

***Friends of the Earth submission
to the Energy Review
April 2006***



Q.1. What more could the government do on the demand or supply side for energy to ensure that the UK's long-term goal of reducing carbon emissions is met?

The Government has pledged in its last three general election manifestos to reduce carbon dioxide emissions to 20 per cent below 1990 levels by 2010. Delivering on this promise would show international leadership and stimulate a dynamic, competitive and strong low-carbon economy fit for the 21st Century. But the Government is way off its target and emissions have actually increased since 1997, despite scientific warnings about the impacts of climate change becoming louder and more frequent.

Despite stated intents, the government has so far failed to put in place ambitious policies to promote renewable energy and energy efficiency. As a result, despite being the windiest country in Europe, the UK only has less than 2% of wind power in its electricity mix, compared to around 20% in Denmark. Germany and Spain also have much bigger shares of wind power in their mix than the UK, and with much higher rates of growth. China has set itself a target to make sure renewables are contributing 15% of the country's energy mix by the year 2020, with wind installed capacity expected to contribute 30 GigaWatts.

On energy efficiency, the government has so far failed to show leadership on European policies to promote minimum energy efficiency standards and energy services. The UK has among the most inefficient housing in Northern Europe.

If the Government is to retain any credibility on climate change & energy policy, it must use the Energy Review to create a long-term framework that will encourage investment in clean technologies. Therefore it should accept a new law setting legally binding **year-on-year emission reductions, with an annual climate budget** to make sure we are on track to do our share to stay below a 2 degree increase from pre-industrial temperatures. This proposal now has the support of the majority of MPs. For more information, see <http://www.thebigask.com>.

In addition to this, it must act in the following sectors:

Electricity sector:

Friends of the Earth produced research [1] showing we could meet CO2 emission reductions of 48-71% by 2020 without nuclear power. We could also stabilise or reduce gas use in the electricity sector.

- Increase promotion of renewable energy through more ambitious policies.

- Transform the energy sector by setting targets for energy efficiency and stimulating the development of a market in energy efficiency services.
- Boost incentives for investment in Combined Heat and Power, highly efficient plants producing both heat and electricity.
- Force coal-fired power station operators to use state-of-the-art technologies to improve CO₂ emission performance. Close old, inefficient coal-fired power stations that don't use these technologies.

Carbon capture and storage technologies could potentially achieve further reductions.

Buildings, Offices & Heat sector:

Homes are responsible for almost a third of carbon dioxide emissions in the UK. The Environmental Change Institute at Oxford University says emissions from the UK's housing stock could be reduced by 60 per cent by 2050. According to the Carbon Trust, UK business wastes £1 billion a year in lost energy.

In Germany, the new chancellor Merkel has decided to push for new policies upgrading 5% of pre-1978 housing stock every single year until 2025. She has also quadrupled the levels of government spending which her predecessor had allocated for improving energy usage in homes. The UK should encourage a similar approach in the UK.

The government should:

- Introduce new fiscal incentives for householders for energy efficiency: stamp-duty rebates, council tax rebates, etc.
- Implement in full the EU Performance of Buildings Directive and support efforts to amend it in order to make it more ambitious.
- Strengthen the Code for Sustainable Homes
- Support the Carbon Trust proposals for a new mandatory consumption-based emissions trading scheme covering both direct and indirect emissions which would apply to companies and public sector organisations.
- Alternatively or in conjunction with this, raise the Climate Change Levy; other more sophisticated fiscal instruments could also be introduced such as a carbon credit tax on commercial and transport sectors.
- Support proposals for a new European Directive on promoting Renewable Heating and Cooling, which will also help to reduce pressure on gas demand in neighbouring countries.

Energy for heat makes up approximately a third of the UK's demand for energy. However, renewable sources such as biomass, solar thermal and geothermal provide only a minute fraction of this heat, compared with the big players – gas, coal and oil.

The heating sector is crucially important for energy security, especially given concerns about the fact that we are importing a growing amount of natural gas – and heating is where most of it is used. There is also a huge potential for low cost carbon abatement to be achieved by stimulating and supporting the market for renewable heat. Abating carbon from renewable heat is far cheaper than abating from electricity. To abate carbon from electricity costs roughly £30/tonne whereas from heat it's about £10/tonne.

Following consultation with industry, trade associations and NGOs, Friends of the Earth feel one of the best ways to promote renewable heat would be through an obligation. The concept has already been endorsed by the Royal Commission on

Environmental Pollution's report on biomass energy and a research study produced for DEFRA. An obligation on energy suppliers has proved to be an effective way of stimulating change, without imposing a financial burden on taxpayers.

