel poverty problem however, each party has a slightly different approach. The Conservative approach on the energy policy for a longer term can be clearly demonstrated by this part in the Appendix C. Conservative government continues in this policy.

A parliamentary statement in December 1989 by the Secretary of State, John Wakeham, set out the ingredients of the Government's current approach to policy: it is to ensure that the United Kingdom:

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<sup>93</sup> Labour Party, “*It’s time for real change The Labour Manifesto 2019*,” 16.

<sup>94</sup> Labour Party, “*It’s time for real change The Labour Manifesto 2019*,” 16.

<sup>95</sup> Labour Party, “*It’s time for real change The Labour Manifesto 2019*,” 16.

<sup>96</sup> “Fuel poverty statistics,” UK Government website, accessed April 4, 2020, <https://www.gov.uk/government/collections/fuel-poverty-statistics>.

<sup>97</sup> “Fuel poverty statistics,” UK Government website, accessed April 4, 2020, <https://www.gov.uk/government/collections/fuel-poverty-statistics>.

<sup>98</sup> Labour Party, “*It’s time for real change The Labour Manifesto 2019*,” 6.



has adequate, diverse, and secure supplies of energy in the forms that people want at the lowest realistic prices. It aims to achieve this wherever possible by ensuring that energy prices reflect their true economic costs and by subjecting as much of energy supply as is practicable to the operation of market forces, bearing in mind the State's strategic responsibilities for health and safety, the protection of the environment, and the elimination of energy waste.<sup>99</sup>

Noticeably, a bigger significance is again on the environment and clean aspect of the energy. Currently, the energy policy continues in the free market policy under the Conservative government with Boris Johnson as a prime minister. This policy is also highlighted by Alex Chisholm from the BEIS department.

Network costs have fallen 17% since privatisation at the same time as improving system reliability; and we now have over 65 suppliers in the retail market, with the number of consumers switching suppliers hitting record highs. From 1990 to 2005, generation grew from 298 to 377 terawatt hours and domestic retail energy prices fell roughly 45% in real terms over the same period. With privatisation came regulation; and the UK led again with the introduction of RPI-X for natural monopoly regulation and liberalisation for potentially competitive parts of the market. This has heavily and positively influenced the design of the EU's energy market framework.<sup>100</sup>

With the development and industrialization of the UK, the population had doubled to almost 67 million and the annual energy consumption had risen to almost to 9000 PJ, which is the equivalent to over 200 million tons of oil. The UK energy consumption peaked in 2005 and has been slowly declining.<sup>101</sup> This trend can be confirmed by the figure 1.0 from the MyGridGB website. The energy usage had also experienced a shift where household usage of energy rose due to spur of cheap gas from the North Sea, in 1970 only 31% of homes had central heating, by 2009 this number has risen to 92%. The shifts where the energy is used can also be observed in the industry which is gradually going down whereas transport energy use has doubled compared to the year 1970.<sup>102</sup>

Zygmunt Bauman, a famous British sociologist who was originally born in Poland, has written a sociology book *Liquid Modernity*. This book provides a description of today's society and attributes a liquid property to contemporary society. The ever-changing society which cannot hold its shape and cannot be held in a different shape for a longer period of time. He also describes the increasing pressure on individuals due to the disappearance of social classes and communities which transfer responsibilities to micro level. These features could be applied to the development of energy policy in the United Kingdom.

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<sup>99</sup> See Appendix C, p 65.

<sup>100</sup> See Appendix A, p 53–54.

<sup>101</sup> Bob Everett, "What do we use Energy for?," in *Energy Systems and Sustainability* ed. Godfrey Boyle, Stephen Peake, Janet Ramage (New York: Oxford University Press Inc., 2012), 75–111.

<sup>102</sup> Everett et al., "What do we use Energy for?," 75–111.

The liquidizing powers have moved from the 'system' to 'society', from politics' to 'life-policies' - or have descended from the 'macro' to the 'micro' level of social cohabitation. Ours is, as a result, an individualized, privatized version of modernity, with the burden of pattern-weaving and the responsibility for failure falling primarily on the individual's shoulders. It is the patterns of dependency and interaction whose turn to be liquefied has now come.<sup>103</sup>

It does not play a role whether the price for the electricity changes during market led solutions after privatisation or during state-controlled solutions, the burden is primarily on the end customer in the means of a higher price. The individual pays the price for the choice that has been made where he had a little if no power.

### **2.3. Political discussions**

The current discussion in energy policy is mostly around meeting the carbon targets, the security of supply and costs. This part will focus on speeches and manifestos by current political parties and map the current discussion. It will present the current Conservative government approach and the main Labour opposition approach. It will also inspect the main political parties from Wales and Scotland to create a factual analysis of current energy policy in the UK. The current government MP's and Lords list consist of 298 Conservatives, 243 Labour, 35 Scottish National Party, 23 Independent, 21 Liberal Democrats, 10 Democratic Unionist Party, 7 Sinn Féin, 5 The Independent Group for Change, 4 Plaid Cymru, 1 Green Party, 1 Speaker.<sup>104</sup>

The trends in decarbonising are one of the main topics in today energy policies. The CCA2008 mentioned in the practical part of the thesis was passed during the Labour Government. In the process of the debates, some of the MP's were in against passing the act, notably Peter Lilley or Nigel Lawson from the Conservative opposition.<sup>105</sup> There is more detailed information in the Climate Scepticism, mentioned later in the thesis. The Bill was passed into law on 26<sup>th</sup> November 2008.<sup>106</sup>

The current discussion revolves around this act and builds on it. The latest step made by the Conservative government was tightening the act and set up a more ambitious goal than the previous act.

The UK today became the first major economy in the world to pass laws to end its contribution to global warming by 2050. The target will require the UK to bring all

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<sup>103</sup> Zygmunt Bauman, *Liquid Modernity* (Cambridge: Polity Press, 2000), 7–8.

<sup>104</sup> "State of the Parties," UK parliament MPs And Lords, accessed April 5, 2020, <https://members.parliament.uk/parties/Commons?fordate=2019-11-05>.

<sup>105</sup> "Climate scepticism in parliament," Campaign against climate change, accessed April 5, 2020, <https://www.campaigncc.org/parlsceptics>.

<sup>106</sup> UK Government "*Climate Change Act 2008*," (2008 Chapter 27), 1.

greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels.<sup>107</sup>

This step was recommended by the report conducted by the CCC. The net-zero means that any emissions would be balanced by other means such as planting new trees or technologies for capturing carbon from the atmosphere.<sup>108</sup> The political parties tend to compete with each other in terms of achieving more green goals faster. The leader of the opposition Labour party Jeremy Corbyn blames the Conservative government not being efficient enough. In the world's first party leaders' debate he stated that "The government current target won't be achieved until 2099 because they are not living up to the demands made by the *Paris agreement*."<sup>109</sup> The *Labour manifesto* also states that just over 100 companies are responsible for the 70% of the carbon emissions and they won't be afraid to tackle this corporate destruction which contributes to climate change. "We will change the criteria a company must meet to be listed on the London Stock Exchange so that any company that fails to contribute to tackling the climate and environmental emergency is delisted."<sup>110</sup> The Labour impute blame for emission to large firms, stating that they are responsible for the majority of emission and that citizens should not pay the price to a net-zero economy. Corbyn also suggests the intention to propose speeding up the mitigation of climate change in the upcoming COP26 which is scheduled from 9 to 20 November 2020 in Glasgow, Scotland.

Some of the similarities can be found in the political party Plaid Cymru. Adam Price is a Welsh politician who serves as the leader of this political party. He states that Plaid Cymru approach to this issue is with a "trinity of zero's, zero carbons, zero waste, zero poverty in 2030 for the Wales"<sup>111</sup> Plaid Cymru manifesto states similar approach to establishing state-owned green energy potential as the Labour does with the agency named Ynni Cymru in charge. The party also want to make use of their coastline possibilities for marine energy including wave, tidal and stream energy. "Seek a complete ban on fracking and new open-cast coal mines. Oppose the development of new sites for nuclear power stations." The reduction of coal energy is one of their policies together with the opposition to construction of new nuclear power, not

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<sup>107</sup> "UK becomes first major economy to pass net zero emissions law" UK Government website, accessed April 5, 2020, <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>.

<sup>108</sup> "UK becomes first major economy to pass net zero emissions law" UK Government website, accessed April 5, 2020, <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>.

<sup>109</sup> "The Channel 4 News #ClimateDebate - world's first party leaders' debate on the climate" Channel 4 YouTube channel, accessed April 6, 2020, <https://www.youtube.com/watch?v=H6bJhKvFVw4&t=368s>.

<sup>110</sup> Labour Party, "It's time for real change *The Labour Manifesto 2019*," 13.

<sup>111</sup> "The Channel 4 News #ClimateDebate - world's first party leaders' debate on the climate" Channel 4 YouTube channel, accessed April 6, 2020, <https://www.youtube.com/watch?v=H6bJhKvFVw4&t=368s>.

revitalization of currently build ones.<sup>112</sup> Plaid Cymru has a similar approach to the strategies by other political parties in terms of mitigation of climate change, increasing biodiversity and transition to a greener economy. The difference is in their view of imbalances across the UK where London and the south of Britain is more economically powerful and politically stronger. Plaid Cymru wants to devolve more power and responsibility to the Welsh government “Economic powers currently reserved to Westminster that should be devolved to enable to Welsh Government to develop a more coherent economic development strategy.”<sup>113</sup>

The Scottish National party approach, with Nicola Sturgeon as a leader, is a net-zero target by 2045, 5 years earlier to the current target of the Conservative government.<sup>114</sup> “Scotland’s planning framework will not support development using unconventional oil and gas extraction techniques, including coal bed methane and hydraulic fracturing, commonly known as ‘fracking’. SNP also opposes new nuclear plants and propose implementations in a similar way to other parties in terms of biodiversity, renewables. SNP will priorities “investment on cleaner, cheaper forms of electricity generation, including reform of the UK support for renewables to ensure it takes into account wider economic considerations such as supply chain benefits, not just price”<sup>115</sup>

Jo Swinson from the Liberal Democrats party states in debate their similar ambition to achieve the target in 2045.<sup>116</sup> The Liberal Democrats manifesto attack at the current Conservative government. Liberal Democrats states

The Conservatives have shown themselves unfit to lead in response to this historic challenge. They have repeatedly flouted EU limits on air pollution and scrapped energy efficiency schemes that would reduce energy bills and end the scourge of fuel poverty They have cut support for renewable energy while trying to force fracking on communities that don’t want it.<sup>117</sup>

The Liberal Democrats not only blames the main political party of Conservatives but also the Labour party. “The failures of Conservatives and Labour are not only morally indefensible but economically illiterate.”<sup>118</sup> According to the manifesto, Liberal Democratic priorities in the next parliament will be:

An emergency programme to insulate all Britain’s homes by 2030, cutting emissions and fuel bills and ending fuel poverty.

Investing in renewable power so that at least 80 per cent of UK electricity is generated from renewables by 2030 – and banning fracking for good.

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<sup>112</sup> Plaid Cymru Party of Wales, “*General Election Manifesto 2019*,” 65.

<sup>113</sup> Plaid Cymru Party of Wales, “*General Election Manifesto 2019*,” 55.

<sup>114</sup> “World’s first party leaders’ debate on the climate”

<sup>115</sup> Scottish National Party, “*Strong Scotland, Manifesto 2019*” 32.

<sup>116</sup> “World’s first party leaders’ debate on the climate”

<sup>117</sup> Liberal Democrats, “*The Liberal Democrat Vision for Britain in Europe, Manifesto 2019*,” 13.

<sup>118</sup> “Plans for Britain’s Future,” Liberal Democrats, accessed April 10, 2020, <https://www.libdems.org.uk/plan>.

Protecting nature and the countryside, tackling biodiversity loss and planting 60 million trees a year to absorb carbon, protect wildlife and improve health.

Investing in public transport, electrifying Britain's railways and ensuring that all new cars are electric by 2030.<sup>119</sup>

One of the topics in environmental policy is the HS2. Transport and aviation contribute to the pollution and the HS2 is expected to connect main cities with a highspeed rail.

HS2 will release space on existing routes. That creates space for additional local, cross-country, commuter and freight services across the country. This will create more services and seats for rail users. It also takes hundreds of thousands of cars and lorries off our roads every year. In turn, reducing carbon emissions and improving air quality.<sup>120</sup>

The HS2 receives support across the parties except for the Green Party. The leader of the Green party Siân Berry stated, that the money could be invested in the local more efficient infrastructure.<sup>121</sup>

There is also a difference in the nuclear approach to achieve security of supply. "Security of energy supply is the resilience of the energy system to unique and unforeseeable events that threaten the physical integrity of energy flows or that lead to discontinuous energy price rises, independent of economic fundamentals."<sup>122</sup> The SNP leader Nicola Sturgeon stated in the debate that "Offshore wind is now the half the price of nuclear and I don't know why the Tories are still supporting the Nuclear Power". She was opposed by the Jeremy Corbyn saying that "There has to be a baseline of production of electricity from a totally sustainable source."<sup>123</sup> The country's two largest political parties tend to currently agree on having the nuclear energy in the energy mix to diversify the security supply. The Conservative manifesto states "We will maintain our Trident nuclear deterrent, which guarantees our security."<sup>124</sup> A Similar approach is from the Labour opposition where the manifesto explicitly says that new nuclear power is needed for energy security.<sup>125</sup> According to the OECD, "Nuclear power offers a high energetic density and an economically competitive electricity generation source. The electricity generated by nuclear is only slightly sensitive to the variations of the price of uranium, contrary to energy sources using fossil fuel."<sup>126</sup> OECD is the abbreviation for The Nuclear Energy Agency which is "unique forum where the governments of 33 democracies work together to

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<sup>119</sup> "Plans for Britain's Future," Liberal Democrats, accessed April 10, 2020, <https://www.libdems.org.uk/plan>.

<sup>120</sup> "What is HS2," accessed April 10, 2020, High Speed Two Ltd, <https://www.hs2.org.uk/what-is-hs2/>.

<sup>121</sup> "World's first party leaders' debate on the climate"

<sup>122</sup> Nuclear Energy Agency, "The Security of Energy Supply and the Contribution of Nuclear Energy" (OECD, 2010), 9.

<sup>123</sup> "World's first party leaders' debate on the climate"

<sup>124</sup> The Conservative and Unionist Party, "Get Brexit Done Unleash Britain's Potential, Manifesto 2019" 53.

<sup>125</sup> Labour Party, "It's time for real change The Labour Manifesto 2019," 14.

