Peter Lilley MP: What Is Wrong With Stern?

The Failings of the Stern Review of the Economics of Climate Change

Executive Summary

Time to review the Stern Review

The government relies on the Stern Review to justify its policies to combat global warming – possibly the most costly programme since the welfare state. But the Stern Review was not fit for purpose.

The Review’s conclusions were way outside the consensus of economic studies it supposedly reviewed and have been roundly criticised by many leading economists. Indeed, Stern’s conclusions, that the costs of a crash programme to reduce emissions are far outweighed by the benefits, contradict even the Intergovernmental Panel on Climate Change (IPCC) which said: “costs and benefits are broadly comparable in magnitude” so it could not establish “an emissions pathway or stabilisation level where benefits exceed costs”.

These criticisms were ignored when Stern’s report was published since political parties, media and environmentalists welcomed its conclusions as incontrovertible truth. However, the mood has changed since the recession, as the costs of climate subsidies hit homes and businesses and the Climategate emails provoke scepticism. It is time to look anew at the economics of tackling climate change (while taking as given the IPCC’s assessment of the science – in order to focus exclusively on the economics of climate change policy).

Key conclusions misleading and not comparable

Stern’s headline conclusions were that:

“If we don’t act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year now and forever.”

whereas

“The costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of GDP each year.”
They succeeded in giving the clear impression that we face huge losses now which could be averted at a fifth of their cost. But this is achieved by verbal virtuosity combined with statistical sleight of hand. In fact, even on Stern’s figures, the cumulative costs of reducing greenhouse gases will exceed the cumulative benefits until beyond 2100. Stern’s misleading headlines rely on comparing apples and pears as well as conflating predictions centuries hence with the present.

- **Comparing apples and pears** – or the whole of an apple with part of a pear. Stern compares the cost of limiting the amount of global warming with the benefit of eliminating it entirely. The benefit of preventing it entirely would, on his figures, be at least 5% of GDP – but to do so would require not just stopping all further carbon emissions but removing all those accumulated since the industrial revolution. The action he proposes to reduce the worst impacts of global warming by stabilising the atmospheric concentration of greenhouse gases at 550 ppm would, using Stern’s methodology, save some 3.1% of GDP – not 5%. The Review headlines put the cost of meeting his emissions target at 1% of GDP, though Stern has since doubled that and, in the body of his report, the cost was put at up to 4% of GDP.

The larger the damage which will still occur if emissions are stabilised at Stern’s target, the more misleading the comparison Stern makes between the cost of reducing damage and the benefits of eliminating emissions entirely. The smaller the residual climate change damage if emissions are stabilised at 550 parts per million (ppm), the less compelling the case for stabilising at that level.

- **Describing future centuries as “now”**. Stern suggests losses from global warming will be at least 5% of GDP “each year now and forever”. This is simply untrue. The cost of his crash programme to reduce emissions does indeed start now and in the decades to come. But the impact of global warming which he wants to mitigate will be largely in the very distant future. Even on Stern’s questionable calculations, it will be the next century before the cumulative benefits of (entirely) preventing global warming would exceed Stern’s low estimate of the costs of (partially) limiting it. Stern justifies his claim by saying losses from global warming centuries ahead are statistically “equivalent to” losses “now and forever”. He calculates the “now and forever” figure by taking high losses reached centuries ahead and projected to infinity, then discounting and averaging them with the negligible losses for many decades to come.

- **Hidden economic assumptions**. Since Stern projects the impact of global warming to infinity, the rate at which he discounts them to the present is crucial. Stern rejects discount rates normally used to compare future costs and benefits – including the rates specified by the Treasury Economic Service which he headed. Instead he adopts an ultra-low rate without explicitly disclosing it in his 700-page report. His low discount rate and infinite time horizon mean that over half the projected losses this
generation will be paying to avoid will not occur until several centuries hence.

