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Comment on 'impact of current climate proposals'

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Response to Article

A response to 'Impact of Current Climate Proposals'
Bjorn Lomborg*

Lomborg suffers from a fundamental methodological flaw which means that it could not fulfil its aim, stated in the 'Abstract', to investigate 'the temperature reduction impact of major climate policy proposals implemented by 2030'.

Projections of global mean surface temperature for the period up to 2100 are based on cumulative annual global emissions of greenhouse gases. While Lomborg purports to analyze the temperature changes associated with policies affecting emissions up to 2030, the author fails to acknowledge that the temperature projections to 2100 are determined primarily by assumptions that are made about cumulative annual global emissions over the 70-year period after 2030, rather than cumulative annual emissions during the period up to 2030.

The results cited by Lomborg are almost entirely due to the assumptions he makes about the post-2030 annual emissions from the US, EU and China. In each of these cases, annual emissions are assumed not to reduce any further, and in most of his 'scenarios', to rise. In most of his 'scenarios', emissions are assumed to rise by the end of the century to levels that reverse completely the effects of emissions reductions by 2030, and in some cases they also reverse the effects of emissions reductions that have occurred in the period up to 2015. As such, most of the 'scenarios' used by Lomborg assume that climate policies are abandoned or reversed after 2030, and it is this assumption that primarily determines the projected global mean surface temperature in 2100. Hence, Lomborg does not investigate 'the temperature reduction impact of major climate policy proposals implemented by 2030'.

In the case of the US, Figure 3 of Lomborg illustrates the assumptions made about annual emissions in relation to the pledge contained in the 'intended nationally determined contribution' (INDC) that was submitted to the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) on 31 March 2015.[1] The INDC indicates that 'the US intends to achieve an economy-wide target of reducing its greenhouse gas emissions by 26–28 per cent below its 2005 level in 2025 and to make best efforts to reduce its emissions by 28 per cent'. Figure 3 shows this reduction in emissions. However, the INDC also notes: 'This target is consistent with a straight line emission reduction pathway from 2020 to deep, economy-wide emission reductions of 80 per cent or more by 2050'. Lomborg disregards this statement, without justification. Instead, he assumes for his 'Optimistic USINDC' scenario that annual emissions by the US remain at about the same level of around 4.6 gigatonnes of carbon-dioxide-equivalent (Gt CO_2e) for the period between 2025 and 2100. For his 'Pessimistic USINDC', Lomborg assumes that annual emissions by the US rise asymptotically to just under 6 Gt CO_2e, exceeding current annual emissions levels during the 2070s. Hence this scenario completely reverses emissions reductions to be achieved by 2030 as well as emissions reductions achieved over about the past five years. Neither of these scenarios corresponds to expected policies beyond 2030.

In the case of the 28 member states of the EU, Figure 7 of Lomborg shows the assumptions made about annual emissions in relation to the pledge contained in the INDC that was submitted to the secretariat of the UNFCCC on 6 March 2015.[2] The INDC indicates that 'the EU and its Member States are committed to a binding target of an at least 40 per cent domestic reduction in greenhouse gas emissions by 2030 compared to 1990'. Figure 7 shows this reduction. However, the INDC also states that the 2030 target is 'in line with the EU objective, in the context of necessary reductions according to the IPCC by developed countries as a group, to reduce its emissions by 80–95 per cent by 2050 compared to 1990'. Lomborg ignores this statement, without justification. Instead, he assumes for his 'Optimistic EUINDC' scenario that annual emissions by the EU rise gradually after 2030, exceeding current levels during the 2070s and reaching about 4.6 Gt CO_2e by 2100. Hence this scenario assumes the reversal of emissions cuts achieved by 2030 as well as the reversal of reductions since about 2010. For his 'Pessimistic EUINDC', Lomborg assumes that annual emissions by the EU climb even more

*Lomborg, B. (2015) *'Impact of Current Climate Proposals'*, ***Global Policy*****, 7 (1), pp. 109–118. DOI: 10.1111/1758-5899.12295.**

steeply, exceeding current levels in about 2040 and eventually rising to about 6.7 Gt CO_2e by 2100. Hence this scenario reverses all emissions cuts achieved since 1990 until the present day and those intended by 2030, with emissions due to be almost 50 per cent higher by the end of the century compared with today, and about 100 per cent higher than the target for 2030. Neither of these scenarios corresponds to expected policies beyond 2030.

