A corruption of governance?

How Ministers and Parliament were misled.

- **This report is about the Government's decision to support new nuclear power stations**
- **It is neither for nor against that decision**
- **It shows that the evidence given to Ministers and Parliament, on which they based that decision, was a false summary of the analysis carried out within Government**
- **This report is about a corruption of Governance**

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A Corruption of Governance? January 2012

The authors of this report are Ron Bailey and Lotte Blair.

This Report is published by two organisations that are ***not*** formally opposed to nuclear power.

The Association for the Conservation of Energy is publishing it because it believes that the mis-information highlighted in this report has resulted in 'demand-side' measures being downplayed as the report describes.

Unlock Democracy is publishing this Report because of the issues it raises regarding governance. Ministers and Parliament need the correct information on which to base decisions but they did not get it.

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Executive Summary

In Chapter 1 we show that, **on the basis of the Government's own evidence**, we do not need any more new nuclear power stations in order to 'keep the lights on' and reduce CO_2 emissions by 80% by 2050.

In Chapter 2 we show that, **on the basis of the Government's own evidence**, electricity generated by nuclear power is the not the least expensive of all low-carbon technologies. In everyday terms, the building of new nuclear power stations to provide electricity is likely to mean higher fuel bills.

In Chapter 3 we try to assess what has gone on. Why the seemingly inexplicable decisions documented in Chapters 1 and 2 (i.e. the decisions in favour of new nuclear power stations that are not needed) were taken by successive Governments.

And let us state at the outset: we are neither blaming, nor questioning the integrity of Ministers, MPs and Parliament as a whole. They acted sincerely on the basis of the evidence that they were shown, and on the basis of that information took their decisions. But the information given to them was false.

What has gone on is nothing less than a corruption of governance.

This corruption of governance can only be rectified if Parliament re-opens this debate, and MPs vote on this issue having seen the correct information.

The National Policy Statement (NPS) on Energy (EN-1) proposing new nuclear power stations, which was prepared for Ministers and presented to Parliament for MPs to vote on

did not present the full information to MPs ... this is not the purpose of the NPSs

DECC Official
(see page 8)

Box 1: Questions that need to be answered

1. Why did the previous Government take two decisions – to reverse previous policy and decide that new nuclear power is needed, and then decide that 10 nuclear power stations are needed – without assessing the long term demand for electricity?
2. Why did the original EN-1 and EN-6 documents, prepared for the previous Government, claim that Redpoint's analysis showed the need for medium term capacity to increase, when it did nothing of the sort?
3. Why didn't the previous Government carry out an assessment of the full potential of energy efficiency (even though they declared it was the most cost-effective way of meeting energy policy objectives), before deciding how much electricity we needed to generate?
4. Why is the current Government ignoring the evidence in its own Pathways to 2050 work, and insisting that nuclear power is necessary to keep the lights on and reduce CO_2, when the analysis shows the opposite?
5. Why have numerous Government documents misrepresented evidence from Government analysis by saying that electricity demand may double, when in fact the analysis and the modelling shows something different?
6. Why has the EN-1 document, prepared for this Government, ignored the results of their modelling, the National Grid modelling, and the Fourth Carbon Budget Assessment regarding electricity needs up until 2025?
7. Why has the EN-1 document misled Parliament by falsifying the results of the modelling regarding the alleged need for extra capacity up to 2025?
8. Why has the Government wasted time, effort and money on its deliberative discussion on the various pathways to 2050, when in fact the decision to use nuclear power has already been made?
9. Why did the Government repeatedly refused to carry out an assessment of the full potential for the policy that it regards as the most cost-effective (energy efficiency) before making the decision to support new nuclear power stations, despite the fact that the Chief Scientific Adviser described the assessment as crucial?
10. Why did the 2011 White Paper on Energy Market Reform not include a full assessment of energy efficiency despite the fact that one of its principle objectives was to minimise costs to the consumer?
11. Why did Charles Hendry's answer to Madeleine Moon's Parliamentary Question omit information about low-carbon technologies that are cheaper than nuclear power?
12. Why has the Government relied on unsubstantiated claims regarding the expected lifetime of new nuclear power stations?
13. Why has the Government relied on unsubstantiated claims regarding the load factor of new nuclear power stations?
14. Why do the Government's official statistics on the price of nuclear power not include the transmission and distribution costs?
15. Why does the EN-1 document quote a study that doesn't include a comparison with all low carbon technologies, as evidence that nuclear is the cheapest source of electricity?

Have we witnessed evidence-based policy making, or policy-based evidence making?

Contents

Chapter 1 No Need

Introduction

The *Government's own* figures, information and analysis show conclusively that:

- There is absolutely no need for any more nuclear power stations to deliver energy security ('keep the lights on') and achieve 80% reductions in carbon dioxide by 2050.
- Government statements that electricity supply will need to double or even triple in order to achieve a low-carbon economy are disproved by its own evidence.
- The initial decision (taken during the previous Government) and the reiteration of that decision (since the current Government was formed) that 10 new nuclear power stations are needed was not based on evidence.
- The recent consultation ("*deliberative discussion*") on the 16 possible pathways suggested by the Government in order to achieve 80% CO_2 reduction by 2050 was undermined by the fact that the decision had already been taken on new nuclear power stations
- Yet Ministers, MPs and Parliament as a whole were told little or none of this: they were all repeatedly given false information and half truths on which to base their decisions in support of new nuclear power stations

So let's look at the evidence.

1. How the previous Government's decision on new nuclear power was capricious

(a) Long term demand for electricity

January 2008: The Government's strategy that new nuclear power stations are needed to supply our long-term electricity needs was decided on and spelt out in the Nuclear White Paper. The Prime Minister at the time, Gordon Brown MP, wrote in the Foreword:

> '*the Government has **today** concluded that nuclear should have a role to play.*' [1] (our emphasis)

November 2009: The Government goes further and states in its Draft National Policy Statement for Nuclear Power Generation (EN-6) that '*all 10 sites are needed*'[2]. The EN documents are those which are given to MPs in order to inform their decisions in advance of them having to vote on whether to support the National Policy Statements (NPSs).

[1] Meeting the Energy Challenge A White Paper on Nuclear Power, published in January 2008, page 4
[2] Draft National Policy Statement for Nuclear Power (EN-6) November 2009 page 6. Subsequently referred to as EN-6

But the need for a large amount of new nuclear electricity depends on the amount of electricity we need to generate to 'keep the lights on', and this depends on an assessment of what our electricity needs are. Yet this basic assessment work had not been carried out, as the following evidence makes clear.

October 2009: We spent considerable time trying to obtain information regarding future electricity demand and even to establish whether or not it existed. Finally, we received a reply from the relevant official in DECC, to whom we had been referred (Alan Clifford), on 9th[th] October 2009 which said:

> '*you also asked for details about the Government assessment of future electricity demand up to and beyond 2050. The Low Carbon Transition Plan (page 73, chart 5) shows projected peak electricity demand and generation capacity to 2024, but, at this point in time, we do not have any published assessments of this nature that extend as far as 2050*.**'**

We then inquired as to whether there were any *unpublished* assessments or evidence and we were told that DECC had not made any long-term projections beyond 2022.

December 2009: DECC's Higher Statistical Officer, Stephen Oxley told us:

> *'DECC has not made any long-term projections of electricity demand / supply. Our latest projections were published up to 2022 and we have previously published figures to 2025. DECC is developing scenarios of potential electricity demand / supply to 2050 but don't have any definite figures for this yet.'* [3]

Therefore, on the basis of information that did not exist, in 2008 Ministers were given a White Paper to present to Parliament[4] saying that new nuclear power stations are definitely needed. But that White Paper failed to mention that no long-term assessment of electricity need had been carried out. In November 2009 EN-6 was also formally presented to Parliament[5] stating that all 10 new nuclear sites are needed, but again Parliament was not told a long-term assessment of electricity need had still not been made.

This is rather like deciding we need 10 new motorways without assessing traffic demand, or that we need 10 new prisons without assessing possible future numbers of inmates.

But the failure to make policy based on a rational consideration of the evidence does not end there. The previous Government, in its 2003 Energy White Paper twice described energy efficiency as the '*cheapest, cleanest, safest way of addressing our energy policy objectives*'[6]. In the light of this, therefore, you might think that an analysis of the cost of the full potential for the accepted cheaper option of energy saving as against energy generation would be carried out ***before*** decisions could be made on how much of the (acknowledged) less cost-effective policy of energy generation was required.

That was never done, as the following email exchange between the Association for the Conservation of Energy (ACE) and the Government confirms.

[3] Email from DECC's Higher Statistical Officer 10th December 2009
[4] Nuclear White Paper op cit Command 7296
[5] EN-6 title page
[6] 2003 White Paper page 32 para 3.2 and again on page 16 second bullet point

- ACE asked '*has the Government carried out a long-term assessment of the costs and benefits of energy saving/efficiency as against those of energy generation? If so where can we find it please?*'[7]
- To which they replied: '*there is not something specific in the public domain on this question*'[8].
- ACE further asked if there was any information **not** in the public domain, and it transpired that there was not.[9]

So, on the basis of no evidence, no assessment of long term electricity needs and without assessing the full potential for what the Government itself considered to be the cheaper alternative (energy efficiency)[10], it was decreed that 10 new nuclear power stations were needed.