Stern justifies his ultra-low discount rate as being rational and ethical – arguing that discounting for time is irrational and we should value the well-being of future generations as much as our own. Since discounting to infinity at a zero rate would put an infinite value on even the smallest reduction of emissions, he discounts time at 0.1% per annum (pa) to allow for the risk of extinction (for reasons other than climate change). He also recognises that benefits accruing to people with higher incomes are less valuable. So he discounts benefits accruing to future generations by the growth in their incomes relative to today – which he puts at 1.3% pa: hence his total discount rate of 1.4% pa.

• **Inconsistent discounting of costs and benefits.** Although Stern discounts benefits of curbing emissions at an ultra-low rate, he does not discount the true cost of doing so – the returns foregone on alternative investments – at the same low rate. As a result, his estimate of the cost of avoiding climate change is understated relative to his estimate of the benefits by a factor of between 2 1/2 and 5 times.

Arguably he is entitled to use a low discount rate, but only if he accepts that, logically, he should advocate investing in a Norwegian-style ‘fund for the future’, not just in mitigating climate change but in any projects with returns above his discount rate until the market rate and his discount rate converge.

• **Peculiar ethical assumptions.** Normal ethics of external costs would require users of fossil fuels to pay a charge sufficient if invested at market rates to compensate future victims of sufficient global warming (which would prompt switching away from fossil fuels if that is less costly than paying the levy). The charge would therefore equal future damages discounted at the market rate. So Stern segues away from the polluter pays principle to base his ethics on a utilitarian welfare maximising approach, which envisages a single “decision-maker acting on behalf of the community and whose role is to improve, or maximise overall social welfare.” The ethical values attributed to the perfectly rational decision maker imply that this relatively poor generation should be required to sacrifice up to 5% of their income to ensure that people in 2200, whose average incomes, even on Stern’s most pessimistic scenario, will be over 7 times higher than today’s, do not suffer a 5% loss of income. He castigates those who do not share this view as “not caring for future generations”. Yet arguably it is more ethical to care about today’s poor than tomorrow’s rich. Moreover, those who put a supreme value on the existence of the human race would not need to use an ultra-low discount rate to justify action if they believed human survival to be at risk.

• **Not discounting for uncertainty.** It is common to use a higher rate of discount for greater uncertainty since that attaches less weight to less
certain, more distant events. But Stern says the greater the uncertainty about the impact of carbon emissions, the lower the rate of discount should be. He argues that the less certain we are, the wider the dispersion of potential outcomes and incomes; lower incomes reduce the element of his discount rate which reflects the difference between future and current incomes. Conversely outcomes at the top of the potential range of dispersion will be discounted more heavily; so the average will be weighted towards less discounted ‘bad’ outcomes. He tacitly assumes we can be certain about the structure of the future, apart from the dimension of the impact of climate change. In fact, the future is likely to be different in utterly unforeseeable ways. It requires supreme hubris to assume that the only uncertainty about how our actions now will affect the world centuries hence, is the precise magnitude of the impact.

- **Clutching at catastrophes.** Even Stern’s base case assumes that higher temperatures might precipitate three catastrophic consequences: (i) the release of methane from the tundra or oceans – but this did not happen on a significant scale during previous periods of rapid warming; (ii) the reversal of the gulf stream - which is not predicted by the IPCC and would offset global warming, scarcely a catastrophe; and (iii) the melting of the icecaps - which the IPCC says will take millennia, giving plenty of time to change course or counteract emissions.

- **Denying scientific certainty.** Stern’s team fall back on the suggestion by Martin Weitzman that Stern may be right for the wrong reasons. Weitzman argued that if there is a finite possibility, however small, of an infinitely bad outcome (human extinction) then virtually any cost is worth incurring to prevent it. To forecast infinitely bad outcomes, ironically Stern has to jettison his belief that “the science is certain” and postulate a response of climate to greenhouse gases beyond anything known to physics. Climate sensitivity is not a random variable, so if it is high its impact must currently be concealed by natural variations and should soon become obvious as those fluctuations reverse, giving plenty of time to respond. Also, by Weitzman’s logic we cannot neglect the risk that measures to prevent emissions have infinitely bad outcomes: e.g. reliance on nuclear energy resulting in nuclear proliferation and war; without greenhouse gas emissions we may enter an ice age; etc. And other tiny but terminal risks such as asteroids hitting the earth would compete with global warming for huge outlays.

