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**Energy NPS consultation**
Department of Energy and Climate Change
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Emailed to: nps.consultation@decc.gov.uk and posted to the above address.

To whom it may concern,

**GOVERNMENT CONSULTATION ON OVERARCHING ENERGY NATIONAL POLICY STATEMENT (EN-1) AND FOR NUCLEAR POWER GENERATION (EN-6)**

I attach a copy of the response to the Government's updated consultations on its Overarching Energy National Policy Statement (EN-1) and for Nuclear Power Generation (EN-6) from the Nuclear Free Local Authorities (NFLA)*. The NFLA has responded to EN-1 AND EN-6 only, which specifically are in the remit of its aims and objectives. It has also considered the updated Appraisal of Sustainability for nuclear power generation within EN-6.

At Appendix 1 is attached the NFLA's original comments made to the February 2010 NPS consultation, as they remain relevant to this response. The NFLA would like to make a number of important additional points made on the re-consultation, which are outlined here on a generic topic level.

## 1. The need for new infrastructure

The Government says new infrastructure is needed to replace power stations which are closing down, and to switch to low carbon forms of electricity generation. It has revised the energy need statement in response to respondents' suggestions to look further ahead than 2025. The NFLA notes DECC's analysis for 'Pathways to 2050', published in July alongside the Annual Energy Statement, in which the Department argues the need for even greater amounts of electricity in the run up to 2050. DECC claims that reductions in electricity consumption resulting from improvements in energy efficiency will be far outweighed by increases in electricity demand, (caused by, for example, the electrification of transport and domestic heating) potentially leading to a doubling of electricity demand. Generation capacity will need at least to double to meet this demand and, if a significant proportion of UK electricity is supplied from intermittent sources, then the total installed capacity might need to triple. (1) To have the required impact on emissions, the electricity being consumed will need to be almost exclusively from low carbon sources. Contrast this with the first quarter of 2010, when nearly 80% of UK electricity was generated by burning gas and coal. (2)

The NFLA and a large number of other groups responded to the first consultation by arguing that new nuclear power will come online too late to be of benefit for the UK in meeting its emissions targets or filling the predicted energy gap. In its response, the UK Government says it is confident that new nuclear power stations can start to be deployed from 2018; and it has also argued that France has already demonstrated that it is technically feasible to build nuclear power stations at the rate that would be needed in the UK if new nuclear power stations were to be constructed on all of the sites listed in the revised draft Nuclear NPS before the end of 2025. (3) In the NFLA's view, the UK Government's confidence is remarkable given the experience so far with new reactor construction in Finland (Olikuloto) and France (Flamanaville), which are years behind schedule and billions over budget. (4)

The NFLA notes that the UK Government says "*the purpose of the consultation was not to re-open discussion of whether nuclear power should form part of our future energy mix (which was itself the subject of a separate consultation in 2007 before publication of the Nuclear White Paper)*". (5) It is also UK Government policy that new nuclear power should be able to contribute as much as possible to the UK's need for new non-renewable capacity. (6) Consequently, the revised EN-1 explicitly directs the Infrastructure Planning Commission (IPC) to give substantial weight to the contribution which projects would make towards satisfying the urgent need for "*a mix of all types of energy infrastructure*" in order to achieve energy security at the same time as dramatically reducing greenhouse gas emissions as noted in the table below. (7)

**EN-1 in numbers**

| | |
|---|---|
| Total Current Generating Capacity | 85GW |
| Peak electricity demand now & 2020 | 60GW |
| Average demand | 43GW |
| Large combustion plant directive closures by 2015 | 12GW |
| Nuclear closures over next 20 years | 10GW |
| Generating Capacity required in 2025 | 113GW |
| Of which new generating capacity | 59GW |
| Of which renewable | 33GW |
| For industry to determine | 26GW |
| Non-nuclear already under construction | 8GW |
| Proposals for new reactors already proposed | 16GW |

The UK Government says it would be prudent to plan for 59GW of new generating capacity by 2025, but points out that:
*"...it is not the Government's intention in presenting the above figures to set targets or limits on any new generating infrastructure to be consented in accordance with the energy NPSs. It is not the IPC's role to deliver specific amounts of generating capacity for each technology type."* (8)

As in the original EN-1 the UK Government says it does not believe that decentralised and community energy systems are likely to lead to significant replacement of larger-scale infrastructure. The NFLA is very much surprised to see that the new EN-1 document no longer mentions that the "*lead scenario in the UK's Renewable Energy Strategy contains around 4GW of small scale electricity*". (9) The NFLA would like to know why this statement, even though it was in no way as ambitious at the NFLA believes is the potential from such energy schemes, has been so easily withdrawn?

The NFLA would very much challenge this view and would like to note in sections 2 – 5 below just a few examples of the real potential of such schemes if the political will and solid investment is provided for them.

## 2. All Electric Society?

The NFLA is very much concerned with the UK Government's apparent desire, as contained in EN-1, to quietly seek to move towards an all electric society, with all domestic heating and cooking switching from gas to electricity, and all new cars powered by electricity by 2030. EN-1 shows total generating capacity climbing from 85GW now to 113 GW in 2025. But if it is to double by 2030 to 170GW, it is not surprising to the NFLA that UK Government ministers are said to be privately considering a much larger nuclear programme than the 16GW currently proposed. (10) This vision of an all-electric future might be one way to tackle climate change, but in the NFLA's view it is certainly not the best, and it is extremely doubtful that it will assist other crucial government objectives, such as the elimination of fuel poverty.

The Department for Transport says that electrification of the whole transport sector (not including aviation and shipping) would add 16% to overall electricity demand but given much charging would take place during the night, this would not require massively more capacity in practice. (11) *Rather, the NFLA believes heat is the main issue for future energy use.*

One technology which is ideal to provide low carbon heat and tackle fuel poverty is Combined Heat and Power (CHP) with District Heating, such as the scheme run by Aberdeen City Council, and promoted by the Scottish Government as an example of how local authorities can tackle fuel poverty. (12) DECC nominally supports CHP technologies and has set a target of at least 10,000 MWe by the end of 2010. Yet DECC's chief scientist David MacKay says the "*...growth of gas-powered combined heat and power would be a mistake. Such combined heat and power is not green: it uses fossil fuel, and it locks us into continued use of fossil fuel*." (13)

The NFLA suggests that DECC consider the study undertaken by Imperial College and Surrey University for the CHP Association. This states that, while an all-electric future could be low carbon, it isn't necessarily the best way of doing things. Heat is a very important end-use of energy in the current energy system and is expected to remain so in 2050. In 2007, heat represented 41% of total final energy consumption in the UK. Over half of this heat demand comes from the domestic sector, highlighting the significant challenge associated with decarbonising this sector particularly. No route to low carbon heat is without challenges, but the all-electric future would not necessarily be optimally efficient, since thermal losses from power generation are large. The all-electric scenario would also be contingent on overcoming certain critical issues, which are neither easy nor fully understood. If the roll-out and performance of heat pumps, insulation and low carbon generation is not as expected, then the scenario will not be able to deliver the emission reductions required. It also gives rise to a set of challenges associated with the management of power flows.

On the other hand, the NFLA would argue that a diverse combination of technologies can help overcome some of these problems, and provide a more robust energy system in the long run. An integrated approach would use a range of heat options, not just gas-fired CHP, including biomass fired CHP plant, and even CHP with carbon capture and storage technologies. (14) Once district heating networks are established geothermal heat, waste heat from industrial processes, heat pumps using boreholes or rivers, solar heat, and so on can also be used.

One of the authors of the report, Dr Rob Gross, explains: "*No route to 80% carbon reduction is without challenges. But it seems clear that improvements can be made to the 'all-electric' approach we are currently pursuing. The integrated scenario we have identified offers a potentially extremely valuable contribution to efforts to green our energy system*."

The NFLA notes as well the comments made by Keith Allott, Head of Climate Change, WWF, welcoming the report findings: "*A strong focus on energy efficiency is the low-risk, low-cost solution, and combined heat and power and district heating networks have a central role to play in delivering this. If the UK intends to meet its carbon targets, there simply isn't room for ruling out these options."*

The NFLA also notes the comments of the report made by Janine Freeman, head of Public Affairs at National Grid said: "*As operator of both the UK gas and electricity transmission systems, we share the view that we should explore the alternatives for providing low carbon heat. Electrification of heating will not provide the whole answer because it will not be efficient to build power stations and electricity networks to supply electric heat for the one or two months a year when it is really cold. Our own work on the use of biomethane for injection into the gas grid indicates this could make a significant contribution to domestic heating. And as this report sets out, other technologies such as CHP and solar thermal will also have important roles to play in a decarbonised energy future*." (15)

Furthermore, the NFLA notes that Centrica has already opened a plant at Didcot sewage works in Oxfordshire which produces renewable gas for households to use. (16) National Grid believes at least 15% of all gas consumed (or 50% of domestic supplies (17)) could be made from sewage slurry, food waste and organic waste created by businesses such as breweries.