<sup>126</sup> Nuclear Energy Agency, "The Security of Energy Supply and the Contribution of Nuclear Energy" (OECD, 2010).

address the economic, social and environmental challenges of globalisation.<sup>127</sup> A Positive approach to nuclear energy is also expressed by Alex Chisholm. “And our approach to new nuclear has enabled us to contract for the first new nuclear plant in a generation, applying innovative thinking to the financial and operating model, and to confirm that we will enter into negotiations in relation to the proposed Wylfa project.<sup>128</sup> However, according to the UK government website, Wylfa project was postponed “to 31 March 2020 to allow further information in respect of environmental effects and other outstanding issues to be provided and considered.”<sup>129</sup> The OECD concludes that nuclear power

as a low-carbon source of electricity, nuclear energy is fully supportive of one the defining policy challenges of our time – the need to reduce climate change inducing greenhouse gas emissions. In a security of energy supply perspective, nuclear energy seems thus well-positioned to reduce import dependency and to stabilise cost as well as to contribute to the diversification of electricity generation technologies in a manner that overall improves the security of energy supply.<sup>130</sup>

According to the figure 1.0 with the energy mix, political manifestos together with the OECD conclusion, nuclear power will contribute to the UK energy sector in the foreseeable future.

The difference in policy by current political parties is the contemporary publicly expressed favour for gas and nuclear by the Conservative government. The Conservative manifesto says, “We will support gas for hydrogen production and nuclear energy, including fusion, as important parts of the energy system, alongside increasing our commitment to renewables.” The Conservative government has also currently placed a moratorium on fracking. “We will not support fracking unless the science shows categorically that it can be done safely.”<sup>131</sup> The difference is that the Labour party want to achieve this via state-owned bodies whereas the Conservative government want to achieve this via free-market and regulations. Despite these differences, all parties are sticking to the currently set net-zero carbon transition. They tend to compete with each other for the voter’s favour by setting more ambitious goals than their counterparts.

## **2.4. Climate Scepticism**

The previous Chapter focused on the green policy of political parties. This chapter will focus on different perspectives to anthropogenic climate change. The holding of doubts about climate

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<sup>127</sup> Ibid.

<sup>128</sup> See Appendix A, p 54.

<sup>129</sup> “National structure planning,” Gov UK, accessed April 11, 2020,

<https://infrastructure.planninginspectorate.gov.uk/projects/wales/wylfa-newydd-nuclear-power-station/>.

<sup>130</sup> Nuclear Energy Agency, “The Security of Energy Supply and the Contribution of Nuclear Energy” (OECD, 2010). 60.

<sup>131</sup> The Conservative and Unionist Party, “*Get Brexit Done Unleash Britain’s Potential, Manifesto 2019*” 55.

change is often referred to as ‘scepticism’.<sup>132</sup> In the article called *What is climate change scepticism? Examination of the concept using a mixed methods study of the UK public*, two types of scepticisms are introduced. “Epistemic scepticism, relating to doubts about the status of climate change as a scientific and physical phenomenon; and response scepticism, relating to doubts about the efficacy of action taken to address climate change.” This study was conducted among the public in the UK. The study finds, that scepticism among the public about a response to climate change is strongly associated with a lack of concern.

This is important because, whilst there are clear arguments which can be made concerning the level of scientific consensus and degree of confidence in an anthropogenic component to climate change, doubts concerning personal and societal responses to climate change are in essence more disputable.<sup>133</sup>

This survey was taken in 2013 and there are mentions about the lack of political response, for example one participant on COP15 stated that “unfortunately we’re in the hands of the world leaders”. It can be argued that this was prior to *The Paris Agreement* where 195 parties have signed the treaty, therefore they are obliged to the treaty. On the basis of the previous chapter, the current political scene in the UK is also heavily focused on mitigation on the state level.

There were some oppositions before the passing the CCA2008, for example, Christopher Cope from the Conservative opposition, who voted strongly against the bill. He cited a report where the United Kingdom will be responsible only for 1.2% of the total emissions. “Even if we eliminated that 1.2 per cent, ‘he argued,’ would it make any difference to the world? I do not think that it would.”<sup>134</sup> Conservative MP Peter Lilley, who also voted against the bill stated that “temperature reconstructions are flawed if not faked” and that “climate models are unreliable”.<sup>135</sup>

One of the biggest sceptics is notably Nigel Lawson. “Lord Lawson of Blaby was Chancellor of the Exchequer from 1983–89 and served as Secretary of State for Energy from 1981–83.” this part of the thesis will use his essay *The Trouble with Climate Change* to illustrate a different perspective to contemporary policies and approach. Nigel Lawson has also founded

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<sup>132</sup> Stuart Bryce Capstick, Nicholas Frank Pidgeon, “What is climate change scepticism? Examination of the concept using a mixed methods study of the UK public,” *Global Environmental Change* 24, no.1 (January 2014): 389-401.

<sup>133</sup> Stuart Bryce Capstick, Nicholas Frank Pidgeon, “What is climate change scepticism? Examination of the concept using a mixed methods study of the UK public,” *Global Environmental Change* 24, no.1 (January 2014): 389-401.

<sup>134</sup> “Climate scepticism in parliament,” Campaign against climate change, accessed April 5, 2020, <https://www.campaigncc.org/parlsceptics>.

<sup>135</sup> “Climate scepticism in parliament.”

the Global Warming Policy Foundation (GWPF) in 2009. The official website of this foundation explains the origins of this organization in Lawson's words.

Last year I brought out a book on global warming which (rather to my surprise) generated an enormous feedback, almost all of it positive. A number of those who wrote to me, who included scientists, engineers and others with an experienced background, urged me not to leave the matter there but to follow it up in some way. It was this that led me to found the think-tank we are launching today, which can achieve far more than I could on my own.<sup>136</sup>

The GWPF refer to themselves as an educational charity which "while open-minded on the contested science of global warming, is deeply concerned about the costs and other implications of many of the policies currently being advocated."<sup>137</sup> According to the website, the foundation is funded by "voluntary donations from a number of private individuals and charitable trusts. In order to make clear its complete independence, it does not accept gifts from either energy companies or anyone with a significant interest in an energy company."<sup>138</sup> This policy is also explained in his essay where Lawsons explains the reason for such behaviour. "The reason why we do not reveal the names of our donors, who are private citizens of a philanthropic disposition, is in fact pretty obvious. Were we to do so, they, too, would be likely to be subject to the vilification and abuse I mentioned earlier."<sup>139</sup>

The GWPF claims to have different principles for themselves apart from other stakeholders in the climate debates as not having "an official or shared view about the science of global warming" or having its member "cover a broad range of different views, from the IPCC position through agnosticism to outright scepticism" and GWPF "regard observational evidence and understanding the present as more important and more reliable than computer modelling or predicting the distant future."<sup>140</sup>

The current energy political approach in the UK is heavily focused on the climate change, more precisely on increasing warmth of the earth. Nigel Lawson's arguments go against the current trend. The approach to climate change by Lawson is unpopular and often criticised. After having Lawson invited on a BBC discussion, the channel did receive a number of organised complaints "some of them, inevitably, from those with a vested interest in renewable

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<sup>136</sup> "Who we are," The Global Warming Policy Foundation, accessed April 7, 2020, <https://www.thegwpf.org/who-we-are/>.

<sup>137</sup> "Who we are," The Global Warming Policy Foundation, accessed April 7, 2020, <https://www.thegwpf.org/who-we-are/>.

<sup>138</sup> "GWPF Who we are."

<sup>139</sup> See Appendix D, p 74.

<sup>140</sup> "GWPF Who we are."



energy – accusing me, among other things, of being a geriatric retired politician and not a climate scientist, and so wholly unqualified to discuss the issue.”<sup>141</sup>

Nigel Lawson does not dispute the current climate change and the greenhouse effect but stresses the issue of the so-called climate change alarmism. “Alarmism is a feature not of the physical world, which is what climate scientists study, but of human behaviour; the province, in other words, of economists, historians, sociologists, psychologists and – dare I say it – politicians.”<sup>142</sup> It states that the danger is for dissenting politicians or climate scientist who could get their career threatened by going against the alarmism. First two arguments in the essay could be put under the epistemic scepticism. The author doubts about climate sensitivity to carbon or about the carbon-dioxide cloud amplifying effect.<sup>143</sup> As it is said before, the GWPF disputes the computer predictions and tends towards an empirical basis. Lawson gives the precedent of warming the earth in history. He states that “A thousand years ago we were benefiting from the so- called Medieval Warm Period, when temperatures are thought to have been at least as warm, if not warmer, than they are today.”<sup>144</sup>

Lawson also disputes the predictions made to foresee the warmth on the example of report by the IPCC where the climate change should accelerate due to the evolution of Chinese economic which in his words did not. “global warming has latterly been occurring at the rate of – wait for it – 0.05°C per decade, plus or minus 0.1°C. Their figures, not mine. In other words, the observed rate of warming is less than the margin of error.”<sup>145</sup> In the end, Lawson concludes, that the carbon dioxide may have only a moderate effect on climate change.

Another advocacy for the uses of fossil fuels Lawson uses is poverty. He emphasizes that poverty has much bigger health impact than the usage of fossil fuels. Usage of fossil fuels is the cheapest mean of energy. While harvesting energy from these sources, developing countries can achieve the industrialization and economic growth much faster. Lawsons says, that putting the burden on the developing countries will slow down the transition process.<sup>146</sup>

Lawson has also the same argument as Christopher Cope about the small share the UK has on global warming. This response scepticism can be observed on his statement that China, as the biggest emitter won’t implement any policies in the upcoming COP in Paris.

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<sup>141</sup> See Appendix D, p 73.

<sup>142</sup> See Appendix D, p 74.

<sup>143</sup> See Appendix D, p 75.

<sup>144</sup> See Appendix D, p 75.

<sup>145</sup> See Appendix D, p 75.

<sup>146</sup> See Appendix D, p 77.

For the developing world, the overriding priority is economic growth: improving the living standards of the people, which means among other things making full use of the cheapest available source of energy: fossil fuels.

The position of China, the largest of all the developing countries and the world's biggest (and fastest growing) emitter of carbon dioxide, is crucial. For very good reasons, there is no way that China is going to accept a binding limitation on its emissions. However, China did sign the *Paris agreement* and ratified it later.<sup>147</sup> A similar attitude can be observed in Peter Lilley speech in Oxford Union society stating that fossil fuels are essential for the initial development and putting example of south-African countries about the economic viability. Lilley states that renewables are unstable and expensive and that the bigger poverty problem will be solved quicker with the hydrocarbons.<sup>148</sup>

“Global warming orthodoxy is not merely irrational. It is wicked.”<sup>149</sup> Lawson compares climate alarmism to religion. Where the situations or events could have a different explanation, people use it to extend the fear of climate change.

The contemporary version is that, as a result of heedless industrialisation within a framework of materialistic capitalism, we have directly (albeit not deliberately) perverted the weather, and will duly receive our comeuppance.<sup>150</sup> A similar approach can be observed in Václav Klaus's, who is also being a climate sceptic himself, speech in 2012 in Erica. He stated that “The climate doctrine is an ideology, maybe almost religion.” and that today's discussions around climate change are not based on science but on conflict of ideologies.<sup>151</sup>

Sceptics look at a different perspective on this topic. Sceptics discuss not only the disadvantages that the changing of climate may bring but also advantages in the form of faster development of countries or greening of the planet in the most parts of Sahel.<sup>152</sup> Sceptics also question the benefits of renewables and whether they are clean, often together with economic implications. The reoccurring theme is also a statement that this green doctrine is ever-present and too strong. There is also an occurrence of suspicion on the precision of measurements or warning about economic impacts.<sup>153</sup>

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<sup>147</sup> United Nations, “*Paris Agreement*,” (COP 21, Paris 2015), Articles 9–11, 13–16.

<sup>148</sup> “Climate Change Debate | Peter Lilley MP | Proposition,” Oxford Union, accessed April 8, 2020, <https://www.youtube.com/watch?v=Z5U2wDWpx6M>.

<sup>149</sup> See Appendix D, p 83.

<sup>150</sup> See Appendix D, p 82.

<sup>151</sup> “About planetary threats,” Václav Klaus speeches, accessed April 9, 2020, trans. Michal Marek, <https://www.klaus.cz/clanky/4425>.

<sup>152</sup> See Appendix D, p 77.

<sup>153</sup> “Climate Change Debate | Peter Lilley MP | Proposition,” Oxford Union, accessed April 8, 2020, <https://www.youtube.com/watch?v=Z5U2wDWpx6M>.

## Conclusion

An attempt to analyse contemporary energy policy in Great Britain was made on the basis of four texts included in Appendices. In the chapter 2.1. Rise of renewables, current trends in the change of energy mix is observed. There is a significant decline in the usage of coal, which is substituted by a new hydrocarbon – gas and by renewable sources, mostly wind. Majority of wind generation facilities is located in Scotland, whereas the majority of sun generation facilities is in the south of the UK. This transition towards different energy sources is due the multinational effort by United Nations and also by the UK government who present themselves as the first nation which has implemented legal obligations on cutting carbon and mitigating climate change. This primacy in mitigating climate change is praised by the UK government and by the communities, who supports it. The turning point for the UK towards this green transition can be observed already in 1977 during the James Callaghan Labour Government.

The thesis also concludes that the trend of increasing renewable generation will continue. This is not only based on recently changed *Climate Change Act 2008*, which is even more ambitious, but also on the manifestos and climate debates where the global warming orthodoxy is ever-present. Great Britain will also continue to have the nuclear power in the energy mix as both main parties are supportive, the Conservative party openly, the Labour party only partly. Labour declared support until new generation facilities prove to be stable by themselves, not endangering the security of supply.

The free-rider problem mentioned by climate sceptics is partly contested by the *Paris Agreement* in the thesis. This agreement has been signed by the majority of states contributing to global warming except for the United States, which has withdrawn. However, some sceptics suggest that the obligation under the agreement are not effective or too low. Further global efforts will definitely be needed to address future climate change.

The thesis has also inspected other energy policies which are tied to contemporary climate change. The UK is trying to conserve more energy via different instruments. These instruments are creating new ways of transport, addressing fuel poverty, increasing biodiversity, improving agriculture, adjusting marine programs or putting a moratorium on fracking. Despite the economic implications from this transition, it is fundamentally right to go towards a more sustainable future. The UK has created a really strict framework, which needs to be followed by other nations in order to succeed globally.

## Resumé

Bakalářská práce se zabývá vývojem energetické politiky ve Velké Británii. Energetická politika je důležitým tématem, jelikož nepřímo ovlivňuje život každého z nás. Vývoj energetické politiky ve Velké Británii prošel značným vývojem. Práce začíná popisovat vývoj od roku 1880, což je období významných technologických pokroků od známých osobností jako byl například Thomas Edison. V teoretické části práci je popsán vývoj od první elektrické elektrárny až do roku 2015, kdy byla dojednána Pařížská dohoda v rámci rámcové úmluvy OSN o změně klimatu. Kapitoly v teoretické části jsou pojmenovány podle významných událostí, jež významně ovlivnily vývoj energetické politiky. Praktická část se orientuje spíše na současnost. Na základě analýzy zvolených textů od významných politiků Anthonyho Giddense a Nigela Lawsona, projevu od Alexe Chisholma a také článku Johna Woodliffa se snaží zmapovat diskuzi, která nyní zaznívá na poli energetiky, ekologičnosti a udržitelnosti.