Like electricity suppliers, coal, gas and oil suppliers should have an Obligation to supply an increasing proportion of their business from renewable energy sources. For ease of terminology this proposed mechanism is referred to as a Renewable Heat Obligation (RHO), with a market in Heat Obligation Certificates (HOCs).

An obligation of this type provides a market-based incentive, to which companies can respond, without the expense, lag-time and inertia in trying to stimulate change in the population at large. The 'technology neutral' approach favours the least cost solutions.

A significant proportion of renewable heat would be likely to come from biomass. Growing crops for fuel results in no significant net increase in carbon dioxide as long as the harvested crops are replaced. Many such crops could be harvested in the UK & the EU, which could greatly help improve our energy security.

However, there must be accreditation rules to ensure that only sustainable sourcing occurs - otherwise we will simply be swapping one environmental problem for another. Accreditation rules must be strong and set out in advance, to ensure that unsustainably sourced biomass production is not boosted by the introduction of a UK obligation.

The heat sector in particular would stimulate the biomass industry, with positive effects in agriculture and the rural economy. Technologies that need to be stimulated include combined heat and power systems and building-integrated and micro-power solutions – both areas where existing policies have had limited impact to date.

Transport and Aviation:

Transport is a rogue sector in climate terms. Emissions are growing, as is transport's share of total emissions.

Surface transport is responsible for around a quarter of total UK carbon emissions, and emissions are set to rise. However, as the Commission for Integrated Transport noted in its submission to the Climate Change Programme Review "*official forecasts of emissions from the transport sector are characterised by a degree of ambiguity and imprecision*"[2]. Two common factors of all the emissions forecasts are that transport makes a major contribution to total UK emissions, and that emissions from the sector will rise in the future.

The scale of the aviation problem was shown by research for Friends of the Earth carried out by the Tyndall Centre. This concluded that, if the UK was on a path to stabilise global carbon dioxide levels at 450 parts per million by volume, then continuing aviation growth could see the sector taking up the entire UK carbon budget by 2037 [3].

Friends of the Earth believes that the lack of any coherent joined-up strategy across Government means that there is a great deal more that could be done to reduce transport's contribution to carbon emissions.

The potential for action to reduce emissions from transport is immense: recent research for the Department for Transport shows that emissions can be cut to 60% below 1990 levels by 2030. [4]

Surface transport

Friends of the Earth believes that the Government must push to get all the emissions cuts possible from technology, such as greener cars and improved or alternative fuels. However this will not be enough on its own, and demand management measures to change how and how much people travel will also be needed. This is echoed by the 'Looking over the horizon' report which concluded that *"the 60% CO2 reduction target in 2030 can be achieved by a combination of strong behavioural change and strong technological innovation. But it is in travel behaviour that the real change must take place, and this should be implemented at the earliest possible occasion"* [5].

The measures needed come under three headings:

- Reducing the need to travel
- Improving alternatives to the private car
- Greener cars and fuels

These should not be seen as alternatives, but as a form of progression:

- Firstly, we should try to make it possible for people to do what they want without having to travel as much
- Secondly, for the journeys that people make, we should provide high quality, less polluting alternatives so that use of private cars can be reduced
- Thirdly, for the journeys that people make by car, we should encourage the use of greener cars and fuels

Reducing the need to travel and improving the alternatives

The 'Looking over the horizon' research found that substantial reductions in carbon emissions could be made by policies to reduce the need to travel and improve alternatives [6]:

- Road pricing, either nationally or just within cities and on motorways: 1.1 – 2.3 MtC
- Liveable cities (land use planning and investment in alternatives): 0.5 – 2.4 MtC
- Using technology (including better public transport information, improved freight distribution, teleconferencing): 0.3 – 1.2 MtC
- Soft measures (including travel plans, car sharing, travel awareness): 0.9 – 2.4 MtC
- Ecological driving (lower speed limits and stricter enforcement): 2.5 – 4.6 MtC
- Long distance travel (including tax on aviation fuel, promotion of rail): 0.5 – 0.7 MtC
- Freight (including local sourcing and improved logistics) 0.7 – 2.5 MtC

The Government must use next year's Comprehensive Spending Review to ensure that spending on measures to cut carbon emissions from transport is prioritised. This should focus on measures to reduce the need to travel, and to provide high-quality alternatives to private car use.