Now, up to 200 Oxfordshire homes will be using biomethane made from sewage they had flushed away three weeks earlier. British Gas, Thames Water and Scotia Gas Networks hope to roll out the process across the UK. The practice of using anaerobic digesters - carefully managed bacteria - to

turn faeces into a means of generating electricity is already well established across the country. British Gas says supplying renewable gas directly is much more efficient, as about two thirds of the energy is lost when electricity is generated. So an additional plant installed earlier this year at the Thames Water sewage treatment works in Didcot cleans up the spare biogas that is produced and turns it into biomethane suitable for household hobs and in gas central heating.

United Utilities is hoping a similar £4.3m scheme, which will cater for 500 homes in Manchester, will be ready by summer 2011. The UK produces 1.73 million tonnes of sewage sludge every year, which could potentially be used to produce biogas. Hypothetically, if all of the UK's 9,600 sewage treatment facilities in the UK were fitted with this type of technology, they could provide enough renewable gas for up to 350,000 homes.

Adnams the brewer has opened an anaerobic digestion facility in Suffolk using waste slurry which will provide renewable gas to about 235 homes. British Gas is also involved in this project and is planning to open three more. (18)

The NFLA believes the UK Government needs to seriously reconsider its 'all-electric' future, which lies at the heart of EN-1 and its promotion of nuclear power generation in EN-6, by considering a more concerted programme developing the technologies mentioned above at a much greater and speedier rate. The examples above, and there are many more, just give a small sample of a better non-nuclear alternative which is cost effective, sustainable, clean and can provide the dramatic increases in energy production that DECC are so intent on developing.

**3. CHP can reduce gas consumption**

The NFLA also suggests that the UK Government consider in some detail a study by Pöyry Energy Consulting looked at industries across the UK which could generate as much electricity as 10 nuclear power stations and halve gas imports by installing or extending CHP plants. (19) Implementing a decentralised energy strategy which makes the most of CHP and District Heating need not be locking the UK into using fossil fuel gas. For a start, as the Poyry study shows, it could lead to dramatic reductions in gas consumption much sooner than would otherwise be the case. Secondly, once the district heating networks are established they can be converted to run on other fuel sources such as biomethane, biomass, geothermal and solar in the future. The UK Government's all electric vision is tending to lead to proposals for new types of wasteful electricity generating plant, such as the three Forth Ports biomass proposals in Scotland which will not be capturing a significant percentage of the waste heat.

As moves towards higher penetration rates for renewable electricity gain momentum, the electricity supply system has to be able to manage a significant increase in periodic renewables, while still maintaining supply to the customers. The intermittency of renewables - and wind in particular - demands flexibility of response for operation from other suppliers on the grid. That is why the successful combination of CHP and renewables is attracting increasing attention. The NFLA strongly encourages the UK Government to consider the Danish model as an example. (20)

Presently in Denmark, when the wind speed drops by 1 metre per second the country needs to find an additional 350 MW of electric power capacity. Gas CHP has the capacity to respond quickly to such fluctuation, but to maintain high efficiency the system must also find a use for the heat produced when generating electricity. In Europe, traditional CHP users are beginning to find new ways (such as temporary heat storage or buffering) to meet this need for flexibility. Danish district heating companies are increasingly providing the grid with balancing services, and the Danish model shows how a combination of a high wind generating capacity and CHP can run together smoothly. (21)

Furthermore, the UK Government should also consider some dramatic developments pioneered In Germany, where micro combined heat and power (CHP) has been identified as the solution to balancing wind in the network. LichtBlick is the largest independent energy supplier in Germany and has announced its goal to place 100,000 micro CHP systems with an electric output of 20 kW each into homes and buildings in Germany. The property owner will be provided with the

cogeneration unit and a heat storage unit and be guaranteed that the home will be supplied with heat as required. (22)

If CHP is not promoted as a way of balancing renewable energy, non-CHP gas-fired electricity generating stations will most likely be used, so, as shown by Poyry in the case of industrial CHP, gas consumption could end up being higher in the all-electric scenario. A study by PB Power for the Mayor of London and Greenpeace UK concluded that a Decentralised Energy (DE) strategy could reduce $CO_2$ emissions from London by 27.6% by 2025. Despite the increased use of gas for CHP, gas consumption could be 15% lower under a high DE scenario compared with a high nuclear scenario. (23) A similar report by PB Power for the City of Edinburgh Council, Greenpeace and WWF, concluded that the most cost effective way for Edinburgh to reduce its carbon emissions and increase energy security is by following a DE pathway. (24)

The NFLA urges the UK Government to consider these examples in promoting a more imaginative, resilient and effective form of energy policy, using the enlightened and successful projects developed not just by our European neighbours, but available with investment and encouragement in this country.

## 4. The role of microgeneration

The UK Government's own Microgeneration Strategy (25) quotes from a study commissioned by the DTI from the Energy Saving Trust (EST) which suggested that by 2050, microgeneration could provide ***30-40% of the UK's electricity needs*** and help to reduce household carbon emissions. Yet the UK Government's Low Carbon Transition Plan (LCTP) only expects 2% to come from small-scale renewables by 2020. If the UK is aiming to produce 40% by 2050, the NFLA believes a target of 10% for 2020 should be set and should be well within reach. This would clearly obviate the need for new nuclear reactors. Domestic-scale CHP could be providing 20% of the UK's electricity, more than current UK nuclear capacity, not long after 2020, and much more quickly than new nuclear build (26)

## 5. The role of Renewables

There are changes to section 3.4 on renewables of EN-1 which the NFLA notes are probably in place to reflect a clearer focus on what the IPC needs to know, rather than arguing the general case for renewables. Gone is the reference to half a million jobs in the original EN-1; instead the revised document says:

*"Renewables have potential to improve security of supply by reducing reliance on the use of coal, oil and gas supplies to keep the lights on and power our businesses. Meeting the 15% renewables target could reduce fossil fuel demand by around 10% and gas imports by 20-30%."* (27)

Why has the Government removed this exciting statement at a time when unemployment is starting to rise significantly and there is a real need to develop new employment opportunities? This contrasts negatively to the rich employment streams that are regularly promoted for new nuclear build by the Government.

Mentions of the Renewable Energy Strategy, (28) produced by the previous Government, have been almost completely removed, (29) despite the fact that it is a White Paper, apart from two footnotes on page 25 of the revised EN-1. Nor is there a single mention of the Low Carbon Transition Plan, which is also a White Paper. (30)

The NFLA believes the UK Government needs to clarify the status of the Renewable Energy Strategy and Low Carbon Transition Plan as a matter of urgency.

## 6. The Role of Nuclear Energy

The NFLA notes that the UK Government relies on a British Energy study from 2009 to show that nuclear power is low carbon. (31) This analysed carbon emissions from Torness and concluded

emissions were ***7gCO$_2$/kWh*** compared with 400g for gas and 900g for coal. The Government says it continues to monitor the results of published Life Cycle Analyses (LCAs) conducted throughout the world to ensure it keeps abreast of developments. (32) Yet it makes no reference to an analysis of 103 lifecycle studies by Benjamin Sovakool from the National University of Singapore published in Energy Policy Journal. (33) He concludes that typical lifecycle emissions from nuclear plants appear to be about ***66gCO$_2$e/kWh***.

Unlike the Government Response document, EN-1 gives a range for carbon emissions from the nuclear life cycle of 7-22gCO$_2$/kWh. (34) The higher figure is still one third of the 66g figure given by Sovacool. EN-1 gives as its sources papers by the Sustainable Development Commission (SDC) (35) and the International Atomic Energy Agency (IAEA) (36). The SDC gives as one of its main sources the Paul Scherrer Institute. The Institute's current web page on Life Cycle Assessments includes a list of papers the most relevant of which are authored by Roberto Dones, sometimes with others. (37) Sovacool criticises Dones for using old data regarding emissions from uranium mining and enrichment. Sovacool looks at several papers by Dones as well as the paper by SDC. Sovacool concludes that:

*"Put simply, investments in nuclear power are much worse at fighting climate change than pursuing wind, solar, and other small-scale power generators. Policymakers would be wise to embrace these more environmentally friendly technologies if they are serious about producing electricity and mitigating climate change."* (38)

In the NFLA's view, it seems remarkably remiss of the Government not to have looked in detail at the work of Sovacool, despite claiming to be monitoring life cycle assessments. The NFLA would be keen to see the Government carefully review Dr Sovacool's analysis and respond to its main points.

