

## Briefing Note on the Report on the Structured Expert Dialogue on the 2013-2015 Review

Carl-Friedrich Schleussner, Bill Hare  
<http://climateanalytics.org/>  
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*The Structured Expert Dialogue (SED) - set up by the UNFCCC and conducted over 2013-2015 - is a process that has reviewed the adequacy of the agreed Long Term Global Goal (LTGG) of holding warming below 2°C. It has now [released its technical summary](#). This is a synthesis of the key points in that report.*

*The report of the SED, was prepared by the co-facilitators, both senior scientists and former IPCC Convening Lead Authors, summarizes the face-to-face dialogue between over 70 experts and parties in the UNFCCC. The list of experts include lead authors from the IPCC AR5 including the Co-Chairs of the three Working Groups as well as non-IPCC experts from international institutions.*

The report of the Structured Expert Dialogue (SED)<sup>1</sup> on the 2013-2015 Review **essentially confirms the views of SIDS<sup>2</sup> and LDCs that the 2°C warming limit is too high**. It finds that a 1.5°C goal would avoid or reduce substantial risks that would otherwise be experienced at 2°C. **Of most significance to the ADP process is the finding that the emission pathways agreed should not exclude meeting a warming limit below 2°C:**

*“We are therefore of the view that Parties would profit from restating the long-term global goal as a ‘defence line’ or ‘buffer zone’, instead of a ‘guardrail’ up to which all would be safe. This new understanding would then probably favor emission pathways that will limit warming to a range of temperatures below 2 °C. **In the very near term, such aspirations would keep open as long as possible the option of a warming limit of 1.5 °C, and would avoid embarking on a pathway that unnecessarily excludes a warming limit below 2 °C.**”*

The findings of the SED vindicate the stance of SIDS and LDCs in insisting on the review occurring and on keeping the 1.5°C goal in sight during the negotiations over the last several years. **The SED report should lead to increasing recognition the climate policy world of the rising level of scientific evidence that indicates the 2°C goal is inadequate and that ultimately limiting warming below 1.5°C would be substantially safer.**

The SED assessed the state of the science relevant to assessing the adequacy of the long-term 2°C global goal and the overall progress made towards it. This **comprehensive assessment of different long-term goals such as 2°C or 1.5°C**, drawing upon IPCC AR5 - as

<sup>1</sup> <http://unfccc.int/files/science/workstreams/application/pdf/structuredexpertdialogue.2015.1.summaryreport.pdf>

<sup>2</sup> See AOSIS Submission on the 2013-2015 Review of the Long-term temperature goal at <http://unfccc.int/resource/docs/2014/sb/eng/misc01a01.pdf>



well as more recent literature - **make the report an indispensable source of information for the ADP and UNFCCC negotiations.**

**Major findings include:**

- **The report on the SED (Structured Expert Dialogue) finds that the ‘guardrail’ concept, in which up to 2 °C of warming is considered safe, is inadequate.** In fact, the report confirms that significant climate impacts are already occurring at the current level of global warming and additional magnitudes of warming will only increase the risk of severe, pervasive and irreversible impacts. Consequently the report confirms that a warming of less than 2 °C would be much more preferable.
- While the world is not on track to achieving a long-term global goal of 2°C, **the report confirms that limiting global warming to below 2 °C is still feasible and will, while posing substantial technological, economic and institutional challenges, bring about many co-benefits.** To hold warming below 2°C target with a likely probability (>66% chance), the SED cites IPCC AR5 findings that a reduction of global greenhouse-gas emissions of 40-70% by 2050 relative to 2010 levels is required. Cost-effective pathways are characterised in particular by immediate action.
- Given the report classifies a 2°C target as a “an upper limit, a defense line that needs to be stringently defended, while less warming would be preferable” an emissions pathway that avoids a 2°C increase with only a likely chance (> 66%), as described above, would appear to not to provide the required level of security. Consequently, pathways with higher probability (90% or above) would appear far more consistent with the SED’s findings.
  - While the SED does not provide information on the specific characteristics of such high-probability emission pathways, scientific results from the IPCC AR5 and the 2014 UNEP Emissions Gap report, and other recent scientific literature provide guidance on this:<sup>5</sup> emission pathways that hold warming below 2°C throughout the 21st century with a high probability (above 90%) also limit warming below 1.5°C by 2100 with a 50% or greater probability. These pathways reduce emissions faster and reach zero emissions earlier than the likely (66% chance) below 2°C emission pathways reported in the IPCC WG3 summary for policymakers<sup>5</sup>.
- **The report also confirms that a 1.5°C target is still within reach.** The technologies required for the 1.5 °C scenarios are the same as for the 2 °C pathway, but need to be deployed faster, and energy demand needs to be reduced earlier, implying a higher direct mitigation cost than for a likely below 2 °C pathway not considering the benefits of more stringent mitigation.<sup>3</sup>
- **The report finds that limiting global warming to below 1.5 °C would avoid or substantial reduce risks** including risks to food production or unique and threatened systems such as coral reefs or many parts of the cryosphere (glaciers, ice sheets of Greenland and Antarctica) and the risk of sea level rise.

