# Subsidising the Nuclear Industry

A briefing for the government from
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*"A new generation of nuclear power stations will cost taxpayers and consumers tens of billions of pounds…in addition to posing safety and environmental risks, nuclear power will only be possible with vast taxpayer subsidies or a rigged market."*

**Ed Davey, Liberal Democrat Shadow Trade and Industry Secretary, 17th July 2006**

*'There have been understandable concerns given the expensive mistakes made in the past which the taxpayer is still paying for. But the Coalition agreement is crystal clear - new nuclear can go ahead so long as it's without subsidy.'*

**Ed Davey, Secretary of State for Energy and Climate Change, 6th February 2012**

The Coalition government has repeatedly claimed that it will only allow the development of new nuclear electricity generation in the UK if it does not receive any public subsidy. That claim is false.

**This paper sets out the multiple ways in which the nuclear industry is subsidized in the UK, and attempts to quantify the scale of those subsidies where this is possible.**

# The Headlines

**1. Electricity Market Reform** The Contracts for Difference Feed in Tariffs (which may be illegal under EU law) that will be introduced under this legislation will provide a subsidy of £63 - £75 billion to EDF over the next 35 years. That is nearly £2.0 billion a year. If all the other proposed reactors are built, this cost to British householders and businesses could double to almost £4.0 billion a year.

**2. Waste disposal** Although the Government admits that the costs of waste disposal cannot be known, it has proposed capping the nuclear industry's liabilities, and is therefore bearing the significant risk that they will cost more than the cap. All previous cost estimates have been too low. Currently, DECC spends £6.93 billion a year on managing nuclear waste and other liabilities from Britain's current nuclear power programme. This amounts to 86% of DECC's current budget, meaning that DECC is spending over eight times as much on the cleaning up the nuclear past as it is on securing our future energy and climate security.

**3. Third party liability insurance** DECC has proposed that nuclear operators' liability should be capped at £1 billion per plant. The total costs of the Fukushima disaster have not yet been estimated, but may well exceed £300 billion. Effectively, the whole of the risk of a high category nuclear accident in Britain has been transferred to the Treasury. The avoided cost of paying for the insurance to cover this scale of third party liability is a direct subsidy to the nuclear industry not available to other electricity generators.

**4. Loan guarantees** It is likely that new nuclear build in Britain will require the creation of special purpose vehicles to protect the balance sheets of the proposers. The companies involved will be looking to borrow the minimum of £32 billion required to build 8GW of new nuclear in Britain. It is difficult to see this level of loan being available without explicit loan guarantees from the French and/or British governments. If these guarantees were provided in a way that lowered the cost of capital to the generator, that too would be a direct subsidy.

**5. Research & Development, training & administrative support** Dozens of agencies, offices, quangos and departments support the nuclear industry, costing billions of pounds per year. Similar levels of support do not exist for other low-carbon technologies.

**6. Security** It is impossible to have nuclear power without huge security and counter-terrorism costs. Most of this is paid for by government, but secrecy prevents us knowing how much.

# 1. Electricity Market Reform – the EMR

*"The widespread perception is that the four measures put forward [in the EMR] are knowingly intended to raise the price of electricity to a point where the government can get by without breaking either the commitment made by Chris Huhne, the Energy and Climate Change Secretary, to have no public subsidy of nuclear power – or European rules on state aid [i.e. subsidy]"*

**Catherine Mitchell, Professor of Energy Policy, Exeter University**[1]

The four main parts of the EMR are (a) a Feed-in Tariff with Contracts for Difference (CfD-FiTs); (b) a Capacity Mechanism; (c) a Carbon Floor Price (CFP); and (d) the Emissions Performance Standard.The two parts of the EMR that are most widely seen as subsidies are the CfD-FiT and the CFP.

## 1.1. CfD-FiTs

These allow long-term contracts at guaranteed prices which help generators. The government argues that they will help consumers too, since if the market price of electricity goes over the strike price agreed, generators must repay the difference. They thus provide 'stability'. However, there are a number of problems with CfD-FiTs.

First, they virtually dispense with a free market in energy, replacing it with fixed long-term contracts, set as a result of auctions regulated by the government. If a 'one size fits all' criterion is used, this will inevitably favour certain types of production over others. If variable criteria are used for different generation types, this becomes de facto a fully regulated market.