## 7. Nuclear Economics

The Government says it believes new nuclear will become the least expensive form of low carbon electricity generation. (39) It says cost overruns and delays at Olkiluoto have arisen partly because of changes made to the design during construction. The Generic Design Assessment process should mean design issues can be resolved early in the process, rather than addressed during construction, when resolution may be more complex, costly and time consuming. (40)

In 2008, when the government revisited nuclear costs, it assumed the construction cost was £1,250/kW ($2,000/kW), but the estimated cost of new reactors now appears to have increased to ***at least $6,000/kW.*** At this price new reactors seem unlikely to be affordable except where huge public subsidies are offered and/or there is a strong likelihood of full cost recovery from consumers, no matter what the cost is. According to the US Government's Energy Information Administration (EIA) capital costs for new nuclear and coal-fired power plants are 25-37% higher than those reported a year earlier. The increase reflects higher global commodity prices, the small number of firms able to engineer complex projects such as a new nuclear or advanced coal facility, and the general trend of increased costs of capital-intensive projects in the power sector. EIA found the capital costs for a new dual-unit 2,236MW nuclear plant were $5,335/kW. However, solar capital costs fell markedly. (41)

Similarly, Dr Mark Diesendorf of the University of New South Wales, speaking to a solar industry conference in Canberra said nuclear costs had risen from about $US2000/kW of installed capacity in 2002, to about $US7400/kW today. In contrast the capital cost of onshore wind power last year was around $1900 to $1700/kW, and solar around $5120 to $7000/kW (and as low as $3000 for utility-scale projects). (42)

The NFLA is concerned that the large increase in nuclear costs in recent years means that a new nuclear build programme would only be possible with considerable recourse to the UK taxpayer, either through direct or indirect public subsidies and / or much higher energy bills. At a time of major stress on the UK taxpayer and the public finances, this is not the time to be pursuing such a policy when cheaper and more sustainable options are available.

## 8. Nuclear Subsidies

On the question of nuclear subsidies, the UK Government continues to insist there won't be any. (43) However, it appears clear to the NFLA that consumers will be expected to foot the bill to incentivise the construction of new reactors.

The NFLA notes with real concern the comments made by Peter Atherton, utilities analyst at Citigroup:
"*The Government's definition of a subsidy is literally a bag of cash delivered personally by George Osborne to each nuclear power plant…This is laughable. What's going to happen will be an economic transfer of risk from company to consumer. Of course it's a subsidy*." (44)

Existing Government subsidies to nuclear power have been detailed by the Energy Fair Group, who have recently provided its detailed report to DECC. (45) The Government, for example, admits that it intends to maintain a limit on nuclear operator's liability in the event of a nuclear accident, albeit at the increased level of €700m. (46)

However, changes made to Part 2 of EN-1 reflect the new UK Coalition Government's plans to implement a carbon floor price, reform the climate change levy and further interventions in energy markets it believes are necessary in order to ensure that developers come forward with proposals to build enough of the kind of infrastructure it claims is required. (47) It would seem to the NFLA that the UK Government is planning to force consumers to fund an expensive unsustainable technology which generates nuclear waste for which there is no long term management solution in place, when there are cheaper low carbon technologies which are capable of tackling climate change much more effectively. (48)

## 9. Radioactive Waste

On nuclear waste, there are three points where the UK Government has changed the wording of EN-6. The Government argues that these changes are intended to:

(a) demonstrate the Government's confidence that 'geological' disposal will be implemented;
(b) clarify the Government's expectations in relation to the likely duration of the onsite storage of higher activity waste; and
(c) clarify the role of the IPC in relation to arrangements for the management and disposal of wastes from new nuclear power stations. (49)

Annex B of EN-6 (50) sets out how the UK Government has satisfied itself that effective arrangements will exist for the management and disposal of waste produced by new reactors. The Government assumes there will be no reprocessing so "higher activity waste" will consist of spent fuel and intermediate level waste. However, just a few days ago Lord Marland was quoted in the House of Lords suggesting that an application for a new reprocessing plant in Cumbria could be expected by the end of 2011 – why has this not been included in EN-6 if it is to be pursued?

The NFLA notes that EN-6 says deep geological 'disposal' is the way in which higher activity waste will be managed in the long term. This will be preceded by safe and secure interim storage until a geological 'disposal' facility can receive waste. In reaching its view on the management and disposal of waste from new nuclear power stations the Government has in particular satisfied itself that:

- geological 'disposal' of higher activity radioactive waste, including waste from new nuclear power stations, is technically achievable;
- a suitable site can be identified for the geological 'disposal' of higher activity radioactive waste; and
- safe, secure and environmentally acceptable interim storage arrangements will be available until a geological 'disposal' facility can accept the waste. (51)

EN-6 adds that:

*"The question of whether effective arrangements will exist to manage and dispose of the waste that will be produced from new nuclear power stations has therefore been addressed by the Government and the* [Infrastructure Planning Commission] *IPC should not consider this further."* (52)

The new EN-6 goes on to clarify that the IPC can look at proposals for waste management facilities on the site of a proposed reactor in accordance with the policies set out in EN-1 and EN-6. (53)

Whilst this is a welcome clarification for local authorities in the vicinity of proposed new reactors, it is still not clear when arrangements for dealing with spent fuel from new reactors will be clarified. A recent Nuclear Decommissioning Authority report for the Nuclear Industry Association outlines options for storage, transport and disposal of spent fuel from potential new nuclear reactors. Local and centralised spent fuel storage and local and centralised encapsulation of spent fuel all remain options, which means a local authority presented with plans for a new reactor does not know the full implications of the plan. In the NFLA's view, this is unacceptable. (54)

On the Geological Disposal Facility (GDF), the Government says it has not yet taken a final decision on whether the facility will be examined under the Planning Act as a major infrastructure project, but at this stage considers this to be likely. (55) This could mean the Infrastructure Planning Commission (IPC), or its successor, is simply told that the strategic question of whether nuclear waste should be disposed of in a geological repository has already been decided (and that it has also been "justified"). Therefore as a result, the Government position is that any planning application for a geological disposal facility only needs to be examined with regard to local planning issues. In other words there is unlikely to be a public inquiry at which technical problems which cast doubt on risk calculations produced by the nuclear industry can be examined in public and open to cross examination. In the NFLAs view, the UK Government needs to provide an alternative means to allow independent challenges to the scientific basis for geological disposal.

**10. High burn-up fuel**

The UK Government's "*arrangements for the management and disposal of waste*" document published along with the first set of draft NPSs stated that it is possible to envisage that storage of spent fuel might be required for ***160 years*** from the start of the power station's operation. (56) The House of Commons Energy and Climate Change Committee pointed out that from the perspective of the local community it is a misnomer to describe this as interim storage as it will be several lifetimes between the commencement of a power station's operation and the eventual removal of waste from that site. The NFLA concurs with the Committee's view in this area. (57)

The Government says it acknowledges that prolonged on-site storage of spent fuel is a matter of concern for local communities and that more detail might allay that concern. (58) The Government's response document discusses various measures which might be used to reduce the cooling period for spent fuel including "*mitigating actions which could reduce the heat load on each disposal canister".* (59) The Government suggests that the period of cooling after the station has finished generating electricity could be reduced to 50 years. The source the Government uses to reach this conclusion is a single NDA study carried out for the Nuclear Industry Association which states that with "*the judicious mixing of long-cooled and short-cooled*" spent fuel the cooling period needed to allow the spent fuel to be considered for disposal could be halved from the previous estimate of 100 years to 50 years. (60)

The NPS has now been revised to indicate the Government no longer expects spent fuel to be stored on reactor sites for as long as 160 years, although it says a Geological Disposal Facility (GDF) will not be able to accept new build waste until 2130, so it's likely to be at least 119 years anyway. The Government says it recognises that interim storage might be required for longer, but there are also factors which might make the storage period shorter, for example arrangements might be made to store waste in a central storage facility. Either way:

"*The Government will expect operators to ensure their waste is disposable when a GDF is anticipated to be available to take the waste*." (61)

The NFLA believes this section of EN-6 has done little to allay the reasonable concerns of local communities of the length of time high burn-up fuel radioactive waste will remain on each new nuclear reactor site. The real concerns over intergenerational equity have not been adequately addressed in reference to radioactive waste. With many decades to run before the current huge waste legacy may be dealt with, it still appears foolhardy to be creating even more of it.

**11. Comments made by Nuclear Waste Advisory Associates**

The NFLA would like to support specific comments made on radioactive waste by the Nuclear Waste Advisory Associates, who have detailed and specific knowledge of these issues and are made up of a number of former members of the Committee on Radioactive Waste Management and independent experts in the field.

On the question of whether geological disposal is technically achievable the Government says several respondents "*drew attention to gaps in technical knowledge, as evidenced by ongoing programmes of research, while others raised specific questions around the evidence base used in the NPS*". (62)

Clearly referring to a submission from the Nuclear Waste Advisory Associates (63), the Government says: "*One detailed response highlighted reports by the European Commission's Joint Research Centre (JRC), the EA and the NDA. It argued that issues raised by these reports highlighted major knowledge deficiencies with regard to technical issues, which called into question whether geological disposal would prove technically feasible*." (64)

In response the Government says it:

"*...believes, in the light of CoRWM's work and wider international experience, that there is already sufficient research work available to be confident that geological disposal is technically achievable*." (65)

The Government says it has examined the reports from the JRC and the EA, but concludes that neither the JRC nor the EA have stated that the technical issues they have identified cannot be resolved. (66)

Despite the numerous problems reported by JRC, (67) its overall conclusion is that the technology of geological disposal has developed well enough for programmes to be implemented. Yet this conclusion was based largely on a description of ongoing research projects – rather than their results - and nuclear agency reports, which tend to be collective statements based on views rather than an analysis of scientific literature. Only three papers published in scientific journals are referenced. Similarly, the Organisation for Economic Co-operation and Development's (OECD) Nuclear Energy Agency (NEA) states that *"geological disposal is technically feasible"* and that a *"geological disposal system provides a unique level and duration of protection for high activity, long-lived radioactive waste"*. (68) Again these statements are based solely on the collective views of its Radioactive Waste Management Committee, not on an analysis of the existing scientific evidence.