Examples of measures needed are given in the report 'Paying for Better Transport' produced by the Way to Go campaign for the 2004 Spending Review [7]. These include:

- A cycle friendly road network and cycle training for all
- Networks of bus lanes
- Safe routes to schools

- Lower speed limits: 20mph default in residential streets
- Increased funding for public transport, particularly in rural areas.
- Streets, lanes and paths in good condition and pleasant for walking
- Quality standards for bus and rail services
- National railcard
- Purchase incentives for smaller, cleaner vehicles
- Funding for rail freight projects
- Services and facilities close to people so that they don't need to drive.
- Pay-as-you-go road pricing

The Comprehensive Spending Review should include big cuts in expenditure on road-building. Road-building often leads to large increases in traffic levels, locking in a carbon-intensive pattern of development. Traffic increases on this scale will make it much harder to cut emissions in the future. The Government seems to have very little information on the carbon impacts of these schemes.

The Government should also resist pressure for road-building coming from the English regions. At the end of January, the regions submitted to the DfT proposals for spending their Regional Funding Allocation (RFA) for the period 2006 - 2016. Analysis of the submissions has revealed a very heavy bias towards road-building, with 72% of the budget earmarked for roads, and only 24% for public transport. Two regions – the South East and the East Midlands – want to spend 95% of their budget on roads.

Price signals should also be used to encourage people to use cars less and make greater use of alternatives. The cost of motoring is cheaper in real terms than when the current Government came to power, but the price of rail and bus travel has risen. Road pricing is one way of providing this price signal, making drivers think about the cost of each journey they make at the point of use.

Research shows that a nationwide road pricing scheme which raised the overall cost of motoring could cut carbon emissions from road transport by 8% [8]. However the Department for Transport seems to regard road pricing as a measure to be used simply to tackle congestion. Achieving environmental benefits is regarded as almost a by-product. Revenue raised from road pricing should be used for improving alternatives to the car and for reducing the need to travel.

Greener cars and fuels

Improving vehicle fuel efficiency can make a major contribution to reducing carbon emissions, but the Government is falling well short of its forecasts. The Government anticipated emissions cuts of 4MtC from the voluntary agreement reached between the EU and car manufacturers. However expected cuts are now more likely to be around 2.6MtC [9].

The target agreed by the EU and car manufacturers in the late 1990s was that by 2008, new cars sold in Member States should on average emit no more than 140 grammes of carbon dioxide per kilometre. Average emissions of new cars sold in the UK have fallen from 189.8 grammes of CO₂ per kilometre (gCO₂ / km) in 1997 to 171.4 gCO₂ / km in 2004 [10]. It is now widely accepted that the voluntary target will not be achieved in the UK: we are two-thirds of the way through the target period, we have made one-third of the progress needed, and the rate of progress is slowing down. Indeed, although average emissions from new company cars are falling, emissions from new private cars are now rising.

Although the failure to reduce emissions reflects in part the advertising policy of car makers, who continue to advertise gas guzzlers rather than fuel efficient cars, the Government must do much more to influence consumer choice. Current Vehicle Excise Duty (VED) bands – even including changes introduced in the last budget - provide very little incentive for buyers to choose a less polluting car.

Friends of the Earth believes that VED for the most-polluting cars should be raised to £600 by March 2008 [11]. Evidence from research for the DfT shows that such a gap would persuade 47% of new car buyers to choose a less-polluting vehicle [12].

The Government must also push for a tough follow-up EU emissions standard for new vehicles to replace the current voluntary agreement. Friends of the Earth believes that new cars should emit no more than an average of 120 gCO₂ / km by 2012. This should be a mandatory target rather than a voluntary agreement, and should be met entirely by action from the car industry: emissions cuts from fuel-related measures, such as greater use of biofuels, should be seen as additional to this, rather than contributing to it.

Figures from the European Federation for Transport & Environment show that the costs of meeting such a standard would be outweighed by the savings made by drivers from using less fuel. Meeting the 120 g/km CO₂ standard would cost less than 600 Euros per vehicle, whereas pre-tax fuel savings would be between 625 and 940 Euros per vehicle, depending on the cost of fuel. The savings to the consumer would be much greater when taxes are taken into account [13].

Aviation

As has been explained above, the challenge posed by growth in aviation emissions is immense. The House of Commons Environmental Audit Committee concluded that *“if aviation emissions increase on the scale predicted by the DfT, the UK’s 60% carbon emission reduction target ... will become meaningless and unachievable”* [14].

Friends of the Earth believes that the Government’s aviation policy is completely out-of-line with its climate change policy. The two must be reconciled. When it published its Aviation White Paper in December 2003, the Government stated that it *“will monitor and evaluate the effectiveness and impact of the policies set out in this White Paper [and] will report in 2006 on progress”* [15]. Friends of the Earth believes that the Government should conduct and publish an aviation policy review, rather than simply a progress report. This policy review should impose a moratorium on further airport expansion.