But whichever is used, nuclear is preferentially subsidized. Unlike the renewables sector, which has a large number of suppliers, the nuclear sector in the UK is effectively just one company, EDF, and there will almost certainly be no competitive bidding within the sector. Moreover, long-term fixed price contracts are far more important for nuclear generation because of the huge initial start-up costs which make guaranteed returns more important. Professor Thomas explains this well:

*'The impact of a CfD is to shift risk from the owner of the plant to consumers and the consequence of this would be to reduce the cost of capital so a simple proxy for subsidy would be to compare the interest rate offered with a CfD to the one that would have been offered without a CfD. However, no company anywhere has seriously tried to finance a nuclear plant to operate unprotected in a competitive electricity market, probably because it is known such a plant would be unfinanceable…'*[2]

Secondly, David Simpson, global head of mergers and acquisitions at KPMG, has said that the huge costs and risks associated with nuclear construction mean that plants will only be built with public support in the form of long-term power purchase agreements, that he expects the UK government to offer 35-year contracts, and that such contracts could be illegal State Aid under European Union competition rules.[3]

Commenting on new nuclear plans, the Energy and Climate Change Committee agrees:

*'…it is almost certain that it will require policy or financial support that will amount to forms of subsidy. While a Contract for Difference Feed-in Tariff may be the best option for nuclear generation, it may not be the best for all low-carbon generation. The Government must not go down the route of Contracts for*

[1] Nuclear power is the reason for the new energy regulations. Guardian 11 March 2011. Accessed online on 1 March 2012 at: http://www.guardian.co.uk/environment/2011/mar/11/nuclear-power-reason-energy-regulations.

[2] Would CfDs Represent a Major Public Subsidy? Professor Steve Thomas (March 2011).

[3] 'Questions over funding for nuclear expansion', Professional Engineering, 3 October 2011 Accessed online on 6 March 2012 at: http://profeng.com/news/questions-over-funding-for-nuclear-expansion.

*Difference for all low-carbon generation just because it does not feel able to differentiate between nuclear energy and other low-carbon technologies'.*[4]

It now appears that the government itself accepts that CfDs may constitute a subsidy under European law. Energy law expert Chris White of Pinsent Masons says:

*'The issue of whether the Government's key facilitative actions in the energy sector might amount to subsidy from a UK perspective may be answered shortly if, as expected, the Government follows through on its indications that it anticipates making a Phase II State Aid application for any interim CfD'.*[5]

A"Phase II application"means that the government will ask the Commission for permission to introduce the CfDFiTs – in other words it believes they will count as a subsidy to nuclear but may be a permitted exemption. Doubtless the nuclear industry will be watching the progress of any such application closely.

## 1.2 The Carbon Floor Price

On the face of it, the Carbon Floor Price (CFP) is not a subsidy to nuclear power per se because it is a subsidy to the whole low-carbon generating sector. However, all is not what it seems.

Because existing low-carbon generating capacity will receive the payments, the nuclear industry will reap CFP payments for its existing plant. This is a subsidy because existing nuclear plants were paid for by the UK taxpayer and sold at artificially low prices to the private companies who now operate them. The UK taxpayer is also paying much of the costs of disposal of the waste created by those plants.

There is a dispute about the value of the windfall. In response to a parliamentary question, the Treasury Secretary, Justine Greening MP, said the benefits to the existing nuclear sector are likely to be:'an average of £50 million per annum to 2030 due to higher wholesale electricity prices'.[6] But according to calculations by WWF and Greenpeace, the proposed carbon price floor could result in windfall profits for existing nuclear generators of up to £3.43 billion between 2013 and 2026.[7] This equates to £264 million per year.

The CFP payments may also be argued to be a de facto subsidy in a second way since the concentration of the nuclear industry in one company, EDF, means that the scale of CFP payments to that company will dwarf payment to any other low carbon generator (such as wind farm operators).

[4] Energy and Climate Change Select Committee, 4th Report on Electricity Market Reform, 16 May 2011.

[5] Environmental campaigners complain to European Commission about nuclear 'subsidies' in Out Law.com (24 January 2012. Accessed online on 25 February 2012 at: http://www.out-law.com/en/articles/2012/january-/environmental-campaigners-complain-to-european-commission-about-nuclear-subsidies/

[6] Justine Greening MP in reply to a written parliamentary question from Martin Horwood MP, the Economic Secretary, on the 9th of May 2011.