Teoretická část začíná kapitolou o první komerční elektrárně Hollborn Viaduct, postavené ve Velké Británii americkou firmou Thomase Edisona. Tento počín vyvolal velký ohlas, který byl ale o 2 roky následován první legislativou ze strany vlády. Na rozdíl od jiných zemí, kde se elektrický průmysl rozvíjel zároveň s Velkou Británií, legislativa vyžadovala vládní povolení. Tento krok je viděn jako zpomalení samotné elektrizace, kde v porovnání s ostatními zeměmi byly tyto náležitosti řešeny na místní úrovni, ne na státní. Vláda v tomto období také chtěla mít dohled nad těmito strategickými surovinami a komoditami jako bylo uhlí nebo plyn. Následující kapitola je z roku 1926, kdy byla vydána další legislativa. Ta měla za účel určit distributorům na poli energetiky standardizovanou frekvenci a napětí. Nutno zmínit také celostátní spolupráci na propojení celé Velké Británie rozvodnou sítí. Následující legislativy za 20 let měly za následek znárodnění energetické průmyslu. Energetický průmysl v tomto období byl řízen územními energetickými odbory. Později měla státní správa dohled nad celým průmyslem, od těžby až po distribuci koncovému zákazníkovi.

Další kapitola pojednává o významné listině z roku 89. Jedná se o éru privatizace za vlády konzervativců v čele s Margaret Thatcherovou. Výroba elektrické energie byla přerozdělena mezi 3 nové firmy. Británie často prezentuje své prvenství v rámci privatizace a tu často vyzdvihuje. Hlavní myšlenkou pro energetickou politiku byl volný obchod, který má zajistit konkurenci mezi soukromými subjekty na trhu. To by mělo mít za následek menší administrativu, efektivnější vývoj a také příznivější ceny pro koncového zákazníka. Tato legislativa obsahuje také nový správní orgán pro regulaci tohoto průmyslu. Následující legislativy a úmluvy jsou zaměřeny na změnu klimatu. První z nich je Rámcová úmluva OSN

o změně klimatu. Tato úmluva je důležitá, jelikož velmi ovlivňuje nejen evropské státy, ale i Velkou Británii. Hlavní myšlenkou této úmluvy je přiznání faktu, že vyšší podíl skleníkových plynů má za následek globální oteplování. Země, které tuto úmluvu ratifikovaly se snaží zmírnit antropogenní klimatickou změnu. V rámci této úmluvy je zmíněn významný Kjótský protokol. Průmyslové země se v něm zavázaly snížit emise skleníkových plynů o 5,2 %. Následující kapitola je o legislativě z Velké Británie. Ta v roce 2008 dala první státem vynutitelný limit na snížení oxidu uhličitého. Poslední kapitola v teoretické části práci se zabývá Pařížskou dohodou, jenž zavazuje státy, aby nárůst teploty nepřekročil hranici 1,5 °C oproti hodnotám před průmyslovou revolucí. Všechny země také musí usilovat o dosažení globálního zlomu v emisích skleníkových plynů.

Praktická část se soustředí na začátku zmíněné eseje, proslov a článek. První kapitola se zabývá trendem vzestupu obnovitelných energetických zdrojů. Tato část je věnována trendu, jež nepochybně utváří dnešní energetickou politiku na tomto území. Jako hlavního nepřítele si Británie zvolila uhlí a jeho využívání. Za poslední roky se jí díky legislativním krokům a jiným nástrojům podařilo značně snížit podíl uhlí v energetickém mixu. Ten byl zastoupen hlavně méně škodlivějším plynem. Tento úbytek se také Británie snaží nahradit obnovitelnými zdroji – biomasou, větrnými elektrárnami a fotovoltaickou energií. Tím se snaží dostat svého cíle nulových emisí oxidu uhličitého daném v zákonu o změně klimatu z roku 2008 spolu s Pařížskou dohodou. Zajímavé je, že největší zelený podíl na tomto energetickém mixu má ze Spojeného Království momentálně Skotsko. To v roce 2019 spotřebovávalo 75% celkové energie z obnovitelných zdrojů, přesněji z větrných elektráren. Plyn má v energetickém mixu stále své místo z ekonomických důvodů. Celá tato politika je v souladu s názory sociologa a politika Anthonyho Giddense který ve své knize a projevu *Politics of Climate Change* často varuje před klimatickou změnou a vyzývá k akci. Další kapitola se zabývá vývojem energetické politiky. Enviromentalismus ve významu braní zřetele na ochranu prostředí, má kořeny už v projevu labouristů v roce 1977. Kapitola se zabývá nejen vývojem ale také Velkou Británií, která se hrdě hlásí a vyzdvihuje výhody privatizaci tohoto průmyslu.

Následující kapitola se zabývá politickými stranami, jejich prohlášeními a také politickou diskuzí mezi představiteli těchto stran. Politická diskuze v energetice je velmi silně zaměřená na dosahování environmentálních cílů stanovených stranami. Strana labouristů se snaží například napadnout své rivaly tím, že slibují dosažení zákona o změně klimatu z roku 2008 o 5 let dříve. Většina politických stran se nicméně na fundamentální rovině shoduje, rozdíly je v nástrojích a politice, které toho chtějí dosáhnout. Strana konzervativců tíhne k volnému

trhu, u kterého argumentuje jeho efektivnost. Strana labouristů například s politickou stranou Walesu tíhnou k levicovějšímu řešení, kde by toto odvětví spravoval a reguloval přímo stát.

Poslední kapitola se věnuje takzvaným klimatickým skeptikům. Nabízí jejich rozdělení do různých skupin podle postoje ke klimatické změně a názoru. Tato část pracuje nejvíce s esejem konzervativce Nigela Lawsons *The Trouble With Climate Change*. Nigel Lawson je jedním z nejvýznamnějších skeptiků v dnešní Velké Británii a zakladatelem fondu globálního oteplování, který vystupuje proti dnešnímu hlavnímu proudu. Skeptici nemusí nutně nevěřit v existenci globálního oteplování. Často jsou spíše skeptičtí k tomu, zda-li je člověk nebo spíše celé státy schopni koordinované činnosti, která by přispěla ke zmírnění tohoto globálního oteplování. Častým jejich tématem je také obrovská neefektivita daných regulací a jejich vysoká finanční náročnost, která se mine s kýženým účinkem. Iniciativa v rámci zmírňování klimatu by se mohla využít lepším způsobem a, to např. pomocí právě se rozvíjícím zemím, jež by dosáhli rychlejšího ekonomického růstu, což by mělo za účinek rychlejšího přechodu na zelenou energii. Lawson přirovnává dnešní debatu k náboženství. V dnešním více ateistickém světě, kde lidé, politici a novináři zbytečně obviňují z katastrof právě klimatickou změnu. místo boha.

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## Appendices

### Appendix A

Alex Chisholm's speech

I am delighted to be here this morning with such an illustrious line-up of speakers. The summit should be very enlightening, and this is a great time to have it.

In just over 3 weeks, Secretary of State Greg Clark and I will be celebrating with colleagues in the department the second anniversary of BEIS. We are one of the youngest departments, with a remit cutting across government and the small task of reshaping the British economy.

And when we were formed, it was clear that in delivering this ambition we would need to look to one sector in particular – the energy market. The sector is in the midst of a transformation as the top-down model focused on centralised generation gives way to a new and more dynamic market. From the rise of renewables and small-scale generation, to the digital revolution and our smart meters programme, energy policy is evolving rapidly and challenging historic assumptions.

In recent years, there has been much focus on the energy “trilemma” of security of supply, cost, and decarbonisation. This has been portrayed as presenting trade-offs – and historically this has indeed often been the case.

My argument today is threefold:

1. the UK has led the world in the transformation of the energy sector over the last 40 years
2. we stand on the cusp of the next transformational change in the energy sector, and that this can move us beyond the trilemma; and
3. the UK is uniquely well-placed to lead that next transformation - and in doing so, we can deliver real economic benefit to the UK as part of our Industrial Strategy

The UK has been at the cutting edge of innovation in energy for the last 40 years. Through the 20th century, the term “energy markets” was a misnomer – with a consensus around centrally planned systems and firm state control.

Britain was at the forefront of the transition to a market-based approach. Nigel Lawson's landmark speech in 1982 summarised the change: as he said, “our task is to set a framework which will ensure that the market operates with a minimum of distortion and energy is produced and consumed efficiently”.

That approach presaged the privatisation of the market – unleashing a wave of competition and market innovation and replicated in markets across the world. And the benefits of that privatisation are clear.

Network costs have fallen 17% since privatisation at the same time as improving system reliability; and we now have over 65 suppliers in the retail market, with the number of consumers switching suppliers hitting record highs. From 1990 to 2005, generation grew from

298 to 377 terawatt hours and domestic retail energy prices fell roughly 45% in real terms over the same period.

With privatisation came regulation; and the UK led again with the introduction of RPI-X for natural monopoly regulation and liberalisation for potentially competitive parts of the market. This has heavily and positively influenced the design of the EU's energy market framework.

The second major wave of change has been more recent – the transition to a secure system which is also low-carbon. Again, the UK has been among the world leaders.

The landmark Climate Change Act made us the first country in the world to set a long-term, statutory emissions reduction target.

Electricity market reform delivered new instruments to ensure security of supply, and to slash the costs of decarbonisation – recognising the need for an active role for government but using competition to minimise costs.

And our approach to new nuclear has enabled us to contract for the first new nuclear plant in a generation, applying innovative thinking to the financial and operating model, and to confirm that we will enter into negotiations in relation to the proposed Wylfa project.

It is worth remembering that many argued that we did not need a capacity market, and that renewable generation could not compete for support. But what we have seen is many other countries following our lead on security of supply, and the costs of offshore wind cut to under £60 per megawatt hour in the most recent auction – unimaginable a few short years ago.

The UK also led the way in the introduction of emissions trading, introducing an emissions trading scheme three years before the EU ETS. Then, in 2013, we delivered a carbon price floor programme to drive low-carbon investment.

These measures have enabled us to lead the world in taking coal off the system, without imperilling our security of supply – a transition we have managed smoothly, without any major supply interruptions.

Already this year we have had more coal-free hours in 2018 than in the whole of 2017 – an enormous achievement, and totemic of the profound change in our power sector in recent years.

But BEIS recognises the need for a relentless focus on keeping costs down for consumers, and, as DECC before it, has taken multiple steps to deliver that:

- our energy price cap is in the final stages of development, and the Bill has received the support of Parliament. This will guarantee protection for 11 million households currently on the highest energy tariffs
- we have compensated our most energy-intensive users to help maintain competitiveness
- we have worked to reduce the impact of renewables on bills
- we have overseen the programme to deliver smart meters, with 12 million installed to date
- and we have supported energy efficiency – recognising that the cheapest unit of energy is always the one that you don't use. Indeed, the Energy Company Obligation has been

responsible for installing 2.2 million energy efficiency measures in 1.7 million households since 2013.

The UK has been at the forefront of both these key shifts over the last 40 years – first, to a market-based system, and second, to a system which helps us to resolve the trilemma – integrating large amounts of renewables, while maintaining security of supply and keeping costs down.

But our work to date is not enough. We now need to place ourselves at the front of the pack for the next big transition. That is the challenge set by our reforming Secretary of State, Greg Clark.

And now is the time to do so. The Climate Change Act has a baseline of 1990, and a target date of 2050 to have reduced our emissions by 80%. We are approaching halfway through that timeline. According to the independent Committee for Climate Change, last year we had reduced our emissions by 42%, more than halfway to that 80% goal.

As world leaders in innovation in technology, systems and market design, with a historic and profound influence on the energy sector, we must challenge ourselves to look ahead to the next exciting stage in the long journey.

We must discern and respond to the changes to the system arising from falling technology costs, increasingly distributed energy sources and the rise of the smart digital energy system. And we must deliver all this while ensuring our costs are as low as possible, ensuring that we are competitive in global markets as we leave the European Union.

That is why, last year, the government asked Professor Dieter Helm to carry out his review of the cost of energy. Dieter's report set out his view that the complexity of the system has added unnecessary costs, and that significant change is needed to exploit the benefits of future advances in technology. Following our call for evidence, we are carefully considering Dieter's recommendations and their implications for our energy strategy.

Our approach will be aligned with the key technological changes which can help to cut costs, cut carbon, and maintain security of supplies – and drive towards a future where the three corners of the trilemma work in concert, not opposition.

For example, decarbonisation offers us another advantage besides emissions reduction; it provides an opportunity to ensure we have a diverse and resilient energy mix, which is not too dependent on any single source. And our approach in future must foster that optionality, while ensuring that the technologies we support meet the three criteria set out by Energy Minister Claire Perry:

- can we see the potential for significant cost reduction?
- does this have the potential to deliver large-scale carbon emission reduction?
- and is this an area where the UK can benefit from a comparative advantage, leading to increased growth and exports?

The third of these criteria brings me to the Industrial Strategy. Too often in the past the links between energy policy and economic policy have been too weak. The creation of BEIS offers a unique opportunity to bring those objectives together. What we do to secure our energy policy

objectives should be delivering our Industrial Strategy ambitions – the world’s most innovative economy, good jobs and greater earning power for all, modern infrastructure, the best place to start and grow a business.

We know that the economic opportunities for the UK are there to be seized. Our record is strong.

Since 1990, we have reduced our emissions by over 40 percent while growing the economy by over two thirds – the best performance in the G7 on a per person basis. The UK’s clean economy already supports almost 400,000 jobs and by one estimate, could grow at 4 times the rate of GDP.

And my department, working with people across the sector, have helped to support supply chain investment in offshore wind and nuclear; innovative approaches in retail and supply; investments in battery innovation and storage technologies; and development of a potentially world-leading capability in smart systems.

But this is only the beginning. The future opportunities are huge – out of the world’s projected \$10 trillion investment in power generation over the next twenty years, over 85% is expected to be in zero-carbon sources.

Electric vehicles are projected to make up over half of global car sales by 2040, and in 2017, one in eight electric cars sold in Europe was made in the UK. By 2060, the global floor area in buildings is expected to double, with an estimated investment potential of \$16 trillion in green buildings across 21 emerging markets.

Of course, we still need to make big changes – not least to our heating systems, which are currently still heavily dependent on hydrocarbons.

But we know that we should not be intimidated by the challenge, as we remember the UK’s proud history of being ahead of the curve in the energy sphere.