(b) Medium term 'need' – capacity up to 2025: how the figures were fiddled

The other factor (i.e. apart from long-term demand) on which the previous Government based its case for new nuclear power stations is the alleged need for medium-term increase in capacity (i.e. up to 2025). This means the amount of electricity required to be generated every day to ensure that we 'keep the lights on' and satisfy peak demand.

Both EN-1 and EN-6 asserted that *'under central assumptions there will be a need for approximately 60GW of new capacity by 2025'*[11] and *'of this 60 GW as much as 35GW could come from renewables (in line with our international obligations) with 25 GW from other conventional generation capacity'*[12].

EN-1 explained this further: '*By 2025 there could be a need for around 110 GW of total capacity with new generation capacity of approximately 60 GW (35 GW from renewables and about 25 GW of other capacity)*'[13] including new nuclear power stations.

The Redpoint Modelling

In both EN-1 and EN-6[14] the Government specifically cited modelling done for DECC by Redpoint Energy[15] as the basis of the assertion that *'under **central assumptions** there will be a **need** for approximately 60GW of new capacity by 2025'* (our emphasis). So we investigated how this 'central assumption' was arrived at.

We sought further information at the DECC public consultation meeting regarding Sizewell C held in Leiston Suffolk on 5th December 2009. The co-author of this document, Ron Bailey, (a resident of Leiston), sought to find out where this 'central assumption' had come from. The official transcript produced by DECC of that meeting reads as follows:

[7] Email from ACE on 16th August 2010
[8] Email from DECC supplying information from their economists on 1st September 2010
[9] Email from DECC 7th September.
[10] This still has not been done despite attempts by the Association for the Conservation of Energy to amend the current Energy Bill to require it to be done
[11] EN-6 page 6; EN-1 page 13
[12] EN-6 page 6; EN-1 page 19
[13] EN-1 page 19 para 3.3.14
[14] EN-6 page 6 footnotes 15 and 16; EN-1 page 19 footnote 8
[15] 'Implementation of the EU 2020 Renewables Target in the UK Electricity Sector: RO Reform' Redpoint Energy June 2009.

'Ron Bailey
You referred me to page six of EN-6 and I have looked at the modelling, but it does not substantiate the 60GW. It substantiates the 35/25 breakdown but it does not give any evidence for the assumption of 60GW. Could you undertake to send me more information on how you reach that figure?

Peter Erwin
Yes, of course'[16]

This information took us dozens of emails and phone calls to obtain. In the end we were simply directed by the Office for Nuclear Development[17] towards Figures 11 and 14 in the Redpoint report. Accordingly we looked at Figures 11 and 14[18] and what they show is this:

- The Redpoint Report says that '*in Figure 14, cumulative plant retirements are shown*'[19] and this does indeed indicate there **will** be a 32 GW loss of current generating capacity by 2025 due to plant closures.[20]
- Redpoint's Figure 11 'New Plant Build' base case[21] just adds up the effects of Government's building policies: it was not an assessment of the **need** for that new-build. There **will** be an extra 60GW built by 2025 – including new nuclear and renewables.
- Current generation capacity in the UK is 80GW. If 32GW is shut down, and a predicted 60GW is built then there will be a total of 108GW by 2025.

This is a simple arithmetic exercise and clearly, subject to some rounding, the maths is correct as regards the amount of capacity: there **will** be a capacity of approximately 110GW by 2025 if 60GW of new renewables and nuclear power are built. But what this did **not** provide us with is the information that we asked for on 5th December – the evidence for the 'central assumption' of the **need** for a total capacity of 110GW by 2025, which therefore **requires** 'approximately 60GW' of new capacity by 2025.

The Redpoint modelling is stated to be the sole source for this 'central assumption' in EN-1, EN-6 and by the Office for Nuclear Development. Therefore we looked in more detail at **how** the figures were arrived at, in order to assess the evidence for the **need** for 60GW of new capacity.

And we found that, in their report for DECC, the Redpoint team was **not asked** to assess the future **need** for electricity – instead their objective was to identify how much new renewable capacity would need to be built in order to meet the Government's statutory renewables obligation (RO). This is stated at the very beginning of their report: *'the scope of this study for DECC was to assess options for both the minimum and potential changes to the RO, with a **goal of achieving around 28%-29% of electricity from renewables by 2020'***.

[16] DECC Transcript of Leiston Public Meeting :https://www.energynpsconsultation.decc.gov.uk/home/events/localevents/
[17] Email from Helen Dwyer Office for Nuclear Development 18.1.10
[18] Redpoint pages 42-45
[19] Redpoint page 44
[20] Redpoint Figure 14 page 44
[21] Redpoint Figure 11 page 43

So Redpoint's analysts did exactly what was asked of them: they deducted plant closures from current capacity in Table 14, then assumed 29% was required from renewables as per their brief from DECC (including 24.6GW of new plant), added on the Government's proposed nuclear new build programme, added on other proposed totals in the Government's programme and reached the total of 110GW total capacity in 2020[22] as explained above.

The Government then took those same figures, renamed them as the 'central assumption' of need, and claimed that they prove the **need** for a total capacity of 110 GW by 2025, thus requiring an extra 60GW of new capacity by 2025, as stated in EN-1 and EN-6. This was the sole basis for the statements in EN-1 and EN-6.

In a nutshell what EN-1 and EN-6 did was add up the Government's ***proposed policies***, including the 29% renewables figure and the proposed new nuclear capacity (plus other proposed new capacity) and call that a 'central assumption' of **need.** However this is not an assessment of need, it is an estimate of predicted generating capacity, which is altogether different. Then, as Redpoint had (perfectly legitimately) done the same thing, the Government referenced Redpoint modelling as the independent analytical source for their 'central assumption'.

In other words, the pre-determined policy of 10 new nuclear power stations created the 'central assumption' of the need for them. Rather than the need driving the policy, the policy dictated the so-called need.

This really is false logic. It is like somebody saying 'assume we need 15 pieces of fruit every week, of which a minimum of 10 must be apples'. They then commission experts to do some modelling to show how we can get the 10 apples. The experts' model does not show how or whether we can get more than 10 apples, because they were not asked to do any such analysis. So then the commissioning agents say 'therefore that means that we need 5 pears to make up the difference.'

Indeed the Redpoint report itself points out that the potential for renewables is far greater than the 28%-29%. See for instance Figure 77 on page 104 of their Report – this shows a far larger potential. Redpoint did not do an analysis of that potential, because they weren't asked to. But the existence of far greater potential is made clear in their report.

Indeed, taking Redpoint modelling and removing nuclear from the equation would, **without any other replacement policies at all**, only reduce 2025 capacity by 4.8GW (the amount of nuclear electricity Redpoint assumed to be available in 2025)[23], leaving total capacity as 105.2GW (110 - 4.8 = 105.2). This is still 45.2GW (or over 66%) above peak demand of 60GW (as EN-1 states will remain the case up to 2025[24]). This is far higher than the current capacity of 80GW is over current peak demand of 60GW[25].

Yet neither Ministers nor MPs were told any of this when given EN-1 and EN-6 on which to decide policy!

[22] Redpoint pp 43 and 44
[23] Redpoint page 43
[24] See EN-1 page 18 and the Low Carbon Transition Plan page 73
[25] See EN-1 page 18 and the Low Carbon Transition Plan page 73

2. How the Coalition Government's decision to continue supporting new nuclear power was not based on its own evidence

The previous Government made the decision that we need 10 new nuclear power stations on the basis of no evidence. Now the current Coalition Government has re-stated the decision in its National Policy Statements[26] that there is a **need** for (possibly 10) new nuclear power stations[27]

(i) despite the fact that the evidence that has been produced on its behalf shows the exact opposite; and

(ii) that evidence has then been presented in such a way as to justify that decision and

(iii) a public consultation on whether we need new nuclear power stations has been held in circumstances whereby the only conclusion possible was the pro-nuclear one; and

(iv) still no full assessment of the potential **for what it regards as the cheapest and most cost-effective policy** – energy saving/conservation – has been carried out.

Let's take those four points in turn.

(a) The Government's own evidence shows that new nuclear power stations are not needed

In July 2010 and March 2011 the Coalition Government published Pathways 2010[28] and Pathways 2011[29] presenting respectively 6 and 16[30] different scenarios, detailing various ways forward regarding energy policy in order to both keep the lights on and achieve 80% CO_2 reductions by 2050[31]. Pathways 2011 points out that DECC has aimed to 'look at what might be physically and technically possible over the next 40 years'[32] and also that they have ensured that the analysis in the Pathways was '**robust**'[33] (our emphasis). Further they state that

> '*each of the Pathways achieved the 80% emissions reduction target while ensuring that energy supply met demand.*'[34]

All the 16 different Pathways 'keep the lights on', and ensure that we meet our obligations to reduce CO_2 emissions by 80% by 2050[35]. Table 1 below shows the results of the Government's own 'robust' assessments in their own Pathways analysis – taken directly from the DECC Pathways Calculator tool[36].

