

*Keeping the Lights On:
Nuclear, Renewables, and Climate Change*

**An Inquiry by the
United Kingdom Parliament Environmental Audit Committee**

**Memorandum by the
Nuclear Free Local Authorities Steering Committee**

Nuclear is not the Answer

Introduction

1. The NFLA Steering Committee has the support of 72 Local Authorities throughout the UK including Glasgow, Edinburgh, Leeds, Manchester and the Greater London Authority. Some of these authorities host nuclear sites, some are neighbouring authorities concerned about local economic, safety and environmental impacts of future legacy management, others are more widely dispersed and affected, for example, by nuclear transportation or historic (and potentially future) nuclear facility siting issues. All have decided to co-operate in the collective community interest in seeking to: eliminate the major production cycles that create radioactive waste, phase out nuclear generating capacity, and; ensure safe management of the radioactive waste legacy.

UK Climate Change Objectives

2. The UK is committed under the Kyoto Protocol to reducing greenhouse gas emissions by 12.5% below 1990 levels by 2008-2012. We also have a national goal of a 20% reduction in carbon dioxide (CO₂) emissions below 1990 levels by 2010. In addition the Energy White Paper was intended to put the UK on a path towards a 60% cut in CO₂ emissions by 2050.
3. The table below shows one of the Government's scenarios for future energy demand detailed in Energy Paper 68 (EP68) - the Central (low prices) scenario. The projections in EP68 do not take into account policy measures, which are expected to reduce carbon emissions of 17.75MtC by 2010, listed as additional to the baseline in the UK Climate Change Programme. The scenario also assumes no new nuclear plants will be built over the projected period.

Emission Projections (at source), MtC

	1990	1995	2000	2005	2010	2015	2020
Power Stations	54.1	44.1	40.5	33.5	33.5	35.9	37.1
Refineries	5.1	5.9	5.1	6.1	6.4	6.6	6.6

Residential	21.5	21.7	22.5	22.7	23.1	23.7	24.3
Services	8.4	8.8	9.6	9.5	9.6	9.7	9.9
Industry	35.2	34.3	33.9	33.5	32.7	32.4	32.2
Road Transport	29.8	30.2	32.0	35.0	37.6	40.1	42.6
Off-road	1.6	1.5	1.3	1.3	1.4	1.4	1.4
Other transport	3.6	3.2	3.1	3.1	3.1	3.1	3.2
Total	159.3	149.6	147.8	144.9	147.5	152.9	157.3

4. We can see that power stations accounted for only around 27% of carbon emissions in 2000. Clearly, if the debate focuses on whether or not to build new nuclear stations it will ignore the fact that the UK's electricity system is responsible for only just over a quarter of UK CO₂ emissions, and nuclear power provides only around 22% of our electricity. So, as well as looking at how to reduce carbon emissions from the electricity sector, we need to look at how to provide heat more efficiently and also how to reduce emissions from other sectors such as housing and transport.

Nuclear Closures

5. Generation from nuclear plants is declining as plants are gradually retired. By 2010 all of Britain's first generation Magnox reactors will be closed and the proportion of electricity provided by nuclear power will be down to around 17 to 18%.
6. By 2020 all but three of British Energy's stations will probably be closed with the proportion of electricity provided by nuclear generation falling to 7%. All of British Energy's nuclear stations, apart from Sizewell B, will be closed by 2023 unless they receive life extensions.

British Energy stations	Station Type	Started Operation	Closure date for accounting purposes	Published Lifetime
Dungeness B	AGR	1982	2008	2006
Hartlepool	AGR	1984	2009	2014
Heysham 1	AGR	1983	2009	2014
Hinkley B	AGR	1976	2011	2011
Hunterston B	AGR	1976	2011	2011
Heysham 2	AGR	1989	2023	2023
Torness	AGR	1989	2023	2023
Sizewell B	PWR	1995	2035	2035

7. The Government's scenarios already take into account closure of the remaining Magnox stations by 2010. Energy Paper 68 also takes into account the expected closure date for British Energy's eight nuclear power stations but assumes the company is successful in achieving life extensions for three of its stations. By 2020, even with some life extensions, only Torness, Heysham 2 and Sizewell B are likely to remain open.
8. According to the Government's First Annual Report on the Implementation of the Energy White Paper, policies which were already current when the Energy White Paper was published, should be able to reduce emissions in 2020 down to 135MtC. The Annual Report says:-

