Memorandum for the Environmental Audit Committee's enquiry into "Energy Subsidies in the UK"

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May 2013

Executive summary

For many years, nuclear power in the UK has been benefitting from seven main kinds of subsidy, several of which are substantial. Withdrawal of just one of those subsidies would raise the price of nuclear power to at least £200 per MWh, much more than the unsubsidised cost of offshore wind power (about £140 per MWh).

The Finance Act 2011 introduced a subsidy for nuclear power by exempting uranium from a tax on fuels used for the generation of electricity.

Three other subsidies have been proposed in the Energy Bill, most notably the "contracts for difference", as applied to nuclear power.

There are five major types of risk for any investor considering putting money into new nuclear plants. It appears from news reports about ongoing negotiations between EDF and the Government about the proposed new nuclear plant at Hinkley Point that the Government may be prepared to allow most of the financial risks to be transferred from EDF to consumers or taxpayers. That would be a large subsidy for EDF.

Energy Fair, with several other environmental groups and environmentalists, has submitted a formal complaint to the European Commission (DG Competition) about state aid for nuclear power in the UK.

There is no valid justification for subsidising nuclear power. It is a mature technology that should be commercially viable without support. Renewables have clear advantages in cost, speed of construction, security of energy supplies, and effectiveness in cutting emissions of CO_2. There are more than enough to meet our needs now and for the foreseeable future, they provide diversity in energy supplies, and they have none of the headaches of nuclear power.

Subsidies for nuclear power have the effect of diverting resources away from techniques and technologies which are cheaper than nuclear power and altogether more effective as a means of meeting our energy needs. Existing subsidies should be withdrawn and no new ones should be introduced.

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Introduction to the submitter

I am the Coordinator of Energy Fair, a think-tank and campaigning group set up in February 2009, with a main focus on subsidies for nuclear power. We have produced three detailed reports and submitted a formal complaint to the European Commission, as described below.[1]

1 Introduction

This memorandum presents evidence that relates to the issues listed in the Environmental Audit Committee's notice: Energy Subsidies in the UK (bit.ly/15EQh6G).

2 Existing subsidies for nuclear power

Our report, *Nuclear Subsidies* (PDF, bit.ly/wPVERU), describes seven existing subsidies for nuclear power:

- *Limitations on liabilities:* The operators of nuclear plants pay much less than the full cost of insuring against a Chernobyl-style accident or worse.
- *Underwriting of commercial risks:* The Government necessarily underwrites the commercial risks of nuclear power because, for political reasons, the operators of nuclear plants cannot be allowed to fail.
- *Subsidies in protection against terrorist attacks:* Because protection against terrorist attacks can only ever be partial, the Government and the public are exposed to risk and corresponding costs.
- *Subsidies for the short-to-medium-term cost of disposing of nuclear waste:* In UK government proposals, the Government is likely to bear much of the risk of cost overruns in the disposal of nuclear waste.
- *Subsidies in the long-term cost of disposing of nuclear waste:* With categories of nuclear waste that will remain dangerous for thousands of years, there will be costs arising from the dangers of the waste and the need to manage it. These costs will be borne by future generations, but they will receive no compensating benefit.
- *Underwriting the cost of decommissioning nuclear plants:* In UK government proposals, the Government is likely to bear much the risk of cost overruns in decommissioning nuclear plants.
- *Institutional support for nuclear power:* the UK government is providing various forms of institutional support for the nuclear industry.

1.1 Sizes of the subsidies

Of those seven subsidies, the largest is probably the cost of managing nuclear waste for thousands of years, although it is difficult to quantify. The next largest are probably the considerable risk of cost overruns in both the decommissioning of nuclear plants and the disposal of nuclear waste on short-to-medium timescales—but again these subsidies are difficult to quantify.