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[26] 'The Government has established the need for all types of energy including new nuclear power stations' – Draft EN-6 October 2010 page 7 para 2.2.1; Final EN-6 presented to Parliament for approval in June 2011 page 7 para 2.2.1; Final EN-1 presented to Parliament for approval June 2011 para 3.3.10 et seq

[27] And the relevant Minister, Charles Hendy told Parliament that '*we decided that eight of the sites were appropriate and could realistically be developed by 2025*' (Hansard 18th July 2011 col 687). As two of those sites are for 2 plants each that indicates 10 new stations. Hendry also said '*we are not limited to eight sites*' (ibid).

[28] DECC 2010

[29] DECC 2011

[30] Pathways 2011 also presented a 17th scenario for achieving 90% CO2 reductions by 2050

[31] Plus on 'hedging' Pathway that achieved 90% CO2 reductions in case that amount is required

[32] Pathways 2011 page 3

[33] Pathways 2011 page 4

[34] Pathways 2011 page 5

[35] Plus Pathway 17 which achieves a 90% CO_2 reduction

[36] This is a tool on the DECC website that enables the public to see the different levels of activity (levels 1-4) for a number of variables - see http://www.decc.gov.uk/en/content/cms/tackling/2050/calculator_exc/calculator_exc.aspx for fuller explanation.

For full details of these Government Pathways and how they deliver energy security and required CO_2 reductions please see Appendix 1.

Table 1: Government Pathways

Government pathways to 2050 and description	CO_2 level in 2050[37]	Total UK Energy Demand in 2050	Total UK Electricity Demand[38] In 2050	Level of Nuclear Power[39]
1. Balanced effort across all sectors	20%	-7%	110%	2
2. Demand reduction across the board	20%	-50%	6%	2
3. Low individual demand	19%	-35%	18%	2
4. Low industrial/business demand	18%	-19%	39%	2
5. Electrifying all sectors	18%	-11%	131%	2
6. Electrifying all except heating	19%	-14%	43%	2
7. Electrifying all except transport	18%	-1%	109%	2
8. Biofuel: solids	20%	-8%	105%	1
9. Biofuel: liquids	19%	-3%	104%	2
10. Biofuel: gas	19%	-6%	110%	2
11. Renewables emphasis	20%	-34%	48%	1
12. Offshore emphasis	18%	-38%	17%	1
13. Nuclear emphasis	19%	-7%	110%	4
14. CCS emphasis	20%	-10%	100%	1
15. Gas emphasis	20%	-44%	-5%	1
16. Microgeneration	20%	-7%	111%	1
17. Hedging: CO_2 reduction of >90%	8%	-40%	53%	3

Table 2: What the trajectories represent

Level 1	Level 2	Level 3	Level 4
little or no action	ambitious level of activity	very ambitious level of activity	heroic level of activity – pushing towards the physical or technical limits of what can be achieved

It can be seen that in 6 of the 16 Pathways (numbers 8, 11, 12, 14, 15, and 16) 'level 1 activity' is envisaged (i.e. no new nuclear power stations - see Table 2). All of these Pathways are based on 'robust'

[37] i.e. the %age emissions based on current levels – so 20% achieves the 80% reduction target and anything less exceeds that target
[38] Based on current levels – so 110% means 110% more (i.e. a doubling).
[39] i.e. the level of effort based on Government trajectories 1-4. Trajectory 1 means no more nuclear power stations; trajectory 2 means 25 more; trajectory 3 means 56 more; and trajectory 4 means 91 additional 1.6GW nuclear power plants.

Government analysis and all achieve the 80% emissions reduction target while ensuring that energy supply met demand.

In other words, robust Government analysis proves that we do not *need* any new nuclear power stations to keep the lights on and achieve 80% CO_2 reductions.

But in EN-1 and EN-6 presented to Parliament for approval in July 2011 none of this information is given. In fact Ministers, MPs and Parliament as a whole were told a very different story.

(b) How the presentation of the evidence in the official documents has been 'doctored' in such a way as to support the case for new nuclear power stations

On 18th July 2011 the Government's final Overarching National Policy Statement for Energy (EN-1) and its National Policy Statement on nuclear power (EN-6) were presented to Parliament 'for approval'[40] claiming that we need new nuclear power stations. Indeed, EN-6 stated quite categorically that '*failure to develop new nuclear power stations significantly earlier than the end of 2025 would increase the risk of the UK being locked into a higher carbon energy mix.*'[41] On the basis of this evidence MPs took the decision to support new nuclear power stations.

The reality is, as we showed above on page 7, that the Government's own Pathways analysis shows that the UK can meet its carbon reduction target and keep the lights on without new nuclear. Yet not one word appeared in EN-1 pointing out that over one third (6 out of 16) of the Government's own analyses do not support the policy presented to Parliament for approval on 18th July 2011 in EN-1.

Put bluntly, MPs and Parliament as a whole were given false evidence (that we need nuclear power to keep the lights on and meet carbon reduction targets) on which to base their decision.

The Director of ACE, Andrew Warren, subsequently challenged this (and other issues) in a protracted correspondence with the Minister responsible for nuclear power, Charles Hendry MP. On 25th October 2011 a DECC official replied that

> '*you note that the overview of the Pathways 2050 analysis in EN-1 did not present the full information to MPs on all the possible options*'

and justified this by saying

> '*this is not, however, the purpose of the NPSs*'.[42]

So a document was given to Ministers and presented to Parliament, for them to make and approve policy that deliberately did not present the full information as that was not its purpose! What was its purpose, then? To mislead Ministers and MPs by only providing the information that supported one policy?

[40] As stated on the cover of EN-1 and EN-6
[41] EN-6 June 2011 page 7 para 2.2.3
[42] Letter to Andrew Warren from DECC 20th October 2011

That is what seems to have been the case. Let's start with an example from the most recent Government publication – the final overarching National Policy Statement published in June 2011 (EN-1) and, as we noted above, presented to Parliament for approval.

Example 1: Electricity Demand up to 2050

Look at page 20 of EN-1 where at para 3.3.14 we are told that '*Government analysis of the different pathways to 2050*' shows that, even with energy efficiency, '*total electricity consumption could double by 2050*'.

That sounds like a good case for the need for new nuclear power stations, doesn't it? We need all that electricity to keep the lights on because 'Government analysis' shows demand may double. Except that it's not true. That is a biased view of what an analysis of the different pathways to 2050 shows. In fact that analysis shows exactly the opposite – as we show in Example 2 below. But the authors of EN-1 seem to be reluctant to let the facts get in the way of making the case for new nuclear power stations, and this misinformation was given to Ministers to present to Parliament for it to vote on.

Example 2: The repeated emphasis on 'doubling of electricity demand'

Let's now consider the repeated incorrect presentation of the evidence regarding the supposed doubling of demand for electricity made in the following official Coalition Government publications and statements:

- Revised Draft Overarching NPS EN-1 October 2010: "*a doubling of electricity demand....'* [43]
- NPS London Consultation Public Meeting December 2010: '*there's a real possibility that the electricity demand or need has to double or even triple*'.[44]
- Final Overarching NPS EN-1 June 2011 '*total electricity consumption could double by 2050*' [45]
- White Paper - Planning our electric future July 2011: '*overall demand for electricity may double by 2050*'[46]
- 12th July 2011: Secretary of State for Energy and Climate Change, Rt Hon Chris Huhne MP tells Parliament that '*demand for electricity could double*.'[47]
- 11th July 2011: Secretary of State for Energy and Climate Change, Rt Hon Chris Huhne MP writes in the Daily Telegraph that '*electricity demand could double by 2050*'

Note the repeated emphasis on the doubling of electricity demand

Now consider the Government's own evidence. Of the 17 Pathways (See Table 1) only 9 result in an increase in electricity demand of anything approaching a doubling of today's consumption levels. The others resulted in electricity demand levels ranging from a decrease of 5% to an increase of 48%, with the one Pathway (number 17) that mapped out a CO_2 reduction of 90% (i.e. more than is legally required) by 2050 only resulting in an increase in electricity demand of 53%. That final point in itself is

[43] Para 3.3.14 page 19
[44] DECC London Consultation Meeting Transcript p 16
[45] EN-1 June 2011 page 20 para 3.3.14
[46] 2011 White Paper page 6 para 3 second bullet point
[47] Hansard 12.7.2011 col 178

interesting: even reducing CO_2 emissions by 90% does not require a doubling or tripling of electricity supply and demand!

So, based on the 'robust' evidence presented by the Government in Pathways 2011 those statements could just as accurately have said 'electricity supply may even drop by 5%'[48] or 'electricity supply may need to increase slightly or by up to 50%'[49]. But that wouldn't quite have the same 'ring'; it wouldn't generate the same feeling that we must have new nuclear. The approach seems to be 'say it often enough and it becomes the accepted evidence'. Whatever that evidence says.

Example 3: Electricity Capacity and Demand up to 2025: fiddling and dismissing the evidence

There are two points of relevance here: fiddling the presentation of evidence and dismissing evidence.