On the other hand, a review of the scientific literature for Greenpeace International (GPI) provides an overview of the status of research and scientific evidence regarding the long-term underground disposal of highly radioactive wastes. It identifies a number of phenomena that could compromise the containment barriers, potentially leading to significant releases of radioactivity. (69) Many of the processes involved are poorly understood and many of the assumptions made to predict the rate of leakage are impossible to verify. Unless and until these difficulties can be resolved, the data suggests that it is quite likely that a significant release of radioactivity from a deep burial facility could occur, with serious implications for the health and safety of future generations.

The NFLA believes the UK Government needs to answer these critical points in much more detail and develop considerably more research to allay reasonable concerns around the scientific and technical uncertainties surrounding the deep 'disposal' of radioactive waste.

**12. UK Inventory of Radioactive Waste**

The NFLA also believe it is worth noting that the Appraisal of Sustainability on Hazardous and Radioactive Waste (70) looks at an inventory of waste from a 10GW new nuclear programme, and repository footprint, and compares this to the baseline of legacy waste. Yet the Government has said that it anticipates proposals being put forward for 16GW of new reactors (Up to 3.2GW at each of Hinkley, Sizewell. Wylfa, Oldbury and Sellafield), (71) which begs the question why only look at a 10GW programme? Obviously any community considering hosting a GDF will want to know what the ***maximum inventory*** could be. Consequently the West Cumbria Managing Radioactive Waste Partnership has been looking at the waste inventory and repository footprint from a 16GW programme. Information on this will appear on the Partnership website shortly. (72)

The Environment Agency (EA) has set a limit on the risk that may be caused by the burial of radioactive wastes of $10^{-6}$ (i.e. one in a million) i.e. the risk of a person contracting non-fatal cancer, fatal cancer or inherited defects must be less than one ion a million. (73) However, the NDA Disposability Assessment Report for waste arising from new EPR reactors states:

*"…a risk of 5.3 x $10^{-7}$ per year for the lifetime arisings of a fleet of six EPR reactors each generating a lifetime total of 900 canisters is calculated"* (74)

This is more than half the total risk of $10^{-6}$ allowable for a GDF. Clearly a GDF with spent fuel from a 16GW new reactor programme, as well as legacy waste, will probably exceed the risk targets set by the EA. Thus, it is quite possible that two separate GDF's might well be required. There is no detail around this possibility and what it means for UK radioactive waste management policy.

In the NFLA's view, the Appraisal of Sustainability on Hazardous and Radioactive Waste needs to be rewritten to take into account the likelihood of a 16GW nuclear programme, and the probability that ***two*** nuclear deep-waste repositories will be required.

**13. The Appraisal of Sustainability (AoS)**

As well as looking at alternative sites the Nuclear AoS considers whether or not the objectives of EN6 could be delivered using alternative options. The UK Government says its:

*"...view (is) that none of the alternative options looked at can be relied upon to deliver the objectives of this NPS by the end of 2025."*

Chapter 3 of the Nuclear AoS Main Report looks at "Need Alternatives", (75) and uses DECC's Updated Energy and Emissions Projections. (76) The NFLA is concerned that references to the Low Carbon Transition Plan and the Renewable Energy Strategy have been mostly removed. Fuel poverty is now referred to as "affordability". (77)

The Government relies on analysis by Redpoint, (78) and MARKAL modelling for the Committee on Climate Change, (79) to show that if new reactors were excluded from the energy mix they would be replaced by gas-fired generation. But there is no comparison with, for example, an energy policy which involves a high level of Government support for decentralised energy and combined heat and power. So the AoS is basically comparing new nuclear reactors with Combined Cycle Gas Turbines and a third option in which nuclear reactors may get built but without an NPS in place to facilitate the approval of planning applications.

The NFLA believes the Appraisal of Sustainability needs to be redone so that the public can see a proper comparison between the Government's proposals for up to 16GW of new reactors with an energy policy based on support for decentralised energy and combined heat and power.

**15. The terrorist threat**

The NFLA is pleased that the Office of Civil Nuclear Security (OCNS) gets a mention in the updated NPS, which it didn't previously, and there is a new paragraph about the terrorist threat:

*"The Government is conscious of the significant detriments to health that could result from an accident or terrorist attack at a new nuclear power station. However, the scale of potential damage must be seen in the light of the robust regulatory regime which exists in the UK to prevent accidents and protect against security threats including terrorist attacks. Government and industry have an emergency preparedness framework in place to mitigate health effects in the unlikely event of any accidental release of radiation into the environment."* (80)

However, the NFLA is concerned that no evidence is presented to indicate that an assessment of the environmental impacts of radioactive releases arising from a range of credible malevolent acts that affect the reactor core or stored spent fuel have been considered. (81) Furthermore, due to the sensitivity of such issues – threats to civil nuclear reactors are classed as one of the biggest risks in the UK Government's National Security Review (82) – there appears to be little, if any, independent verification of the work of the OCNS. This point has been raised by the NFLA and a number of NGOs at recent DECC / NGO stakeholder dialogue meetings and it compares unfavourably with experience in other countries, particularly the United States.

In answer to a series of detailed Parliamentary Questions from Green Party MP, Caroline Lucas, Energy Minister Charles Hendry replied:

"*The government does not comment on the detail of security matters at civil nuclear sites. It is important that security measures adopted at civil nuclear installations are proportionate to the threat. Nuclear site licence companies are responsible for meeting the costs of security.*" (83)

Unless a mechanism can be found to give assurances that the Government has carried out threat assessments and an assessment of the environmental impact of a range of malevolent acts, the NFLA can only assume that these issues are simply being ignored. Given that other low-carbon energy options exist that are arguably preferable and much safer on other grounds, the Government needs to give some well-argued reasons to outweigh these concerns. (84)

**14. Further nuclear emergency planning concerns**

EN-6 is very generic in nature when it comes to nuclear emergency planning issues. Given that both EDF and Horizon – the likely constructors of new nuclear reactors – have expressed a desire to build two or even three reactors at the listed sites, the potential footprint of these developments is huge in scope.

All of these reactors are in predominantly rural locations where access routes are limited, communities are isolated and the emergency services may have to travel substantial distances to a major incident. EN-6 largely plays down these concerns yet; to take the example of Bradwell, a substantial population on nearby Mersea Island could be cut adrift in the event of an incident with access routes closed to them (85).

Though emergency planning at existing nuclear reactors are highly regulated and, fortunately there have not been serious incidents to date since the Windscale fire; there have been a whole range of examples of significant fires, leakages and safely breaches at every UK nuclear reactor over the last three decades. The doubling and tripling of such sites for new build inevitably increases the complexity of the sites and requires a complete reassessment of the risk. It also potentially increases the pressure on the emergency services and local authorities in providing an adequate response to a major incident – this at a time when such services are enduring a likely major contraction of staff due to the substantial cuts in the public finances.

EN-6 does go into some detail of one main emergency planning risk – major flooding – but it does not adequately outline what a wider area flooding incident would mean on large two or three reactor sites. The flooding in Cumbria in spring 2010 for example, which saw large areas of the county cut off due to the collapse of a number of bridges and significant damage to trunk roads, leads the NFLA to lay out the obvious scenario – how effective could the emergency response have been if there was flooding or another type of major emergency incident at Sellafield at the same time? Similarly, climate change models outline the real potential for more severe bouts of

inclement weather in future decades – the UK Government needs to produce independently verified research that all new reactors can withstand the increased flooding risk.

Furthermore, the development of a large number of new reactors will also inevitably increase the transportation of nuclear materials by land and sea in coming years. This has a major impact not just on the areas around the new reactors, but across the UK. The NFLA is concerned that there are potential gaps in detail on such emergency plans and on the capability of the local response, particularly in areas which do not contain fixed nuclear sites (86). The NFLA is now about to undertake further research of the knowledge and planning awareness of local authorities and emergency services on civil nuclear transports by road and rail and also the response to nuclear terrorist attacks, and plans to share these results with DECC.

The NFLA believes the UK Government should undertake a thorough review of the fragmented nature of UK nuclear emergency planning response arrangements and the knowledge of such plans across the board, not just in areas with fixed nuclear sites – to which DECC's Nuclear Emergency Planning Liaison Group presently largely focuses on.

**15. KiKK & COMARE**

The NFLA notes that there are new paragraphs in EN-6 on the KiKK study of childhood cancer in the vicinity of German nuclear power plants. (87) It points out that KiKK:

"...*noted that the exposure to ionising radiation in the vicinity of German nuclear power stations was lower by a factor of 1,000 to 100,000 than the exposure to natural background and medical radiation, and that therefore the findings of the study could not be explained in the present state of radiobiologic and epidemiologic knowledge*".

It goes on to say that the German Commission on Radiological Protection concluded that the design of the KiKK study was not suitable for establishing a correlation with exposure to radiation from nuclear power plants. It says the database of childhood cancers being used in the UK is much larger than that used in the KiKK study.