[7] How can zero nuclear subsidy = £3.43bn profit. WWF blog, 14 February 2011. Online at: http://www.wwf.org.uk/wwf_articles.cfm?unewsid=4625) and Energy bills to rise as nuclear gets £3.43bn for doing nothing. WWF press release, 14 February 2011. Accessed online on 25 February 2012 at: http://www.wwf.org.uk/what_we_do/press_centre/?4629/Energy-bills-to- rise-as-nuclear-gets-343bn-for-doing-nothing).

# 2. Waste Disposal

The Government has a problem with the disposal of radioactive waste from nuclear power plants. On the one hand, it is publically committed to a policy of 'no subsidy'; on the other hand, it knows that the nuclear industry must have an upper limit on the cost of waste disposal in order to provide essential investor 'certainty'. Radioactive waste needs very long-term management, and, historically, costs have escalated well above expected levels.

Initially, the government stated its intention to place the risk of price escalation with the operators, but as a result of lobbying,it has reversed its position, claiming 'it is reasonable for nuclear operators to have some certainty over their maximum exposure to these risks from the outset'.[8] Since 'certainty' is exactly what doesn't exist, the government is effectively taking on that risk.

The Government's proposals are that the so-called 'Waste Transfer Price' will increase over time, as the final costs of actually siting, building and operating the deep Geological Disposal Facility are better understood. The Coalition Government has also proposed that the Waste Transfer Price should be deferred for a period up to 30 years after the start of new nuclear reactor power generation (assumed to be around 2020). By 2050, the government will know the true capital cost of siting and constructing the repository, and will also have had 10 years practical operating experience running the repository, which is planned to be fully operational by 2040.[9]

This is clearly a subsidy because:

(a) the price cap is transferring risk from the industry to government

It is also likely to be a subsidy because

(b) DECC and its predecessor departments have systematically underestimated the cost of disposal in the past and will therefore set the cap too low.

In any time frame of 'up to 30 years', it will be assumed by any industry operator that this sum of money is open to future haggling.

Furthermore,

(c) nuclear operators are not required to be insured against any cost over-runs for disposal.

## Long-term costs of disposal of nuclear waste

These significant financial costs will be borne by future generations. The only fair basis for those generations to carry those costs will be that they have obtained some comparable benefit from them. Otherwise, this becomes a clear case of the future subsidising the present. This is where the paucity of evidence that nuclear is the only way to prevent runaway climate change is so important. If there were no alternative to nuclear then there could be a 'no subsidy argument' (or at least a 'no externality' argument) here. But this case has never been made, whereas there are many alternative options (in terms of both supply and demand management) to reduce greenhouse gas emissions.

## Decommissioning Costs

The Energy Act (2008) requires the operators of new nuclear power stations to have plans for decommissioning, including plans for how decommissioning will be financed.The Act also requires that these plans must be approved by the Government. Operators are not required to insure these costs, leaving the government to carry the risk of operator default.

[8] Consultation on an updated Waste Transfer Pricing Methodology for the disposal of higher activity waste from new nuclear power stations. Department for Energy and Climate Change (December 2010), page 3

[9] Consultation on a methodology to determine a Fixed Unit Price for waste disposal and updated cost estimates for nuclear decommissioning, waste management and waste disposal, Department for Energy and Climate Change(March 2010).

# 3. Third Party Liability Insurance

Liability is regulated by the Paris/Brussels Conventions (2004). In January 2011, DECC published a proposed revision of the liability cap (i.e. the part for which the operator is responsible) for an individual plant to 1.2 billion euros (approximately £1billion). This is an explicit subsidy to the nuclear industry since all other power generators have to bear the full costs of their third party liability. To give an idea of the scale of this subsidy, BP is currently paying out in excess of $20billion (£15billion) for the Gulf of Mexico disaster, and has allocated $41 billion to cover all claims arising from the disaster.[10] The estimated costs of the Fukushima clean up has been put between $130 billion and $250 billion.

The government seeks to justify the very low level of liability that nuclear operators will carry by claiming that it will enforce a regulatory regime that makes the risk so low as to be irrelevant. In the Government Response to Consultation on the Revised National Policy Statements (NPS) on Energy Infrastructure,we find that the government believes that imposing an uncapped rather than capped liability would be inappropriate or ineffective, preferring instead to regulate to reduce the likelihood of accident.[11]

But the fact remains that any limit on liability for the costs of nuclear accidents, even one at a much higher level than currently, eases the burden on nuclear operators. And a capped limit is a direct subsidy.

