

## Speech at Launch of Scientific Alliance Scotland

27<sup>th</sup> June 2013. Edinburgh.

*Dr John Constable was invited by the Scientific Alliance (<http://www.scientific-alliance.org/>) to speak as a guest at the launch of its new branch in Scotland. The following is the text of that talk.*

### Introduction

1. The Scientific Alliance has for some time now been casting a questioning eye over the way in which scientific publications are used as a source of information on which to ground policy.
2. Clearly there are problems in the way in which the civil service handles data and scientific hypotheses. It is painfully apparent that civil servants often seem to wish to interpret a scientific *result* as if it were a final score. (The blight of our cultural obsession with sport has non-trivial outcomes.)
3. But emphatically, nothing in science, not even Newton, is final
4. Worse still, having decided to treat provisional hypotheses as permanent and doctrinal knowledge, governments then select such interim conclusions as are convenient to the policy agenda, leaving them inflexible in the face of changing intellectual circumstances.
5. In recent correspondence with the Scottish Government regarding work by Professor Hughes, on wind turbine lifetimes, the findings of which the government rejects on what we think are poor grounds, I had occasion to say that: "The fundamental question that is raised by the correspondence is whether the Scottish Government is committed to the development of policies that rely upon the best evidence available or whether it is more interested in creating policy-based evidence." We have no reply as yet.
6. REF has not quite given up hope of persuading sensible people in that department that a rethink is needed, but I think it likely, when you reach the point of having to speak in this way with officials, that matters have become institutionally rigid. Instead, we have to hope for alterations in the political attitudes of the government and its administration, changes that can really only occur as a result of public pressure.
7. But this is far from being the only difficulty arising in the relation between scientific research and the construction of policy. So complex is much scientific

material that it is very hard to present it in a way that is widely intersubjective, and this is often taken as pretext for simplistic summaries and, of course, secrecy or opacity.

8. Or worse, it may be taken to support the view that government can and should base its policy on a dialogue between civil service 'experts' and selected 'authorities' in science, with the public largely excluded.
9. Thus, anyone, no matter how reputable and knowledgeable, disagreeing with the government is simply told that government's work has been reviewed by the 'relevant' experts in the field and criticism is therefore out of step with the current state of authoritative knowledge. Worse still, the objectors may simply be told that government's models, of which all too often there is little or no evidence, suggests that concerns and criticisms are groundless.
10. I'm thinking particularly here of the Westminster government's analysis of the price and bill impacts of its climate policies, a subject that I will touch on later.
11. Government's attempt to buttress its positions is not really very different from the *argumentum ad auctoritatem*, the argument from authority, which I think we imagined had been left behind long ago.
12. Let us recall the caustic criticism of David Hume, who urged us to test the contents of our libraries by taking up a book, and asking "Does it contain any abstract reasoning concerning quantity or number? No. Does it contain any experimental reasoning concerning matter of fact and existence? No. Commit it then to the flames, for it can contain nothing but sophistry and illusion."
13. This of course too stern a code to live by, train journeys would be unendurable, and the traditions of cookery would be impossible to transmit except by word of mouth (perhaps an improvement), but as far as science and policy goes it points us in the right direction: it is not enough for the civil service, for the minister, simply to say Professors Z and Y say so, and Professors X and W before them, or to say that the government's (frequently opaque) analysis and modeling shows that so and so is the case.
14. On the contrary we should expect to be persuaded by abstract and experimental reasoning and with quantitative data. Instead we are in effect simply told by the relevant minister to "Trust the government", as if it were a source of revealed wisdom.

15. In some areas, defence for example, this argument from authority, this appeal to trust, has some plausibility, though the handling of intelligence in the Iraq war has made the public reluctant to concede even national security as a justification.
16. In other sectors the exceptionally complex nature of the field, medical epidemiology perhaps, or nuclear safety, may seem to offer a reasonable cover for secrecy and exclusion of the public; but even here I feel, and I suspect that many of this audience will feel that it should be resisted.
17. However, in very many fields a high-handed argument from authority is straightforwardly unjustifiable, and energy and climate policy is key point in case.
18. Firstly, because neither energy nor climate change are issues of such outstanding complexity that reasonably literate and numerate people cannot grasp the facts and engage in reasonable discussion.
19. Secondly, because the interaction of climate policy with the energy markets is exposing the consumer to costs that are large, and must be explained and justified, partly to secure consent and partly to ensure that the revenues are not dispensed as favour and patronage.
20. Unfortunately, as you all know, this very far from the case. Government's handling of the debate around climate science has been marked, marred indeed, by a high-handed, and *bien pensant* condescension that has stimulated resentment and served to increase public skepticism.
21. In the field of energy the situation is no better. The consumer is being sold short by the progressive suppression of competitive activities in the energy market, suppression through targets, mandates, subsidies such as the Renewables Obligation and the Feed-in Tariff, and now the Electricity Market Reform system of Contracts for Difference, which is in fact administrative pricing, government's own term, and de facto nationalization.
22. Under pressure Government has hidden behind a screen of sketchy arguments which have varied over time, ranging from the overwhelming importance of addressing climate change, the potential to create green jobs, and now, increasingly, the suggestion that the policies will actually protect the consumer against "volatile" fossil fuel prices.