Fiddling the presentation of the evidence

The more serious point is the way in which the modelling evidence has been fiddled in EN-1. Para 3.3.18 of EN-1 reports that the Updated Emissions Projections (UEP)[50] 'modelled four different scenarios' and the results were printed in Table 3.1 on page 21 of EN-1. Four levels of new capacity were shown in that Table and the Table is said to show 'the likely impact of different fossil fuel and carbon prices on **the need for new electricity generating** capacity by 2025'[51] (our emphasis). Below is the Table 3.1 from EN-1.

Table 3.1: Summary of UEP projections of new electricity capacity by 2025

	Low fossil fuels and carbon prices (GW)	Central fossil fuels and carbon prices (GW)	High fossil fuels and carbon prices (GW)	High high fossil fuels and carbon prices (GW)
Projected new electricity capacity required by 2025	50	54	59	59

Note those words in the Table 'projected new electricity capacity **required** by 2025'.

So that is quite clear, isn't it: the UEP modelling shows 'the need' for new capacity that is 'required' by 2025. So that makes a good case for new nuclear power stations to prevent the lights going out.

Indeed, EN-1 emphasises this very point, arguing that 'given the severe social and economic disruption that would be caused by insufficient electricity ... it is prudent to plan for the greatest potential **need**

[48] Pathway 15, 2011;
[49] Pathways 2, 3 and 12, 2011
[50] EN-1 page 21
[51] EN-1 page 21

[i.e. the high prices option in the Table]... to do otherwise would create an **unacceptable risk to the delivery of secure ... energy supplies**.'[52](our emphasis).

So that is what Ministers and MPs were told: the modelling shows that we need an extra 59GW new capacity by 2025 or there will be an 'unacceptable risk' of the lights going out.

Except that it is not true. **That is not what the UEP modelling shows at all**. How do we know? Because we contacted the person who told us he was responsible for the figures regarding plant capacity,[53] Mr David Wilson (the Economist at the DECC Energy Modelling Team). We asked him why the higher fuel prices scenarios in EN-1 Table 3.1 produced the higher new capacity figures. And he explained very clearly that:

> *'high fossil fuel prices may bring forward investment in non-fossil plant (adding to capacity) without necessarily leading to closure of some older fossil plants. So if the new capacity exceeds any closures, then high fossil fuel prices can lead to higher capacity overall.'*[54]

To which we replied that this

> *'clears it up – higher fossil fuel prices make other generation more economic, so people may invest in it. So we might have this new investment in non fossil plant without, as you say, the closure of older fossil fuel plant. So the information in Annex I (and EN-1) is then an assessment of market forces.'*[55]

To which Mr Wilson replied

> *'I think your comment about 'assessment of market forces' is about it!'*[56]

So there it is: the modelling in the UEP, quoted in EN-1, as showing '**the need'** for '**required**' new capacity (thus meaning that new nuclear power stations were needed to provide it) was nothing of the sort: it was an assessment of market forces.

Yet in EN-1 the Minister, MPs and Parliament as a whole were told that the modelling demonstrated the need for new capacity! And they voted accordingly in favour of new nuclear power stations

<u>Dismissing the evidence</u>

EN-1 also seems to dismiss evidence that does not support the case for new nuclear power stations. Page 21 of EN-1 states that four different scenarios were modelled on the need for electricity until 2025 and reported that these '*scenarios all suggest that electricity demand in 2025 will be at **approximately the same levels** as today*'

[52] EN-1 para 3.3.19 page 21
[53] Email from Mr David Wilson 7th December 2011
[54] Email from Mr David Wilson December 8th 2011
[55] Email from the co-author of this Report, Ron Bailey, December 8th 2011
[56] Further email from David Wilson 8th December 2011

What is more, EN – 1 also states that projections by National Grid also 'support this assumption'. So both analyses support the assessment that electricity demand in 2025 will be approximately the same as today.

This being the case, new nuclear power might not be needed, because it is only needed to meet an *increase* in electricity demand. It is curious then, that one page later, on page 22 it states that the Government's position is to '*assume ... that total electricity demand is **unlikely** to remain at approximately current levels (and may have increased) in 2025*'[57]. This is in direct contradiction to what was said one page earlier. Can it be coincidental that this sudden change happens to support the case for new nuclear build?

(c) The 'deliberative dialogue' on the Pathways

Both Pathways 2010 and 2011 say quite specifically that

> '*None of these illustrative Pathways represents a preferred option or a lead scenario, and none represents Government policy*.' [58]

And they add that the Government wants '*to move this discussion about Pathways forwards*'[59] and they '*strongly encourage readers to come up with their own Pathways*'[60]. The process is described as a 'deliberative dialogue'[61] or, as Energy Secretary Chris Huhne told Parliament

> '*We are inviting comments over the summer. We want to start a grown-up debate.*' [62]

It all sounds so open - a 'deliberative dialogue' on 17 Pathways; public views sought; a grown-up debate.

But now look at the reality.

The public is asked to comment on all pathways, including numbers 8, 11, 12, 14, 15 and 16. However, these six Pathways are irrelevant as they all contain no new nuclear power stations. So how can there be a deliberative dialogue or 'grown-up debate' on those Pathways when they have already been rejected? And the invitation to the public to 'come up with their own Pathways' should have added the words 'providing they are nuclear'. We are reminded of an advertisement for Russian cars some years ago that ended with the words '*and you can have any colour – provided that it is red!*'

[57] EN-1, page 22
[58] Pathways 2011 page 11
[59] Pathways 2011 page 5
[60] Pathways 2011 pages 6 and 49
[61] Pathways 2011 page 50
[62] Hansard 27.7.10 col 868

(d) The continued refusal to assess the potential for energy savings

We noted above (see page 2) that the previous Labour Government failed to assess the full potential for energy saving/conservation, which could be done by carrying out an assessment of the costs and benefits of energy saving as against energy generation. This was despite the fact that it regarded energy efficiency as the 'the cheapest, cleanest and safest way of addressing our energy policy objectives'[63].

This inexplicable omission has been continued, despite the views of both the current Secretary of State and the Minister of State. Note their words regarding energy efficiency: 'cheapest' and 'best value for money':

> '*The cheapest way of closing the gap between energy demand and supply is to cut energy use*.'
> Secretary of State Chris Huhne MP Hansard, July 27th 2010, col 867

> *'There is one over-arching simple truth: the cheapest energy we all have to pay for is the energy we do not use'* and *'energy efficiency is the most important and the best value for money consideration in terms of saving carbon.'* –
> Minister of State Greg Barker MP Hansard, June 30th 2010, col 870 and col 872

Note too, that the Government's Chief Scientific Adviser on Climate Change, Dr David McKay, has stated that

> '*I agree that this is a* ***crucial comparison to make*** [our emphasis]*, and I'd love to see us develop a rational quantitative approach that incentivises energy saving in the same way that, say, renewables are incentivised.*'[64]

Dr McKay has also advised DECC officials that such an assessment can easily be done. Yet still this has not been done – and Ministers were briefed to oppose amendments to the Energy Bill tabled in both the House of Lords[65] and the House of Commons[66] that would have required it.

The publication of the Government's White Paper on energy market reform on 12th July 2011 renders this refusal all the more extraordinary because one of the 'principal objectives' of the reforms is to 'minimise costs to the consumer'[67]. Yet they still no full assessment of the potential for what is agreed to be the 'cheapest' and 'best value' policy that will minimise costs was carried out before decisions on the need for nuclear power were made.

This defies common sense.

(d)(i) Postscript to point (d) above – recent updates

Subsequent to Parliament's decision on nuclear power two important things have happened regarding the importance of this point – i.e. the failure to make a full comparison between the costs and benefits of saving against those of generating energy.

[63] 2003 Energy White Paper, pages 11 and 32.
[64] Email to Director of ACE 8th February 2011
[65] March 2nd2011, Energy Bill Report Stage Proceedings, Column 1091
[66] Minutes of Proceedings Energy Bill Public Bill Committee col 449
[67] Planning our electric future July 20112 page 16 para 1.3

First, now that the new nuclear policy has been decided upon and voted upon by Parliament, Climate Change Minister Greg Barker has finally agreed to authorise this[68].

Second, in December 2011, just before this document was printed, the Government published the third 2050 Pathways document. This contained the same 17 Pathways as in their Pathways 2 document discussed above – but this time it included the estimated costs of each Pathway.

We reproduce here the summary table of the December 2011 Pathways comparing the cost of saving energy as against that of generating it[69].

Table 3: Costs from 2050 Pathways Calculator

Pathway	Demand by 2050 (TWh)	Electricity Demand by 2050 (TWh)	CO_2 reductions from 1990 levels	Total costs between 2010 and 2050 (£trillions)	Annual costs in 2050 (£ billions)	Per capita costs in 2050 (£)	% change in 2050 costs from 'business as usual'
Business as usual (everything set to 1)	3,100	583	97%	11.34	332.1	4,325	-
Max effort on demand, no effort on supply	1,400	440	40%	11.48	277.9	3,619	16% less
Max effort on supply, no effort on demand	2,750	471	49%	13.68	421.7	5,429	27% more

From this it can be seen that placing as much reliance as possible on energy saving

(i) costs less overall than supplying energy (£11.48 trillion rather than £13.68 trillion)
(ii) results in greater CO_2 reductions (40% of 1990 levels as compared with 49% of 1990 levels) ; and
(iii) has a far smaller annual per capita cost from 2050 onwards (£3,619 as opposed to £5,429)

Of course we are not saying that energy saving precludes the need to generate: clearly it does not. But what these Government figures do show is

(i) the only sensible, and the cheapest, policy is to implement demand side measures to the full; and
(ii) that to decide on a generation policy including new nuclear power stations without the full potential of energy saving being known, is absurd.