## The high price of low liability

The Japan Centre for Economic Research estimates Fukushima clean up costs at $250 billion.[12] Andrew McKillop, former chief policy analyst at DG XVII (Energy) at the European Commission, has suggested that the Fukushima disaster will add between $135 billion and $175 billion to Japan's national debt.[13]

Little surprise then that Norbert Rottgen, the German Environment Minister observes '… no insurance company in the world is willing to cover these [nuclear accident] risks'.[14] Versicherungsforen Leipzig, a spin-off of the University of Leipzig which serves as a bridge between insurance sciences and insurance practice, has calculated that full liability insurance on the open market for nuclear energy would add between €0.14 per kWh and €2.36 per kWh, depending on the assumptions made.[15]

## Moral Hazard as a factor in the liability issue

'Moral hazard' is defined as a tendency to take undue risks because the costs are not borne by the party taking the risk. The relevance to the nuclear case should be clear. Ultimately, governments will have no option but to bear the costs of a disaster since companies will simply not be able to. The hope that a 'robust regulatory regime' will replace the need for insurance moves the onus for avoiding disaster completely from the company to the government – in other words, the taxpayer. Nuclear operators will clearly be placed in a position of moral hazard by the UK Government.

When considering the kinds of costs that can be generated, it is worth noting that it is only in February 2012 that the Food Standards Agency began a consultation on ending the controls in place on Cumbrian sheep farmers, established as a result of Chernobyl radioactive contamination of Cumbrian grasslands following the 1986 explosion. Those controls have been paid for by the UK taxpayer for the past 26 years.

[10] Court order halts BP talks with Rosneft. Guardian, 1 February 2011. Available online at: www.guardian.co.uk/business/2011/feb01/bp-loss-gulf-oil-spill-resumes-dividend Accessed 6 March 2012.

[11] The Government Response to Consultation on the Revised Draft National Policy Statements for Energy Infrastructure. Department for Energy and Climate Change (June 2011), para 3.127. Available online at:http://www.decc.gov.uk/assets/decc/11/meeting-energy-demand/consents-planning/nps2011/1945-govt-resp-consultation-on-nps.pdf Accessed 26 February 2012.

[12] Nuclear Generating Cost Treble Pre-Accident Level, Japan Centre for Economic Research, July 19, 2011

[13] 'Post Nuclear Japan: Atomic Debt', Market Oracle, 5 July 2011. Available online at: http://www.marketoracle.co.uk/Article29069.html. Accessed 25th March 2012.

[14] What Germany must learn from Chernobyl and Fukushima.DerSpiegel, 27 April 2011. Accessed online on 28 February 2012 at: http://www.spiegel.de/internationalgermany/0,1518,759228,00.html

[15] Günther B et al, Calculating a risk-appropriate insurance premium to cover third-party liability risks that result from operation of nuclear power plants. Commissioned by the German Renewable Energy Federation (April 2011). Accessed onlineon 11 March 2012 at http://www.energyfair.org.uk/reports.

# 4. Loan Guarantees and Commercial Risks

*'Government programmes to subsidise the cost of capital are probably the most common form of public subsidy as well as the largest source of subsidy to the nuclear sector around the world. These programmes include loan guarantees…'*

## The World Nuclear Industry Status Report[16]

As with so much of nuclear cost accounting, the biggest subsidies are buried in some of the dullest parts of the paperwork. But what is it that makes an innocuous 'loan guarantee' so expensive?In a word – risk. According to Citibank,[17] construction risks are one of three 'corporate killers' that can take down even the biggest corporations who may be tempted to invest in nuclear.

So why are construction risks so big for nuclear? The answer is the sheer scale and complexity of nuclear construction.A combined cycle gas turbine with a capacity of 800 MW can be built in four years, for a construction cost of approx €550 million ($750 million). The equivalent figures for nuclear (for a plant of 1,600MW) would be up to €6 billion ($8 billion +). Construction experience shows that it would also take at least eight years before it would generate electricity and start to return revenue to investors. Until that point, the plant is costing investors huge amounts of money.