“To be on track for our longer-term goals, we will aim for cuts in carbon of 15-25 MtC below that level by 2020.”¹

Nuclear Power's potential contribution

9. British Energy said in its 2001 submission to the Energy Review that nuclear power was displacing around 13.5MtC per year. The amount of CO₂ emissions displaced by nuclear power will depend on the level of emissions from an alternative fuel mix. Emissions from power stations have been going down since 1990 whilst electricity consumption has been rising. The amount of carbon produced per kWh is expected to continue to fall until 2010 despite a fall in nuclear generation. Consequently the CO₂ emissions which could potentially be displaced by a new nuclear programme will also fall. We can estimate that a new 10,000MW nuclear power programme would reduce emissions by around 6 – 8 MtC depending on the output.²
10. Putting this 6-8 MtC into perspective, it represents around 4 - 5% of total carbon emissions. It is, for example around half of the increase in emissions expected from the transport sector by 2020. Other policies set out in the Energy White Paper aim to reduce emissions by 15 – 25MtC by 2020. By aiming for the upper end of this target the contribution from nuclear power becomes unnecessary.

	Estimated MtC reductions
Energy efficiency in households	4-6
Energy efficiency in industry, commerce and the public sector	4-6
Transport; continuing voluntary agreements on vehicles; use of biofuels for road transport	2-4
Increasing renewables	3-5
EU Carbon trading scheme	2-4
Total	15-25

Lead Time

11. One of the main problems for nuclear power is that the earliest a new generation of nuclear stations could start coming on stream would be 2018-21, according to Dr Catherine Mitchell – of Warwick Business School, and a member of the Cabinet Office’s energy review team.³ This timetable assumes that everything goes well. In practice, everything rarely goes well and the earliest realistic date for delivery of power from a new UK reactor is around 2020.⁴
12. On the other hand energy efficiency improvements can be implemented now, with carbon savings beginning immediately, and up to seven times more cost effectively than building new reactors.

Do we really need new nuclear stations?

13. The danger of promoting a new generation of nuclear reactors is, as then Trade and Industry Secretary Patricia Hewitt told a meeting of Energy & Environment Ministers in London in March 2005, that it will detract from the need to give energy efficiency priority. Not only could this mean, as Gordon Brown mentioned at the same meeting, that we miss out on profitable, cost-saving measures, but could also mean, as evidence from Finland is beginning to suggest, that we end up with higher carbon emissions than we would have had without nuclear power.⁵

Finance

14. If the government decides it wants new nuclear stations then one of the main questions which will need to be answered is how new stations might be financed, what kind of government support might be necessary, and whether this support would be consistent with the market framework for energy. Nuclear power is very expensive, so the liberalised electricity market would have to be radically rearranged to get the finances to work. This will be a major concern to any non-nuclear companies operating within the current market.
15. If taxpayers’ and consumers’ money is going to have to be spent to drive carbon out of the economy, then we need to ensure it is spent in the most effective and environmentally sustainable way. Nuclear power is probably one of the least efficient ways of spending, so should only be countenanced after other, more cost effective methods of carbon abatement have already been implemented. Unless nuclear is the cheapest way to meet our energy needs, paying for it will actually make climate change worse. As Amory Lovins of the US Rocky Mountain Institute, explains:-

“If we suppose pessimistically that saving a kilowatt hour costs as much as 3 cents, while generating a new nuclear kilowatt costs optimistically as little as 6

cents, delivered ... then each 6 cents you spent on such a nuclear kilowatt hour could have bought two efficiency kilowatt hours instead. Therefore, by buying the costlier instead of the cheaper option first, you generated an additional kilowatt-hour from, say, coal that would have been avoided if you'd bought the cheapest things first".⁶

17. Provided there are still energy efficiency gains to be made, these will almost always be a more financially effective way of spending public money than subsidising new nuclear power stations.