23. None of these claims are plausible. Our role in climate policy is not one of scale, but the demonstration of cost effective emissions reductions; the net effect of subsidies to renewables is to destroy jobs in the fundamentally viable parts of the economy; and the suggestion that state driven energy efficiency measures and a large subsidized renewable fleet will actually reduce bills is based on special pleading and assumptions so wildly optimistic that no one outside the Department of Energy and Climate Change or the Scottish Government believes a word of it. It is literally incredible.
24. Let me explore some of these points a little further.

### Energy and Economy

25. Some of you will be aware of the policy cost estimates that I and the advisors to the Renewable Energy Foundation have published over the last few years. Since they still stand, unrefuted, forgive me for repeating them as an assertion of their continuing relevance.
26. The subsidy cost, the cost over and above the current conventional costs, of the renewable electricity target for 2020 will be in the region of £8 billion pounds a year, for about 20 years, with most of this revenue being taken by wind power.
27. Using system integration cost estimates produced by Colin Gibson for the Institute of Engineers and Shipbuilders in Scotland, we estimated that the consumer would be faced with a further £5bn a year to cover the cost of additional network, special measures to deal with short term problems, and, perhaps most importantly, the cost of running an almost unchanged conventional fleet at low load factor to guarantee security of supply on a cold, windless, and dark winter's afternoon.
28. With VAT, for taxes are levied on taxes, the total additional cost comes to about £14 billion a year, which is about 1% of current UK GDP, a stunning burden, amounting to about £500 to £600 pounds a year per household in full cost of living impact, consisting of about 1/3 direct bill impacts, and 2/3s on the costs of goods and services as these are passed through by industrial and commercial consumers.
29. There is also the wholesale market price uplift for existing renewable generators caused by the Carbon Price Floor, but I will leave this to one side; it's only another billion a year, and hardly seems worth mentioning.

30. Government itself admits that the price impacts of their policies are very striking indeed, though the figures are squirreled away at the back of a rebarbative and misleading document that advertises very different conclusions.
31. For those you that wish to look for it, the title is *Estimated Impacts of Energy and Climate Change Policies on Prices and Bills* (2012, though actually published in March 2013).
32. DECC itself admits that the current price of electricity to domestic consumers is 17% higher as the result of climate policies;
33. By 2020 this will have risen to 33% higher, and 41% higher in 2030, in the central fossil fuel price scenario.
34. If fossil fuel prices are low, and many now think this is highly probable, DECC estimates that the price of electricity will be 44% higher due to climate policies in 2020, and 57% higher in 2030.
35. For businesses the predictions are even worse. The current impact is +22%, and in the low fossil fuel scenario the impact in 2020 will be +50%, and in 2030 +100%. Even in the high fossil fuel price scenario, the impacts for businesses are +40% in 2020 and plus 50% in 2030. So much for protecting the UK against fossil fuel price increases.
36. What does government say in response to criticism of these business impacts?
37. Firstly, that energy efficiency improvements will offset these costs. If government is sincere in believing that there is such efficiency potential then we can turn their statement around, and say that there are tremendous cost reductions available to both domestic and industrial consumers, but government has decided to confiscate these savings and distribute them to investors in pet technologies of uncertain merits.
38. But in fact the potential for efficiency savings is probably overestimated (businesses have considerable incentives to be efficient already), and the likely effects probably exaggerated, for example because of the Jevons paradox.
39. Secondly, they say that energy costs are only a small fraction of energy costs to business, about 3 to 5% of all costs, so, the argument runs, they should be able to absorb the policy shocks without too much difficulty.