Friends of the Earth believes that the Government should:

- **Rewrite the Aviation White Paper to rule-out further airport expansion**
The level of growth in aviation planned in the White Paper is incompatible with overall climate policy. Without airport expansion, flight numbers would still increase, but far slower, and coupled with technological improvements emissions growth in this sector could be halted. This would be a far better integration of economic and environmental objectives, allowing growth and keeping emissions from rising, than the major expansion written into the White Paper.
- **Introduce an Emissions Charge on aviation and include aviation in an EU Emissions Trading System.**

The Government has recently pinned its hopes on including aviation into the EU Emissions Trading Scheme (EUETS) as its preferred method of tackling aviation's climate change emissions. Although it is possible that this might be effective, the Government must take other actions on aviation – using taxation – now. This is for four reasons:

- First, it will be years before aviation can be included within EUETS – measures are needed before that to bring aviation's ever-increasing emissions under control.
- Second, it is likely that aviation's inclusion within EUETS would not be environmentally effective. The aviation industry advocates EUETS as its favoured measure because it believes that EUETS of all the possible measures is the one least likely to mean they have to change. They are already advocating large allocations of emissions for their own sector, in contradiction with Government policy that the polluter should pay.
- Third if other measures are not brought in now, aviation runway capacity will increase and the aviation sector will argue for even larger future allocations to itself, meaning greater cuts will be required from other economic sectors – like industry.
- Fourth, it is not a question of either emissions trading or other measures. Both are needed. If aviation is inside EUETS its current billions-a-year fuel tax-exemptions will have to be addressed otherwise aviation will receive a major unfair competitive advantage compared with other industrial sectors.

Aviation is currently outside international climate agreements and with emissions spiralling out of control. Waiting years for emissions trading is not sufficient. The Department for Transport's own models show that if the cost of flying were to stay constant (rather than predicted falls), then the industry would expand, but much slower, and therefore growth could be accommodated within existing runway capacity. There would be no need for new runways. This would be a major first step to keeping aviation emissions within environmentally acceptable limits.

The tool to stop the cost of flying falling is increases in Air Passenger Duty (APD). Doing this would reduce the rate of growth in aviation's emissions. If however the aviation industry argues that the cost of flying is not falling, then according to the Government's own figures there will be no need for new runways, and the industry can drop its proposals for airport expansion across the country.

There are a number of advantages to this increase in APD approach:

- APD is already in place, so increases are administratively simple.
- APD increases reflect environmental damage and will slow demand growth (but not as the industry claims, reverse growth).
- APD can be reformed to better reflect environmental damage. Longer journeys and seats taking more space already attract higher rates of APD. But APD could also be extended to include transfer passengers, and freight aircraft, or other factors.
- APD increases would help meet the Government's aim that the polluter pays – as set out in the Aviation White Paper.

Q.2. With the UK becoming a net energy importer and with big investments to be made over the next twenty years in generating capacity and networks, what further steps, if any, should the government take to develop our market framework for delivering reliable energy supplies? In particular, we invite views on the implications of increased dependence on gas imports.

A good market framework that ensure secure supplies AND helps to meet climate change goals:

A-provides long term certainty to investors & is adequately regulated

A new law setting a legally-binding target for year on year reductions would greatly help to provide the certainty that low-carbon investments will pay off in the future (see above).

Investment in new nuclear power stations does not necessarily provide a long-term stable framework for secure energy supplies. Nuclear power stations take long to build and have a history of cost overruns.

Interestingly, the electricity company created by the Woking Borough Council [16] to promote decentralised power solutions and to reduce emissions locally was considered to provide attractive and safe returns, enough to attract investment from Danish pension funds.[17]

Woking Council has proven that it is possible to have a more decentralised model for energy generation. However, this requires a number of regulatory changes to become viable more widely. Ofgem's mandate needs therefore to be amended.

B-promotes an efficient use of fossil fuels

Fossil fuels will continue to be used for a few decades. Therefore we need to make sure we use fossils as efficiently as possible. This means maximising the share of Combined Heat and Power and the use of the most efficient technologies to burn both gas and coal.

Friends of the Earth's "A Bright Future" report [18] shows that the UK could at least stabilise, and in many cases even reduce, use of natural gas in the electricity sector. For example, in the "good mix" scenario, gas use could be reduced by 33% in the electricity sector by 2020.

C-reduces the need for baseload power & over-reliance on unflexible and large-scale nuclear.

Over-reliance on large nuclear power plants for base-load energy creates risks. In 2003 in Sweden, two large nuclear power stations had to shut suddenly within a few minutes of each other because of technical problems, at a time when other nuclear power stations were already shut. This led to a huge blackout affecting the whole of southern Sweden and Eastern Denmark, leaving 4 million people in 2 countries without electricity, and facing severe disruptions of trains and airports. The same year, French nuclear power generation faced severe problems because of the heatwave, which caused river water levels to run so low that there was insufficient water for cooling purposes (nuclear power stations need very large amounts of cooling water) [19].