"Each dollar invested in electric efficiency displaces nearly seven times as much carbon dioxide as a dollar invested in nuclear power, without any nasty side effects," says Lovins. "If climate change is the problem, nuclear power isn't the solution. It's an expensive, one-size-fits-all technology that diverts money and time from cheaper, safer, more resilient alternatives."⁷

18. In a letter to *The Times* on 16th September 2004, the Chief Executive of the Government's Energy Saving Trust, Philip Sellwood said:-

"To present nuclear power as one of the main ways of combating climate change is short-sighted ... nuclear power simply does not represent a viable option at present. Given the costs associated with nuclear power and current uncertainties surrounding the problems of dealing with nuclear waste, making the UK more energy efficient is a far safer, cheaper and more realistic solution..."⁸

Delivering Energy Efficiency

19. The Government's energy efficiency strategy is not ambitious and can hardly be said to represent the 'step change' in energy efficiency promised in the Energy White Paper. The strategy for reducing domestic energy consumption, for example, relies mainly on requiring larger domestic energy suppliers to meet an energy saving target by encouraging customers to install energy saving measures (The Energy Efficiency Commitment). This programme, along with the Warm Front programme, which is designed to tackle fuel poverty, is producing savings, but much more could be done.
20. The Energy White Paper set out in February 2003 a programme to achieve cuts in emissions from the domestic sector of 5MtC by 2010. The subsequent Energy Efficiency Action Plan (EEAP) launched in April 2004⁹ watered this down to 4.2 MtC. The Association for the Conservation of Energy (ACE) has described the new target as "*wholly unacceptable*",¹⁰ and a majority of MPs signed an Early Day Motion backing the original 5MtC target.¹¹ The Energy Savings Trust told the Environmental Audit Committee that it does not agree with the new 4.2MtC target.

21. The Government has basically scrapped policies that could easily make up the extra 0.8MtC. For example, the Energy White Paper expected savings of 0.4MtC from increasing the uptake of A-rated household appliances. This in itself was a reduction from the 1MtC suggested by the Energy Savings Trust.¹² In the EEAP this was mysteriously dropped to 0.1MtC with no explanation. Similarly, the contribution from gas condensing boilers in the EEAP also appears to have been lowered.
22. Micro-combined-heat-and-power, or micro-CHP, can replace domestic central heating boilers. As well as generating heat for central heating and hot water, they can produce around 50% of a households electricity needs, and use less energy than the standard heating boilers of today. By 2020, 13 million central heating boilers are likely to have been replaced in the UK. If micro-CHP boilers are used instead of conventional boilers, these homes could be producing around half the electricity produced by our current nuclear programme. A number of companies in the UK are already marketing domestic micro-CHP boilers.¹³ The BG Group, one of the pioneering companies, says micro-CHP could potentially achieve cuts of around 5.4MtC.¹⁴ In drafts of the EEAP, a saving of 0.1MtC was listed for micro-CHP, but this was dropped from the final plan, despite the fact that VAT on micro-CHP has been reduced. Admittedly the plan only runs until 2010 and most micro-CHP boilers are likely to be installed between 2010 and 2020, but the deletion of this target still displays a worrying lack of ambition.

Micro-renewables

23. In addition to micro-CHP, millions of homes and offices could have their own electricity generators, such as solar roofs, and roof-top wind turbines by 2020.¹⁵
24. By 2020, Britain could have a very different energy system from today. The turnover of housing stock means around 3 million homes¹⁶ will be added to the housing stock, and 200,000 or so will be removed. Much better standards of efficiency will be used in these new buildings as well as refurbished ones. Energy supply companies should become energy service companies, which can make a profit by selling less electricity and gas.
25. Most delivered energy is used in buildings. All new buildings and refurbishments should be built to a zero emission standard¹⁷, and new estates should incorporate district scale Combined Heat and Power (CHP) plants which will avoid the losses associated with conventional power plants which waste up to 65% of their energy by discharging hot water.
26. The Energy Efficiency Action Plan sets out how the Government intends to make additional cuts of 12MtC across the business, public and domestic sectors by 2010. Clearly by re-instating the 5MtC target for the domestic sector, as well as setting ambitious targets for the period 2010-2020, and promoting micro-CHP and

micro-renewables, it would be perfectly feasible to replace the carbon savings which might accrue from a replacement nuclear programme.

The role of local authorities

27. The Government recognises climate change is one of the greatest threats to the environment that sustains our society. yet it is not yet responding to the issue as a priority. Government must take the lead, for example by making its own estate energy-efficient. Multiple measures will be required to bring about change on the appropriate scale and at the necessary speed. In particular, the role of local government in climate change mitigation has received much rhetorical championing in recent years, but the reality is that the powers and resources devolved to local government, and the assessment regime under which it works, and which dictates its priorities, are clearly not aligned to the goal of climate change mitigation. This situation requires urgent government attention.
28. Some local authorities (e.g. Merton London Borough Council) are beginning to adopt planning policies which promote renewable energy in developments above a certain size – requiring, for example, at least 10% of predicted energy requirements from on-site renewables such as solar energy. Local authorities have a role to play and Government needs to align planning guidance, building regulations and incentives for household energy saving and micro generation etc, with its carbon reduction targets.