We pointed out above that to decide on supply side policies before the full potential for demand side polices, that were already claimed to be cheaper, was a highly suspect way of making policy. This most recent Government information confirms that it will waste public money.

But will Parliament now be told this, and allowed to reconsider on the basis of this new information?

[68] Minutes of Proceedings Energy Bill Public Bill Committee, September 14th 2011, column 1122
[69] Pathways Calculator December 2011 (as above in footnote 36)

3. Summary

As we noted above on 18th July 2011 Parliament voted overwhelmingly for new nuclear power stations. Whether MPs were persuaded by EN-1, or whether they had made up their minds at an earlier date is impossible to know. It would not be surprising if it was the latter, because for years they had been given false information. Let us list that false information in chronological order:

(i) The Nuclear White Paper in January 2008 asserted that we need new nuclear power stations to keep the lights on but did not tell MPs that

  (a) No long term assessment of electricity need had been carried out; and
  (b) No assessment of the potential for the most cost effective policy (i.e. energy efficiency) had been carried out.

(ii) The original EN-6 in November 2009 asserted the need for 10 more nuclear power stations to keep the lights on, again without telling MPs of the failure to carry out the two assessments mentioned above.

(iii) A number of documents and Government speeches (based on those documents) incorrectly asserted that electricity demand may double or even triple, namely

  (a) the Revised Draft Overarching NPS EN-1 October 2010;
  (b) the NPS London Consultation Public Meeting December 2010 transcript;
  (c) Final Overarching NPS EN-1 June 2011 'total capacity of electricity generation may need to double ... (and) ... could need to triple'[70];
  (d) Secretary of State for Energy and Climate Change, Rt Hon Chris Huhne MP in Parliament on 18th July 2011;
  (e) Secretary of State for Energy and Climate Change, Rt Hon Chris Huhne MP writing in the Daily Telegraph 18th July 2011

(iv) At no time were MPs told that the Pathways background analysis done by officials showed that these claims were untrue.

(v) The final EN-1 presented to Parliament 'for approval' in July 2011

  (a) asserted the need for new nuclear power stations but failed to inform Parliament that over one third of the Government's own background analyses do not support the policy presented to Parliament for approval on 18th July 2001 in EN-1.
  (b) Falsified and dismissed and the results of the Government's own research regarding long term electricity demand and regarding capacity needs up to 2025.

In these circumstances it is not surprising that Parliament agreed that nuclear power stations are necessary and voted accordingly on 18th July 2011.

[70] EN-1 June 2011 page 20 para 3.3.14

4. Our Own Pathways

Notwithstanding the unsatisfactory nature of the 'deliberation' process, we decided to accept the Government's invitation and develop our own Pathways.

In fact we developed 10 different Pathways (see Table). Every single one of these used Government information about the level of activity (see Table 2), from level 1 (no action) to level 4 ('heroic' action), for the various policy options given. Every one of our Pathways is thus based on the same 'robust' Government figures referred to elsewhere, and

- All keep the lights on
- All achieve the 80% CO_2 reduction target
- All have no new nuclear power stations (level 1 activity)

For full details of these Pathways and how they deliver energy security and required CO_2 reductions please see Appendix 2.

Table 4: Our Pathways to 2050

Other possible scenarios, and descriptions	CO_2 reductions compared to 1990 levels	Total UK Energy Demand in 2050	Total electricity demand in 2050	Level of nuclear power
Business as usual	99%	+ 30%	+ 53%	1
A Our first non-nuclear scenario	17%	- 43%	- 6%	1
B Our second non-nuclear scenario	16%	- 40%	+ 4%	1
C No level 4 efforts	20%	- 27%	+ 26%	1
D Second no level 4 efforts	16%	- 27%	+ 54%	1
E Favouring micro-CHP	20%	- 36%	+ 31%	1
F No level 4s, and no geo-sequestration	20%	- 27%	+ 26%	1
G Favouring micro-CHP and no geo-sequestration	19%	- 37%	+ 5%	1
H No level 4 's, no geo-sequestration, no onshore wind	20%	- 27%	+ 26%	1
I No level 4 's, no geo-sequestration, no wind	20%	- 27%	+ 26%	1
J Favouring micro-CHP and no onshore wind	19%	- 37%	+ 5%	1

Of our 10 Pathways include no level 4 efforts (see Table 2 for explanation of the various levels of effort). All achieve energy security and 80% CO_2 reduction. None create anything approaching a doubling of

electricity demand. All are based on the information provided in the Government's Pathways Calculator[71] - i.e. 'robust' Government figures.

We also took into account the possibility that some people might say 'yes but no nuclear means loads of horrible wind turbines'. So we produced Pathways (I and J) with no more onshore wind – they also delivered energy security and 80% CO_2 reduction without resorting to heroic (level 4) effort on anything. Based on the same 'robust' Government figures.

[71] As above – see footnote 36

Chapter 2 Costs

Introduction

On the basis solely of an analysis of Government evidence we show here that:

- Consumers are likely to pay more per unit for electricity from nuclear power than for electricity from other sources – based upon an analysis of the evidence and sources used by the Government.
- Incorrect information has been given to Ministers to give to Parliament.

1. Government's Position

Following the Fukushima accident, and public concern about nuclear safety, the Government Minister responsible for nuclear power, Charles Hendry MP, admitted on Radio 4 that energy security and 80% CO_2 reductions could be achieved without new nuclear power – but claimed that it would cost more[72].

'Cheap electricity' has long been the claim of the proponents of nuclear power. For instance, Walter Marshall, former Chairman of the UK Atomic Energy Authority, once said that electricity from nuclear power would be "*too cheap to meter*".[73]

More recently Mr Hendry repeated his Radio 4 comment, referred to above, in the House of Commons in answer to a Parliamentary Question[74] telling MPs that electricity from nuclear power was the cheapest source of electricity (see Table 1 below) and will cost consumers between 6.8 and 9.9pence per/kWh[75]. Furthermore, the Final Overarching National Policy Statement, EN-1, published in June 2011 and presented to Parliament 'for approval', asserted that 'new nuclear is likely to become the least expensive form of low carbon electricity generation'[76] and referenced modeling work done by Parsons Brinckerhoff as the source for that statement.[77]

This may sound convincing – but a look at the evidence shows something rather different.

2. Mr Hendry's answer to a parliamentary question

The Parliamentary Question was:

> ***Mrs Moon:*** *To ask the Secretary of State for Energy and Climate Change what assessment he has made of the relative costs of energy generation infrastructure and energy efficiency measures designed to reduce demand; and if he will make a statement. [43120]*

[72] Charles Hendry: The World this Weekend 10th April 2011
[73] http://news.bbc.co.uk/1/hi/world/europe/792209.stm
[74] PQ No 43120 asked by Madeleine Moon MP and answered on 8th March 2011 Hansard col 272W
[75] ibid
[76] EN-1 June 2011 page 29 para 3.5.8
[77] At footnote 54 on EN-1 on page 29

Mr Hendry's Parliamentary answer gave Mrs Moon and all MPs the figures for the costs of electricity from various sources (printed in Table 5 below), and it stated that these figures were based on an assessment in a 2010 paper by Mott MacDonald,[78] which is available on the DECC website.

Table 5[79]

Technology	First of a kind (FOAK) levelised costs (p/kWh)	Nth of a kind (NOAK) levelised costs (p/kWh)
Gas CCGT	8.0	9.7
Coal IGCC	13.5	13.6
Onshore wind	9.4	8.6
Offshore wind	16.1	11.2
Offshore wind 3rd generation	19.1	12.8
Nuclear (PWR)	9.9	6.8

a) The omissions in Mr Hendry's answer

However, evidence provided for Mr Hendry to give his Parliamentary answer is selective in the information that it took from the Mott MacDonald analysis. That analysis also gave the figures for the cost of electricity from other sources not shown in Mr Hendry's answer. So Table 5 should have read

Table 5A[80]

Technology	First of a kind (FOAK) levelised costs (p/kWh)	Nth of a kind (NOAK) levelised costs (p/kWh)
Gas CCGT	8.0	9.7
Coal IGCC	13.5	13.6
Onshore wind	9.4	8.6
Offshore wind	16.1	11.2
Offshore wind 3rd generation	19.1	12.8
Nuclear (PWR)	9.9	6.8
Large biomass CHP	4.3	Potentially negative due to steam revenue
Small biomass CHP	3.0	Potentially negative due to steam revenue
Large gas CHP	7.1	Some reductions
Small gas CHP	7.9	Some reductions
Landfill gas	6.0	Some reductions
Sewage gas	5.5	Some reductions

[78] Mott MacDonald [2010], *UK Generation Costs Update*, June 2010, available at http://www.decc.gov.uk/assets/decc/statistics/projections/71-uk-electricity-generation-costs-update-.pdf

[79] From Mr Hendry's PQ answer 8.3.2011 col 272W

[80] All information in Table 1A is from Mott MacDonald op cit pp 90-95

And this information would have shown MPs that nuclear is not the cheapest electricity. Apart from the last two sources in Table 1A (landfill gas and sewage gas) which are and will remain very small, the other sources can provide large amounts of electricity[81] at less cost than nuclear – according to the very source that Mr Hendry quoted. But MPs were told none of this.