And that's if everything goes according to plan. It rarely does with nuclear construction. As Professor Thomas notes *'the most reliable indicator of future costs has generally been past costs… Estimates of future costs have almost invariably been over-optimistic, based on faulty expectations about learning, scale, and innovation effects that have not been reflected in costs'*.[18]

There are currently two EPR reactors(the type slated for construction in the UK) being built in Europe, one at Olkiluoto in Finland and one at Flamanville in France. Budgets and time for completion have nearly doubled on both projects. Even when on time and on budget the huge demands for both capital and time that nuclear requires frightens investors and make loan guarantees even more important.

## Loan Guarantees as subsidies

If the government agrees to provide any form of loan guarantee, or in other ways mitigate the construction risks of new nuclear (e.g. through providing preferential tax regimes for new-generation investment etc), this is a subsidy and potentially a huge one. Even if this subsidy is extended to the whole of the electricity-generating sector, it will remain a preferential subsidy to nuclear because the extraordinarily high costs of nuclear construction mean that these constitute a much larger proportion of risk to nuclear than to any other part of the sector.

When Citibank issued its warning about the 'corporation killing' scale of construction risk in nuclear power they did offer investors some scope for optimism. Over-runs and time slippages could destroy investment equity, they say, 'unless these costs can be passed through somehow' - by which they mean getting the taxpayer or consumer to compensate them.

[16] The world Nuclear Industry Status Report 2009. Professor Steve Thomas, Section III.6.2.1

[17] New Nuclear - The Economics Say No Citibank (November 2009).

[18] The Economics of Nuclear Power – An Update, Professor Steve Thomas (March 2010). Available online at: www.boell.de/downloads/ecology/Thomas_economics.pdf. Accessed 6th March 2012.

# 5. Research & Development, training and administrative support

An astonishing number of bodies are involved in supporting the nuclear industry. All are at least part-funded by the taxpayer. The following is nota comprehensive list, but hint at the scale of this spending.

Bodies involved wholly or partly in Nuclear Administration (not including those involved solely in security for civil nuclear power) that receive either some or all of their funding from the taxpayer include:

- the Nuclear Decommissioning Authority (NDA) (£1.6 billion per year),
- the National Nuclear Laboratory (NNL),
- the Office for Nuclear Development (OND),
- the United Kingdom Atomic Energy Authority (UKAEA),
- Culham Centre for Fusion Energy (CCFE), formerly UKAEA Culham,
- the Nuclear Advanced Manufacturing Research Centre (NAMRC) (£15 million p.a.),
- the Nuclear Legacy Advisory Forum (NLAF),
- the Nuclear Directorate of the HSE,
- the Office for Nuclear Regulation (ONR),
- the UK Safeguards Office (UKSO), which oversees the application of nuclear safeguards in the UK to ensure that the UK complies with its international nuclear safeguards obligations,
- the Radioactive Materials Transport Team (RMTT),
- the Committee of Major Accident Hazards (COMAH),
- the Nuclear Emergency Arrangement Forum (NEAF),
- the Decommissioning and Environmental Remediation Centre (DERC) at Thurso
- the Nuclear Research Co-ordination Group (NRCG), and
- the Nuclear Liabilities Funding Board

International nuclear bodies to which the UK subscribes and funds either directly or through membership of the European Union include:

- the European Atomic Energy Community (EAEC, or 'Euratom'),
- The European Nuclear Safety Regulator Group (ENSREG), an agency of the EU,
- the European Nuclear Energy Forum (ENEF), an agency of the EU,
- the International Atomic Energy Authority (cost to the UK, approx £20 million p.a.),
- European Safeguards Research and Development Association (ESARDA),
- Institute of Nuclear Materials Management (INMM), and
- the OECD Nuclear Energy Agency. (£950,000 annual subscription).

Academic spending includes:

- the Nuclear Technology Education Consortium (NTEC),
- the Dalton Nuclear Institute (DNI) at theUniversity of Manchester,
- the Research Councils UK (RCUK),which states that 'We are currently supporting research in this area with a portfolio of £41 million. This involves 20 projects of which 7 are collaborative with industry involving 20 separate industrial partners',
- Keeping the Nuclear Option Open (KNOO) - £6.1 million for a 'research programme focusing on new reactor technology, waste disposal and materials as well as providing significant levels of training', funded by the RCUK,
- the Engineering and Physical Sciences Research Council (EPSRC) -'current nuclear research portfolio' totals £8.5million,[19]