In the case of China, Figure 9 of Lomborg shows the assumptions made about annual emissions in relation to the pledge contained in the INDC that was submitted to the secretariat of the UNFCCC on 30 June 2015.[3] The INDC indicates that China pledges 'to lower carbon dioxide emissions per unit of GDP by 60 per cent to 65 per cent from the 2005 level'. Figure 9 shows a projection for annual emissions resulting from a 60 per cent cut in emissions intensity by 2030. However, the INDC also pledges that China will 'achieve the peaking of carbon dioxide emissions around 2030 and making bets efforts to peak early'. Lomborg ignores this statement, without justification. Instead, he assumes for his 'Optimistic China INDC' scenario that annual emissions by China continue to rise gradually after 2030 until about 2060, exceeding 20 Gt CO_2e from about 2050 up to 2100, compared with 11 Gt CO_2e today and about 16 Gt CO_2e in 2030. Hence this scenario assumes that emissions will increase by about a third after 2030, instead of reaching their peak in 2030. For his 'Pessimistic China INDC', Lomborg assumes that annual emissions by China climb even more steeply, to about 20 Gt CO_2e during the 2040s and reaching about 22 Gt CO_2e from 2060 up to 2100. Hence this scenario assumes that emissions increase by more than 45 per cent after 2030 instead of peaking. Neither of these scenarios corresponds to expected policies beyond 2030.

Overall, Lomborg's 'optimistic' scenarios for the US, EU and China assume that their collective annual emissions rise from about 23 Gt CO_2e in 2030 to more than 29 Gt CO_2e in 2100. His 'pessimistic' scenarios mean collective emissions would rise to more than 34.5 Gt CO_2e. It is clear that the post-2030 assumptions largely obliterate the benefits of the emissions cuts up to 2030. It is for this reason that Lomborg projects that his 'Optimistic World INDC' scenario means a rise in global mean surface temperature of 4.5°C by 2100, with the 'Pessimistic World INDC' leading to an even bigger rise. The overwhelming majority of this warming is due to the assumptions by Lomborg about post-2030 emissions.

These temperature rises far exceed the warming projected by other studies that have analyzed the INDCs. For instance, the International Energy Agency (2015) and Gütschow et al. (2015) have both projected that they would lead to a warming of 2.7°C by 2100. Indeed, both 'World INDC' scenarios described by Lomborg far exceed the temperature rises projected in 'business as usual' scenarios that omit the impact of the INDCs (e.g. Gütschow et al., 2015). This shows just how extreme the assumptions about post-2030 emissions made by Lomborg really are – they suggest that the INDCs would lead to an increase in warming compared with scenarios without the INDCs. Lomborg hides this fact by choosing to compare his scenarios against the most extreme scenario (RCP8.5) described by the Intergovernmental Panel on Climate Change (2013), which assumes strong growth in annual emissions throughout this century, leading to carbon dioxide concentrations in the atmosphere of more than 900 parts per million by 2100 (compared with the pre-industrial concentration of 280 parts per million and about 400 parts per million today) and a mean rise in global surface temperature of 4.3°C.

Hence, a comparison of temperature projections based on the scenarios of Lomborg, which depend largely on his extreme assumptions about post-2030 emissions, with RCP8.5 cannot be reasonably presented as an investigation into 'the temperature reduction impact of major climate policy proposals implemented by 2030'.

Notes

1. Available from: http://www4.unfccc.int/submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf [Accessed 10 November 2015].
2. Available from: http://www4.unfccc.int/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf [Accessed 10 November 2015].
3. Available from: http://www4.unfccc.int/submissions/INDC/Published%20Documents/China/1/China's%20INDC%20-%20on%2030%20June%202015.pdf [Accessed 10 November 2015].

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Intergovernmental Panel on Climate Change [T. F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung et al. (eds)] (2013) *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK and New York, NY: Cambridge University Press.

International Energy Agency (2015) 'Energy and Climate Change', *World Energy Outlook Special Briefing for COP21* [online]. Available from: http://www.iea.org/media/news/WEO_INDC_Paper_Final_WEB.PDF [Accessed 10 November 2015].

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