That is why Clean Growth is one of our Industrial Strategy Grand Challenges – helping to ensure that we maximise the economic benefits to the UK of the low-carbon transition.

Through the Industrial Strategy and Clean Growth Strategy, we are confident we can move towards an economy where low-carbon is synonymous with low-cost. And by harnessing new technologies, we can develop solutions that help meet future demand while keeping down costs.

The role of BEIS is as an agent for this change, creating markets which drive innovation and competition, supporting the conditions for growth, and keeping costs down for consumers. And we want to work with you, in industry, in research, in the investor community and elsewhere in government, to deliver that.<sup>154</sup>

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<sup>154</sup> Alex Chisholm, “*Energy policy now and the direction it’s headed,*” accessed February 2, 2020. <https://www.gov.uk/government/speeches/energy-policy-now-and-the-direction-it-s-headed>.



## Appendix B

Anthony Giddens – The Politics of Climate change

My key argument in this lecture is that we – as individuals, communities, nations and global citizens – need a resurgent effort to deal with the threats created by climate change. We have a limited window of opportunity in terms of time to do this. Dramatic climate transformations are creating risks, not just for our remote future but for our *immediate future*.

At the time of the first publication of my book, *The politics of climate change* (Giddens, 2009) seven to eight years ago, there was a great deal of optimism that there would be concerted and organised alliances between countries to reduce the carbon emissions which are causing the earth's climate to warm up. It was a time when Al Gore's book and film, *An inconvenient truth* (Paramount Pictures, 2006), were resonating around the world with audiences of millions, earning him a Nobel Prize for the endeavour. In 2009, under the auspices of the UN, there was a major international meeting to try to reach international agreements on how to limit carbon emissions. It was the fifteenth such conference (COP 15) (UN, 2009), but by far the largest ever held. Some 115 world leaders attended, including President Obama and Hillary Clinton. The location was in Europe – in Copenhagen, a significant location because the EU saw itself as the leader in developing active climate change policy.

There was widespread anticipation among climate change activists around the world that the Copenhagen meetings would produce a set of internationally binding agreements. The outcome, however, was something of a fiasco. Unfortunately, no agreement was reached, and a rift deepened between the developed and developing countries. At the last minute a small group of state leaders got together and drew up a short agreement – the Copenhagen Accord, which was in the end endorsed by most of the range of countries represented at the conference. The EU was not represented at the meeting that drew up the Accord – a very severe dent to its prestige and influence. The Accord had little, if any, impact of an enduring kind on global emissions. Not only were all the hopes that had been vested in this particular meeting dashed, but the situation was actually worse afterwards, precisely because so much emotional effort had been invested. Subsequent UN meetings were muted, inconsequential affairs.

So what has happened since then? Significant advances have been made in the science of climatology. Our understanding of the influences causing the world to warm up, and what its likely consequences will be, has become much more robust (for example, Rockström et al, 2009). The latest studies from NASA (National Aeronautics and Space Administration), the American space organisation, which monitors the level of carbon dioxide and other greenhouse gases in the atmosphere, shows that 2014 was the warmest year globally since records began in 1880 (NASA, 2015). Apart from 1998, the ten warmest years in recorded history have all occurred since the year 2000. It is important to recognise that our means of measuring the advance of climate change are many – there is not just a single measure. For example, the warming of the atmosphere is the most often quoted indicator, but NASA gives about 20 different indices of the changing of the world's climate. These include satellite measurements from inner space; satellite measurements from further out in space; changes in the Arctic, particularly the warming of the oceans; the melting of the glaciers across the world; and the acidification of the oceans, among others.

Global warming is likely to produce an increasing incidence of extreme weather events of all types across the world, including greater aridity in some areas, floods and turbulent weather in others. To take an example, in the last five years there has been an extreme drought in California

such that the state is facing a massive water shortage (US Drought Monitor, 2014). This is not only due to climate change, but it is almost certainly influenced by it. In Australia and in Latin America there has also been widescale and sustained drought. It is not possible to prove conclusively whether any particular weather event is the result of climate change, but when you look at the statistics of extreme weather events, it is difficult not to conclude that they are becoming more frequent and more radical across the world (for example, IPCC, 2013, 2014). A crucial thing to recognise about climate change is that, as far as we know, it is irreversible. Short of some technological innovation which no one can anticipate, there is no way of getting greenhouse gases out of the atmosphere on a large scale, once they are there.

The likely consequences of humanly induced climate change could vary greatly according to how robust the earth we inhabit is. Here there are quite discrepant views. The climate change sceptics – those who either doubt that climate change is happening at all or see its consequences as minor – see the earth as robust and impermeable. Nothing human beings can do is likely to influence it too much. Those in the green movement tend to see the earth's ecosystems as inherently fragile and human activities as damaging to them. However, there is a third and even more disturbing version of what we are doing to the earth suggested by some scientists. Nature, they suggest, is like a wild beast. We humans are busy prodding it with sticks, with the result that it will react violently (for example, Broecker, 1987). It is an even more disturbing view of the implications of climate change than the view of straightforward ecological

damage. Climate change policy is all about containing risk. The risks suggested by the third view must be taken seriously.

We should not confuse risk and uncertainty. What is not known, because there are uncertainties, is the full level of danger that climate change poses. The findings of the International Panel on Climate Change (IPCC, 2013, 2014) that gathers the scientific evidence every few years, forecasts different scenarios. Some scenarios show that the impact of climate change might be relatively limited – if we get lucky, or, of course, if practical measures are taken on a global level that contain carbon emissions. However, it is crucial to see that uncertainty cuts both ways. The impact of climate change might be greater – it might be more dangerous – than the majority of the scientific community currently believes. Science is largely a conservative enterprise, almost by definition.

Existing examples of extreme weather patterns and their impact on human life amply illustrate the sheer power of nature. Recently, there was the cyclone in Vanuatu in the southwest Pacific where there were winds with gusts of over 200 miles per hour. Large parts of the island were flattened. A reasonably cautious viewpoint of the future might argue that humanity tampers with such powers at its peril. On the level of collective humanity we are tampering with forces of an awesome kind. The consequences will not just fall on future generations – they are also, to some extent, already happening in the present. There has been no parallel issue to that of humanly induced climate change for any previous civilisation. No previous society has intervened in nature even remotely to the degree to which we do on an everyday basis. It could be argued, as some geologists do today, that nature is no longer nature because it is so thoroughly infused with human intervention and human activity. We have entered the age of the Anthropocene.

There is a seeming contradiction here. While the science has become more robust and the risks have become clearer over the past seven or eight years, public opinion seems to have moved in the other direction, at least in the industrial countries. Surveys indicate that views on how

dangerous climate change is, and whether actions should be taken in the near future to contain it, have moved in the opposite direction to the main scientific findings (for example, Johnston and Deeming, 2015). Most citizens, in other words, seem less worried about the dangers of climate change than they were a few years ago. Why should this be? First, as everybody knows, there are quite powerful interests involved, especially among some of the fossil fuel companies. These have actively deployed disinformation, at least in some countries, to try to mute public awareness of risk (for example, Frumhoff and Oreskes, 2015). There is something of a similarity here between climate change and smoking, where there was a long-term attempt by the tobacco industry to cover up the consequences of smoking.

The second reason – more important than the first, in my view – is precisely that the findings on the dangers of climate change are filtered through science, to be more precise, through the findings of some 10,000 or so climatologists across the world. There has never been an issue before where science has had this pivotal political and consequential role in global policy-making. I am not myself a climatologist. As someone studying the politics of climate change, I have mastered some of the relevant science of climatology – but to nothing like the level of a professional climatologist. Most of the lay public are much more remote from the findings of climatology and science. It isn't surprising that the climate change sceptics, who represent a tiny proportion of professional climatologists, are able to make a considerable impact on public opinion.

Third, there is a fundamental 'free rider' problem. Britain only contributes less than 2 per cent of total global emissions. Why, it can be – and is – argued, should the UK lead the climate change campaign? Every nation, or group of nations, could argue that they will not act until others do, which is effectively what happened at Copenhagen. The free rider issue is a big obstacle for the collective politics of climate change and there is no easy way of overcoming it. Finally, there are real issues around economic development. The rich countries have been responsible for most of the greenhouse gas emissions that have entered the atmosphere. Their very position of affluence has been created through their embrace of fossil fuels and other sources of climatic contamination. Hence they should almost exclusively shoulder the burden of reducing emissions, even at a cost to their own economic position. The poorer countries should have the same chance to develop their economies that the industrial states have enjoyed. The rich part of the world, it can be said, cannot argue for the closure of avenues of development that they themselves have used to such effect.

These are powerful influences indeed and account for a good deal of the paralysis that has affected world climate change policy. However, as I argued in *The politics of climate change*, the prime reason for the dislocation between public concern and the findings of the science of climate change is none of these things. It is what in the book I presumptuously termed 'Giddens's paradox'. Since no previous generation has ever had to confront the problem of human-induced climate change before, it is hard for the public to accept it as a reality, let alone an urgent problem, when stacked up against the diversity of other problems the world has. For reasons already given, we do not know the true level of risk in advance. In traditional risk situations the situation is often quite different. Every time a person steps into a car, it is possible to say what his or her chances are of being involved in an accident. With climate change, however, this cannot be done because there is not the past experience to draw on. It has an 'all-too-late' quality. The paradox lies in the fact that, as collective humanity, we might wait until the destructive potential of climate change is irrefutable. But by then it will by definition be too late, since – at least so far as we know at the moment – it is irreversible.

In 2015, the United Nations climate change body is meeting again. It will be the twentieth such annual gathering (COP 20). For the first time since Copenhagen, the conference will take place in Europe, this time in Paris. Seeking to get ahead of public opinion, as they must indeed attempt to do, and with the scars of Copenhagen to some extent healed up, political leaders are trying to once more secure binding international agreements to curb emissions. Al Gore is visible again. He is planning a range of concerts and other global events designed to get some billion people onto the streets to put pressure on the leaders.

What are the chances of achieving what was not achieved in Copenhagen seven or eight years ago? The outcome could be different because the major actors will not want a repeat of that debacle and will be conscious of what produced it. The EU leaders will be all too aware of their lack of influence last time and will not want to repeat that. Over the period of the last seven years significant changes have happened so far as the Chinese leadership is concerned. At the time of COP 15, the Chinese were very cautious about making firm promises to reduce their emissions. Since then, they have changed their position very substantially. They now see climate change as inherently dangerous and related to high levels of ordinary air pollution in China, a huge issue for them. The journalist, Chai Jing, has produced a series of programmes called *Under the dome* (Jing, 2015), which document the consequences for health and other aspects of life of the massive pollution in Chinese cities. It has gone viral on the internet. Although it has been censored by the Chinese state, governing officials are all too aware of how huge the problem is. Measures taken to reduce direct pollution could also be coupled to curbing greenhouse gases, at least in principle.

The motivation to reach agreement is quite high. However, it is unrealistic to expect breakthroughs. Even if agreements are reached, and they could be, there is no mechanism for making them binding. The United Nations is a relatively weak organisation, having no legislative power, and there is no effective framework of international law. At this point we need a new paradigm. I would suggest four main features that it should incorporate.

1. Climate change must be recognised as an immediate issue, as posing risks in the here-and-now. In *The politics of climate change*, as in most discussions of climate change, I saw the risks involved as located primarily in the future. However, to speak of what is likely to happen in 2030, 2040 or 2050 is too remote to have much traction with public opinion. Moreover, I have come to see that it is in fact a false perspective. The reason why climate change is an immediate and pressing issue is that it overlaps with a cluster of other risks which we face in global society and those risks are multipliers. They include the growth of the world's population. In 1850 there were less than one billion people in the world. Now there are over seven billion and the total could reach ten billion by 2100 (UN, 2012). The world has never had to accommodate anything like that number of people. That risk overlaps with the risks produced by climate change. The same is true of water scarcity and food scarcity, influenced by climate change but also having independent sources too, coming from the overuse of water in some areas and the inability of other areas to feed their populations. Each of these risks overlaps with the possibility of violence and war. Taken together they are daunting and immediate. The American television series, *The years of living dangerously* (Showtime Networks, 2014–15), seeks to show that drought influenced by climate change was an important causative factor in producing the Syrian civil war. Such a cluster of factors is emerging in quite a few different parts of the world.

2. No matter what happens in Paris this year, bilateral and regional agreements are likely to be more important than any universal agreements reached there. There are several reasons for this. As stated previously, the UN is weak. The world is dominated by power blocs: namely the large countries and groupings of large countries. What the United States does, what China does and what India and Brazil do, and what the European Union does, will determine how far real, rather than notional, policies can be introduced. Unfortunately, what any one of those does, especially the large developing countries, such as China and India, could determine the future of the global climate and, therefore, worldwide civilisation. Taken together these countries comprise well over half of the world's population. Paris could provide a mechanism for the large states getting together. China seems to be collaborating with the United States, recognising the risks of climate change and their overlap with their own massive problems of pollution. The crucial actor at the moment, however, is probably India. India is still pushing to expand its coal production even though coal produces the most lethal form of greenhouse gas. If India cannot be persuaded to join together with the other large power actors on the global scene, the whole game could be lost. But there is a lot of potential in bilateral agreements, and they could have a powerful impact.
3. The power of the fossil fuel companies must be challenged on a global level. The fossil fuel companies – coal, oil and gas producers – have brought massive economic development to many parts of the world, but they are one of the main sources of the emissions contributing to climate change. So far, renewable forms of energy have made very little impact on the spread of fossil fuels. In past decades, it seemed that the global role of the fossil fuel companies was implacable. They are so powerful and have such inertia built into their existing investments that it seemed impossible to reverse their impact on the world scene. I used to believe that such was the case, but I have changed my mind. This is a period of radical and global technological change, led by the digital revolution. There is the chance to change established structures. Indeed, they have been changed in some areas much more quickly and much more widely than ever before. When the telephone was first invented in the nineteenth century, it took 75 years before there were 50 million users. By contrast, the first smart phone only dates from about 15 years ago (WSS, 2014). Today there are some 2.5 billion in use across the world. Moreover, this is the first time in human history that the most advanced technologies have gone directly to the poorer countries. Many African countries have been able to skip a whole period in the development of fixed telephone lines and go straight to mobile phone systems. Perhaps the same could be possible for renewable technologies? Because of the advance of digitalisation it might be possible for large swathes of Africa and other developing continents to go directly to renewables on a large scale, and to do so quickly. Much the same applies to the possibility of creating a global disinvestment campaign (for example, Rusbridger, 2015). Fossil fuel companies are on the portfolios of many pension funds. There is a growing volume of shareholder activism around the world trying to ensure that such funds invest more heavily in renewable technologies.
4. Local activism can have an immediate global impact in a way that was never possible before. Today, someone from China living in the UK can easily and cheaply talk to their family in China every day and see them on their mobile device – and for free. No one would have thought that remotely possible probably even a few years ago. It transforms the nature of what immigration and mobility mean. The same thing could happen in terms of the relationship between local and regional activism and the imperatives of climate change. One example of this is cities. Rather than it being just nations that are

leading the attempt to curb climate change, cities might come to have a significant role. Because cities can organise themselves dynamically, they can collaborate across the world, and they can do so in real time. It is possible to share knowledge in an immediate way such as was never the case before. There are various groups of cities such as the C40 Cities Climate Leadership Group, which have come together to try and act as a vanguard for transformation to combat climate change. Cities produce a high proportion of global emissions, particularly in the poorer countries. There are actually quite amazing changes now happening. For example, Mexico City, one of the most polluted cities in the world, has developed a whole range of initiatives to try to reduce both local pollution and emissions. They have been dramatically successful over a fairly short period. What can be done in Mexico City can in principle be done in many other cities across the world. Similarly, local activist groups, because they can network in an immediate way as a result of the digital revolution, can have much more of a global impact than ever before, and that global impact can reverberate back to local places.<sup>155</sup>

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<sup>155</sup> Anthony Giddens, "The politics of climate change," *Policy & Politics* 43, no. 2, (April 2015): 155-162.