*"COMARE is currently undertaking a further review of the incidence of childhood cancer around nuclear power stations, with particular reference to the KiKK study and COMARE's 10th and 11th reports. This will be published as COMARE's fourteenth report later this year. COMARE is also keeping the incidence of childhood leukaemia and other cancers in the vicinity of Sellafield and Dounreay under surveillance and periodic review."*

The NFLA has been in touch with the COMARE Secretariat and been informed there is still no publication date for the fourteenth report. In February 2010 it was informed by DECC that it expected the report to have been published by March 2010, so is disappointed by this long delay.

In EN-6 the Government relies on a re-examination of UK cancer data by Bithell (88) to conclude that:

*"...there is no evidence ... that living with 25km of a nuclear generating site in Britain is associated with an increased risk of childhood cancer*".

However the Appraisal of Sustainability does not appear to have examined the alternative viewpoint such as the recent letter published in Radiation Protection Dosimetry, by Dr Ian Fairlie and Dr Alfred Körblein (a German radiation scientist) which raises many objections to the Bithell paper (89). The NFLA remains concerns these critical issues around the effects of low level radiation on human health have not been adequately determined to a satisfactory level.

**16. NFLA's overall conclusions on the NPS re-consultation**

Within this response the NFLA has made a number of key points. These are in summary:

1. There needs to be a much wider debate about the implications of moving towards an all-electric society by 2030 than is offered by this consultation.
2. The Government simply asserts that decentralised and community energy systems are unlikely to lead to significant replacement of larger-scale infrastructure, but it fails to assess properly how a scenario based on these would compare with one based on a new programme of nuclear reactors.
3. The Government fails to explain how its nuclear electric energy policy will tackle fuel poverty compared with a scenario based on decentralised energy.
4. The Government needs to clarify the status of the Renewable Energy Strategy and Low Carbon Transition Plan as a matter of urgency.
5. The Government has failed to take account of life cycle assessments of carbon emissions from the nuclear cycle as it said it would.
6. The Government has failed to take account of recent increases in the capital cost on new reactors which appear to have tripled from around $2,000/kW to $6,000/kW since 2008.
7. The Government is planning to 'incentivise' nuclear power against the spirit of earlier commitments not to subsidise new reactors. This means consumers will be forced to fund an expensive unsustainable technology which generates nuclear waste for which we have no long term management solution in place, when there are cheaper low carbon technologies which are capable of tackling climate change much more effectively.
8. There is still no clarity for communities around proposed new reactors about how waste will be managed - whether or not there will be a waste encapsulation plant for instance.
9. Spent fuel could still be stored on new reactor sites for 110 years – hardly 'interim storage'. There will still be several lifetimes between the commencement of a power station's operation and the eventual removal of waste from that site.
10. The Government needs to clarify how the public will be able to put forward evidence and cross examine witnesses with regard to plans to build a deep geological disposal facility.
11. Statements claiming there is an international consensus on deep geological disposal of nuclear waste are based the collective views of proponents, not on an analysis of the existing scientific evidence.
12. The Appraisal of Sustainability on Hazardous and Radioactive Waste needs to be rewritten to take account of the likelihood of a 16GW nuclear programme, and the probability that two nuclear waste repositories will be required.
13. A mechanism needs to be found to give assurances that the Government has carried out threat assessments and an assessment of the environmental impact of a range of malevolent acts otherwise it can only be assumed that these issues are simply being ignored. Given that other low-carbon energy options exist that are arguably preferable on other grounds, the Government needs to give some pretty good reasons to outweigh these concerns.
14. There needs to be a much thorough consideration of the impacts of developing new nuclear reactors on local and wider emergency planning response, particularly given the potential for wide-area flooding incidents, other serious incidents and potential gaps around the transportation of nuclear materials. A review of the UK nuclear emergency planning regime and a widening of the remit of the Nuclear Emergency Planning Liaison Group should be considered as a corollary to this re-consultation.
15. The Appraisal of Sustainability needs to examine alternative viewpoints on the German KiKK study to the one put forward by COMARE, and no final decisions should be taken regarding new reactors until the forthcoming COMARE report has been subjected to a full critique.

**18. Concluding comments**

The comments made above, and in the NFLA's original response to EN1 and EN6 attached as Appendix 1, which are attached below, have been endorsed by the Nuclear Free Local Authorities Steering Committee. The NFLA hopes that DECC consider each point carefully and reconsider its policy statements on wider energy use and on new nuclear power generation in light of them.

If you have any queries with this response please contact the NFLA Secretariat using the details at the top of this letter.

Yours sincerely,

Bailie George Regan
Chair of Nuclear Free Local Authorities

***Information on the NFLA**

The NFLA is the principal local authority organisation in the UK and Ireland working on all aspect of nuclear policy. Its terms of reference can be found at the NFLA website – http://www.nuclearpolicy.info.

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**NFLA RESPONSE TO OVERARCHING ENERGY NATIONAL POLICY STATEMENT (EN-1) ABND NUCLEAR PIOWER GENERATION POLICY STATEMENT, FEBRUARY 2010**

1. **Do you think that the Government should formally approve ('designate') the draft Overarching Energy National Policy Statement?**

No. The draft Overarching National Policy Statement for Energy (EN-1) does not set out clearly what the criteria are for pushing utilities in a certain direction with regard to deciding the future generation mix.

EN-1 suggests the UK might need a generating capacity of around 100GW by 2020, of which around 43GW is expected to be new capacity. 26GW of this would need to be renewable to meet the UK target of providing 30% of electricity from renewables by 2020. 17GW would be other types of electricity generation. By 2025 these figures could increase to 35GW and 25GW respectively.

EN-1 says the precise mix will depend on decisions by the utilities. However, it specifically encourages the nuclear industry, quite prominently, (para 3.1 page 13) to contribute as much as possible towards meeting the need for 25GW of non-renewable capacity by 2025, but only mentions briefly that offshore wind has the potential to provide an extra 25GW by 2020 (para 3.4.4 page 23).

Similarly, small-scale renewables are only expected to provide 2% of electricity – or around 4GW (para 3.3.18 page 20). This compares with the 12% which the European Photovoltaic Industry Association expects to be able to provide with just solar PV across Europe. (1) And the Chief Executive of National Grid, Steve Holliday, says that 15% of the country's electricity production could come from so called "embedded generation" in homes and offices by 2020 as micro-generation becomes increasingly viable after the £9 billion rollout of "smart meters" for every home in Britain. (2) This higher figure will include micro-CHP as well as small-scale renewables.

The NFLA believe the arguments in EN-1 on energy efficiency and decentralised energy as alternatives to new large scale electricity generation are weak and vague. (paras 3.3.16 to 3.3.19 pp19-20) The document claims that energy efficiency savings are likely to be limited and offset by increases in the use of electricity for heating and transport. It also claims that decentralised and community energy systems are 'unlikely to lead to significant replacement of larger-scale infrastructure'.

Unlike nuclear, energy efficiency and renewables are not encouraged to aim high.

If the generation mix is not being left to the market, but utilities are being pushed in certain directions, EN-1 should set out clearly the criteria being used in decision-making about the mix. This is particularly important given that both EDF and Eon have asked the Government to set a maximum contribution for renewables – at around the 30% level - so as not to constrain nuclear. (3) The criteria should set out the Government's priorities for electricity generation, for example stating the need to meet its sustainable development objectives by not generating radioactive waste or carbon emissions.

Obviously, in order to meet the Government's climate change objectives one criterion is going to have to be that the electricity generation should be low carbon. Para 2.3.2 of the Nuclear NPS (EN-6) claims that emissions from the nuclear cycle are around 7 - 22gCO2e/kWh. However, a recent meta-study which looked at 103 lifecycle studies concluded that the figure is more likely to be around 66g CO2e/kWh - worse than all the renewable alternatives, including solar PV. (4) If this is the main criterion being used to direct utilities in a certain direction then the Government needs to commission an independent investigation into what the real emission levels are. In particular, it needs to investigate whether, with increasing demand for uranium, ore quality will decrease causing emissions from the whole nuclear cycle to rise substantially before the end of the life of proposed new reactors. (5)

2. **Does the draft Overarching Energy National Policy Statement provide the Infrastructure Planning Commission with the information it needs to reach a decision on whether or not to grant development consent?**

No. EN-1 gives no indication of priority (geographical) areas for new energy infrastructure provision, nor does it seek to steer investment away from certain areas where such developments would be undesirable. The approach leaves it entirely to the market to decide where proposals for new electricity generating infrastructure might be brought forward.

3. **Does the draft Overarching Energy National Policy Statement provide suitable information to the Infrastructure Planning Commission on the Government's energy and climate policy?**

No. Part 3 of EN-1 (Need for New Energy Infrastructure) focuses almost exclusively on electricity, rather than looking at heating and transport as well. The trouble is that electricity only provides around 18% of UK energy demand. (6) Transport and most space heating are provided by other sources of energy. Nuclear power provides around 20% of UK electricity, which only amounts to about 8% of total energy. Allowing for losses at the power station, nuclear power's current contribution to the UK's final energy consumption is only 3.6 % (80 TWh/y out of a final consumption of about 2,250 TWh/y). (7)

Therefore, replacing nuclear reactors will save only around 4% of the UK's carbon emissions. EN-1 makes no attempt to put proposals for new reactors into perspective in this way. The Government has said elsewhere that it challenges the view that 4% is not worth bothering with, and that it has to look across all forms of energy, especially because there will be a greater need to start using more electricity for transport and heating. (8) However, the IPC will need to be absolutely sure that by approving new nuclear reactors it is not going to negatively impact on the ability to deal with the other 96% of emissions.