With regard to the cap on liabilities for nuclear disasters, Versicherungsforen Leipzig GmbH, a company that specialises in actuarial calculations, has shown that full insurance against nuclear disasters would increase the price of nuclear electricity by a range of values—€ 0.14 per kWh up to € 2.36 per kWh—depending on assumptions made.

[1] The reports may be downloaded via links from www.energyfair.org.uk. Our (second) formal complaint to the European Commission is described on www.energyfair.org.uk/actions.

If those insurance costs were to be paid, even at the lowest level (€ 0.14 per kWh), the cost of nuclear power would rise to at least £200 per MWh, substantially more than the unsubsidised cost of offshore wind power (about £140 per MWh). Details of the calculations may be found on www.energyfair.org.uk/oppcost.

3 Other existing or proposed subsidies for nuclear power

Our report, *Subsidies for nuclear power in the UK government's proposals for electricity market reform* (PDF, bit.ly/wZqBDH), describes four other subsidies for nuclear power, the first one, below, in the Finance Act 2011 and the other three proposed in the current Energy Bill:

- *Exemption from tax*. The "carbon price floor", introduce in the Finance Act 2011, is, in effect, a subsidy for nuclear power because it is a *de facto* tax on fuels used for the generation of electricity, and uranium is exempted from that tax.
- *Contracts for difference*. Although it is a mature technology that should not need subsidies, nuclear power would be eligible for the same system of subsidies as is proposed for renewable sources of power.
- *Capacity mechanism*. The UK government's proposals for a "capacity mechanism" as a backstop for the power supply system are not yet finalised. However, there is potential for the proposed mechanism to be used to provide unjustified support for nuclear power.
- *Emissions Performance Standard*. Although peer-reviewed research shows that nuclear power emits substantially more fossil carbon than wind power, it appears that the effect of the proposed new standard would, for the foreseeable future, be to lump them together as if they were equivalent in their carbon emissions.

The "contracts for difference" could be very substantial. For example, it has been reported that, for the proposed new nuclear plant at Hinkley Point, EDF has been holding out for a 40-year deal with a guaranteed price for nuclear electricity at around £95-£100 for each megawatt hour generated, close to twice the current market price for electricity.[2]

4 The financial risks of investing in new nuclear plants and what that can mean in terms of subsidies

Our report, *The financial risks of investing in new nuclear power plants* (PDF, bit.ly/JhdNtL) describes five major types of risk for any investor considering putting money into new nuclear plants:

- *Market risk*. By the time any new nuclear plant could be built in the UK (2020 or later), the market for its electricity will be disappearing, regardless of any possible increase in the overall demand for electricity. The rapidly-declining cost of photovoltaics (PV) with the falling costs of other renewables, and the likely completion of the European internal market for electricity with the strengthening of the European transmission grid, will be transforming the market for electricity in the UK, and throughout the rest of Europe and beyond. Consumers, large and small, will be empowered to generate much of their own electricity (on their own sites or elsewhere) or to buy it from anywhere in Europe, and this without the need for subsidies. Explosive growth of PV is likely to take much of the profitable peak-time market for electricity. And there will be stiff competition to fill in the gaps left by PV, from a range of renewable sources, many of which are better suited to the gap-filling roll than is nuclear power.

[2] "EDF staff cuts raise fresh fears over Hinkley Point C", The Telegraph, 2013-04-23, bit.ly/XUwVWJ.