- **Cherry picking unreliable studies.** Stern draws heavily on non-peer reviewed and alarmist literature to paint an exaggerated picture of the key risks of global warming:

  a) **Hurricanes and storms.** A World Bank study shows that Stern’s forecasts of damage to infrastructure from more powerful storms are up to 100 times too large - being based on extrapolating a non-peer reviewed paper which attributed much of the growth of insurance claims (which is mainly the result of more properties being built in storm-
prone areas) to greater prevalence of more powerful storms. There is scant evidence of this. The IPCC is uncertain, citing models indicating that the number of storms may decline but intensity may increase.

b) **Food and famine.** He neglects scope for adaptation (citing a study showing a 4 degree Celsius rise could cut yields of one crop variety by 70% but assumes farmers will not switch to another variety whose yields would increase – a fact he withholds). He says a 4°C rise would cut world cereal production by 10%. But he accepts that meeting the biofuels target will absorb 10% of the world’s arable land. In any case this is insiginificant given the massive scope to boost output by using existing agricultural techniques more widely.

c) **Water supplies.** Higher temperatures mean more precipitation overall. But Stern highlights the number of people forecast to suffer increased water stress, although twice as many will enjoy reduced water stress.

d) **Rising sea levels.** This is the most iconic fear aroused by global warming but the IPCC says it will take millennia for higher temperatures to melt the ice-caps. Meanwhile the oceans are set to rise at a rate similar to the average of the last 18,000 years. A World Bank study suggests that even Bangladesh can prevent projected storm surges at a cost of barely 1% of its GDP.

e) **Disease.** Stern relies on a study which arbitrarily assumes 2% of all deaths from diarrhoeal diseases, malaria and malnutrition are the result of climate change and that this will double for each 1°C rise in temperature. But these are diseases of poverty and invariably disappear as countries experience economic growth.

- **Neglecting adaptation, reduced vulnerability and technological advances.** Apart from cherry picking alarming studies, Stern systematically downplays or ignores possible trade-offs between adaptation to, and prevention of, climate change; he assumes poor countries remain vulnerable to climate change whereas economic growth makes countries much more resilient; and he neglects likely technological changes – like GM crops, vaccines for malaria and other diseases, sturdier buildings for hurricane zones, etc.

- **Reliance on models to predict damage.** Despite using alarmist studies to depict a frightening future, his actual estimates of climate damage depend on an essentially arbitrary algebraic formula embedded in the Integrated Assessment Model he uses. This reduces all the consequences of climate change to a single variable and assumes they occur as soon as a given temperature is reached – effectively bringing forward the possible impact of melting ice-caps by millennia.

- **Underestimating cost of reducing emissions.** Although the IPCC
concludes that it is impossible to say whether the cost of preventing global warming would be more or less than the benefits of doing so, Stern claims the costs will be only a fifth to a twentieth of the benefits.

Embarrassingly, given he was head of the government’s economic service, his estimate is well below the UK government’s own estimate of the cost of the Climate Change Act and also below the lowest of 21 studies collated by Stanford University.

He selects the most optimistic estimates which assume costs of alternative energy sources will fall rapidly. Yet if they are set to do so it is foolish to adopt new technologies prematurely while the cost is still so high.

He puts immense faith in Carbon Capture and Storage – as yet commercially unproven - since he assumes 75% of electricity will still be generated using hydrocarbons.

If Stern applied his ultra-low discount rate to the true cost of investing in decarbonising the economy (the returns foregone on alternative investments), it would increase his cost estimate up to five-fold.