The UK Government's Sustainable Development Commission (SDC), (9) Warwick Business School (10) and the Environment Agency (11) have all warned that a decision to proceed with new reactors could seriously undermine the development of a low carbon energy system.

SDC points out that, even with a doubling of nuclear capacity from current levels, cuts of at least 50% would still be needed from other measures if the UK is to meet its climate targets for 2050. (12) So it is important that our capacity to implement other carbon abatement measures is not damaged by any decision to go ahead with the construction of new reactors. SDC says a new nuclear programme would give out the wrong signal to consumers and businesses, implying that a major technological fix is all that's required, weakening the urgent action needed on energy efficiency. A new reactor programme will require "*a substantial slice of political leadership … political attention would shift, and in all likelihood undermine efforts to pursue a strategy based on energy efficiency, renewables and more CHP*." (13) Sir Jonathon Porritt, former chair of the Commission, says nuclear power is already seriously diverting attention from the hard decisions required to solve the UK's energy challenges. (14)

Furthermore, Warwick Business School argues that, far from complementing the necessary shift to a low carbon economy, the scale of the financial and institutional arrangements needed for new nuclear stations means they would fatally undermine the implementation of low carbon technologies and measures such as demand management, and therefore will ultimately undermine the shift to a true low carbon economy. (15)

The Government has a legal obligation to ensure that 'as far as is reasonably practicable, persons do not live in fuel poverty' by 2016 in England and 2018 in Wales, widely interpreted as 'eradicating' fuel poverty. The Government is also committed to ending the blight of fuel poverty for vulnerable households by 2010. (16) Yet EN-1 only briefly mentions the issue. Para 2.1.20 appears to suggest that tackling fuel poverty will simply be left to the market:

"…*provision of new energy infrastructure contributes to … reducing fuel poverty … because the availability of appropriate infrastructure supports the efficient working of the market so as to ensure competitive prices for consumers*".

More than seven million households struggle to pay their fuel bills, almost double the official estimate, according to research published by the National Housing Federation. (17) Ofgem has estimated that renewing infrastructure and meeting carbon targets is likely to require an investment of up to £200 billion which will mean significant increases in domestic energy bills of between 14% and 25% by 2020. (18) Clearly climate policy also has to take into account fuel poverty. Without an integrated strategy for both there is a danger that climate policy will end up worsening the situation with regard to fuel poverty.

It is clear now that the 2010 target is unobtainable. There are parallel worries about the achievability of the 2016 target. The numbers of those suffering still appears to be growing. This worsening fuel poverty would be constraining policy options for climate change alleviation, if the Government were serious about tackling both. Moving towards more electric heating, for example, would not be an option. On the other hand, policies that focus on energy efficiency for the fuel poor, including insulation and appliances would be necessary and appropriate. (19)

If the Government is to meet its target to reduce carbon emissions by 80% by 2050, AND eliminate fuel poverty by 2016, it will need to implement a set of policies which can cut emissions from the domestic sector by 80% by 2050. Every house will need excellent insulation and some form of Low and Zero Carbon Technology – micro-generation or community heating schemes. This means carrying out installations in all of the UK's 25 million dwellings over the next 40 years or 625,000 dwellings every year between now and 2050. (20)

Clearly, there are strong policy synergies between the need to reduce fuel poverty and the need to reduce carbon emissions. Brenda Boardman, Emeritus Fellow with the Lower Carbon Future at the Environmental Change Institute at Oxford University – the person who in many ways can be said to have identified and defined fuel poverty says:

"*The real challenge is to make sure that both sets of policies focus on both sets of priorities, at the same time*." (21)

EN-1 needs to be re-written to take this into account. Attempts to tackle fuel poverty through fuel pricing policy as suggested by EN-1 have failed for 30 years.

4. **Does the draft Overarching Energy National Policy Statement provide suitable direction to the Infrastructure Planning Commission on the need and urgency for new energy infrastructure?**

The question should be asking whether EN-1 provides suitable direction to the IPC on the need and urgency to reduce carbon emissions whilst maintaining security of supply. The NFLA believes the answer to this question is that it does not provide suitable direction.

To tackle climate change, the speed with which carbon abatement measures are introduced is important. Para 3.5.2 refers to the urgent need for low carbon forms of electricity to contribute to the energy system, but makes it clear that the earliest a new nuclear reactor could start contributing is 2018. By 2025 a new nuclear programme might have reduced UK emissions by 4% compared with what they would have been without new reactors.

Unless we make significant progress before 2025 then the chances of meeting the required targets will be very slender indeed, because the cumulative emissions between now and 2025 will be so high that greater reductions requiring huge additional investment will be needed after 2025 if there is to be any hope of keeping the global temperature increase below $2^{o}$C. And it will be much more difficult to achieve the required 80% cuts in carbon emissions by 2050. (22)

During the period when reactors are being constructed, capital is tied up and therefore unavailable for investing in alternative carbon abatement techniques, yet reductions in carbon emissions do not begin until the reactor is operational. Because nuclear investments are also inherently slower to deploy, then such investments also retard carbon displacement. Spending on energy efficiency measures can be put into effect much more quickly. (23)

The UK Association for the Conservation of Energy, for example, says if one new nuclear reactor is operating by 2020, it could be delivering perhaps just over one million tonnes of carbon saving. In contrast energy efficiency "could save around 25 million tonnes of carbon through cost-effective energy efficiency measures" by that date. (24)

Similarly, decentralised energy can be installed quickly without needing complex regulatory processes. Keith Barnham, Emeritus Professor of physics at Imperial College says the most significant feature of the newer wind turbine and PV systems is that they come in small units and can be installed very quickly - much shorter lead-in times than the 10-year wait for nuclear stations and installations can grow exponentially. (25)

EN-1 fails to express the urgency with which we need to start reducing carbon emissions. The failure of the Copenhagen Conference to come up with a legally binding set of climate targets means all public agencies must redouble their efforts to open up new fronts at the local and grassroots levels to reduce carbon emissions.

The 2003 Energy White Paper promised a "step change" in policies and programmes to deliver energy efficiency with local authorities to taking the lead, acting as catalysts for change. (26) The UK is still waiting for this step change. Energy efficiency schemes implemented by local authorities have the potential to make dramatic carbon savings quickly. The trailblazing work of a few local councils, such as Manchester and Kirklees, is beginning to show how grassroots campaigns can be turned into effective action. A groundswell of actions by individual communities led by local authorities will need all the financial support they can get from national government. But if the Government is focused on getting new nuclear reactors build to the exclusion of building a local decentralised energy system, then it will be difficult for local authorities to continue this exciting leadership role, and without the central government support these schemes will never be ambitious enough or at the scale required to meet carbon abatement targets.

The Local Government Association (LGA) agrees that local government is pivotal to delivering the step-change in $CO_2$ emissions reductions required. (27) The scope for local authority action is significant. Through delivery of services such as transport, planning and housing as well as through their influence on all sectors of the community, local authorities can make reductions in emissions from corporate activities and through stimulating savings in the wider community. Such action can help to deliver joint social, economic and environmental aims and link together initiatives to maximise their impact.

5. **Do the assessment principles in the draft Overarching Energy National Policy Statement provide suitable direction to the Infrastructure Planning Commission to inform its decision-making?**

Part 4 of EN-1 on Assessment Principles and Generic Impacts lacks a coherent message. Given that, rather surprisingly, none of the Appraisal of Sustainability documents appear to include a definition of sustainability, it would make sense to give the IPC some direction on assessing the ‘sustainability’ of an energy infrastructure project.

The Government has previously defined sustainable development as development which enables all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without compromising the quality of life of future generations. (28) This is open to wide interpretation, particularly where a process which produces dangerous nuclear waste is involved.

Further clarity is provided by an organisation called ‘The Natural Step’ which sets out four principles of sustainability. (29) These explain that sustainability must involve the elimination of our

contribution to the progressive build-up of both substances extracted from the Earth's crust and substances produced by society. In other words, the UK should be aiming for a goal of zero production of all toxic/radioactive and/or persistent or bio-accumulative substances. Any production of such substances is likely to compromise the ability of future generations to satisfy basic needs and enjoy a better quality of life. Obviously these four principles represent the ideal to strive towards, but it is difficult to see how anything other than renewable energy can even begin to approach this ideal. The IPC should be directed accordingly.