- *Cost risk*. There is good evidence that, contrary to the often-repeated claims that nuclear power is cheap, it is one of the most expensive ways of generating electricity. The inflation-adjusted cost of building new nuclear power stations has been on a rising trend for many years. The introduction of new safety measures after the Fukushima disaster will push up prices further. Meanwhile, the cost of most renewable sources of power is falling.
- *Subsidy risk.* Although nuclear power is a long-established industry which should be commercially viable without support, it depends heavily on subsidies. This is a clear breach of the principle of fair competition. At any stage, some or all of the subsidies may be withdrawn, either via formal complaints to the European Commission, or via the European Court of Justice, or via decisions made by politicians. All state aid which is deemed to be illegal must be repaid. Consumers may refuse to pay surcharges on electricity bills. There is additional subsidy-related risk arising from the great complexity of government proposals in this area, with its potential for unexpected and unintended consequences.
- *Political risk.* Apart from the risk that politicians may decide to withdraw some or all of the subsidies for nuclear power, it is vulnerable to political action arising from events like the nuclear meltdowns in Fukushima. That disaster led to a sharp global shift in public opinion against nuclear power and it led to decisions by politicians in several countries to close down nuclear power stations and to accelerate the roll-out of alternative sources of power. The next nuclear disaster—and the world has been averaging one such disaster every 11 years—is likely to lead to even more decisive actions by politicians, perhaps including the closing down of nuclear plants that are still under construction or are relatively new.
- *Construction risk.* The delays and cost overruns in the Olkiluoto and Flamanville nuclear projects are just recent examples of nuclear projects where actual build times and actual costs greatly exceed what was estimated at the outset. But the extraordinary complexity of nuclear power stations—which is likely to increase, after Fukushima, with the added complexity of new safety systems—means that construction risk will remain a major hazard for investors for the foreseeable future.

The connection between these risks and possible subsidies for the nuclear industry is that risk equates with cost, so if some or all of the risk is transferred from a nuclear operator to consumers or taxpayers, that is a subsidy for the nuclear operator.

As we have seen (Section 3), EDF is seeking a guaranteed price for electricity from the proposed Hinkley Point nuclear plant of £95-£100 for each megawatt hour generated (close to twice the current market price for electricity) for a period of 40 years.

Any such contract would mean that most of the financial risks outlined above would be transferred from EDF to consumers or taxpayers. This subsidy would be worth many billions of pounds.

Any such contract would be extremely wasteful and very unfair, as described in *A subsidy for nuclear power and its unintended consequences* (bit.ly/16sbLEm).

5 There is no valid justification for subsidising nuclear power

The Government has suggested repeatedly that nuclear power is needed because it is cheap, because it is a low-carbon source of power, and because it provides security in energy supplies. But:

- *Cost*:

    - As we have seen (Section 3), EDF is seeking a guaranteed price for electricity from the proposed Hinkley Point nuclear plant that is nearly double the current market price.
    - As noted in Section 1.1, removing just one of the several existing subsidies for nuclear power would raise the price to at least £200 per MWh, substantially more than the unsubsidised cost of offshore wind power (about £140 per MWh).
    - The cost of nuclear power has been on a rising trend for many years, while the cost of renewables is falling.
- *Emissions*. Peer-reviewed research shows that the nuclear cycle emits between 9 and 25 times more CO_2 than wind power (Jacobson, M.Z., "Review of solutions to global warming, air pollution, and energy security". *Energy and Environmental Science* 2,148–173, 2009. doi:10.1039/b809990c.).
- *Security*:
    - Nuclear power is a hindrance, not a help, in ensuring security of energy supplies:
        - Like all kinds of equipment, nuclear power stations can and do fail. *Failure of a nuclear power station is very disruptive on the grid because a relatively large amount of electricity is lost, often quite suddenly and with little warning.* For that reason, special provision is need, the Large Loss Response, to cope with the failure of a nuclear plant.[3]
        - By contrast, variations in the output of renewables are much easier to manage because they are gradual and predictable.
    - There is a range of techniques for ensuring reliability of electricity supplies with 100% renewable sources of power (see www.desertec-uk.org.uk/elec_eng/supply_demand.html).
    - There are now many reports showing how to decarbonise the world's economies without nuclear power. Details, with download links, may be found via www.mng.org.uk/gh/scenarios.htm.
    - Nuclear power is not a home grown source of power in the UK. All uranium is imported.