Instead, increased take-up of decentralised power and energy conservation policies would reduce the need for both peak demand and base-load.

D-promotes technologies that ensure reliability of the system

A well designed renewable electricity system takes advantage of different patterns of variability to smooth the overall supply of electricity generated from a combination of resources. [20]

As for wind power, a report for the DTI [21] studied over 30 years of UK wind records in the UK finding that there was not one occasion when the UK as a whole was

becalmed. Electricity from wind is produced at the right time of the day and wind turbines produced more electricity than those in Denmark and Germany due to more favourable wind conditions, it found.

The UK wind power source is located in various parts of the country, ensuring greater reliability, because lower wind speed in one region will be compensated by higher wind speed elsewhere. [22]

Another technology that could help us reduce the need for capacity investment is dynamic demand.[23] This means controlling peaks in demand for electricity with smart devices that control when fridges, air-conditioners, and water-heaters consume electricity.

F-is able to respond quickly to disruptions

No matter what we do, supply disruptions may occur under any fuel mix scenario. The government should be prepared to respond by “saving energy in a hurry”. The International Energy Agency published recommendations on this based on experiences in California, Brazil, Norway, New Zealand and Japan and other parts of the world. In these countries temporary shortfalls in energy supply and/or price spikes have been successfully dealt with through energy efficiency measures, leading to demand reductions of up to 20% in a few months’ time.[24]

Gas import dependency

The issue of increased dependency on natural gas imports is certainly relevant, but must not be exaggerated in order to promote unsustainable solutions such as nuclear. The latter creates security issues of its own – and will not solve the problem of gas imports as these are not just used for electricity production but mostly for heating homes.

The UK was only one of six OECD countries to produce more energy than it consumed in 2002. The Netherlands, United States, Switzerland, Germany, Austria, Spain, Japan and Italy are all major energy importers [25]. The UK’s chief supplier of piped gas for the coming decades will be Norway. A deal with this country was signed in April 2005 that could secure up to 20% of our future gas supply. New LNG terminals and pipelines are being built to allow a larger diversity of sources of gas in the future (and hence security), and ensuring that no single gas exporting country will ever be able to have control over the country’s supply.

The real problem is that natural gas prices have been going up because for historical reasons they are linked to oil prices on international markets and because there has been a temporary problem with import capacity. Many analysts now say prices will return to lower levels once import capacity has been increased in the near future. However, uncertainties remain over the relative prices of gas and coal – which have an impact over the choice of fuels in the electricity generation sector in the absence of a strong signal on the price of CO₂. The recent increases in gas prices have meant there has been a return back to coal burn, with a consequent increase in emissions in the UK. This is why the government must do all it can to make sure only the most efficient technologies are used to burn both coal and natural gas.

Q.3. The Energy White Paper left open the option of nuclear new build. Are there particular considerations that should apply to nuclear as the government re-examines the issues bearing on new build, including long-term liabilities and waste management? If so, what are these, and how should the government address them?

Nuclear power is not the answer to climate change. A government advisory body, the Commission on Sustainable Development [26] has drawn together the most comprehensive evidence base available, to find that there is no justification for bringing forward a new nuclear power programme. The report, based on eight new research papers, finds that the problems with nuclear power outweigh the advantages.

To justify this conclusion, the Commission on Sustainable Development states that even if the nuclear capacity of the UK was doubled, this would only achieve an 8% in CO₂ emissions by 2035, and no emission reductions before 2010. This is a small amount, set against the country's commitment to reduce CO₂ emissions by 60% by 2050, and would not happen fast enough to contribute in any way to current Kyoto targets. This, the Commission says, must be set against five "major disadvantages":

- 1- no long term solutions for disposal of radioactive waste are yet available, let alone acceptable to the general public; it is impossible to guarantee safety of the long-term disposal of waste.
- 2- the economics of a new nuclear programme are highly uncertain. There is little justification for public subsidy. If estimated costs escalate, though, the taxpayer will be have to pick up the tab.
- 3- nuclear would lock the UK into a centralised distribution system, at exactly the time when opportunities for micro-generation and local distribution network are stronger than ever.
- 4- 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.
- 5- if we build new nuclear power stations, we cannot deny other countries the same technology as part of international climate change negotiations. This will greatly increase risks of accidents, radiation exposure, proliferation and terrorist attacks.

