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Schmidt, M. G. W., Lorenz, A., Held, H., & Kriegler, E. (2011). Climate targets under uncertainty: Challenges and remedies. *Climatic Change*, *104*(3–4), 783–791.

In this paper, they state that probabilistic targets resulted from cost effectiveness analysis (CEA) are very likely to leads to major conceptual problems, even more likely when "learning" is taken into account. Under large probabilistic uncertainty about climate sensitivity, the target should be rather safety constraints than probabilistic thresholds targets such as 2-degree. They propose ways to adjust targets to new information; a full-fledged cost-benefit analysis together with monetary climate damage function and multi-criteria decision analysis based on trade-off between aggregate mitigation cost and a climate target based.

BIPM, IEC, IFCC, ILAC, ISO, IUPAC, … OIML. (2009). Evaluation of measurement data — An introduction to the "Guide to the expression of uncertainty in measurement" and related documents, (July), 28.

It is inevitable to have uncertainties from measurement no matter what kinds of field we are. This document introduces basics of measurement uncertainty from scientific, industrial activities and the Guide to the expression of uncertainty in measurement (GUM) including calibration, testing and inspection in industry. By suggesting principles and concepts, this document helps readers to deal with uncertainty better so that they can understand and solve the situation better.

Geden, O. (2016). An actionable climate target. *Nature Geoscience*, *9*(5), 340–342.

He strongly criticizes that the Paris Agreement introduced 1.5 or 2℃ as mitigation target and not focused on net zero emission, which has greatest potential to effectively guide policy according to him. Temperature target does not pay attention to individuals, but it addresses the Earth system as a whole, thus policy makers in individual countries do not know what to do. In contrast, net zero emission target tells precisely what to do. Moreover, temperature target poses 'either/or' situation, so if we miss it or not. Therefore, he states that we need more actionable target, net zero emission.

Geden, O. (2013). Modifying the 2°C Target: Climate Policy Objectives in the Contested Terrain of Scientific Policy Advice, Political Preferences, and Rising Emissions. *SWP Research Paper*, (June), 30.

The author argues that current climate objective, 2℃ target, has to be modified which has been set as a thresholds into "dangerous climate change" since it is unrealistic to be attained and there is no plan B. Thereby he presents 2 different modification pathways; reinterpretation and revision. Under reinterpretation approach, when should be the last year to have peak needs to be decides, so that it is indirect and less politically risky whereas revision approach has more direct aspect such as setting less ambitious goal. He emphasizes the role of science-based climate policy advice, because climate science and climate policy are likely to be more dependent as time goes, deducting science-based objective as climate target.

Kunreuther, H., Gupta, S., Bosetti, V., Cooke, R., Dutt, V., Duong, M. H., Held, H., Llanes-Regueiro, J. Patt, A., Shittu, E., Weber, E. (2014). Integrated Risk and Uncertainty Assessment of Climate Change Response Policies. *Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III to the IPCC Fifth Assessment Report*, 151–206

This report defines risk and uncertainty and presents how risk and uncertainty play a role in processes and decisions under climate change. Laypersons often judge risks based on past experiences and emotional and intuitive thinking whereas experts go through more deliberative thinking by using data for estimation. Considering risk perception and responses to uncertainties in decision making processes can effectively improve risk communication and policy dealing with climate change. The report presents evidences of response to uncertainty and illustrate theories of decision making models.

Mastrandrea, M. D., Field, C. B., Stocker, T. F., Edenhofer, O., Ebi, K. L., Frame, D. J., … Zwiers, F. W. (2010). Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties IPCC Cross-Working Group Meeting on Consistent Treatment of Uncertainties. *Intergovernmental Panel on Climate Change (IPCC)*

They offer a guideline for IPCC lead authors on how to treat and communicate uncertainties across all three working groups. The document aims to build a common language and approach in the treatment of uncertainty so that they can broadly communicate and evaluate to make a judgement in assessment process. Moreover, it targets to inform authors how to communicate with readers by using recommended language to avoid misunderstandings.

A. Muller, R., Rohde, R., Jacobsen, R., Muller, E., & Wickham, C. (2013). A New Estimate of the Average Earth Surface Land Temperature Spanning 1753 to 2011. *Geoinformatics & Geostatistics: An Overview*, *01*(01), 1–7.

This paper presents the estimate of Earth's mean land surface temperature. According to their estimate, Earth mean land surface temperature has increased by 0.90 ± 0.05°C with 95% confidence. Unlike Intergovernmental Panel on Climate Change (IPCC) report, solar variability does not play a significant role, but the Earth mean land surface temperature mainly correlated with volcanic activities and a single anthropogenic factor showing linear relation. The paper is pointing out the significance of diurnal temperature range change which is not anticipated enough in current climate models. The diurnal temperature range showed slow drop between 1900 and 1980 followed by increase since then.