Security of Supply

29. The issue of whether we are going to be too reliant on future imports of gas from unstable or unreliable supplier countries is often raised in support of the case for new nuclear stations.
30. However, the Energy White Paper concluded that relying on imports of gas “need not be a problem”. Jonathan Stern, who leads a research group on gas at the Oxford Institute for Energy Studies, says the fact that gas supplies will be coming from overseas in future does not necessarily mean we will be more prone to supply disruptions. He says there is a touch of xenophobia in some of the scare stories.
31. For at least the next decade we will be importing from Norway, Belgium and the Netherlands. In the longer term there may be a need to import from Gulf Countries and Russia, but other European countries have been importing gas from Russia for 20 years with no supply disruptions. Most major disruptions to gas supplies in other countries over the past 20 years have been caused by domestic problems.
32. Stern concludes that arguments equating increased imports with a growing lack of security are not supported by international experience.

¹ DTI & DEFRA (April 2004) First Annual Report on the Implementation of the Energy White Paper
<http://www.dti.gov.uk/energy/sepn/annualreport/firstannualreportfull.pdf>

² EP 68 uses a baseline nuclear output of 66 TWh in 2010, and examines a scenario in which nuclear generated electricity is only 45TWh, and concludes that CO₂ emissions would be some 2 MtC higher than the baseline. Alternatively if the output were 74TWh, then emissions would be some 0.7 MtC lower than in the baseline ie around 1MtC is displaced per 10TWh of nuclear output.

³ Catherine Mitchell, “Action Stations” Guardian 8th September 2004
<http://society.guardian.co.uk/societyguardian/story/0,7843,1298972,00.html>

⁴ MacKerron, G (September 2004) ‘Nuclear Power and the Characteristics of Ordinarity – the Case of UK Energy Policy’ NERA Economic Consulting.

⁵ Pearl Marshall “Official says reviews needed before new U.K. nuclear built” Nucleonics Week, Vol46 No.11 March 17th 2005

⁶ “Why Nuclear Power’s Failure in the Marketplace is Irreversible (Fortunately for Nonproliferation and Climate Protection)” by Amory Lovins, Rocky Mountain Institute, Transcription of a presentation to the Nuclear Control Institute’s 20th Anniversary Conference, “Nuclear Power and the Spread of Nuclear Weapons: Can We Have One Without the Other?” Washington, DC, April 9, 2001. www.nci.org

⁷ Guardian 12th August 2004, “Nuclear Plants Bloom” by John Vidal,
<http://www.guardian.co.uk/life/feature/story/0,1280884,00.html>

⁸ Letter from Philip Sellwood, Chief Executive Energy Saving Trust to The Times 16th September 2004
<http://www.timesonline.co.uk/article/0,,59-1264441,00.html>

⁹ Energy Efficiency: The Government’s Plan for Action, DEFRA, April 2004 <http://www.official-documents.co.uk/document/cm61/6168/6168.pdf>

¹⁰ <http://www.ukace.org/pubs/press/ST040426.pdf>

¹¹ http://edm.ais.co.uk/weblink/html/motion.html/EDMI_SES=03/ref=96

¹² Evidence to the Environmental Audit Committee 19th May 2004, Q371
<http://www.publications.parliament.uk/pa/cm200304/cmselect/cmenvaud/490/4051908.htm>

¹³ See for example Guardian, 12th June 2003 ‘PowerGen markets boiler that generates electricity’ by Paul Brown <http://www.micropower.co.uk/content/1.cfm?pageid=98> & Hewitt, C (2001) “Power to the People: Delivering a 21st Century Energy System” IPPR

¹⁴ “Natural gas – meeting the UK’s energy challenges”. BG Group Advertisement, The Parliamentary Monitor, December 2003.

¹⁵ Paul Brown, “Home wind turbines cut bills and pollution”, Guardian 3rd May 2005,
<http://society.guardian.co.uk/environment/news/0,14129,1475224,00.html>

¹⁶ Calculated from figures on p.3, Improving Domestic Energy Efficiency – A technical overview, background work for Energy White paper 2003. DEFRA ref no IDG/EES/WP13.

¹⁷ See <http://www.zedstandards.com/>

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