6. **Does the draft Overarching Energy National Policy Statement appropriately cover the generic impacts of new energy infrastructure and potential options to mitigate those impacts?**

**Climate impacts**: The risk of sea level rise and flooding to energy infrastructure developments on the coast is dealt with in several places (para 4.20 & 4.22). Para 4.8.6 only requires applicants to take account of the latest UK Climate Projections, but does not specify whether they should take into account high medium or low emission scenarios. (30) This is a fast moving area of research. For example, recent study published in the Proceedings of the National Academy of Sciences (31) has predicted that global average sea levels are likely to rise by between 75cm and 190cm by 2100 – three times faster than official predictions of the Intergovernmental Panel on Climate Change (IPCC) which estimates a maximum rise of 59 centimetres by 2100 (32) (and compared with around 40-50cm in the UK's high emission scenario climate projections).

Given the uncertainties involved in predicting sea-level rises, applicants (and the IPC) should be required to consider the most up-to-date climate projections and to take a precautionary approach. In some cases the mitigation of flood risk to a given site may have an adverse effect on the flood risk elsewhere. If measures are required on nearby land not owned by the applicant, EN-1 does not make clear how these measures might be implemented.

**Socio-economic impacts:** EN-1 mentions "the changing influx of workers" during the different lifetime phases of a large energy infrastructure project, which may alter the demand for services and facilities. (para 4.27.3) Few adverse effects are mentioned, and an applicant is only expected to describe the socio-economic impact. Short duration, capital intensive construction projects have been shown to seriously distort the local labour market. Often the bulk of those employed are from outside of the area. After the project is completed many migrant workers remain in the area compounding local employment problems. (33) Applicants should be required to implement mitigation measures to avoid these problems.

7. **Do you have any comments on any aspect of the draft Overarching Energy National Policy Statement not covered by the previous questions?**

The IPC is required to have regard to any local impact report submitted by a relevant local authority. The IPC should also encourage local authorities to submit reports on alternatives to the applicant's proposal.

Any new energy infrastructure project will have an opportunity cost - the cost of forgoing the alternative outcomes that could have been purchased with the same money. This is not reflected in EN-1. This particularly impacts on local authorities who, in the case of new nuclear reactors, could achieve far more if the money were spent instead on energy efficiency and renewables.

The proponents of nuclear power argue that, because climate change is serious we need to promote renewables, energy efficiency *and* nuclear power. This suggests the UK has infinite sources of finance to spend on large numbers of energy projects, which is clearly not the case, and particularly so given the extent of the public finances and a worldwide economic recession.

A scarcity of resources means anything that is spent on nuclear power will not be available to be spent on other energy projects. Since tackling climate change is an urgent priority, so the UK, as a nation, needs to spend its limited resources as effectively as possible. There should be some

recognition in EN-1 of the need to assess the effectiveness of spending decisions compared with alternative spending scenarios. It is imperative that we maximize the carbon reductions achieved with every pound spent. Investing in expensive nuclear power is not cost effective. Energy efficiency can be up to seven times more cost effective. So investment in new reactors effectively worsens climate change because each pound spent is buying so much less of a 'solution' than if it were spent it on energy efficiency measures. (34)

**NFLA RESPONSE TO NUCLEAR NATIONAL POLICY STATEMENT (EN-6)**

16. **Do you think that the Government should formally approve ('designate') the draft Nuclear National Policy Statement?**

No. The NFLA answer to question 19, in particular, explains why EN-6 is not "fit for purpose".

17. **Does the draft Nuclear National Policy Statement provide the Infrastructure Planning Commission with the information it needs to reach a decision on whether or not to grant development consent?**

Section 2 explains Government policy on nuclear power. Paragraph 2.5.1 repeats the contentious point that nuclear power should be free to contribute as much as possible towards meeting the need for 25 GW of new non-renewable capacity, which means between 15 and 25 new reactors, depending on the type of reactor built.

Obviously, the generation mix is not being left to the market, but utilities are being pushed in certain directions (see response to question 1). The IPC will still need to know the criteria being used in decision-making about the mix in case conflicts arise, for example between decisions about proposed new reactors and proposed wind-farms. The criteria should set out the Government's priorities for electricity generation, for example stating the need to meet its sustainable development objectives by not generating radioactive waste or carbon emissions.

New nuclear reactor developments may also start to conflict with other Government policy objectives such fuel poverty and climate change objectives.

18. **Does the draft Nuclear National Policy Statement provide suitable direction to the Infrastructure Planning Commission on the need and urgency for new nuclear power stations?**

It is important that the IPC considers problems occurring around the world with regard to reactor construction projects taking longer than scheduled and going over budget. If reactor construction fails to result in the replacement of existing capacity because of construction delays then it will be impossible for the Government to meet its climate change commitments.
Paragraph 2.5.6 continues: "*France has already demonstrated that it is technically feasible to build nuclear power stations at the rate that would be needed in the UK if new nuclear power stations were to be constructed on all 10 sites listed in this NPS by the end of 2025 … it is, therefore, important for the IPC to consider and grant consent at a rate that is consistent with the rate at which energy companies may wish to build new nuclear power stations*".

It is also important for the IPC to consider problems occurring around the world with regard to reactor construction. Finland's Olkiluoto 3 reactor was supposed to be the showpiece of a nuclear renaissance, for example. Its modular design was supposed to make it faster and cheaper to build. After four years of construction and thousands of defects and deficiencies, the reactor's €3 billion price tag has climbed at least 50%. And while the reactor was originally meant to be completed in summer 2009, Areva, the French company building it, and TVO, the utility that ordered it, are no longer willing to predict when it will go online. (35)

In March 2006 EDF expected the second EPR reactor at Flamanville in France to cost €3.3bn, (10% more than the contracted Olkiluoto in Finland price) and the lead-time to be 54 months instead of the 48 month period forecast for Olkiluoto. But this increased to €4bn in 2008. (36)

Problems are not confined to Europe. Country after country has seen nuclear construction programmes go considerably over budget - for example, completion costs for the last ten Indian reactors have been 300% over budget. (37) China's Tianwan project began commercial operation in June 2007, more than two years later than planned. The Chinese regulator halted construction for almost a year on the first of two Russian-designed reactors while it examined welds in the steel liner for the reactor core. In Taiwan, the Lungmen reactor project was five years behind schedule. Difficulties included welds that failed inspections in 2002 and had to be redone. The World Energy Council says construction times for new reactors have risen from 66 months in the mid-1970s to 116 months - nearly ten years - for completions between 1995 and 2000. The unproven designs being proposed for the UK are likely to lead to more potential delays.

If reactor construction fails to result in the replacement of existing capacity because of construction delays or public opposition, the IPC needs to be able to assist with the implementation an alternative plan. Gordon MacKerron, former Chair of the Committee on Radioactive Waste Management (CoRWM), puts forward a worst-case scenario that following a commitment to nuclear new-build there is a sterilisation of non-nuclear investment and then the nuclear programme itself stalls. Such a scenario is far from a remote chance - the last time a UK government committed to 10 nuclear stations (Margaret Thatcher's in 1979) only one station was built, Sizewell, and then only after 15 years. If that were to happen again, carbon dioxide emissions would continue to increase. (38) Similarly, Bridget Woodman, formerly of Warwick Business School, suggests a "nightmare scenario" in which a commitment to new reactors leads to a stalling of renewables and combined heat and power stations, but nuclear power fails too, leading to an inevitable rise in carbon emissions. (39)

Another former CORWM member, Professor Andrew Blowers of the Open University, warns that nuclear power provides the illusion of a solution. He says: "*It is this business-as-usual aspect of nuclear that is its most insidious characteristic. … The danger is that by focusing on nuclear we refrain from recognizing the scale of the challenge we face and shirk our responsibility for dealing with it*". (40)

19. **Do you agree with the Government's preliminary conclusion that effective arrangements will exist to manage and dispose of the waste that will be produced by new nuclear power stations in the UK?**

No. The Government's conclusion that effective arrangements will exist to manage and dispose of waste produced from new nuclear power stations is not supported by the evidence. EN-6 is, therefore, not 'fit for purpose".

The Government's confidence that it will find a suitable site in a community which has expressed a willingness to host a site is misplaced. The three Cumbrian authorities looking into whether or not to volunteer will not finish the first round of consultation until 31st March 2010, and will not look at the radioactive waste inventory until later in 2010. The full extent of the new reactor programme is still unknown and may require a second deep geological disposal facility. Cumbria may yet decide against hosting a deep geological disposal facility, or it may decide it is only willing to host a facility for legacy waste. The fact that the Government has explicitly stated it is prepared to "*explore other approaches*" i.e. override a Community's wishes – if the voluntarism approach to disposal does not work has completely undermined the voluntary approach and suggests that Cumbria could be forced to accept waste whether it wants to or not. (41)

The Government says because it is satisfied effective arrangements will exist to manage and dispose of the waste produced by new reactors "*the IPC need not consider this question*." (para 3.8.20) Consequently the need to store spent nuclear fuel at the reactor sites for up to **160 years** is not even going to be examined by the new IPC. No information is given on how this waste might be transported away from reactor sites eventually, and whether facilities might be required in future for, for example, encapsulating the waste. The public living around the proposed nuclear sites are to be given almost no say on whether their area should be allowed to become a *de facto* nuclear

waste storage site for the foreseeable future. This is in sharp contrast to the voluntarist approach recommended by the Committee on Radioactive Waste Management.