In addition, there is abundant evidence from reputable sources that, in general, renewables, with conservation of energy:

- Can be built much faster than nuclear power stations.
- Can easily meet all our needs for energy, now and for the foreseeable future.
- Provide more flexibility than nuclear power.
- Provide diversity in energy supplies.
- Are largely free of the several problems with nuclear power.

Detailed evidence may be found on www.energyfair.org.uk/oppcost and via links from there.

[3] See "Exclusive: Will wind farms pick up the tab for new nuclear?" (Business Green, 2010-08-24, bit.ly/czZCRx) and "Renewable energy providers to help bear cost of new UK nuclear reactors" (The Guardian, 2013-03-27, bit.ly/15Uz44N).

Nuclear power is a mature technology that has been established for many years. It should be commercially viable without subsidies.

Subsidies for nuclear power have the effect of diverting resources away from techniques and technologies which are cheaper than nuclear power and altogether more effective as a means of meeting our energy needs.

6 Formal complaint to the European Commission

In December 2011, Energy Fair, with several other environmental groups and environmentalists, submitted a formal complaint to the European Commission (DG Competition) about state aid for nuclear power in the UK. Our press release about this submission may be seen in Legal bid to halt nuclear construction (bit.ly/Mp9Bfy). We understand that the Commission has passed the complaint to the UK government for its response but we have not yet heard a ruling on the submission.

In summary, the "grounds for complaint" in our submission is:

- That the so-called "carbon price floor", introduced in the Finance Act 2011, is a *de facto* tax on fuels used for the generation of electricity and that the exemption of uranium from that tax is incompatible with EU state aid rules, Articles 107 and 108 of the Treaty on the Functioning of the European Union (TFEU).
- That the cap on liabilities for nuclear accidents of the Paris/Brussels Conventions constitutes state aid in the sense of Article 107 of the TFEU. Since Article 351 of the TFEU requires EU Member States to adapt and align their pre-existing Treaty obligations to be compliant with EU law, since relevant UK laws have not been amended in the light of that requirement, and since the cap on liabilities has not been notified to the European Commission, it is, technically, illegal under EU law.
- That the proposed cap on liabilities of nuclear operators for the disposal of nuclear waste falls under the definition of state aid in Article 107(1) of the TFEU; that, unless or until it is notified to the Commission, it is illegal under EU law; and that, since the measure cannot be justified (Article 107(3) of the TFEU), it should not be approved by the Commission and should not enter into force.
- That the proposed "feed-in tariff with contracts for difference", as applied to nuclear power, is, under Article 34 of the TFEU, a measure having an effect that is equivalent to "quantitative restrictions on imports" and is thus contrary to EU law.

7 Conclusion and recommendation

For many years, nuclear power has been enjoying seven main types of subsidy, several of which are substantial. Another subsidy was introduced in the Finance Act 2011, and three more are proposed in the Energy Bill.

In connection with the current negotiations between EDF and the Government about the proposed new nuclear plant at Hinkley Point, it appears from news reports that EDF would like UK consumers and taxpayers to take on most of the financial risks of the project. Since the risks are large, the transfer of those risks would be a correspondingly large subsidy for EDF.

1.2 Recommendation

There is no valid justification for subsidising nuclear power. It is a mature technology that should not require subsidies. Those are for technologies that are still finding their feet commercially.

Renewable sources of power, with conservation of energy: Are cheaper than nuclear power (taking account of all subsidies); Can provide greater security in energy supplies than nuclear power; Are substantially more effective than nuclear power in cutting emissions of CO_2; Can be built much faster than nuclear power stations; Can easily meet all our needs for energy, now and for the foreseeable future; Provide more flexibility than nuclear power; Provide diversity in energy supplies; and Are largely free of the several problems with nuclear power.

Subsidies for nuclear power have the effect of diverting resources away from techniques and technologies which are cheaper than nuclear power and altogether more effective as a means of meeting our energy needs.

Existing subsidies, as described in this memorandum, should be withdrawn and no new ones should be introduced.