## Appendix C

### *Environmental Awareness and United Kingdom Energy Policy*

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The production, conversion, transportation, and end-uses of energy in the economy of an industrialized state have significant impacts on the local, regional and, increasingly, global environment. Scientific understanding and public awareness of the linkage between energy and the environment have grown steadily over the past two decades, resulting in the demand for a framework of policy-making that seeks to balance and integrate both energy and environment objectives.' Political acceptability is, however, likely to prove the ultimate determinant of action to protect the environment. A recent study by the Organization for Economic Co-operation and Development (OECD) identifies eleven major areas of environmental concern where energy-related activities play a role in some degree.<sup>2</sup> The areas are: (i) major life-threatening environmental accidents or perceived risks thereof caused, for example, by unplanned releases of radioactivity in the course of the production of nuclear energy or of the transport or storage of radioactive materials; (ii) groundwater pollution which is the result, for example, of an oil leak from underground storage tanks;<sup>3</sup> (iii) maritime pollution occasioned by the discharge of oil by ships at sea and by tanker accidents; (iv) land use and siting impact associated with the development of mines or construction of power stations and refineries; (v) radiation and radioactive releases attributable to the front and back ends of the nuclear fuel cycle; (vi) solid waste disposal of sludge and fly ash produced by air-pollution abatement measures such as flue gas desulphurization;<sup>4</sup> (vii) hazardous air pollutants such as lead that are emitted by petrol-driven vehicles; (viii) ambient air quality, which is especially affected by discharges of SO<sub>2</sub> and NO<sub>x</sub> from stationary combustion facilities and by CO emissions from mobile sources; (ix) acid deposition - again, related principally to emissions of SO<sub>2</sub> and NO<sub>x</sub> - that produces deleterious effects, both locally and much further afield upon, among other things, lakes, forests, and buildings; (x) stratospheric ozone depletion (this is tentatively linked to harm to human health occasioned by increased levels of ultraviolet radiation. In this area, the responsibility of fossil fuel and biomass combustion appears to be secondary to that of chlorofluorocarbons.); (xi) global climate change or global warming as it is commonly known, that is produced by the build-up of so-called 'greenhouse gases'. Increases in world temperature could trigger rises in sea level, changes in rainfall and weather patterns, and shifts in food-growing regions. CO<sub>2</sub> emissions are responsible for more than half of global warming, and fossil-fuel burning contributes nearly three quarters of all CO<sub>2</sub> emissions. This inventory is far from immutable. The capacity of science to identify and measure new hazards and pollutants puts continuing pressure on political decision-making to accede to public demands for action.<sup>5</sup> Moreover, there are substantial variations in the impact that each of the areas listed has on the environment. Several of these areas are specifically addressed by other contributors. This paper adopts a narrower brief; it focuses on the incorporation of environmental goals in the formulation and implementation of United Kingdom law and policy over the past twenty years appertaining to the production and use of energy. For this purpose, the conceptual model of energy and environment decision-making employed in the above-mentioned OECD study is adopted: this involves, first, identification of potential policy responses to the environmental impacts of energy production and use. A pre-requisite of each response is that it 'provide[s] the energy needed for an activity with the lowest environmental impact, at the least cost, and the maximum of energy security possible.'<sup>6</sup> Other constraints to be taken into account are the political and institutional barriers to action at the level of industry, consumers, and governments. The next stage in the process is a review of the policy measures (such as

information, regulation, and economic instruments) available for implementing chosen policy response. The review must include an assessment of each policy instrument according to its effectiveness in changing consumer behaviour and its effects at a micro- and macro-economic level.<sup>7</sup>

## ENVIRONMENTAL FACTORS IN THE DEVELOPMENT OF UNITED KINGDOM ENERGY POLICY

Over the past two decades United Kingdom policies on energy and the environment, in common with those of other industrialized countries, have developed from 'either the need to respond to an identified national or regional problem or from the need to meet a policy objective as set out in an international agreement.'<sup>8</sup> These trends are a reflection of the widespread recognition of the transboundary and often global nature of many environmental problems. This in turn results in scrutiny of and the shaping of national energy policies within regional and international fora. For member states of the European Community, this collaborative approach has assumed an even closer form since the Single European Act 1986, where it is stipulated that 'environmental protection requirements shall be a component of the Community's other policies.'<sup>9</sup> In addition to participating in the application and development of the 1979 Convention on Long-range Transboundary Air Pollution,<sup>10</sup> drawn up by the United Nations Economic Commission for Europe, the United Kingdom is a participating country in the International Energy Agency (IEA) of the OECD and the Intergovernmental Panel on Climate Change set up under the auspices of the United Nations Environment Programme and the World Meteorological Organization." There is thus considerable force in the argument that in energy affairs today there is 'no longer such a thing as a coherent national policy'; coherence is attainable only by means of a global energy policy that takes into account 'the environmental issues raised by the global energy system and fuel mix.'<sup>12</sup>

In retrospect, the turning-point may be seen to have been the energy policy review conducted by the Labour Government in 1977.<sup>13</sup> It acknowledged that the traditional approach of United Kingdom governments to energy policy was 'rather insular' and called for greater attention to be paid to international considerations and the European Community (para. 8). The goal of energy policy was 'to secure that the nation's needs for energy are met at the lowest cost in resources, consistently with security and with environmental, social and other objectives.' (para. 4). The main source of environmental anxiety was nuclear power (paras. 7, 41).<sup>14</sup> The review singled out 'transfrontier pollution, with pressure particularly from Scandinavia for a reduction in emissions of sulphur oxides' (para. 40), but added: there is a danger of improved standards being set up as an absolute objective, not related to evidence of environmental impact and with little regard to cost. The review re-affirmed support for the principle of 'best practicable means' (BPM) and foresaw major investment in the coal industry as part of the United Kingdom's long-term energy strategy (para. 45 et seq.). The review did purport to put down some markers for the future including: the development of coal conversion research; encouragement of energy conservation (para. 15); and the establishment of viable renewable energy sources (para. 48 et seq.).

A shift in the priorities of United Kingdom energy policy is evident from a speech in 1982 by the then Secretary of State for Energy, Nigel Lawson.<sup>15</sup> While detecting a growing public interest in the forms of renewable sources of energy and in the importance of conservation as levers on the demand side, he stressed that nuclear power remained a vital part of United Kingdom policy. He outlined the task of Government thus:



... to set a framework which will ensure that the market operates with a minimum of distortion and that energy is produced and consumed efficiently.

This market ideology provided the touchstone for a programme of privatization of state-owned industries in the energy sector, culminating in 1990 in the first instalment of the sale of the electricity industry. During the 1980s the United Kingdom became a net exporter of oil (produced from fields in its North Sea Continental Shelf) and coal. The United Kingdom also continued the expansion of a significant nuclear programme. Two of the major goals of national energy policy were thereby satisfied; diversification and security of supply. Towards the end of the decade, both the EC Commission and the International Energy Agency expressed concern about the Government's articulation of energy policy on a case-by-case basis; this absence of a comprehensive policy statement explaining the reliance on market forces and defining the proper role of government complicated attempts to plan a mid- to long-term strategy.<sup>16</sup> A parliamentary statement in December 1989 by the Secretary of State, John Wakeham, set out the ingredients of the Government's current approach to policy: it is to ensure that the United Kingdom:

has adequate, diverse, and secure supplies of energy in the forms that people want at the lowest realistic prices. It aims to achieve this wherever possible by ensuring that energy prices reflect their true economic costs and by subjecting as much of energy supply as is practicable to the operation of market forces, bearing in mind the State's strategic responsibilities for health and safety, the protection of the environment, and the elimination of energy waste.<sup>17</sup>

While the policy mix is much as before, a higher profile is accorded to protection of the environment. The Government has indicated that in shaping domestic policies it will take into account the threat of global warming - 'one of the most important issues facing the world today.'<sup>18</sup> The political commitment to the protection of the global environment was forcefully underlined by the former Prime Minister, Margaret Thatcher, in speeches to the Royal Society<sup>19</sup> and the United Nations.<sup>20</sup>

In assessing which of the changes in United Kingdom energy policy during the 1980s have had most impact on environmental goals, two events stand out. First, the Government succumbed to considerable international pressure and overturned the long-standing position of the Central Electricity Generating Board (CEGB) that no substantial expenditure should be incurred in the installation of flue gas desulphurization (FGD) plant at existing coal-burning power stations until the causes of the acid deposition ('acid rain') affecting soil and surface waters in Scandinavia were scientifically proven.<sup>21</sup> The CEGB announced in July 1986 that it proposed to retrofit 6000 MW of coal-fired generating capacity with FGD equipment over the period 1988-1997.<sup>22</sup> These measures would reduce the annual current emissions of SO<sub>2</sub> from what is by far the largest single source of such emissions in the United Kingdom<sup>23</sup>

The second dramatic reversal of policy occurred in November 1989 - three and a half months after the 1989 Electricity Act received the Royal Assent - with the Government's announcement of the removal of the nuclear power industry from the planned electricity privatization.<sup>24</sup> It thus remains in the public sector. This volte-face was prompted to a large extent by the revelation during the planning of the privatization of new information about the real costs of nuclear power; this showed 'a systematic bias in CEGB costings in favour of nuclear power.'<sup>25</sup> Accordingly, nuclear power was less economic than electricity generated from fossil-fuel stations at current prices. At the same time, the Government abandoned its plans for three more pressurized water reactors (PWRs) to follow on from Sizewell B, pending a full-scale review

of the prospects for nuclear power in 1994 when Sizewell B nears completion. The decade had started with the announcement of a massive ?15 billion ten-year rolling programme of 15 GW of PWR capacity starting in 1982.<sup>26</sup> The Government recognizes the part that nuclear power can play in reducing acid rain and combating global warming and thus 'wishes to maintain the nuclear option'; but it is conditional on nuclear power becoming 'more economic' and on the industry demonstrating it can 'maintain high standards of safety and environmental protection'.<sup>27</sup>

The singular position of nuclear power described above is taken account of in the Electricity Act 1989. Section 21 stipulates that licensed public electricity suppliers in England and Wales<sup>28</sup> must contract for a certain minimum level of electricity from non-fossil sources (predominantly nuclear) until 1998.<sup>28a</sup> The purpose of this requirement, known as the non-fossil fuel obligation (NFFO),

is to secure diversity and security of supply. To spread the cost of purchasing the higher priced nuclear-generated electricity, suppliers will pay a fossil fuel levy (FFL) of 10.6 per cent on sales of electricity that are gained from fossil fuel sources.<sup>29</sup> The levy, in essence a subsidy to nuclear power, is estimated to run initially at ?900 million a year, after which it should slowly decline.<sup>30</sup> The environmental implications of the non-fossil fuel obligation are considered further below.

In September 1990, the Government published a major policy document, *This Common Inheritance: Britain's Environmental Strategy*,<sup>31</sup> the first comprehensive White Paper on the environment. This sets out the philosophy behind the government's approach to environmental problems affecting Britain, Europe, and the world. It also includes a series of measures on energy designed to contribute to a reduction in global warming;<sup>32</sup> these are considered below.

## ENVIRONMENTAL PRIORITIES IN THE ENERGY SECTOR: CURRENT TRENDS

The centre-piece of the United Kingdom's strategy for combating its own greenhouse gas emissions is directed at emissions of CO<sub>2</sub> that result from the use of fossil fuels. The aim is to keep such emissions to 1990 levels by the year 2005. As mentioned above, earlier projections of new nuclear generating capacity have been drastically revised downwards. This has in turn reduced

the projected savings in CO<sub>2</sub>, SO<sub>2</sub> and NO<sub>x</sub> emissions that an expansion of the nuclear power programme would otherwise have produced. Implementation

of the main elements of United Kingdom strategy is already under way on two main fronts: energy efficiency and renewables.

## ENERGY EFFICIENCY

The House of Commons Energy Committee report on the greenhouse effect observed that 'the most obvious and most effective response to the problem of global warming' lies with 'improvements in energy efficiency',<sup>33</sup> a view with which the Government agreed.<sup>34</sup> The European Community likewise regards energy efficiency and energy conservation as 'the corner-stone of integration of the environmental dimension into energy policy'.<sup>35</sup> Three major current initiatives on energy efficiency are outlined in the 1990 White Paper.

### 1. Electricity generation and supply under the Electricity Act 1989

It is the Government's belief that the privatization of the electricity industry 'will lead to very substantial reductions in CO2 emissions'.<sup>36</sup> Three examples are given in support of this claim. First, the introduction of competition among electricity generators will provide them with a strong incentive to produce electricity more efficiently. Already, the two main non-nuclear generators, PowerGen and National Power, have indicated that gas will be their first choice of fuel for power generation.<sup>37</sup> In comparison with coal-fired plant, combined-cycle gas-turbine plants are able to cut emissions of carbon dioxide and sulphur dioxide by 59 per cent and almost 100 per cent respectively, and achieve a 45 per cent rate of efficiency as opposed to 35 per cent for coal.<sup>38</sup>

The second example is the non-fossil fuel obligation referred to earlier; this is intended to encourage electricity generation from non-fossil fuels such as nuclear power and renewable sources of energy.