MPs were also not told that the Government thinks it is realistic to halve the cost of offshore wind[82] by the end of the decade, thus makings its NOAK costs 5.6 – 6.2 p/Kwh - so that source would also be cheaper than nuclear in the long term.

b) Life of the new nuclear power stations

The Mott Macdonald analysis assumes that the lifetime of a nuclear power plant is 60 years whereas, in reality, and based on past experience, nuclear plants are much more likely to be active for a maximum of around, or slightly more than, 40 years [83]. Indeed, in a paper done for EdF, (the most enthusiastic builders) it states that *'resource use, emissions, and waste are distributed over 40years, the assumed station life time.'*[84]

Whilst it may be claimed that the new plants will last longer, to assume an increase in their life of nearly 50% based simply on **an unreferenced claim** in the Mott MacDonald analysis[85]and without any evidence apart from manufacturers'estimates[86] is a surprising and unprecedented methodology on which to base energy policy!!

One MP, Martin Caton, investigated this issue. The correspondence between him and Mr Hendry is revealing. Mr Caton wrote to Mr Hendry:

> *'MM's calculations re nuclear seem to be based on a 60 year life of new stations. If this is so, what is the evidence for this?'*[87]

To which Mr Hendry replied that

> *'this is based on reactor manufacturers'* ***estimates*** *of technical life'*[88] (our emphasis)

And Mr Hendry further explained that licensing restrictions would only allow for 40 years and that although an extension to the licence period is likely this '*is likely to include repowering and* ***therefore additional capital costs****.'*[89](our emphasis).

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[81] Up to 40% in some European countries (e.g. Holland)

[82] Speech to the Conservative Party Conference 2011: 'offshore wind, we have set business a challenge – to bring down the cost of offshore wind by almost half by the end of the decade, so Britain can be the undisputed global leader in this 21st century industry.' Unless the Government sets industry unrealistic challenges this means that it must regard this as realistic.

[83] Parsons Brinkerhoff, 2011, "Electricity Generation Cost Model". We discovered, from evidence produced by the International Atomic Energy Agency, that the average age of reactors so far closed down was 22 years and the average age of reactors still operating 26 years. We also discovered from the same source that of 467 reactors worldwide (both current and extant) only 21 had operated for more than 40 years the maximum being 48 years. These were small reactors (up to 225 GW) and not comparable to the large 1500 Mw new reactors being considered here.

[84] AEA [2009], *Environmental Product Declaration of Electricity from Torness Nuclear Power Station: Technical Report*, December 2009, available at http://www.british-energy.com/documents/Torness_EPD_Report_Final.pdf, page 11

[85] Mott MacDonald on page 56 (ibid) simply states that the life will be 60 years without giving any evidence to back this up

[86] Letter from Charles Hendry to Martin Caton 1i.11.11

[87] Letter from Martin Caton MP to Charles Hendry 26.10.11

[88] Letter from Charles Hendry to Martin Caton 11.11.11

The relevance of this is that if a plant generates electricity over a shorter period of time, and any extension would require further capital costs, then the cost per unit of electricity inevitably needs to increase in order to cover the cost of the initial investment and any further capital investment.

But none of this information was given to Mr Hendry for his answer to Ms Moon's parliamentary question. So Parliament was not told this.

As Mott Macdonald produced no evidence for the 60 year life claim, we looked into where the 60 years had come from and what is the evidence base for it.

November 2009: Original EN-1 says that nuclear reactors have an 'operating life in the region of 40-60 years'[90]. No evidence or reference in support of this is provided. This – a Government document - seems to have been the origin of the 60 year life claim which Mott MacDonald then used.

October 2010: By the time of the revised Draft EN-1 the '40-60 years' had lost the '40' and become 'an estimated design lifetime of 60 years'[91]. Again, in a document full of references no evidence or reference in support of this is provided.

June 2011: Final EN-1 submitted 'for approval' by Parliament: 'an estimated design lifetime of 60 years'[92]. As before, in a document full of references no evidence or reference in support of this is provided.

So the 60 years was simply a manufacturers' 'estimate' for the new 'Generation 3' reactors (as they will be). Unproved; untested; unsubstantiated – yet forming a fundamental basis of the Government's energy policy

We noted above, regarding the alleged 'doubling and even tripling' of electricity demand, the practice seems to be 'say it often enough and it becomes established fact', whatever the evidence.

c) Load Factor of new nuclear power stations

Load factor means the amount of time each year when the plant is fully operational at maximum efficiency

Mott MacDonald assumes, but gives no evidence to support the assumption,[93] that a nuclear power plant will run at 86%. In reality, despite targeting an availability factor of 85% for its existing operational nuclear plants, EdF (the main operators in the UK) have reported load factors of well below 80% for 5 years in a row (as shown in Table 6 below). Whilst it may be claimed that new plants will be more efficient, again to base energy policy on unproven manufacturers' claims is a very strange way of making energy policy.

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[89] ibid
[90] EN-1 November 2009 page 24 para 3.5.1
[91] Revised Draft EN-1 October 2010 page 29 para 3.5.10
[92] EN-1 June 2011 page 30 para 3.5.10
[93] Again Mott MacDonald simply assumes this without giving any evidence to back it up: on page 62 of the Report MM simply quotes his own paper as a reference for this assumption!

Table 6: EDF's Reported Load Factors and Availability Factors[94]

Year	2004	2005	2006	2007	2008	2009 (estimate)
Load Factor	77.2%	77.6%	77.4%	75.6%	75.5	74.6%

d) Build Time and costs of capital

Mott MacDonald assumes a 4 to 5 year construction time for new nuclear power stations; this is optimistic, to say the least! Indeed, the Government's own schedule does not envisage generation to start until 2018/19. Mott MacDonald also assumes an interest rate of 10% on the cost of borrowing the money to build the plant. Again, this is not substantiated.

The point about these two issues is that they are highly uncertain and not able to be substantiated. Indeed, the Mott MacDonald report warns of the 'uncertainty' and that 'any conclusions are tentative'[95]

But neither the Minister, MPs nor Parliament were told this.

e) Distribution costs

Finally Mott MacDonald's figures exclude distribution costs – i.e. the costs not of generating the electricity, but of 'sending' it to local areas. According to OFGEM[96] these comprise 17% of total electricity costs. Yet Mott MacDonald – and thereby the Minister – omits them and although they would apply to other large scale electricity generation (which would also incur these costs), they would not apply to locally generated energy such as small scale biomass or gas fired CHP. So the already lower costs of those technologies noted above (see Table 5A) would in fact compare even more favourably with the costs of nuclear.

(f) Misleading MPs: summary points regarding the PQ answer

In summary, therefore, the figures given to the Minister to give to the House of Commons when asserting that nuclear power provides cheaper electricity than other methods of generation

- Omitted information on other sources of electricity that are demonstrably cheaper than nuclear.
- Were based on two facts not backed up by past performance (life of the plant and load factor) and unproven for the future; and
- Were based on two major factors that are uncertain and optimistic.
- In EN-1 the Government claims that it is necessary to be 'prudent'[97] when deciding on the need for new capacity. That approach seems to have been abandoned regarding the cost of nuclear electricity, in order to justify the 'nuclear is cheapest' argument.

[94] Atherton, P. et al [2009], *New Nuclear – The Economics Say No*, Citigroup, November 2009, available at https://www.citigroupgeo.com/pdf/SEU27102.pdf
[95] Mott MacDonald Op cit page 65 para 7.2
[96] Factsheet No 97 18.01.11
[97] EN-1 page 22 para 3.3.22

3. The Statement in EN-1

This, it will be recalled, stated that '*new nuclear is likely to become the least expensive form of low-carbon electricity generation*'[98], and cited modelling work done for DECC by Parsons Brinckerhoff to back up the statement So we looked at that work and found that It compares nuclear primarily to gas/coal/Carbon Capture and Storage and then to CHP and pumped storage - but there is no comparison at all to the costs of other forms of low-carbon generation such as wind, wave, tidal, solar, biomass etc. And even CHP is not included in the summary chart and so it is unclear what its levelised costs/kWh would actually be.

So to use this modelling work in order to make the claim, as the Government does in EN-1, that '*new nuclear is likely to become the least expensive form of low carbon electricity generation*' is completely invalid and constitutes a clear and deliberate misleading of Parliament.

4. Cost of nuclear power: a summary

As we noted earlier EN-1 and Mr Hendry's PQ answer informed MPs that nuclear provided the cheapest electricity. But what Parliament – and indeed Ministers also - were not told were

- The issues raised above relating to the the Mott MacDonald analysis, on which the PQ answer was based; and
- The fact that the Parsons Brinkerhoff report did not even compare the cost of nuclear with that of renewable electricity.

So, on the basis of the incorrect evidence given to them regarding cheap electricity, MPs voted for nuclear power on 18th July.