[19] Omnibus written parliamentary rely to Paul Flynn MP by Energy Minister Charles Hendry, Hansard 10 June 2010: columns 221-222W

- the ESPRC also states that they have a portfolio of 59 grants [in the field of nuclear research] of which £35.8million is taxpayer funded,[20]
- the Natural Environment Research Council (NERC) spent approx. £3.5 million per year on 'nuclear decommissioning and radioactive waste management'?,[21]
- the Environment Agency spent £180,000 on research 'relevant to nuclear waste and decommissioning costs' in 2009-10?,[22]
- the Manufacturing Advisory Service (budget £4 million per year) includes in its brief advising companies on 'Supply chain and engineering opportunities in the Nuclear New Build programme'? (but no equivalent advice for the renewable sector), and
- the Highlands and Islands Enterprise Board (HIEB) contributed (possibly from European Development Funds) £7.1 million to The Decommissioning and Environmental Remediation Centre (DERC) at Thurso

Some academic research involves multiple taxpayer inputs. The UK fusion programme is centred on the innovative Mega Amp Spherical Tokamak experiment and employs around 150 people. The programme is funded by the EPSRC and the European Union under the EURATOM treaty.

Yet all of these costs, paid for by the taxpayer, are clearly consequences of the operation of a civil nuclear power programme in the UK.For further examples of government funded agencies that provide support for nuclear.(See section on'Security').

[20] Personal communication to David Lowry from Dr Stephen Reid ESPRC 27-7-11.

[21] Nuclear Subsidies 2.9, Energy Fair (January 2012).

[22] Ibid.

# 6. Security

All power generators benefit from state protection from terrorism, but obviously nuclear infrastructure presents a vastly more attractive target than wind turbines or solar panels. This is reflected in the requirement that new nuclear generators be built to withstand a plane strike. Nuclear reactors therefore demand a massively higher level of response-readiness by state agencies. However, attempts to quantify this are confounded because the subject has become shrouded in anti-terrorist confidentiality. In the government's response to the Consultation on the revised National Policy Statement on Energy Infrastructure,we are told that '…for reasons of national security, the Government cannot comment on the detail of security matters at UK civil nuclear sites'.[23]

The government states security arrangements are 'robust', and follow a principle of 'defence in depth'. This includes, physical protection (fencing, turnstiles, CCTV etc), personnel (security guards, the Civil Nuclear Constabulary etc), protection of computer data and systems, and positive vetting of individuals working on nuclear sites. Most of these are not funded by the industry but by the taxpayer, particularly those involved in general counter-terrorist activities.

Bodies involved wholly or partially in civil nuclear security that receive either some or all of their funding from the taxpayer include:

- the Civil Nuclear Constabulary (CNC),
- the Office of Civil Nuclear Security (OCNS),
- the Radioactive Materials Transport Team (RMTT),
- the Joint Terrorism Analysis Centre (JTAC),[24]
- the Centre for Protection of National Infrastructure (CPNI),[25]
- the Office for Security and Counter-Terrorism (OSCT),[26]
- M.I.5,
- the Special Branch of the Metropolitan Police,
- the Radioactive Materials Transport Team (RMTT),
- the Ministry of Defence Police (responsible for military nuclear security) who collaborate with the CNC and the RMTT, and
- the British Transport Police.

The CNC and the OCNS are supposed to be paid for by the civil nuclear industry 'in accordance with the Nuclear Industries Security (Fees) Regulations 2005 and the Energy Act 2004'.[27] CNC's Annual Report for 2010-11 shows its income was £61,360,000. It is not clear what proportion of that expense was cost recovered from the industry. Even if recovery was 100%, this cost will ultimately fall on consumers of electricity in the form of higher electricity prices.

In addition, ordinary local police forces are expected to have contingency plans in place to deal with 'Chemical, Biological and Nuclear' emergencies. For example, 12,000 'dirty bomb' suits were purchased by UK police forces in 2006.[28] Again, a national figure for the extra costs imposed on individual police forces by the necessity to cover a nuclear terror attack is almost impossible to calculate. Nonetheless, it is clear that there is such a cost, and that it has been effectively externalised by the nuclear industry as with so many other construction, operating and liability costs.

## Summary

The whole electricity generation industry receives some de facto subsidy as part of the national costs of defending the infrastructure from terrorist attack. However, it is clear that the nuclear industry receives very much more than the industry average of that subsidy, and the renewables sector very much less than the industry average. The nuclear industry should pay the full cost of security and insurance against attack.