40. But how persuasive this? Perhaps not at all. Firstly, the margin for a business is not large, perhaps 4.5%. So an additional percentage point or two on energy costs is large share of profits.
41. This will place a downward pressure on other costs, particularly wages which are under the direct control of the firm concerned.
42. Secondly, and much more importantly it is wrong to suggest that we should focus exclusively on the direct energy costs, electricity and gas bills to companies.
43. All costs, labour and capital included, have an energy component, some would say almost all of the cost, with these costs resulting previous energy consumption, with the cost of that energy being embodied in the outputs of that consumption.
44. That is to say, all or almost all costs to a business are energy costs, but not all those energy costs are *current* energy costs. Past energy costs are represented in the current costs not now labeled as energy, wages for example, or in capital.
45. On this view energy has a residence time in the economy; it lingers embodied in capital stocks, in skilled labourers, and, though I am here verging on the philosophical, in intellectual and scientific traditions and institutions, none of which could have been created and maintained without energy consumption.
46. Indeed, there is a case for saying that the British economy is still benefitting from (or perhaps labouring under) the cost of coal in the 19<sup>th</sup> century, as it is embodied in various kinds of capital stock. As we have to replace those stocks, current costs of energy will be embodied in our economy for some time to come.
47. The residence time of energy and energy costs doubtless varies a great deal. Some will be discharged along with waste quite rapidly, leaving no after-trace, save for their opportunity cost (a significant matter of course). As a very rough rule of thumb, a starting point for analysis, I hypothesize that the average residence for energy and its cost can be estimated by dividing total costs by direct energy costs. In a business, say, that would yield an average residence time of about 25 years; at the national level that seems plausible too.
48. But some energy will have much longer residence times, and there is some reason to suggest that this can be very long. I think of the embodied energy in

amortized Victorian drains and gas pipes, reducing current costs after all these years; the embodied energy in our institutions and traditions.

49. I raise this point for your consideration because from this perspective that £14 billion pound a year additional cost to electricity is not merely a temporary, twenty year, pain that eventually comes to an end.
50. The cumulative additional cost, about £150 billion in all, will linger in our economy for years to come, embodied in capital stocks, in our wealth (in the widest possible definition) and increasing the cost of use of that wealth.
51. And lest you think that figure a little wild, let me tell you that the cost of the current very low levels of renewable electricity since 2002 have cost consumers an additional £10 billion to date.
52. Even if we were to stop these policies tomorrow, that cost will haunt us for some time to come, until its products are expelled from the economy as waste, perhaps driven out by assets made with cheaper energy.
53. This is why, in my view, government should be neurotically cautious in imposing additional cost on energy. Yet the renewables policy is, as I have noted, cavalier in this respect.
54. Of course, such carelessness is not unprecedented. Writing in a recent article co-authored with Patrick Heren in *Standpoint* I remarked that the economic impacts of transport fuel tax, which accounts for almost 60 to 70% of the pump price, is too little considered.
55. From the perspective I have outlined above, transport fuel tax, inhibiting movement and embedding cost, seems to me likely to be one of the most important brakes on economic development, and the additional costs imposed by those taxes over the last few decades will linger as a burden on our activities for many decades to come.
56. The example of transport fuel tax is perhaps the fundamental explanation for government's relaxed attitude towards current costs. Those costs have been borne by the population, and the wider economy, and we have survived. The consumer can take a bit more, they reason.
57. In response we might say that the fact that consumers have simply stumped up for petrol and diesel in spite of the tax burden really shows that there is no substitute to hand that is anything like as attractive. We cannot infer from the

fact that the tax has been accepted that there has been no economic damage to our economy or that this damage will not continue to weigh us down in the future.