[98] EN-1 page 29 para 3.5.8

Chapter 3: Making sense of the nonsensical

In Chapters 1 and 2 we documented some seemingly inexplicable decisions taken by Government. Here we ask why and how these decisions were taken, and what has gone on in order to reach this situation. And, as we said in the Executive Summary, we are not questioning here the integrity of the Ministers who took those decisions - those Ministers acted sincerely on the basis of the evidence that they were repeatedly given. But that evidence was not the correct evidence. So what has gone on and why?

Let us consider the actions we have documented above and ask some questions to try to assess what has gone on. Box 1 at the beginning of this document contains a longer list of the questions that need to be answered.

Question 1: Why have successive Governments ignored and misrepresented the evidence on the future demand for electricity and need for new capacity?

Was it an oversight? Or were Ministers kept in the dark?

Question 2: Why have successive Governments ignored, and failed to fully assess, the cost-effective potential of energy efficiency for meeting future energy needs?

Did they forget?

Question 3: Why did the Government's answer to a parliamentary question exclude information about technologies that are significantly cheaper than nuclear power?

Was it a mistake?

Question 4: Why have the Government relied on unsubstantiated evidence regarding the lifetimes and load factors of nuclear power stations? And why have they disregarded certain costs such as distribution costs?

Was it another oversight?

Answers to these Questions

False evidence, misrepresentation of evidence, omission of evidence have consistently been supplied to Ministers, the public and parliament. Put another way: the evidence given to them did not represent the true evidence held by Government.

Is the 'error/oversight/forgetfulness' answer to all these questions credible? Was it error that led Government to:

- ignore their own evidence
- misquote their own evidence
- refuse to do things that they themselves believe are the most cost effective
- break assurances given to Parliament
- ignore certain facts regarding costs
- make policy on the basis of no evidence
- ignore previous evidence regarding costs
- quote a study in support of a proposition regarding cheaper costs than other low-carbon technologies, when that study did not even make that comparison

It is a very strange coincidence that all these errors, oversights and memory losses relate to facts that undermine and destroy the case for new nuclear power stations. What are we saying? Are we saying that successive Ministers have deliberately lied to or misled Parliament; that they have fiddled the evidence when making policy; that they are all (every one of them) 'in hock' to the nuclear industry?

No – we are not saying that. We do not believe that.

Ministers rely on the evidence they are given – they do not have the time to read thousands of pages of reports and thousands of pages of footnotes and references and modelling when they take their position in the Cabinet.

They **have to rely** on the summary which says repeatedly 'Minister, we need new nuclear power stations to keep the lights on and reduce CO_2 emissions and provide cheap electricity' and 'Minister, nuclear electricity is the cheapest option'. They may well read the final advice (EN-1 and EN-6) when presenting it to Parliament. But they **cannot** read the hundreds of footnotes referred to therein; and **they cannot know the evidence that they are never given.**

So we do not question Ministers' integrity; we do not think that Ministers have been guilty of deception. But ***someone*** has fiddled the evidence, ignored the analysis and misrepresented the conclusions of modelling. Someone has written report after report running into thousands of pages, with back-up documents running to more thousands of pages that no Minister can possibly read.

Conclusion: Coincidence or conspiracy?

We don't know. We don't like conspiracy theories, but either it's a monumental series of mistakes or the 'nuclear lobby' has got control of the Whitehall machine.

And in one sense it does not matter because either way, **it is abundantly clear that there has been a corruption of governance**. MPs and Parliament have been misled. And either Ministers were in on this misleading (which we do *not* believe) or they too were misled. The decision to support new nuclear power stations has been made on the basis of false evidence, misrepresentation of evidence and omissions of evidence.

In the light of this:

1. **Parliament needs to re-open the nuclear debate, and to make a decision based upon the correct and full evidence.**
2. **Members of Parliament must seek answers as to how this has happened.**
3. **There should be a Select Committee inquiry into this corruption of governance.**

Appendices

Appendix 1. Keeping the lights on without new nuclear power – the Government's evidence

In the main text we showed in brief, in Table 1, how six of the Government's Pathways, **based on their own 'robust' evidence,** achieved energy security and required CO_2 reduction without new nuclear power stations. From that table, and the explanation thereto, it can be seen that six of the Pathways (Numbers 8, 11, 12, 13, 14 and 15) achieve the stated objectives without any more nuclear power stations (level 1 activity). So we explain these in more detail. Below are the full details as to how each of these six Pathways work.

All the Pathways contain many 'variables' both on the supply side (generating energy) and on the demand side (cutting down the use of energy). By altering any of the variables it is possible to achieve the twin objectives of keeping the lights on and 80% CO_2 reduction. For example less wind generation can be compensated for by more nuclear generation – and vice versa. Or less supply side activity can be compensated for by more demand side activity – or vice versa.

The Charts

Charts 1 to 3 in Appendix 3 below show the details of those Government Pathways that envisage no further nuclear power stations. Charts 4 to 6 show the details for the pathways that we designed. They are taken from the DECC Pathways Calculator[99].

Charts 1 and 4 portray the demand side (i.e. saving energy) measures necessary and Charts 2 and 5 show the supply side (i.e. generating energy) measures. The numbers under each variable (1-4) indicate the level of action taken on each variable, as explained in Table 2 of the main text. Charts 3 and 6 show the end results of all the Pathways.

Descriptions and summaries of the Government's pathways, along with their electrification levels are given below. All of these pathways are based the Government's own 'robust' analysis that we referred to in Chapter 2. All achieve the two key objectives of keeping the lights on and reducing CO_2 emissions by 80% by 2050.

In other words they show *in detail* that which we were asserting in Chapter 2, and that which MPs were not told (indeed EN-1 told them the contrary was the case): *that the Government's own research shows that we do not need new nuclear power stations.*

Summarising the Charts

Pathway 8 (emphasis on biofuel: solids)
Supply side: three level 4 activity levels

Demand side: there are no level 4 demand side activity levels

Pathway 13 (CCS emphasis)
Supply side: There are two supply side level 4 activity levels

Demand side: Has only 1 demand side level 4

[99] DECC Pathways Calculator http://www.decc.gov.uk/en/content/cms/tackling/2050/calculator_exc/calculator_exc.aspx

Electrification levels:

- Transport: 39
- Home heating: 75%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

Pathway 11 (renewables emphasis)

Supply side: there is only one level 4 activity level

Demand side: there are a number of level 4 demand side activity levels

Electrification levels:

- Transport: 86
- Home heating: 41%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

Pathway 12 (offshore emphasis):

Supply side: Has a number of level 4 supply activity levels

Demand side: there are a number of level 4 demand side activity levels

Electrification levels:

- Transport: 86
- Home heating: 41%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 47%
- Micro CHP (businesses): 0%

activity

Electrification levels:

- Transport: 62%
- Home heating: 75%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

Pathway 15 (gas emphasis)

Supply side: There are four supply side level 4 activity levels

Demand side: There are a number of level 4 demand side levels

Electrification levels:

- Transport: 86
- Home heating: 68%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 47%
- Micro CHP (businesses): 0%

Pathway 16 (microgeneration)

Supply side: There are four supply side level 4 activity levels

Demand side: Has only 1 demand side level 4 activity

Electrification levels:

- Transport: 62
- Home heating: 88%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

Appendix 2

Other Evidence: Our Pathways

As explained in the main text, the public was invited to use the Government's Pathways Calculator Tool to develop different Pathways – and we accepted the invitation. We developed 10 different Pathways, all of which:

- All keep the lights on; and
- All achieve the 80% CO_2 reduction target; and;
- All have no new nuclear power stations (level 1 activity); and
- All show the effect on electricity demand of between 6% and 54% based on current levels - nothing like the old doubling argument.

The full details of these Pathways are printed in the charts in Appendix 3. As with the Government Pathways they involve different levels of activity for the numerous variables give by the Government. So every bit of evidence in them is Government evidence. The descriptions and summaries of our 10 Pathways is below.