Lastly, the Electricity Act 1989 imposes duties on public electricity suppliers 'to develop and maintain an efficient, co-ordinated and economical system of electricity supply';<sup>39</sup> in addition, the terms of their licences require them to provide information and advice to their customers on the efficient use of electricity.<sup>40</sup> The Act also establishes the post of Director-General of Electricity Supply (DGES) whose duties include monitoring the performance

of licence holders and taking account of the physical environment of activities connected with the generation, supply, or distribution of electricity.<sup>41</sup>

## 2. Industry and Commerce

Industry and commerce, which includes housing and the public sector, account for around 30 per cent of national CO2 emissions. Energy efficiency in this sector is promoted by a government body, the Energy Efficiency Office (EEO). Since April 1989, this body, through its best practice programme, has provided information and guidance on energy efficiency technologies and management techniques. It also assists the energy efficiency industry with developing marketing opportunities for equipment and consultancy services.

In this respect, one of the most promising technologies for reducing CO2 emissions is combined heat and power (CHP).<sup>42</sup> This highly fuel-efficient technology, which can operate with any fuel, using plant of any size, is already widely used and is likely to prove an attractive option for the soon-to-be- privatized generating companies.<sup>43</sup>

## 3. Buildings

Heating, lighting, and electrical appliances in buildings account for nearly half of all energy use in the United Kingdom. A significant part of the EEO's best practice programme is aimed at this sector. New building regulations prescribing higher thermal insulation standards for new houses came into force on 1 April 1990." Also under consideration for inclusion in future building regulations is a system of energy 'labelling' of buildings.<sup>45</sup> The EEO is also proposing to introduce a home energy efficiency scheme, to provide advice and grants for lower-income households in both public and private sector housing.<sup>46</sup>

Finally, it should be noted that energy efficiency and fossil fuel CHP schemes can form part of the non-fossil fuel obligation since both satisfy the twin aims of security of supply through diversity of fuel inputs.<sup>47</sup>

## RENEWABLE SOURCES OF ENERGY

At present, virtually all of the 1.5 per cent of electricity generated from renewable sources (renewables) derives from hydro power.<sup>48</sup> The most comprehensive survey of the potential of United Kingdom renewable energy technologies is in Energy Paper 55.<sup>49</sup> This suggests that renewables 'could make a useful and economic contribution to the UK economy from the late 1990s' and possibly account for one quarter of current electricity supply by 2025.<sup>50</sup> The treatment of renewables in the 1990 White Paper is cautiously optimistic. It recognizes that some technologies such as the use of methane from land-fill sites are already commercially viable; the majority, however, will require more research, not least into their environmental impacts. The Government has earmarked £50 million for expenditure on renewables research and development, demonstration, and promotion over the period 1990-1992, and significantly, has allocated a tranche of the non-fossil fuel obligation to renewables.<sup>52</sup> As described earlier, the higher cost to public electricity suppliers that the obligatory purchase of non-fossil fuel electricity capacity entails is met by the imposition of a levy on all sales of electricity produced from fossil fuels. From 1 September 1990, suppliers are required to contract for a total of some 102 MW of renewable capacity by 1998.<sup>53</sup> Contracts have been concluded for some seventy-five projects that are to be supported by the levy; they include, in descending order of contribution: waste incineration, gas from land-fill, hydroelectric, and wind.<sup>54</sup> Further orders will be laid before Parliament for up to 600 MW of renewable capacity and will cover projects that were not ready for contracting when the 1990 order was laid.<sup>55</sup> The Government intends to institute a fundamental review of its renewables programme in 1991.

## INSTRUMENTS

The Government shares the view expressed in the Energy Committee's report on the greenhouse effect<sup>56</sup> that there are 'market imperfections in the energy efficiency field';<sup>57</sup> it rejects, however, the 'mixture of regulation, penalties, and incentives' recommended by the Energy Committee<sup>58</sup> to combat those imperfections. The way forward is through the free market 'lubricated by information and advice.'<sup>59</sup> On the broader issue of the best instruments for tackling environmental consequences of global warming, the Government likewise dismissed the committee's strong reservations on the operation of market mechanisms."

The 1990 White Paper acknowledges the vital role of the 'polluter-pays' principle as a means of influencing potential polluters.<sup>61</sup> It dismisses, however, the widely held view that regulation is the best instrument of control, arguing that it is unresponsive to technical change and inaccurately gauges the precise level of control at which the most cost-effective balance between

environmental benefits and compliance costs is reached.<sup>62</sup> The Government's stated preference is for market-based approaches that integrate economic and environmental concerns and which influence the behaviour of consumers and

producers in ways that benefit the environment.<sup>63</sup> While this approach regards the price mechanism as the key to tackling the environmental consequences of the consumption of energy, it discounts the introduction (other than in the transport sector) in the 'next few years' of energy taxation or other measures directly raising the relative price of energy.<sup>64</sup> This will only change when competitor countries are prepared to take similar action.<sup>65</sup>

No form of energy production is environmentally benign; there will always be some impact on the environment. For example, the flue gas desulphurization system involves limestone as a feedstock and produces as a by-product either gypsum or sulphur.<sup>66</sup> A further unanticipated by-product of FGD plant is chloride which poses a threat to water supplies." Similarly, a tidal barrage may produce emission-free electricity yet flood important wildlife habitats.

These examples point up a central problem in establishing the precise

synergy between environmental and energy goals. On the one hand, low energy prices are a disincentive to investment in energy efficiency; on the other hand, reliance on free market forces requires clear proof that energy prices reflect their true social and environmental costs. Whether there is a system that can accurately assess and allocate these 'external costs' is still a matter of considerable controversy." The need for more research into the development of a methodology for quantifying the environmental costs and benefits of each energy technology is recognized by the Government.<sup>69</sup>

Under the auspices of the National Advisory Group on Eco-Labeling, the United Kingdom is contributing at a European level to what is called 'ecobalance research' or 'life-cycle analysis'. This seeks to measure the environmental impacts of such products as washing machines or motor vehicles throughout their life cycle, from the extraction of raw materials for their manufacture to the dumping of the product in a land-fill.<sup>70</sup>

#### IS PRIVATIZATION OF THE ELECTRICITY INDUSTRY ENVIRONMENTALLY FRIENDLY?

Prima facie, the environmentally desirable objectives of energy efficiency and energy conservation co-exist uneasily with the goals of the privatized electricity industry which 'will make their profits from selling electricity, and the more electricity they can sell, the higher will be everyone's profits'." There are several indications that environmental concerns have been put second to commercial profitability.

The first indication is the Government decision announced in April 1990,<sup>72</sup> to modify the ?26 million FGD programme launched in 1986 to reduce pollution emissions from 12,000 MW of plant in compliance with the EC directive on large combustion installations.<sup>73</sup> The directive requires cuts of 40 per cent in sulphur emissions by 1998 and 60 per cent by 2003, using 1980 as the base year. The revised FGD programme envisages the retrofitting of 8000 MW of plant only.<sup>74</sup> The Government response to critics of its decision is that the directive does not stipulate any specific form of abatement technique; its aims can be met by means other than retrofitting, such as switching to gas-fired stations and imported low-sulphur coal." The desire to reduce the pre- privatization investment commitments of PowerGen and National Power is probably nearer the mark.

The second significant development is the treatment accorded to energy efficiency objectives in the Electricity Act 1989. This proved to be one of the most contentious issues during the passage of the bill through Parliament. The House of Lords inserted into the bill a new clause on the efficient use of electricity. The new clause would have empowered the Secretary of State, in consultation with the Director-General of Electricity Supply, to require each distribution company to produce evidence to the Director showing that it 'has made such arrangements as will promote the efficient use of electricity.' The Secretary of State would also be authorized to direct any distribution company 'to take specific action in this area and if appropriate. .. refuse

or amend any application for tariff increases or major capital projects.<sup>76</sup> The House of Commons Energy Committee felt sufficient sympathy for the principle of the Lords' amendment to publish a separate report on the matter. The report does, however, find the amendment technically deficient, not least for its failure to recognize that major capital investment would normally be made by generators and not suppliers of electricity. The committee called upon the Government to introduce amendments to strengthen the obligation to provide energy efficiency.<sup>77</sup>

Attempts by the opposition parties to write this obligation into the legislation along with several new clauses on energy conservation and protection of the environment failed in both Houses. The main thrust of these amendments was to require the DGES to promote efficiency and conservation of energy by (i) ensuring that suppliers take such steps as are reasonable to maximize energy efficiency and conservation, and (ii) setting annual targets for improvement in energy efficiency for suppliers.<sup>78</sup> Its other amendments sought to achieve annual target reductions in pollution and to introduce the radical concept of least-cost planning.

Least-cost planning (LCP): a missed opportunity

The essential idea behind LCP is that no new plant can be built unless it can be demonstrated that the required capacity cannot be met by additional measures of efficiency or conservation. In effect, every pound invested in energy conservation measures will yield more saved units of electricity than that same pound spent on investing in new generating capacity." This policy has had a measure of success in Norway and the United States of America.

Underlying LCP is the radical notion that the consumer does not buy electricity as such, but services such as heat, light, and motive power. These end-uses are only minimally secured by market mechanisms. If electricity and other fuel suppliers view themselves as providers of services rather than of kilowatt hours, then the issue is simply one of how that demand is best met. LCP places the choice squarely between investment in more power-plant construction or in raising end-use efficiency.

Thus, in the United States of America, customers are offered low-cost energy audits from the electricity supplier who will offer low-interest loans to enable the customer to buy, for example, high-efficiency lighting, heating, and other appliances. Everyone gains: the company gets a more rapid return on its investment; the customer gets lower bills; and the impact on the environment is lower. In this way, LCP balances supply and demand-side resources in order to meet the needs of energy users at the least cost."<sup>s</sup>

Despite widespread all-party support for the concept, LCP was given a hostile reception by the then Secretary of State for Energy, Cecil Parkinson, who described its operation in the United States as 'a disaster.'<sup>8</sup> Without regulatory pressure it is unlikely that the electricity industry will adopt LCP, thus confirming the view of one expert that 'privatization and environmental accountability cannot be separated from a strong and independent public interest regulation.'<sup>82</sup>

#### THE UNITED KINGDOM RECORD ASSESSED 1. Energy policy or energy politics?

As the environment moves rapidly up the scale of political priorities of both Government and electorate, there are signs that the 1990s may herald a breakdown of the ceasefire in the United Kingdom energy policy debate that was a mark of the late 1980s.<sup>83</sup> First, the privatization of the gas and electricity industries will accelerate the inter-fuel substitution and market interpenetration already taking place within those industries and take the battle for primary energy markets into the remaining public sector energy industries, namely nuclear and coal. National Power has begun to loosen its dependence on British coal, by announcing plans for new gas-fired power stations, for coal-mining joint ventures overseas and for gaining access to long-term gas supplies from the North Sea.<sup>84</sup> The nuclear industry is vigorously pressing what it regards as its environmental advantages over fossil fuel."<sup>5</sup> The British coal industry is on the

defensive and its economic prospects after its contracts with the power-generating companies terminate in 1993 look bleak. In the autumn of 1990, the gas industry sponsored a series of newspaper advertisements and position papers by independent experts on key environmental issues, designed to show the industry's 'green' credentials. Indeed, campaigning is increasingly conducted along acrimonious lines. Nuclear Electric is proposing that, in return for industry's role in combating global warming, nuclear power should be accorded 'environmental credits' set at ?8 for every tonne in reduction of CO<sub>2</sub>, to replace the fossil fuel levy when this ends in 1998.<sup>86</sup> However, nuclear power's long-term prospects in the United Kingdom are highly problematic: when the NFFO and FFL end in 1998 nuclear power will be even less economically attractive to the electrical distribution companies. The economic, safety, and environmental preconditions for a revival of nuclear power as a 'realistic option for energy policy during the next twenty years' are increasingly unlikely to be met.<sup>87</sup>

Conversely, proponents of renewable energy projects argue that the limited lifespan of the FFL gives an unfair advantage to nuclear power since nuclear stations are already built and have only to cover their running costs.<sup>88</sup> The Government's projected expenditure of ?22 million on research and development of renewables in 1992 is in real terms no higher than it was ten years previously." The House of Commons Energy Committee has recently called for a radical review of the Department of Energy's research and development programme which continues to lean heavily towards nuclear research; in particular it calls for an examination of how mistakes were made in costing a pioneering programme of research into deep-sea wave power (Salter's Duck) which was wound up in 1983." The critical issue remains whether the development of renewables is best left to the private sector or to state planning and investment.<sup>91</sup>

Lastly, the Labour Party's environmental programme, *An Earthly Chance*, published in October 1990, is further evidence of a breakdown of consensus on energy policy. While the programme rules out any new nuclear power station, it opposes the switch to gas-fired plants which is the favoured policy of the Government as well as PowerGen and National Power; Labour's preference is for clean-burn coal-fired stations.<sup>92</sup>

## 2. The Tortoise of Europe

On the European front, the United Kingdom lags behind its Community partners in cutting down CO<sub>2</sub> emissions. At the meeting of EC environment ministers in October 1990, a compromise agreement was reached that committed the Community as a whole to stabilizing CO<sub>2</sub> emissions at 1990 levels by the year 2000, while allowing the United Kingdom to proceed at a slower pace towards its target of stabilizing emissions by 2005.<sup>93</sup> Despite the isolation of the United Kingdom, the compromise enabled the Community to present a united front at the Second World Climate Conference in November 1990.<sup>94</sup> This is yet another reason which makes the early removal of the label the 'dirty man of Europe' less likely.<sup>95</sup> When measured against the achievements of its major competitors, the United Kingdom is again at the back of the field in the area of energy efficiency. Thus, current building insulation standards are on a par with those introduced in Sweden fifty years ago. Denmark operates a scheme for mandatory energy audits whenever dwelling houses are bought and sold. When a similar proposal was mooted as

an EC draft directive in 1987, it was vetoed by the United Kingdom. Several voluntary schemes have recently appeared, such as the national home energy rating scheme launched by the National Energy Foundation. The United States of America already bans the sale of appliances that are unacceptably inefficient;<sup>96</sup> in contrast, the 1990 White Paper only contemplates a voluntary system of energy labelling of domestic appliances. But the British Government intends to seek agreement within the European Community on (i) a common scheme for energy efficiency labelling of electrical appliances, and (ii) minimum efficiency standards for such equipment as well as for central heating boilers and industrial heating equipment.<sup>97</sup>

United Kingdom expenditure on energy efficiency per head of the population lags substantially behind many European states. In 1988-89, there was a twelve per cent decline in investment in energy-saving materials<sup>98</sup> and the budget for the Energy Efficiency Office had, in real terms, halved in value from its peak three years previously.<sup>99</sup> Whereas, between 1973 and the mid-1980s, the United Kingdom had improved its energy efficiency at a rate twice the European Community average, it has now fallen behind other EC states.<sup>100</sup>

These developments are now out of kilter with policy trends in the rest of the European Community. The EC Directorates-General responsible for energy and the environment have put mandatory least-cost planning among the priorities for action in promoting energy efficiency.<sup>101</sup> There is also a potential clash looming between the United Kingdom and the Community over the introduction of a carbon tax on fossil fuels which Carlo Ripa di Meana, the Environment Commissioner, is reported to favour strongly.<sup>102</sup> The United Kingdom remains hostile to the introduction of such a tax in the foreseeable future.<sup>103</sup> The rise in Community GDP that completion of the single market is expected to generate will lead to a significant rise in SO<sub>2</sub> and NO<sub>x</sub> emissions above the levels that would prevail in the absence of the single market.<sup>104</sup> This will accentuate the need for an integrated Community policy on energy and the environment grounded in the concept of sustainable development. It is also imperative that co-ordination between different sectors of the economy is strengthened so that reductions in emissions in the energy sector are not wiped out by corresponding increases in the transport sector.