In addition, according to Friends of the Earth, nuclear power is not a solution to climate change for the following reasons:

- One of the arguments sometimes used in favour of nuclear power is that it would be easy to build new stations close to the existing ones. However, a report by government agency Nirex reveals that at least 11 preferred sites are at risk from flooding or coastal erosion from climate change. [27]
- Nuclear is not an 'emissions free' solution. The mining and transport of uranium, the making of nuclear fuel rods, the building of nuclear power plants and the storage of nuclear waste all lead to carbon dioxide emissions.

In addition, it is currently estimated that the cost of nuclear waste disposal will be up to £70 billion, according the Government's Nuclear Decommissioning Authority (NDA) which is an increase of £22 billion over previous estimates. The Government's rescue of British Energy in 2003 is expected to cost British tax payers £12 billion over the next 100 years.

Despite this, since 1974 the UK government has spent £6.8 billion in research and development funding for nuclear fission (compared to £540 million for renewables) according to information from the International Energy Agency.

Q.4. Are there particular considerations that should apply to carbon abatement and other low-carbon technologies?

The Intergovernmental Panel on Climate Change (IPCC) has produced in 2005 a report assessing the technological potential of carbon capture and storage. The draft IPCC report does now suggest that there are no insurmountable technological hurdles to implementing carbon capture and storage.

However, a number of legal, regulatory and liability issues need to be resolved.

Also, there needs to be internationally agreed criteria on storage standards, site selection and leakage. Large-scale implementation of carbon capture and storage can only be supported after these issues have been addressed.

There are some storage options which are less understood and some which pose unacceptable environmental risks. For example, while the petroleum industry has experience with the injection of CO₂ in oil and gas fields, there is limited experience of injection into saline aquifers and limited geological knowledge of potential sites. Also, the use of marine storage poses significant environmental impacts on little understood and vulnerable ecosystems. As the IPCC draft report states, the suitability of storage sites can only be determined on a case-by case basis.

Should the technical, regulatory, legal hurdles and site selection hurdles be successfully overcome, within the UK there could be a role for carbon capture and storage as part of a transition to a low carbon economy. This recognition is based upon the following understanding:

- That the latest scientific research suggests that deeper cuts in carbon dioxide are needed sooner than envisaged ten years ago.
- The need for these bridging technologies is also increased because the UK Government has failed to make progress in cutting emissions (carbon dioxide levels are higher than when the present Government came to power in 1997).
- The UK needs to simultaneously wean itself off nuclear power whilst shifting from fossil fuels and although the UK has a huge potential to provide its energy through renewable sources it will take some time to realise this potential.

Therefore, the government should:

- Redouble its efforts domestically and through European Union legislation to tap into the very large and cost-effective potential for reducing demand for energy and to promote renewable power.
- Develop, with others as necessary, the legal, regulatory, and liability regimes needed for the development of carbon capture and storage.
- Contribute to the adoption of international standards for site selection and monitoring to ensure that there is no leakage or that leakage rates are negligible and that environmental impacts are minimal.
- Ensure that fossil fuel power plants are modified to ensure they are using best available technology, and that all new fossil fuel plants incorporate the ability to implement carbon capture and storage
- Ensure that when carbon capture and storage is ready to be introduced that regulatory and trading regimes ensure that fossil fuel plants implement carbon capture and storage without government subsidies or other forms of public support (which should focus instead on promoting energy efficiency and renewable energy).
- Ensure that the promotion of carbon capture and storage at an international level is not seen as an alternative to binding international agreements on

climate change or to the promotion of energy efficiency and renewable power and does not divert attention and resources from the latter.

Q.5 What further steps should be taken towards meeting the government's goals for ensuring that every home is adequately and affordably heated?

As a solution to fuel poverty the government must enhance its energy efficiency policies, especially in the domestic heating sector and housing standards. The UK has among the most energy inefficient houses in Northern Europe.

Making sure products or houses that come on the market are as efficient as possible and that financial support is available for e.g. insulating homes or installing double-glazing is good for fighting both climate change and fuel poverty. Microgeneration and household scale renewables have low running costs. Therefore, the spread of these technologies will be helpful for fuel poverty- if the equipment is provided to those in fuel poverty free of charge or at a subsidised cost. The development and promotion, for climate change reasons, of such technologies and equipment will help bring down their costs.

The government has in the past few years increased energy conservation grants and developed initiatives for low income over-60's, chronically sick and the disabled people. However, many fuel poor households still fall outside the eligibility criteria for these programmes.

In developing its fuel poverty strategy Woking Council recognised that some fuel poor households in the private sector needed top-up measures over and above the normal grants to provide them with full energy conservation measures (e.g., draught-proofing, cavity wall and loft insulation).