A. First non nuclear scenario

Supply side: There are no supply side level 4 activity levels

Demand side: There are 9 demand side level 4 activity levels

Electrification levels:

- Transport: 86
- Home heating: 43%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 49%
- Micro CHP (businesses): 0%

B. Second non nuclear scenario

Supply side: There are no supply side level 4 activity levels

Demand side: There are 8 demand side level 4 activity levels

Electrification levels:

- Transport: 86
- Home heating: 75%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 49%
- Micro CHP (businesses): 0%

C. No level 4 efforts

Supply side: There are no supply side level 4 activity levels

F. No level 4's and no geothermal

Supply side: There are no supply side level 4 activity levels

Demand side: There are no demand side level 4 activity levels

Electrification levels:

- Transport: 62
- Home heating: 75%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

G. Favouring micro-CHP, and no geothermal

Supply side: There are two supply side level 4 activity levels

Demand side: There are 6 level 4 demand side activity levels

Electrification levels:

- Transport: 60
- Home heating: 1
- Micro CHP (domestic): 16
- Businesses with electric heating: 1
- Micro CHP (businesses): 18

H. No level 4's, no geothermal, no onshore wind

Supply side: There are no supply side level 4

Demand side: There are no level 4 demand side activity levels

Electrification levels:

- Transport: 62
- Home heating: 75%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

D. No level 4 efforts, 2nd attempt

Supply side: There are no supply side level 4 activity levels

Demand side: There are no demand side level 4 activity levels

Electrification levels:

- Transport: 62
- Home heating:
- Micro CHP (domestic):
- Businesses with electric heating:
- Micro CHP (businesses):

E. Favouring micro-CHP

Supply side: There are no supply side level 4 activity levels

Demand side: There are 6 level 4 demand side activity levels

Electrification levels:

- Transport: 59
- Home heating: 1%
- Micro CHP (domestic): 16%
- Businesses with electric heating: 1%
- Micro CHP (businesses): 18%

activity levels

Demand side: There are no demand activity level 4 activity levels

Electrification levels:

- Transport: 62
- Home heating: 75%
- Micro CHP (domestic): 0%
- Businesses with electric heating: 86%
- Micro CHP (businesses): 0%

I. No level 4's, no geothermal, no wind

Supply side: There are no supply side level 4 activity levels

Demand side: There are no demand activity level 4 activity levels

Electrification levels:

- Transport:
- Home heating:
- Micro CHP (domestic):
- Businesses with electric heating:
- Micro CHP (businesses):

J. Favouring micro-CHP, but no onshore wind

Supply side: There are two supply side level activity levels

Demand side: There are 6 demand side level 4 activity levels

Electrification levels:

- Transport: 60
- Home heating: 1
- Micro CHP (domestic): 16
- Businesses with electric heating: 1
- Micro CHP (businesses): 18

Appendix 3: The Government's pathways in more detail

Chart 1: Demand Side measures

Pathway/Description		Measure / Trajectory																		
							Domestic space and water heating				Domestic appliances and cooking		Industrial processes		Commercial heating and cooling			Commercial appliances and cooking			
Government's		Passenger transport behaviour	Passenger transport electrification	Domestic freight	International aviation	International shipping	Comfort level	Housing thermal efficiency	Electrification	Non-electric fuels	Demand/ efficiency	Electrification	Growth of industry	Energy intensity	Demand	Electrification	Non-electric fuels	Demand	electrification	Geo-sequestration	Storage, demand shifting and interconnection
8	Solid biofuel focus	1	2	3	1	1	2	2	3	3	2	2	1	3	2	3	3	2	2	1	4
11	Renewables	4	4	4	4	4	2	2	3	3	2	2	3	3	2	3	3	2	2	1	4
12	Offshore renewables	4	4	4	4	4	3	3	3	2	3	2	3	3	2	3	2	2	2	1	4
14	CCS generation	2	3	2	4	1	2	2	3	3	2	2	1	3	2	3	3	2	2	1	2
15	Gas generation	4	4	4	4	4	4	4	4	2	4	2	3	2	2	3	2	4	2	1	4
16	Microgeneration	2	3	2	1	1	2	2	4	3	2	2	1	3	2	3	3	2	2	1	2

Chart 2: Supply side measures

Pathway/Description		Measure / Trajectory																	
Government's		Nuclear power	CCS (power stations)	CCS (fuel mix)	Offshore wind	Onshore wind	Tidal and wave	Biomass/ coal	Soalr PV	Solar thermal	Geothermal	Hydro electric	Small-scale wind	Electricity imports	Land management	Livestock management	Waste and recycling	Marine algae	Types of biomass	Bioenergy imports
8	Solid biofuel focus	1	2	2	2	2	1	2	1	1	1	1	1	1	4	1	2	4	2	4
11	Renewables	1	1	1	3	3	3	1	3	2	3	3	3	4	1	1	3	1	1	2
12	Offshore renewables	1	1	1	4	1	4	1	1	2	1	1	1	4	3	3	3	2	2	2
14	CCS generation	1	4	3	3	1	1	1	1	2	1	1	1	1	3	3	3	2	2	2
15	Gas generation	1	2	4	1	1	1	1	1	4	1	1	1	1	3	4	2	4	1	3
16	Microgeneration	1	4	3	1	2	1	1	4	4	1	1	4	1	3	3	3	2	2	3

Chart 3: the outcomes of these non nuclear Pathways

Pathway/Description		CO_2 (as compared to 1990)	Total energy demand (compared to 2010)	Total electricity demand (compared to 2010)
8	Solid biofuel focus	20%	-8%	+105%
11	Renewables	20%	-34%	+48%
12	Offshore renewables	18%	-38%	+17%
14	CCS generation	20%	-10%	+100%
15	Gas generation	20%	-44%	-5%
16	Microgeneration	20%	-7%	+111%

Appendix 4: Our own pathways in more detail

Chart 4: Demand side measures

Pathway/Description		Measure / Trajectory																		
		Passenger transport behaviour	Passenger transport electrification	Domestic freight	International aviation	International shipping	Domestic space and water heating				Domestic appliances and cooking		Industrial processes		Commercial heating and cooling			Commercial appliances and cooking		Geo-sequestration	Storage, demand shifting and interconnection
							Comfort level	Housing thermal efficiency	Electrification	Non-electric fuels	Demand/ efficiency	Electrification	Growth of industry	Energy intensity	Demand	Electrification	Non-electric fuels	Demand	electrification		
A	Simple non-nuclear	4	3	1	4	1	4	4	3	4	4	2	3	3	4	3	4	4	1	1	1
B	Second non-nuclear	4	3	1	4	1	4	4	3	3	4	2	3	3	4	3	4	4	1	1	2
C	No level 4 efforts	3	3	3	3	3	3	3	3	1	3	1	2	2	3	3	3	3	1	1	2
D	Second no level 4 efforts	3	3	3	3	3	3	3	3	1	3	1	2	2	3	3	3	3	1	2	3
E	Favouring micro-CHP	4	3	3	3	3	4	4	1	3	4	1	2	3	4	1	3	4	1	3	3
F	No level 4 efforts, no geothermal	3	3	3	3	3	3	3	3	3	3	1	2	2	3	3	3	3	1	1	3
G	Favouring micro-CHP, no geothermal	4	3	3	3	3	4	4	1	3	4	1	2	3	4	1	3	4	1	1	3
H	No level 4 efforts, no geothermal, no onshore wind	3	3	3	3	3	3	3	3	3	3	1	2	2	3	3	3	3	1	1	3
I	No level 4 efforts, no geothermal, no wind	3	3	3	3	3	3	3	3	3	3	1	2	2	3	3	3	3	1	1	3
J	Favouring micro_CHP, no onshore wind	4	3	3	3	3	4	4	1	3	4	1	2	3	4	1	3	4	1	1	3

Chart 5: Supply side measures

Pathway/Description		Measure / Trajectory																	
		Nuclear power	CCS (power stations)	CCS (fuel mix)	Offshore wind	Onshore wind	Tidal and wave	Biomass/ coal	Soalr PV	Solar thermal	Geothermal	Hydro electric	Small-scale wind	Electricity imports	Land management	Livestock management	Waste and recycling	Marine algae	Types of biomass	Bioenergy imports
A	Simple non-nuclear	1	2	2	3	3	2	1	2	3	3	2	2	1	3	3	3	2	2	2
B	Second non-nuclear	1	2	2	3	3	2	1	2	3	3	2	2	1	3	3	3	2	2	2
C	No level 4 efforts	1	3	3	3	3	3	1	3	3	3	3	3	1	3	3	2	3	1	3
D	Second no level 4 efforts	1	3	3	3	3	3	1	3	3	3	3	3	1	3	3	2	3	1	3
E	Favouring micro-CHP	1	3	3	3	3	3	1	3	3	3	3	3	1	3	3	2	3	1	3
F	No level 4 efforts, no geothermal	1	3	3	3	3	3	1	3	3	3	3	3	1	3	3	2	3	1	3
G	Favouring micro-CHP, no geothermal	1	3	3	3	3	3	1	3	4	3	3	3	1	4	3	2	3	1	3
H	No level 4 efforts, no geothermal, no onshore wind	1	3	3	3	1	3	1	3	3	3	3	3	1	3	3	2	3	1	3
I	No level 4 efforts, no geothermal, no wind	1	3	3	1	1	3	1	3	3	3	3	3	1	3	3	2	3	1	3
J	Favouring micro_CHP, no onshore wind	1	3	3	3	1	3	1	3	4	3	3	3	1	4	3	2	3	1	3

Chart 6: the outcomes of our non nuclear Pathways

Pathway/Description		CO_2 (as compared to 1990)	Total energy demand (compared to 2010)	Total electricity demand (compared to 2010)
A	Simple non-nuclear	17%	-43%	-6%
B	Second non-nuclear	16%	-40%	+4%
C	No level 4 efforts	20%	-27%	+26%
D	Second no level 4 efforts	16%	-27%	+54%
E	Favouring micro-CHP	20%	-36%	+31%
F	No level 4 efforts, no geothermal	20%	-27%	+26%
G	Favouring micro-CHP, no geothermal	19%	-37%	+5%
H	No level 4 efforts, no geothermal, no onshore wind	20%	-27%	+26%
I	No level 4 efforts, no geothermal, no wind	20%	-27%	+26%
J	Favouring micro_CHP, no onshore wind	19%	-37%	+5%