The United Kingdom has been slow to accept that the key to effective action is international co-operation. It deserves credit, however, for taking the initiative to secure a framework convention on climate change; it now accepts there is a responsibility to provide technological and economic

assistance to help developing countries tackle the root causes of global

warming; and it is a belated convert to the principle of precautionary action.<sup>105</sup> For the foreseeable future the environmental dimension of United Kingdom energy policy is likely to be driven by market-based approaches but within a policy framework that, increasingly, will be defined and controlled by the European Community.<sup>156</sup>

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<sup>156</sup> John Woodliffe, "Environmental Awareness and United Kingdom Energy Policy," *Journal of Law and Society* 18, no. 1. (Spring, 1991): 110-125.



## Appendix D

### The Trouble with Climate Change

Nigel Lawson

There is something odd about the global warming debate – or the climate change debate, as we are now expected to call it, since global warming has for the time being come to a halt.

I have never shied away from controversy, nor – for example, as Chancellor – worried about being unpopular if I believed that what I was saying and doing was in the public interest. But I have never in my life experienced the extremes of personal hostility, vituperation and vilification which I – along with other dissenters, of course – have received for my views on global warming and global warming policies.

For example, according to Climate Change Secretary, Ed Davey, the global warming dissenters are, without exception, ‘wilfully ignorant’ and in the view of the Prince of Wales we are ‘headless chickens’. Not that ‘dissenter’ is a term they use. We are regularly referred to as ‘climate change deniers’, a phrase deliberately designed to echo ‘Holocaust denier’ – as if questioning present policies and forecasts of the future is equivalent to casting malign doubt about a historical fact.

The heir to the throne and the minister are senior public figures, who watch their language. The abuse I received after appearing on the BBC’s *Today* programme last February was far less restrained. Both the BBC and I received an orchestrated barrage of complaints to the effect that it was an outrage that I was allowed to discuss the issue on the programme at all. And even the Science and Technology Committee of the House of Commons shamefully joined the chorus of those who seek to suppress debate.

In fact, despite having written a thoroughly documented book about global warming more than five years ago, which happily became something of a bestseller, and having founded a think tank on the subject – the Global Warming Policy Foundation – the following year, and despite frequently being invited to appear on *Today* to discuss economic issues, this was the first time I had ever been asked to discuss climate change. I strongly suspect it will also be the last time.

The BBC received a well-organised deluge of complaints – some of them, inevitably, from those with a vested interest in renewable energy – accusing me, among other things, of being a geriatric retired politician and not a climate scientist, and so wholly unqualified to discuss the issue.

Perhaps, in passing, I should address the frequent accusation from those who violently object to any challenge to any aspect of the prevailing climate change doctrine, that the Global Warming Policy Foundation’s non-disclosure of the names of our donors is proof that we are a thoroughly sinister organisation and a front for the fossil fuel industry.

As I have pointed out on a number of occasions, the Foundation’s Board of Trustees decided, from the outset, that it would neither solicit nor accept any money from the energy industry or from anyone with a significant interest in the energy industry. And to those who are not –

regrettably – prepared to accept my word, I would point out that among our trustees are a bishop of the Church of England, a former private secretary to the Queen, and a former head of the Civil Service. Anyone who imagines that we are all engaged in a conspiracy to lie is clearly in an advanced stage of paranoia.

The reason why we do not reveal the names of our donors, who are private citizens of a philanthropic disposition, is in fact pretty obvious. Were we to do so, they, too, would be likely to be subject to the vilification and abuse I mentioned earlier. And that is something which, understandably, they can do without.

That said, I must admit I am strongly tempted to agree that, since I am not a climate scientist, I should from now on remain silent on the subject – on the clear understanding, of course, that everyone else plays by the same rules. No more statements by Ed Davey, or indeed any other politician, including Ed Miliband, Lord Deben and Al Gore. Nothing more from the Prince of Wales, or from Lord Stern. What bliss!

### **Alarmism and its basis**

But of course this is not going to happen. Nor should it; for at bottom this is not a scientific issue. That is to say, the issue is not climate change but climate change alarmism, and the hugely damaging policies that are advocated, and in some cases put in place, in its name. And alarmism is a feature not of the physical world, which is what climate scientists study, but of human behaviour; the province, in other words, of economists, historians, sociologists, psychologists and – dare I say it – politicians.

And *en passant*, the problem for dissenting politicians, and indeed for dissenting climate scientists, who certainly exist, is that dissent can be career-threatening. The advantage of being geriatric is that my career is behind me: there is nothing left to threaten.

But to return: the climate changes all the time, in different and unpredictable (certainly unpredicted) ways, and indeed often in different ways in different parts of the world. It always has done and no doubt it always will. The issue is whether that is a cause for alarm – and not just moderate alarm. According to the alarmists it is the greatest threat facing humankind today: far worse than any of the manifold evils we see around the globe which stem from what Burns called ‘man’s inhumanity to man’.

Climate change alarmism is a belief system, and needs to be evaluated as such. There is, indeed, an accepted scientific theory, which I do not dispute and which, the alarmists claim, justifies their belief and their alarm. This is the so-called greenhouse effect: the fact that the earth’s atmosphere contains so-called greenhouse gases (of which water vapour is overwhelmingly the most important, but carbon dioxide is an- other) which, in effect, trap some of the heat we receive from the sun and prevent it from bouncing back into space.

Without the greenhouse effect, the planet would be so cold as to be uninhabitable. But, by burning fossil fuels – coal, oil and gas – we are increasing the amount of carbon dioxide in the atmosphere and thus, other things being equal, increasing the earth’s temperature.

But four questions immediately arise, all of which need to be addressed, coolly and rationally.

First, other things being equal, how much can increased atmospheric carbon dioxide be expected to warm the earth? (This is known to scientists as climate sensitivity, or

sometimes the climate sensitivity of carbon.) This is highly uncertain, not least because clouds have an important role to play, and the science of clouds is little understood. Until recently, the majority opinion among climate scientists had been that clouds greatly amplify the basic greenhouse effect. But there is a significant minority, including some of the most eminent climate scientists, who strongly dispute this.

Second, are other things equal, anyway? We know that, over millennia, the temperature of the earth has varied a great deal, long before the arrival of fossil fuels. To take only the past thousand years, a thousand years ago we were benefiting from the so-called Medieval Warm Period, when temperatures are thought to have been at least as warm, if not warmer, than they are today. And during the Baroque era we were grimly suffering the cold of the so-called Little Ice Age, when the Thames frequently froze in winter and substantial ice fairs were held on it, now immortalised in contemporary prints.

Third, even if the earth were to warm, so far from this necessarily being a cause for alarm, does it matter? It would, after all, be surprising if the planet were on a happy but precarious temperature knife-edge, from which any change in either direction would be a major disaster. In fact, we know that, if there were to be any future warming (and, for the reasons already given, 'if' is correct) there would be both benefits and what the economists call disbenefits. I shall discuss later where the balance might lie.

And fourth, to the extent that there is a problem, what should we, calmly and rationally, do about it?

## **Surface temperatures, past and projected**

It is probably best to take the first two questions together. According to the temperature records kept by the UK Met Office (and other series are much the same), over the past 150 years (that is, from the very beginnings of the Industrial Revolution), mean global temperature has increased by a little under a degree centigrade – according to the Met Office, 0.8°C. This has happened in fits and starts, which are not fully understood. To begin with, to the extent that anyone noticed it, it was seen as a welcome and natural recovery from the rigours of the Little Ice Age. But the great bulk of it – 0.5°C out of the 0.8°C – occurred during the last quarter of the 20th century. It was then that global warming alarmism was born.

But since then, and wholly contrary to the expectations of the overwhelming majority of climate scientists, who confidently predicted that global warming would not merely continue but would accelerate, given the unprecedented growth of global carbon emissions as China's coal-based economy has grown by leaps and bounds, there has been no further warming at all. To be precise, the latest report of the Intergovernmental Panel on Climate Change (IPCC), chairman is a committed climate alarmist, reckons that global warming has latterly been occurring at the rate of – wait for it – 0.05°C per decade, plus or minus 0.1°C. Their figures, not mine. In other words, the observed rate of warming is less than the margin of error.

And that margin of error, it must be said, is implausibly small. After all, calculating mean global temperature from the records of weather stations and maritime observations around the world, of varying quality, is a pretty heroic task in the first place. Not to mention the fact that there is

a considerable difference between daytime and night-time temperatures. In any event, to produce a figure accurate to hundredths of a degree is palpably absurd.

The lessons of the unpredicted 15-year global temperature standstill (or hiatus as the IPCC calls it) are clear. In the first place, the so-called General Circulation Models which the climate science community uses to predict the global temperature increase which is likely to occur over the next 100 years are almost certainly mistaken, in that climate sensitivity is almost certainly significantly less than they once thought, and thus the models exaggerate the likely temperature rise over the next hundred years.

But the need for a rethink does not stop there. As the noted climate scientist Professor Judith Curry, chair of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology, recently observed in written testimony to the US Senate:

Anthropogenic global warming is a proposed theory whose basic mechanism is well understood, but whose magnitude is highly uncertain. The growing evidence that climate models are too sensitive to CO<sub>2</sub> has implications for the attribution of late-20th-century warming and projections of 21st-century climate. If the recent warming hiatus is caused by natural variability, then this raises the question as to what extent the warming between 1975 and 2000 can also be explained by natural climate variability.

It is true that most members of the climate science establishment are reluctant to accept this, and argue that the missing heat has for the time being gone into the (very cold) ocean depths, only to be released later. This is, however, highly conjectural. Assessing the mean global temperature of the ocean depths is – unsurprisingly – even less reliable, by a long way, than the surface temperature record. And in any event most scientists reckon that it will take thousands of years for this ‘missing heat’ to be released to the surface.

In short, the effect of carbon dioxide on the earth’s temperature is probably less than was previously thought, and other things – that is, natural variability and possibly solar influences – are relatively more significant than has hitherto been assumed. But let us assume that the global temperature hiatus does, at some point, come to an end, and a modest degree of global warming resumes. How much does this matter?

## **The question of impacts**

The answer must be that it matters very little. There are plainly both advantages and disadvantages from a warmer temperature, and these will vary from region to region depending to some extent on the existing temperature in the region concerned. And it is helpful in this context that the climate scientists believe that the global warming they expect from increased atmospheric carbon dioxide will be greatest in the cold polar regions and least in the warm tropical regions, and will be greater at night than in the day, and greater in winter than in summer. Be that as it may, studies have clearly shown that, overall, the warming that the climate models are now predicting for most of this century is likely to do more good than harm.

This is particularly true in the case of human health, a rather important dimension of wellbeing. It is no accident that, if you look at migration for climate reasons in the world today, it is far easier to find those who choose to move to a warmer climate than those who choose to move to a colder climate. And it is well documented that excessive cold causes far more illnesses and deaths around the world than excessive warmth does.

The latest (2013–14) IPCC Assessment Report<sup>3</sup> does its best to ramp up the alarmism in a desperate, and almost certainly vain, attempt to scare the governments of the world into concluding a binding global decarbonisation agreement at the crunch UN climate conference due to be held in Paris next year. Yet a careful reading of the report shows that the evidence to justify the alarm simply isn't there.

On health, for example, it lamely concludes that 'the world-wide burden of human ill-health from climate change is relatively small compared with effects of other stressors and is not well quantified' – adding that so far as tropical diseases (which preoccupied earlier IPCC reports) are concerned, 'Concerns over large increases in vector-borne diseases such as dengue as a result of rising temperatures are unfounded and unsupported by the scientific literature'.

Moreover, the IPCC conspicuously fails to take proper account of what is almost certainly far and away the most important dimension of the health issue. And that is, quite simply, that the biggest health risk in the world today, particularly of course in the developing world, is poverty.

We use fossil fuels not because we love them, or because we are in thrall to the multinational oil companies, but simply because they provide far and away the cheapest source of large-scale energy, and will continue to do so, no doubt not forever, but for the foreseeable future. And using the cheapest source of energy means achieving the fastest practicable rate of economic development, and thus the fastest elimination of poverty in the developing world. In a nutshell, and on balance, global warming is good for you.

The IPCC does its best to contest this by claiming that warming is bad for food production: in its own words, 'negative impacts of climate change on crop yields have been more common than positive impacts'. But not only does it fail to acknowledge that the main negative impact on crop yields has been not climate change but climate change policy, as farmland has been turned over to the production of biofuels rather than food crops. It also understates the net benefit for food production from the warming it expects to occur, in two distinct ways.

In the first place, it explicitly takes no account of any future developments in bio-engineering and genetic modification, which are likely to enable farmers to plant crops that are drought-resistant and which thrive at warmer temperatures, should these occur. Second, and equally important, it takes no account whatever of another effect of increased atmospheric carbon dioxide, and one which is more certain and better documented than the warming effect, namely, the stimulus to plant growth: what the scientists call the 'fertilisation effect'. Over the past 30 years or so, the earth has become observably greener, and this has even affected most parts of the Sahel. It is generally agreed that a major contributor to this change has been the growth in atmospheric carbon dioxide from the burning of fossil fuels.

This should not come as a surprise. Biologists have always known that carbon dioxide is essential for plant growth, and of course without plants there would be very little animal life, and no human life, on the planet. The climate alarmists have done their best to obscure this basic scientific truth by insisting on describing carbon emissions as 'pollution' – which, whether or not they warm the planet, they most certainly are not – and deliberately mislabelling forms of energy which produce these emissions as 'dirty'.

In the same way, they like to label renewable energy as 'clean', seemingly oblivious to the fact that by far the largest source of renewable energy in the world today is biomass, and in particular

the burning of dung, which is the major source of indoor pollution in the developing world and is reckoned to cause at least a million deaths a year.

Compared with the likely benefits to both human health and food production from CO<sub>2</sub>-induced global warming, the possible disadvantages from, say, a slight increase in either the frequency or the intensity of extreme weather events is very small beer. It is, in fact, still uncertain whether there is any impact on extreme weather events as a result of warming (increased carbon emissions, which have certainly occurred, cannot on their own affect the weather: it is only warming which might). The unusual persistence of heavy rainfall over the UK during February, which led to considerable flooding, is believed by scientists to have been caused by the wayward behaviour of the jetstream; and there is no credible scientific theory that links this behaviour to the fact that the earth's surface is some 0.8°C warmer than it was 150 years ago.