58. In short I see nothing in the case of transport fuels to suggest that it is not dangerous to artificially force a transition from cheaper to more expensive fuels. And the danger is not necessarily some satisfyingly catastrophic event that might provoke correction; but rather it is likely to take the form of an insidious but nonetheless grievous loss of potential wealth, and a steady degradation of current wealth, again considered in the widest possible sense.
59. Energy transitions are amongst the most important epochs in human history, and cause or facilitate others that are more obvious, for example intellectual development, and shifts in the balance of social and political power.
60. The transition to fossil fuels, which began to be salient in Europe in the 16<sup>th</sup> and 17<sup>th</sup> Centuries, accelerated throughout the 18<sup>th</sup> and 19<sup>th</sup> Centuries, particularly with coal in England, and then with oil in the United States, and, to a degree is still continuing with gas, underlies the appearance of progressive development, what the *Edinburgh Reviewers* might have called the “March of Mind”, but is perhaps better described as the Leap of Energy with Mind riding bareback and with barely a bridle or a stirrup.
61. In the pre-coal world around three quarters of the working population of Britain laboured on the land, producing energy in fact, food for human and equine muscle.
62. There was little economic activity aside from that associated with the ownership of land, and consequently land title conferred vast power and social prestige; it is why aristocratic privilege lingers even today, in the post coal world.
63. The pre coal economy was also rigid. As Anthony Wrigley has observed in his exceptionally important, *Energy and the English Industrial Revolution* (2011) there have been many sophisticated and intellectually impressive civilizations based on organic flows of energy, renewables, but while their elites were rich, “the bulk of the population was poor once the land was fully settled; and it seemed beyond human endeavour to alter this state of affairs”.
64. It was coal that broke that social settlement, and liberated consumers from the dominance of one of the most socially coherent and impressive alliances of producer interests that we have ever known.



65. Cheap energy also increased lifespans, resulting in more disposable time, facilitated the low cost printing of books, and provided affordable light by which these books could be read.
66. Travel became cheap, rendering weak and irrelevant those longstanding attempts to prevent low income classes from moving around. With greater movement, came greater opportunities for improved income, choice of work, choice of mates, choice of experience.
67. It is difficult to think of any aspect of what we would characterize as modernity that is not critically dependent on low cost energy.
68. Consequently, I suggest to you that the state mandated pseudo-transition to renewable energy, a forced return to the organic cycles of energy in the natural world, the flows instead of the fossil stocks, is an error of historic proportions.
69. However, I do not believe that it will persist, and bring about a return to the conditions of "laborious poverty" that Jevons so famously described in his account of the pre-coal economy. Indeed, I doubt that history will furnish any example of an energy transition against the cost gradient. Our government will not succeed in the current attempt.
70. The implications will soon become clear, and the population will instruct politicians to mend their ways fairly soon. But there is every reason to be concerned that the costs incurred in the meantime will be acutely painful, and chronically damaging through embodied costs.
71. For the avoidance of doubt, may I note and emphasize that the problems with our current policies are not do with technologies, so much as with policies that force the adoption of technologies on macroeconomically significant scales before they are inherently attractive.
72. Fundamentally viable renewables, would be welcome, and spontaneously adopted, but can we find such things? There are theoretical problems, energy density being one, that suggest that low cost renewable conversion devices will by no means be easy to come by.
73. I recognize that some of you will be wondering at this remark; for after all, the fuel, as the wind and solar industries like to say is free.

74. But the coal, the oil, and the gas are free in the ground, the bounty of nature as Marx observed. All that is needful is for these fuels to be extracted, converted, and delivered to consumers as useable energy.
75. And the situation is identical for wind and solar devices. Except that the cost of extraction, conversion, and delivery is very high compared to that for fossil fuels, largely because the density of renewable energy flows are so diffuse in comparison, requiring large machines to concentrate this energy.
76. The capital and O&M costs of the conversion devices, the wind turbines, the solar panels, the delivery costs, have to be very low to become competitive with current fossil fuels.
77. Is there any prospect of this? Not with current subsidies, which reward investors for the adoption and deployment of existing equipment, and give them no incentive to put capital at risk in ventures to produce the very dramatic inventions and innovations that would be needed to overcome the problems I have just outlined.
78. Furthermore, renewables are now so damaged in the eyes of prudent long term investors, and in the eyes of the public, that even if we were to introduce wiser policies at a stroke tomorrow, it will take some considerable time before they get a fair hearing.
79. Short term investors in renewables have done very well in the last ten years; the industry as an intellectual creation has been cursed.

### Energy and Scotland

80. As I have suggested, the unfolding disaster of renewables policy affects the whole of the United Kingdom, as consumers, but it has special and especially threatening implications for Scotland, where the government has combined ambitions for independence with a courageous bet on one energy technology, wind, and the hope that large wind fleets onshore and offshore Scotland will be able to harvest subsidies from English and Welsh consumers.
81. There are several gambles here, tightly bound together: firstly, that the subsidies will continue, or that they will be needless; secondly that generators in an independent Scotland will be able to access these subsidies, and, or, that English and Welsh consumers will not have cheaper low carbon alternatives.