Out of 32,500 private sector households in Woking, over 12,000 households have so far taken advantage of the Council's energy conservation schemes from 1996 to 2004, of which over 3,700 households have been provided with energy conservation grants to provide full insulation measures.

Importantly, it is worth noting that by creating a new energy service company, Woking Council was able to provide energy at low prices for the fuel poor.

Comments are also invited on the following issues, as described in the text:

i. The long term potential of energy efficiency measures in the transport, residential, business and public sectors, and how best to achieve that potential;

The Performance and Innovation Unit's 2002 Energy Review says the UK could reduce current energy use by up to 30% through adoption of cost-efficient and existing technologies. The Energy White Paper recognised this potential.

The current Energy Review, however, appears from the very beginning to neglect and/or underestimate energy conservation opportunities, despite stated intents. The consultation document – and speeches given so far by ministers about it - put a lot of emphasis on the question of how to tackle lack of awareness of energy efficient options and their lack of take-up.

While creating awareness is hugely important, a lot of what energy efficiency is about is good regulation and good incentives. Setting minimum standards for products,

buildings, cars, etc, is key. The taxation system, and the regulatory framework, are also hugely important. Behavioural change, although important, will not deliver by itself.

Studies for the European Commission have identified the potential to make significant cuts in electricity-use and considerable financial savings by ensuring that industry uses correctly-sized and super-efficient motor devices. Industry studies indicate there is a potential to reduce electricity consumption by around six per cent in the UK within a few years, simply through increased use of these motors. [28]

Around one nuclear power station, or two medium sized coal plants in the UK have to be kept running in order to provide power for appliances not in use and on 'standby' mode. Around 24 nuclear plants are kept running throughout the industrialised world for this purpose.

Replacing ordinary light-bulbs with energy efficient light-bulbs could reduce electricity consumption by at least two per cent (equivalent to one nuclear power station) by 2020. And the potential is much higher if we implement a programme to replace inefficient street lighting and lighting in the commercial sector.

Legislation [29] is currently being considered by the EU to set minimum efficiency standards for a variety of energy using products such as lightbulbs, but also including the stand-by function (see below).

In addition to measures outlined earlier on housing and the office and retail sector, further measures the government should take to promote efficiency are the following:

Planning:

- The minimum standards within the Code for Sustainable Homes and PPS3 (Housing) need to be improved.
- Local authorities should also tackle housing efficiency in new developments through the Local Development Frameworks, where these exist.
- planning consent should be informed by anticipated energy performance; reform of planning rules;
- local and regional authorities should produce energy strategies;
- spatial development plans should be required to identify both renewable energy opportunities and high-density heat demand suitable for community heating;

Product policy:

- The EU Directive on Eco-Design of Energy Using Products was approved in 2005; when implemented, it will set minimum efficiency standards for many energy-using products on the market. There is a very large potential for savings. The UK should drive this process forward.
- Possible obligation on retailers or voluntary agreement to sell increasingly efficient products.
- Establish government procurement standards for a wider range of goods.
- Subsidy on best appliances, and higher tax on worst appliances

Taxation:

- Increase green taxation. Green taxes have decreased under Labour – despite a 1997 pledge to shift the burden of taxation from employment onto environmental pollution.[30]

- End the anomaly whereby householders are charged more than three times as much tax for buying materials for saving energy as they are for using energy,
- Introduce nationwide council tax rebates and cut stamp duty for low-carbon, energy efficient homes.
- Introduce a much higher zero-rated tax disc (VED) for gas-guzzling vehicles. The biggest gas guzzlers should pay at least £600.
- Introduce tax breaks, grants and other incentives for householders to install micro-generation systems.

An additional measure the government should take is mandating differentiated tariffs for electricity that penalise profligate users and reduce costs for those who use less.

ii. Implications in the medium and long term for the transmission and distribution networks of significant new build in gas and electricity generation infrastructure;

As explained above, there is a very large potential to reduce the need to build new transmission and distribution infrastructure if we implemented a policy to decentralise the power system and to promote ambitious energy efficiency policy.

The International Energy Agency estimates in its World Energy Investment Outlook [31] that at least \$700 billion in investment in generation, distribution and transmission could be saved worldwide through even modest energy efficiency policies.

The types of investment needed in new capacity and networks depends on whether or not the governments promotes the development of decentralised energy systems and a more sustained effort to promote energy conservation.