That has not stopped some climate scientists, such as the publicity-hungry chief scientist at the UK Met Office, Dame Julia Slingo, from telling the media that it is likely that 'climate change' (by which they mean warming) is partly to blame. Usually, however, the climate scientists take refuge in the weasel words that any topical extreme weather event – whatever the extreme weather may be, whether the recent UK rain-fall or last year's typhoon in the Philippines – 'is consistent with what we would expect from climate change'.

So what? It is also consistent with the theory that it is a punishment from the Almighty for our sins (the prevailing explanation of extreme weather events throughout most of human history). But that does not mean that there is the slightest truth in it. Indeed, it would be helpful if the climate scientists would tell us what weather pattern would *not* be consistent with the current climate orthodoxy. If they cannot do so, then we would do well to recall the important insight of Karl Popper – that any theory that is incapable of falsification cannot be considered scientific.

Moreover, as the latest IPCC report makes clear, careful studies have shown that, while extreme weather events such as floods, droughts and tropical storms have always occurred, overall there has been no increase in either their frequency or their severity. That may, of course, be because there has so far been very little global warming indeed: the fear is the possible consequences of what is projected to lie ahead of us. And even in climate science, cause has to precede effect: it is impossible for future warming to affect events in the present.

Of course, it doesn't seem like that. Partly because of sensitivity to the climate change doctrine, and partly simply as a result of the explosion of global communications, we are far more aware of extreme weather events around the world than we used to be. And it is perfectly true that many more people are affected by extreme weather events than ever before. But that is simply because of the great growth in world population: there are many more people around. It is also true, as the insurance companies like to point out, that there has been a great increase in the damage caused by extreme weather events. But that is simply because, just as there are more people around, so there is more property around to be damaged.

The fact remains that the most careful empirical studies show that, so far at least, there has been no perceptible increase, globally, in either the number or the severity of extreme weather events. And, as a happy coda, these studies also show that, thanks to scientific and material progress, there has been a massive reduction, worldwide, in deaths from extreme weather events.

## **Scientific standards**

It is relevant to note at this point that there is an important distinction between science and scientists. I have the greatest respect for science, whose development has transformed the world for the better. But scientists are no better and no worse than anyone else. There are good scientists and there are bad scientists. Many scientists are outstanding people working long hours to produce important results. They must be frustrated that political activists then turn those results into propaganda. Yet they dare not speak out for fear of losing their funding.

Indeed, a case can be made for the proposition that today's climate science establishment is betraying science itself. During the period justly known as the Enlightenment, science achieved the breakthroughs which have so benefited us all by rejecting the claims of authority – which at that time largely meant the authority of the church – and adopting an overarching scepticism, insisting that our understanding of the external world must be based exclusively on observation and empirical investigation. Yet today all too many climate scientists, in particular in the UK, come close to claiming that they need to be respected as the voice of authority on the subject – the very claim that was once the province of the church.

If I have been critical of the latest IPCC report, let me add that it is in many respects a significant improvement on its predecessors. It explicitly concedes, for example, that 'climate change may be beneficial for moderate climate change' – and moderate climate change is all that it expects to see for the rest of this century – and that 'Estimates for the aggregate economic impact of climate change are relatively small...For most economic sectors, the impact of climate change will be small relative to the impacts of other drivers.'<sup>5</sup> So much for the unique existential planetary threat.

What it conspicuously fails to do, however, is to make any assessment of the unequivocally adverse economic impact of the decarbonisation policy it continues to advocate, which (if implemented) would be far worse than any adverse impact from global warming.

Even here, however, the new report concedes for the first time that the most important response to the threat of climate change must be how mankind has responded throughout the ages, namely intelligent adaptation. Indeed, the 'impacts' section of the latest report is explicitly entitled 'Impacts, Adaptation and Vulnerability'. In previous IPCC reports adaptation was scarcely referred to at all, and then only dismissively.

## **The importance of adaptation**

This leads directly to the last of my four questions. To the extent that there is a problem, what should we, calmly and rationally, do about it?

The answer is – or should be – a no-brainer: adapt. I mentioned earlier that a resumption of global warming, should it occur (and of course it might) would bring both benefits and costs. The sensible course is clearly to pocket the benefits while seeking to minimise the costs. And that is all the more so since the costs, should they arise, will not be anything new: they will merely be the slight exacerbation of problems that have always afflicted mankind.

Like the weather, for example – whether we are talking about rainfall and flooding (or droughts for that matter) in the UK, or hurricanes and typhoons in the tropics. The weather has always varied, and it always will. There have always been extremes, and there always will be. That

being so, it clearly makes sense to make ourselves more resilient and robust in the face of extreme weather events, whether or not there is a slight increase in the frequency or severity of such events.

This means, in the UK, measures such as flood defences and sea defences, together with water storage to minimise the adverse effects of drought; and in the tropics better storm warnings, the building of levees, and more robust construction.

The same is equally true in the field of health. Tropical diseases – and malaria is frequently (if inaccurately) mentioned in this context – are a mortal menace in much of the developing world. It clearly makes sense to seek to eradicate these diseases – and in the case of malaria (which used to be endemic in Europe) we know perfectly well how to do it – whether or not warming might lead to an increase in the incidence of such diseases.

And the same applies to all the other possible adverse consequences of global warming. Moreover, this makes sense whatever the cause of any future warming – whether it is man-made or natural. Happily too, as economies grow and technology develops, our ability to adapt successfully to any problems which warming may bring steadily increases.

Yet, astonishingly, this is not the course on which our leaders in the Western world generally, and the UK in particular, have embarked. They have decided that what we must do, at inordinate cost, is prevent the possibility (as they see it) of any further warming by abandoning the use of fossil fuels.

Even if this were attainable – a big ‘if’, which I will discuss later – there is no way in which this could be remotely cost-effective. The cost to the world economy of moving from relatively cheap and reliable energy to much more expensive and much less reliable forms of energy – so-called renewables, on which we had to rely before we were liberated by the fossil-fuel-driven Industrial Revolution – far exceeds any conceivable benefit.

It is true that the notorious Stern Review, widely promoted by a British prime minister with something of a messiah complex and an undoubted talent for PR, sought to demonstrate the reverse, and has become a bible for the economically illiterate. But Stern’s dodgy economics have been comprehensively demolished by the most distinguished economists on both sides of the Atlantic. So much so, in fact, that Lord Stern himself has been driven to complain that it is all the fault of the computer models used, which – and I quote him – ‘come close to assuming directly that the impacts and costs will be modest, and close to excluding the possibility of catastrophic outcomes’. It may well be the case that these elaborate models are scarcely worth the computer code they are written in, and certainly the divergence between model predictions and empirical observations has become ever wider. Nevertheless, it is a bit rich for Stern now to complain about them, when they remain the gospel of the climate science establishment in general and of the IPCC in particular. But Stern is right in this sense: unless you assume that we may be heading for a CO<sub>2</sub>-induced planetary catastrophe, a view for which there is no scientific basis, a policy of decarbonisation cannot possibly make sense.

A similar, if slightly more sophisticated, case for current policies has been put forward by a distinctly better economist than Stern, Harvard’s Professor Martin Weitzman, in what he likes to call his ‘dismal theorem’. After demolishing Stern’s cost-benefit analysis, he concludes that Stern is in fact right but for the wrong reasons. According to Weitzman, this is an area where cost-benefit analysis does not apply. Climate science is highly uncertain, and a catastrophic



outcome which might even threaten the continuation of human life on this planet cannot be entirely ruled out, however unlikely it may be. It is therefore incumbent on us to do whatever we can, regardless of cost, to prevent this.

This is an extreme case of what is usually termed ‘the precautionary principle’. I have often thought that the most important use of the precautionary principle is against the precautionary principle itself, since it can all too readily lead to absurd policy prescriptions. In this case, a moment’s reflection would remind us that there are a number of possible catastrophes, many of them less unlikely than that caused by runaway warming, and all of them capable of occurring considerably sooner than the catastrophe feared by Weitzman; and there is no way we can afford the cost of unlimited spending to reduce the likelihood of all of them.

In particular, there is the risk that the earth may enter a new ice age. This was the fear expressed by the well-known astronomer Sir Fred Hoyle in his book *Ice: The Ultimate Human Catastrophe*, and there are several climate scientists today, particularly in Russia, concerned about this. It would be difficult, to say the least, to devote unlimited sums to both cooling and warming the planet at the same time.

At the end of the day, this comes down to judgment. Weitzman is clearly entitled to his, but I doubt if it is widely shared; and if the public were aware that it was on this slender basis that the entire case for current policies rested I would be surprised if they would have much support. Rightly so.

## **The global dimension**

But there is another problem. Unlike intelligent adaptation to any warming that might occur – which in any case will mean different things in different regions of the world, and which requires no global agreement – decarbonisation can make no sense whatever in the absence of a global agreement. And there is no chance of any meaningful agreement being concluded. The very limited Kyoto accord of 1997 has come to an end; and although there is the declared intention of concluding a much more ambitious successor, with a UN-sponsored conference in Paris next year at which it is planned that this should happen, nothing of any significance is remotely likely.

And the reason is clear. For the developing world, the overriding priority is economic growth: improving the living standards of the people, which means among other things making full use of the cheapest available source of energy: fossil fuels.

The position of China, the largest of all the developing countries and the world’s biggest (and fastest growing) emitter of carbon dioxide, is crucial. For very good reasons, there is no way that China is going to accept a binding limitation on its emissions. China has an overwhelmingly coal-based energy sector – indeed it has been building new coal-fired power stations at the rate of one a week – and although it is now rapidly developing its substantial indigenous shale gas resources (another fossil fuel), its renewable energy industry, both wind and solar, is essentially for export to the developed world.

It is true that China is planning to reduce its so-called ‘carbon intensity’ quite substantially by 2020. But there is a world of difference between the sensible objective of using fossil fuels more efficiently, which is what this means, and the foolish policy of abandoning fossil fuels,

which it has no intention of doing. China's total carbon emissions are projected to carry on rising – and rising substantially – as its economy grows.

This puts into perspective the UK's commitment, under the Climate Change Act, to near-total decarbonisation. The UK accounts for less than 2% of global emissions; indeed, its total emissions are less than the annual increase in China's. Never mind, says Lord Deben, chairman of the government-appointed Climate Change Committee, we are in the business of setting an example to the world.

No doubt this sort of thing goes down well at meetings of the faithful, and enables him and them to feel good. But there is little point in setting an example, at great cost, if no one is going to follow it; and around the world governments are now gradually watering down or even abandoning their decarbonisation ambitions. Indeed, it is even worse than that. Since the UK has abandoned the idea of having an energy policy in favour of having a decarbonisation policy, there is a growing risk that, before very long, our generating capacity will be inadequate to meet our energy needs. If so, we shall be setting an example all right: an example of what not to do.

## **Unreason and morality**

So how is it that much of the Western world, and this country in particular, has succumbed to the self-harming collective madness that is climate change orthodoxy? It is difficult to escape the conclusion that climate change orthodoxy has in effect become a substitute religion, attended by all the intolerant zealotry that has so often marred religion in the past, and in some places still does so today.

Throughout the Western world, the two creeds that used to vie for popular support – Christianity and the atheistic belief system of Communism – are each clearly in decline. Yet people still feel the need both for the comfort and for the transcendent values that religion can provide. It is the quasi-religion of green alarmism and global Salvationism, of which the climate change dogma is the prime example, that has filled the vacuum, with reasoned questioning of its mantras regarded as little short of sacrilege.

The parallel goes deeper. As I mentioned earlier, throughout the ages the weather has been an important part of the religious narrative. In primitive societies it was customary for extreme weather events to be explained as punishment from the gods for the sins of the people; and there is no shortage of this theme in the Bible, either – particularly, but not exclusively, in the Old Testament. The contemporary version is that, as a result of heedless industrialisation within a framework of materialistic capitalism, we have directly (albeit not deliberately) perverted the weather, and will duly receive our comeuppance.

There is another aspect, too, which may account for the appeal of this so-called explanation. Throughout the ages, something deep in man's psyche has made him receptive to apocalyptic warnings that the end of the world is nigh. And almost all of us, whether we like it or not, are imbued with feelings of guilt and a sense of sin. How much less uncomfortable it is, how much more convenient, to divert attention away from our individual sins and reasons to feel guilty, and to sublimate them in collective guilt and collective sin.

Why does this matter? It matters, and matters a great deal, on two quite separate grounds. The first is that it has gone a long way towards ushering in a new age of unreason. It is a cruel irony that, while it was science which, more than anything else, was able by its great achievements

to establish the age of reason, it is all too many climate scientists and their hangers-on who have become the high priests of a new age of unreason.

But what moves me most is that the policies invoked in its name are grossly immoral. We have, in the UK, devised the most blatant transfer of wealth from the poor to the rich – and I am slightly surprised that it is so strongly supported by those who consider themselves to be the tribunes of the people and politically on the Left. I refer to our system of heavily subsidising wealthy landlords to have wind farms on their land, so that the poor can be supplied with one of the most expensive forms of electricity known to man.

This is also, of course, inflicting increasing damage on the British economy, to no useful purpose whatever. More serious morally, because it is on a much larger scale, is the perverse intergenerational transfer of wealth implied by orthodox climate change policies. It is not much in dispute that future generations – those yet unborn – will be far wealthier than those – ourselves, our children, and for many of us our grandchildren – alive today. This is the inevitable consequence of the projected economic growth which, on a ‘business as usual’ basis, drives the increased carbon emissions that in turn determine the projected future warming. It is surely perverse to abandon what is far and away the cheapest source of energy in order that future generations avoid any disadvantages that any warming might bring: this simply impoverishes those alive today in order to ensure that future generations, who will be signally better off regardless of what happens today, are better off still.

However, the greatest immorality of all concerns those in the developing world. It is excellent that, in so many parts of the developing world – the so-called emerging economies – economic growth is now firmly on the march, as they belatedly put in place the sort of economic policy framework that brought prosperity to the Western world. Inevitably, they already account for, and will increasingly account for, the lion’s share of global carbon emissions.

But, despite their success, there are still hundreds of millions of people in these countries in dire poverty, suffering all the ills that this brings, in terms of malnutrition, preventable disease, and premature death. Asking these countries to abandon the cheapest available sources of energy is, at the very least, asking them to delay the conquest of malnutrition, to perpetuate the incidence of preventable disease, and to increase the numbers of premature deaths.

Global warming orthodoxy is not merely irrational. It is wicked.<sup>157</sup>

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<sup>157</sup> Nigel Lawson, “The Trouble With Climate Change,”