[23] Government response to DECC consultation on revised National Policy Statement on Energy Infrastructure (2011), para. 3.157.

[24] DECC's consultation on the revised NPS on Energy Infrastructure (June 2011), para. 3.157.

[25] ibid.

[26] ibid.

[27] Written answer from Charles Hendry, Hansard18 October 2010, column 481W, part 1, chapter 3, section 60.

[28] 5,000 extra 'dirty bomb' protection suits for police. Guardian, 29 December 2006 Available online at: http://www.guardian.co.uk/uk/2006/dec/29/society.politics. Accessed 3rd March 2012.

# Appendix 1

## Subsidy – the quagmire of definition

Not all of the spending listed above can be considered 'pure' subsidy; some can only be considered partial subsidy, some are not be considered to be subsidies at all, and others are hefty direct subsidies. But disaggregating these from each other and quantifying them requires a Kafkaesque exercise in forensic accountancy. It is hard to avoid the conclusion that some of this confusion is part of a process of deliberate obfuscation.

Article 87 of the EU Treaty - which defines subsidy – describes it as **'any aid** *granted by a Member State…**in any form** whatsoever which distorts or threatens to distort competition by favouring certain undertakings'* – a wording designed to prevent precisely these kinds of concealments via complexity and to make clear the intention of the Treaty.

Normally there are two main questions to consider when assessing whether a transfer of funds is a subsidy or not:

(a) Does the transfer directly benefit the UK civil nuclear industry by covering costs the industry would otherwise have to bear?

(b) Is there a comparable transfer benefitting other energy generating sectors?

However, answering these questions does not necessarily yield the straightforward answer we seek. An answer to question (a) might be positive but still not be a 'full' subsidy since some of the functions of government nuclear agencies would still be necessary even if there were no civil nuclear power programme. An example would be the Radioactive Materials Transport Team (RMTT), which would exist anyway in some form (to deal with the movement of radioactive material used for medical purposes or in manufacturing processes not involving power generation) but which would certainly be smaller and less expensive if there was no civil nuclear power programme to cater for. Attributing a precise figure to the size of this cost is very tricky.

Answering questions of type (b) can be hard too. The nuclear industry is supported by DECC via the Office for Nuclear Development (budget £3 million p.a.). However, since DECC also funds the Office for Renewable Energy Deployment (ORED), it could be argued that there is no preferential subsidy to nuclear compared to renewables. But 'renewable energy' embraces at least 7 distinct and unrelated energy generation methods (biomass, geothermal, solar, wave, wind, hydro, tidal – and there are others) and for there to be parity of support, each should have its own support office. Since they do not have this, there is a de facto subsidy to nuclear.

## The 'Comparable Funding' Justification.

'And I say again there will be no subsidy to nuclear, for a very clear reason: it is a mature technology, not an infant needing nurture'

Chris Huhne, speech to the Liberal Democrat Annual Conference, 21st September 2010.

If it can be shown that all parts of a sector receive the same level of subsidy, then there is no preferential subsidy. This justification has a general theoretical problem when comparing renewables and nuclear generation because it assumes that both forms have an equal 'right' to subsidy. In fact economic theory (and current UK government policy) stress that 'mature technologies' – e.g. nuclear power – do not have an equivalent right. Support for immature technologies is particularly indicated where there are considered to be barriers to entry to a market that are sufficient to create 'market failure'.

# Appendix 1 continued

## The 'Informed Decision' Justification

Speaking to the Lords Science and Technology Committee in July 2011, the then Energy Secretary, Chris Huhne, argued that nuclear research quangos and departmental support were essential in order to allow DECC to be an 'intelligent customer'. There is some merit in this case. Good policy making requires technical expertise and nuclear is a highly complex means of power generation that has very long-term implications. Informed decision-making is critical, and an 'intelligent customer' may choose not to buy nuclear.

But if this spending is to be justified solely on the basis of creating good policy, then one would expect to see non-nuclear analogues of bodies such as 'Keeping the Nuclear Option Open' (KNOO), researching non-nuclear energy scenarios and – presumably – conducting the kind of forensic, hidden-cost analysis of nuclear power that is demanded by, but beyond the scope of, this report. Yet there are no such bodies and thus the 'informed decision' defence of nuclear subsidy cannot be validated.

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