The Energy Review must therefore not be short-sighted, and take in consideration the fact that a new decentralised energy system might need infrastructural investments of a different kind – i.e. less focused on transmission and distribution and more focused on e.g. smart metering. It is important not to lock our electricity generation system into the wrong type of investments.

iii. Opportunities for more joint working with other countries on our energy policy goals;

- The government should accept the principle of long-term year on year targets, and work to persuade other industrialised countries in Europe and around the world to adopt similar long-term approaches.
- The UK should work with the Internal Energy Agency and the EU to set up global initiatives on energy efficiency standards.
- It should support international initiatives to promote decentralised power and energy efficiency around the world. Decentralised power can be a very efficient way to bring energy services to the 2 billion people in the world currently without them. The UK should take the lead in promoting the take-up of these technologies. And by developing them here, it will support technological developments that will help tackle both climate change and the challenge of growing global energy demand.
- The UK could join efforts by other governments investigating proposals to import electricity from large-scale solar power plants in the Sahara. This cutting-edge technology is currently being investigated by the German

government in cooperation with other countries including Italy, Spain, Morocco, Jordan and Israel. It is also being studied by UNEP, the World Bank and the IEA. [32] Electricity is already traded throughout Europe, with plans to expand the grid into North Africa.

iv. Potential measures to help bring forward technologies to replace fossil fuels in transport and heat generation in the medium and long term.

Opportunities to reduce carbon emissions from heating have been explained in the answer to Q1.

In the transport sector, the current best bet long-term alternative to the use of fossil fuels is hydrogen fuel cells. Widespread use of hydrogen as a fuel for private cars is at least 20 years away, as substantial progress is needed in research and development into hydrogen storage and transfer. Another key issue to be addressed is how the hydrogen will be generated. Hydrogen made from electricity produced at fossil fuel-fired power stations will still generate carbon. Nor, as explained above, is the use of nuclear power the answer. The 'dream ticket' would be hydrogen produced from electricity from renewable energy sources. This would require a step change in the renewables sector. Measures to ensure this happens are addressed above.

The development of hydrogen-based transport fuels offers huge potential. The Government should ensure that there is sufficient investment in the development of hydrogen storage and transfer for this country to benefit from this potential.

However, as has been explained above, technological measures alone will not deliver the emissions cuts needed. Measures to change travel behaviour are also essential.

Annex - A Sustainable Energy Policy

Friends of the Earth has joined more than 30 other organisations in supporting a joint statement on a sustainable energy policy. The statement follows.

We believe that the priorities of the Government's Energy Review should be to:

- **Uphold the vision, objectives and targets** for sustainability, security, prosperity and fairness set out in the 2003 Energy White Paper. The government should re-affirm its commitment to all related statutory and non-statutory targets and introduce supporting annual milestones.
- **Develop the long-term policy framework** necessary to provide enduring investment signals for businesses of all sizes to deliver the major changes needed to our energy system. This includes a long-term carbon market beyond existing emission trading schemes.
- **Minimise the 'energy gap'** before trying to fill it. The first priority is to reduce demand; followed by encouraging efficient energy production and usage; then boosting renewables. Incentives and support measures should reflect these priorities.
- **Focus on sustainable heat and transport as well as electricity.** Energy is an inter-related system and policy should pay equal attention to all parts of the mix.
- **Structure Government and agencies to meet the objectives** by identifying a single body responsible for achievement of sustainable energy targets. The primary duties of the regulator should reflect *all* national energy policy objectives.

This strategic framework should lead to the following policy actions:

- **Reduced consumption through energy saving.** Conservation is the most cost-efficient solution to energy security, fuel poverty and climate change. *Government should implement a package of measures that deliver an absolute reduction in energy consumption in industry, transport and the home.*
- **Investment in decentralised energy systems.** Integrated community systems and micro-generation deliver clean heat and electricity at the point of use, displacing inefficient production in conventional stations. *Government should ensure a fair value for distributed energy and provide regulatory and fiscal incentives for consumers, installers and network operators. It should strengthen regulations to require all new buildings to be carbon neutral no later than 2015, and use standards to eliminate the most inefficient products from the market.*
- **Accelerated renewable energy capacity growth.** Renewables produce low carbon energy without fossil fuels and stimulate agriculture and the economy. *The Government should aim to put the UK in the top five EU members for renewable energy contribution by 2025. Coherent transitional support measures are needed to build scale and reduce costs.*
- **Champion sustainable energy at home and abroad.** The Government should press for international policies to encourage energy efficiency, boost renewables and eliminate barriers to sustainable energy. *It must lead by example in its own procurement policies and infrastructure developments. Government should invest in a sustained programme of education to achieve cultural change in energy use.*

Individually and together these measures will enhance sustainability, boost UK industry and reduce fuel poverty. They can make a major contribution to energy security by reducing import dependence, maximising local resources and increasing the effectiveness of valuable fuels.

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[28] For more information: see:

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[29] the so-called implementing measures of the Eco-Design of Energy Using Products Directive, which was approved in 2005

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