The Government cannot assume that waste produced by new reactors can be safely disposed of - along with legacy waste - in a deep geological disposal facility, because a whole host of issues connected to disposal have yet to be resolved. Technical problems associated with a disposal facility are legion and most are recognised by the Environment Agency, thereby making any assertion of confidence in the disposability of radioactive waste premature. (42) Thus, the assumption that adequate arrangements for the long term management of radioactive waste from new reactors will exist when required is highly questionable.

If the Government is dropping its voluntarist approach to nuclear waste management and moving back to the previous decide-announce-defend position it should state this clearly. Under the Planning Act 2008 the Nuclear NPS consultation appears to be the last chance to challenge the principle that new nuclear reactors should be built at the ten proposed sites, and that these reactors should be permitted to generate spent nuclear waste fuel which may be stored on the sites for up to 160 years. The Justification consultation quotes the International Commission on Radiological Protection (ICRP) Publication 77 which states that:

"*Waste management and disposal operations are an integral part of the practice generating the waste. It is wrong to regard them as a free standing practice that needs its own justification*." (43)

In other words, the disposal of spent fuel and nuclear waste from new reactors may well be subject to no further public scrutiny after 22nd February 2010. The Government needs to explain what the process will be should an application for permission to construct a deep geological disposal facility be received. It looks likely that, as things stand at the moment, the IPC will be simply told that the strategic question of whether nuclear waste should be disposed of in a geological repository has already been decided and that any planning application only needs to be examined with regard to local planning issues. There will effectively be no Nirex Inquiry Part 2. In other words, Cumbria, or anywhere else, could be forced to accept a geological disposal facility against its will without even so much as a public inquiry.

20. **Does the draft Nuclear National Policy Statement appropriately cover the impacts of new nuclear power stations and potential options to mitigate those impacts?**

No. EN-6 is not fit for purpose because the examination of the KiKK study being carried out by the Committee on Medical Aspects of Radiation in the Environment (COMARE) has not been completed in time for this consultation, and has not been subjected to an independent critique.

The individual site Appraisals of Sustainability (AoSs) deal with human health in more detail than the main EN-6 report. The recent work of COMARE is discussed, along with the German KiKK study. (See for example paragraphs 4.41 – 4.47 in the Bradwell AoS – ref 12) Para 4.46 mentions that COMARE is currently undertaking a review of childhood cancers around nuclear power stations with particular reference to the KiKK study. It doesn't mention, however, that the results of this study will not be available until after this consultation has ended.

It is not acceptable for something as important as the COMARE review to be published after this consultation has closed.

21. **Do you agree with the Government's preliminary conclusion on the potential suitability of sites nominated into the Strategic Siting Assessment, as set out below? You can respond in general terms on the assessment as a whole, or against one or more specific sites.**

No. Evidence strongly suggests that sea level rise and storm surges on the level of the 1953 floods will be the inevitable consequences of climate change (and coastal sinking) during the next century. The decision to consider building such hazardous facilities as nuclear power stations and

their associated waste storage facilities on low lying land which in many cases is vulnerable to subsidence and rising sea level, is not sensible.

It is inconceivable that the selection of sites on vulnerable coasts in southern England represents 'good sense', given that the risks from climate change in the form of sea level rise, storm surge and coastal erosion at the favoured sites are serious and increasing over time. There will also be an increase in major storms, more intense gales and hurricanes and these, in turn, will produce massive storm surges as they pass over the sea. The result will be a "climatic double whammy" that will savage low-lying regions including Britain's south-eastern coastline, in particular East Anglia and the Thames Estuary.

The Institution of Mechanical Engineers says coastal sites like the Sizewell nuclear site on the Suffolk coast might have to be abandoned. It will certainly be affected by rising sea levels. Engineers say they can build concrete walls that will keep out the water throughout the working lives of these new plants. But that is not enough. Nuclear plants may operate for 60 years (up to around 2080), but it could take hundreds of years to decommission them, and spent nuclear waste fuel could be stored there until 2180 or later. (44) The Flood Hazard Research Centre at Middlesex University concluded that there could be problems at three of the favoured sites, Bradwell, Hinkley, and Sizewell, as well as Dungeness. The report concludes that defending the sites from sea water will mean they are "*likely to become economically unsustainable*" and they "*cannot be considered as suitable locations for new reactors*". (45)

Emergency Planning issues clearly need to be examined in more detail before concluding the nominated sites are suitable.

An examination of the possibility of evacuating Mersea Island, for example, which is only around 2 miles just across the Blackwater estuary from the Bradwell site, gives cause for concern. The Strood is the road leading off Mersea Island to the mainland, the one exit route in the case of a nuclear incident. It also floods twice a day at the highest tides in Spring and Autumn, sometimes for as much as two hours. Mersea Island has a large additional summer population of perhaps 5,000 tourists, many of whom would be at caravan and camp sites, without the shelter of permanent accommodation. This would further compound the difficulty of implementing an evacuation plan. (46)

In Cumbria the emergency planner has attacked plans to build nuclear power stations on farm land on two green field sites near Sellafield. David Humphreys, Cumbria County Council's Emergency Planner says at Sellafield "*we already have a well developed emergency plan and a well educated local population*. [But] *what does concern me is the new reactors at Kirksanton and Braystones. What this does is it brings in an entirely new population being put at risk from these reactors. As an emergency planner it creates major new problems*." (47)

26. **Do you have any comments on any aspect of the draft Nuclear National Policy Statement or its associated documents not covered by the previous questions?**

New risks have emerged since nuclear reactors were built on the existing sites, such as the risk of terrorist attack, and the storage of spent fuel on site, increasing the overall level of risk to nearby communities.

The Government dismisses concerns about terrorism risks saying it believes the regulatory framework will ensure that risks are minimised and sensibly managed by the industry. The regulatory framework requires nuclear power stations to have their security arrangements approved by the Office for Civil Nuclear Security. The Generic Design Assessment (GDA) is also considering a wide range of hazards including the ability of reactors to withstand accidental aircraft crash or malicious activity. (48)

Nuclear terrorism has the potential to cause a large number of deaths, and the risk of a successful attack will increase if more nuclear power stations and radioactive waste stores are built. (49) Yet local authorities have very little input into these areas. In fact, information on nuclear reactors and

radioactive waste facilities is likely to be increasingly withheld, because of security risks, reversing the trend of the last decade to allow greater openness and transparency in what has traditionally been a highly secretive industry. (50) So great is the risk of a terrorist attack on nuclear facilities that some say nuclear power should no longer have a role to play in supplying energy. (51)

Leaked documents by EdF on the vulnerability of the new European Pressurised water Reactor (EPR) to terrorist attack revealed a dangerously flawed approach to security. (52) Nuclear engineering consultancy, Large and Associates, has assessed the secret EdF document and concluded that it includes seriously flawed assumptions about whether the reactor could withstand a potential terrorist attack using hijacked commercial aircraft. (53) Clearly modes of attack other than crashing a passenger aircraft into a nuclear site also need to be considered, such as attacks involving vehicles loaded with explosives, or suicide bombers. (54) NFLA believes that if these issues cannot be debated in an open and transparent way because of security concerns, then we have to conclude that new reactors are not compatible with an open and democratic society.

28. **Does this package of draft energy National Policy Statements provide a useful reference for those wishing to engage in the process for development consent for nationally significant energy infrastructure, particularly for applicants?**

No. The sheer volume of material which it is necessary to read in order to comment makes it impossible for ordinary members of the public to engage with the process. This whole exercise needs to be re-thought and started again from scratch.

29. **Do you have any comments on any aspect of the draft energy National Policy Statements or their associated documents not covered by the previous questions?**

The NFLA is seriously concerned about how the Planning Act represents an attack on democratic accountability. (55) In the case of applications to build nuclear power stations the removal of the right to cross examine witnesses is particularly disturbing. The new Act means that the IPC will normally make decisions without even a public hearing. The Government could go some way towards rectifying this situation by instructing the IPC to hold public hearings in the case of applications for nuclear power stations.

NFLA is also concerned that there may be a perception, amongst some community groups, of potential collusion between the applicant and the local authority when a Planning Performance Agreement is reached, with funding going from the applicant to the local authority. The “perception” of collusion could seriously strain relationships between the local authority and its citizens, because of the danger that any funding from the developer will compromise the local authority’s final recommendations. The Government should seriously consider making alternative funding arrangements for the planning authority.

NFLA finally believes that there are large numbers of planned alternative renewable energy solutions – in addition to energy efficiency measures and micro-generation projects mentioned above – that may be hindered by the decision to build new nuclear power stations in the NPS. Offshore wind, tidal and solar energy all have greater potential to provide much more energy than the Government is suggesting. Many NFLA members would like to encourage such energy sources being tapped over nuclear. There are some excellent examples around the UK and Ireland and the positive moves towards supporting renewable energy across is a key component of NFLA policy. The NFLA response has concentrated on specific and detailed concerns around new nuclear build, but a number of our member authorities will also be responding providing specific examples in their localities of the promotion of renewable sources of energy.

**References have been removed for the sake of brevity, but are available on request from the NFLA Secretary. This complete response can be found on the NFLA website with full references included.**