- **Sacrificing today’s poor for tomorrow’s rich.** Poor countries are more vulnerable to global warming – because they are poor. The cure for poverty is growth, which requires energy.

  Requiring poor countries to replace fossil fuels by renewables costing upwards of twice as much will hinder their growth, leaving them vulnerable to global warming.

  Stern admits the bio-fuel target will require 10% of the world’s arable land, driving up food prices by more than the yield loss he expects if temperatures rise 4°C.

  Developing countries will account for the bulk of growth in emissions on a ‘business as usual’ scenario as the poorest two-thirds of the world’s population catch up with the most developed nations. So Stern’s crash programme to limit emissions would involve major restraint by them even if developed countries decarbonise almost totally.

  Emissions trading would allow rich countries to cut their emissions by less in return for paying poor countries to cut by more, using more costly methods than they would otherwise have done. Subsidies for low carbon development will divert aid from other uses; impose an additional layer of bureaucracy on developing countries; create huge opportunities for abuse; and encourage countries to threaten high emission schemes unless paid to abandon them.

  In practice, developing countries have no intention of slowing down their growth while millions of their citizens are living in poverty.
Stem presents China’s plans to get back to their previous path of rising energy efficiency as “cuts” whereas their growth plans imply massive increases in their total emissions.

**Policy implications conflict with consensus and governments’ own cost benefit analysis**

Stem sets a target of stabilising the atmospheric concentration of carbon dioxide at 500 to 550 parts per million (ppm). This would ultimately require reducing emissions by more than 80% from current levels. Developed countries would have to do so by 2050.

Stern does not evaluate alternatives nor demonstrate that this is the optimum target (nor mention that it was the target already adopted by the UK government).

To achieve this, the price of carbon must be raised by taxing or pricing emission permits to reflect its social cost, which he puts at $310/ton of carbon rising to $950/ton by 2100.

The consensus of conventional economists was that the optimum path was to intensify the effort more gradually. For example, Nordhaus’s optimum path involves an initial Social Cost of carbon of $27/ton of carbon to cut emissions by a quarter by 2050 against Stern’s three-quarters.

Gradually intensifying the effort avoids prematurely abandoning existing capacity or adopting new technologies while still too expensive and allows time to reach firmer estimates of climate sensitivity.

The British government ignored its own impact assessments, which showed potential costs of its Climate Act were twice the maximum benefits and costs of its Feed-In Tariffs were 20 times their benefits.

The subsequent revision increased benefits of the Act ten-fold by assuming that the rest of the world follows the UK example, which undermines the case for unilateral action.

Developing countries like China and India have no intention of following suit. The increase in China’s emissions every year exceeds the UK’s emissions, which are just 2% of the world total. And despite Stern’s optimistic belief that public opinion would force countries to adopt and observe stringent international targets, both Canada and Japan have resiled from Kyoto commitments.
Key Recommendations

The government should cease to rely on the flawed Stern Review to justify policy and should commission a new, independent Review.

The government should prescribe the same discount rate for assessing costs and benefits of climate policies as it uses for all long-term public projects or explain fully why it is not so doing – and show the sensitivity to alternative plausible discount rates and the Internal Rate of Return of alternative pathways for tackling global warming.

The Review should assess the impact of global warming specifically on the UK and include in figures for UK emissions estimates of carbon emitted to produce goods imported into the UK.

The Review should assess the cost and benefits for scenarios with varying degrees of international cooperation. Meanwhile, Parliament should remove the legal requirement on the UK to act unilaterally.

In the absence of a new Review, government strategy should at most involve:

- gradually ramping up incentives to reduce carbon emissions
- cost effective measures to increase energy efficiency
- greater focus on incentivising Research and Development
- acceptance that developing countries need to develop the cheapest energy sources available to them
- more emphasis on adaptation to climate change as it occurs
- focussing development aid on helping vulnerable countries adapt to climate change, whatever its cause.