82. As I have already suggested, it seems very unlikely that the subsidies will continue, so great are the costs. And I do not think it likely, in the near or medium term, that renewables will become fundamentally economic. The hill to climb is fiercely steep, the policy schemes give no one any incentive to try to make the ascent.
83. In the event that the subsidies continue in England and Wales, what ground is there for thinking that a Chancellor in Westminster will be able to secure a political mandate to transfer wealth on a very large scale to wind farms in a neighbouring and independent country? The chances are slim at best, and if there are compelling low carbon alternatives available, no government, of whatever party, will be able to justify continuing the purchase of expensive electricity from Scotland.
84. The hazards of the Scottish Government's policy are plain enough, the risks of those hazards sufficiently manifest.
85. The current energy policy is simply incompatible with reasonable aspirations for Scottish independence. If you wish for independence, and I for my own part I see no reason why the Scottish people should not do so, then as a matter of urgency you must seek another energy policy. The current policy would expose an independent Scotland to unacceptable economic hazards of very high risk.

### A Compelling Climate Policy

86. I have suggested that there are numerous downsides to the current set of policies relating to renewables in the United Kingdom, all clustered around the economic cost of the targets adopted.
87. There is one further implication to note; the validity of our ambitions for renewables as part of an integrated global strategy to reduce emissions of greenhouse gases and mitigate climate change.
88. I am very conscious of the intemperate debate around climate science. Let us put that to one side, and ask a question that is relevant regardless of your views on climate science. Even if we accept that a climate change mitigation policy is prudent, is the current policy set adequate or proper to the task?
89. The United Kingdom's production emissions are a small fraction of the world total, a couple of percent, and are stable. We cannot make a quantitative difference to climate mitigation policy.

90. Our contribution, if we are to make one, is to offer an economically compelling example of low carbon energy generation. Otherwise, why should decision makers in China, India, Africa, be interested in us, except as customers for their renewable energy equipment.
91. The central consideration, then, is the cost per low carbon MWh generated and thus the cost per tonne of CO<sub>2</sub> saved.
92. Even at the pure subsidy level, ignoring for the moment the integration costs outlined by Colin Gibson in his work for IESIS, the abatement costs are simply too high to be economically compelling.
93. Saving a tonne of CO<sub>2</sub> from onshore wind costs around £100 of subsidy; from offshore wind about £200. These are well in excess of the social cost of carbon, or the EU ETS carbon price, and are utterly unaffordable for the OECD, let alone the developing world. Integration costs drive the cost still higher. No one in India, Africa, China will pay any serious attention to this, except to shake their heads in wonder.
94. Consequently, that multi billion pound cost, £8bn of subsidy, £5bn of integration, for twenty years or more, is not only wasted, it is counterproductive. It is off-putting, discrediting to the argument for climate mitigation. If this is the cost of reducing emissions, it might be argued, the world's people would be better off taking the wealth to be gained from burning fossil fuels now, perhaps using that wealth to adapt to any climate change.
95. My own conclusion is slightly different, and takes into account that there is some evidence now to suggest that rates of climate change are not as worrying as was formerly suggested, though still sufficient to give reasonable cause for concern. I also note that the impact of shale gas in the United States has been transformative, and promises to be so elsewhere, perhaps in England.
96. This lucky combination of circumstances gives a breathing space. A move towards gas would enable the reduction of coal consumption at reasonable cost, avoiding consumer rebellion, and give us time to redesign our energy policies to foster invention and innovation to deliver clean energy that is economically attractive and will be adopted spontaneously.
97. Such a move requires us to accept that the last decade has been disastrous, however rich in lessons and information.

98. It is essential that we put respect for the consumer interest at the heart of this new emphasis on invention and innovation. Hitherto, climate and energy policy has been scripted for timid governments by unrealistic green NGOs and exploited by rent-seeking investors. The voice of the consumer has been all but excluded, increasing the risk of eventual resistance to a certainty.
99. Rent-seekers and vested interests must be resisted, and tranquil capital write-downs will be relatively easy to secure in comparison with dilution of the influence of the emotionally intense and quasi-religious green movement.
100. These ultimately puritanical enthusiasts have crippled low carbon policy, and exposed the United Kingdom and other countries to economic hazards that are dangerous in themselves and make the formation of viable pathways towards clean energy all but impossible.
101. Consumers and politicians must stand up to the greens for a whole range of reasons, not least of which is that the future of the climate is not safe in their hands.

John Constable

27.06.13