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<sup>3</sup> **Is it possible to return warming to below 1.5°C within this century?**

[http://climateanalytics.org/files/climate\\_analytics\\_briefing\\_is\\_it\\_possible\\_to\\_return\\_warming\\_to\\_below\\_1.5degc\\_within\\_this\\_century-.pdf](http://climateanalytics.org/files/climate_analytics_briefing_is_it_possible_to_return_warming_to_below_1.5degc_within_this_century-.pdf)

- Consequently, the report advises, in the immediate short term, to pursue emission pathways that limit warming below 2°C and keep open the option of limiting warming to 1.5°C.<sup>4</sup>

### The consequences of the SED report for the ADP include strong scientific support for:

- Reference to a below 1.5°C by 2100 warming goal in the ADP agreement, in particular to guide the ongoing improvement in emission commitments
- Reference to the emissions pathway consistent with the 1.5° goal in the review of the aggregated effect of INDC's
- Increasing mitigation ambition from all above the levels presently put forward.
- Including 1.5°C-consistent global reduction goals for 2050, emissions levels for 2100, and 1.5°C consistent zero emissions goals in the ADP agreement.<sup>5</sup>
- Ensuring that the 2020 - 2025 pathways agreed<sup>5</sup> upon in the ADP agreement do not make the achievement of the 1.5°C goal infeasible by requiring post 2025 decarbonisation rates that are unrealistic.

With the SED concluding its work, the next phase is for the joint contact group set up by the UNFCCC (JCG) to use this outcome to advise negotiators in the ADP on the level of mitigation ambition that should guide the Paris agreement – and to advise the COP21 in Paris on the need for strengthening of the long term global goal.

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<sup>4</sup> **Timetables for Zero emissions and 2050 emissions reductions: State of the Science for the ADP Agreement**  
[http://climateanalytics.org/files/ca\\_briefing\\_timetables\\_for\\_zero\\_emissions\\_and\\_2050\\_emissions\\_reductions.pdf](http://climateanalytics.org/files/ca_briefing_timetables_for_zero_emissions_and_2050_emissions_reductions.pdf)  
[http://climateanalytics.org/files/infosheet\\_timetables\\_for\\_zero\\_emissions\\_and\\_2050\\_emissions\\_reductions\\_20150211\\_final.pdf](http://climateanalytics.org/files/infosheet_timetables_for_zero_emissions_and_2050_emissions_reductions_20150211_final.pdf)  
 and **Benchmark Emission Levels for 2025 and 2030 consistent with the below 2°C limit and the 1.5°C limit**  
<http://climateanalytics.org/publications/2015/benchmark-emission-levels-for-2025-and-2030-consistent-with-the-below-2c-limit-and-the-1-5c-limit>



## Key Findings

### 1. Substantially lower Impacts of Climate Change at 1.5°C

Impacts	at 1.5°C	at 2.0°C
	Most terrestrial and marine species would be able to follow the speed of climate change	The rate of climate change would become too rapid for some species to move sufficiently fast
	Ocean acidification impacts would stay at moderate level and up to half of coral reefs may remain	The risks for mass coral bleaching would become very high
	Sea level rise may remain below 1 m	Long-term sea level rise may exceed 1 m
	Some Arctic sea ice may remain	Arctic summer sea ice will be further significantly reduced
	More scope for adaptation would exist, especially in the agricultural sector	Crop production would be at high risk with some potential for adaptation

Figure 1: Key impacts relevant for Article 2 of the Convention for 1.5°C and 2°C as identified in the SED

The SED report confirms that risks increase significantly between 1.5°C and 2°C, where three out of the five “Reasons for Concern” as identified by the IPCC are rated at least moderate to high. The IPCC Working Group 2 identified five Reasons for Concern (RFCs) that provide a framework for summarizing key risks across sectors and regions that provide guidance to assess dangerous levels of climate change (See Box SPM.1 AR5 WG2 at [http://ipcc.ch/pdf/assessment-report/ar5/wg2/ar5\\_wgII\\_spm\\_en.pdf](http://ipcc.ch/pdf/assessment-report/ar5/wg2/ar5_wgII_spm_en.pdf))

#### Impacts at 2°C accompanied by ‘high’ adaptation include:

- **Unique and threatened systems would be at high risk**, in particular systems with limited or barely any adaptive capacity (e.g. Arctic sea ice and coral reefs).
- **Extreme weather events would pose a high risk for human health**, urban housing and infrastructure in megacities, also in relation to the urban heat island effect, air pollution and differential vulnerabilities; displacement and permanent migration; livelihood struggles and conflict in resource-dependent livelihoods, such as agriculture and pastoralism; **and high impacts on livelihood** (trapped populations are more vulnerable to environmental change because of their inability to move).
- The risks will be increasingly unevenly distributed, and are generally greater for disadvantaged people and communities in countries at all levels of development; populations that experience shifts from transient to chronic poverty and related social

marginalization and food insecurity; and the elderly, children, the socially marginalized, and outdoor workers, who are disproportionately at risk from heat stress.

- Global aggregate impacts show a moderate economic impact, but these aggregates may mask impacts across sectors and regions (evaluations are incomplete, in part because they do not take into account large-scale singular events affecting several sectors at once or other effects from disrupted interdependencies).
- The risk of large-scale singular events, such as the disintegration of ice sheets in Greenland and Antarctica, would be moderate.

## 2. Assessing the adequacy of the long-term global goal implies risk assessments and value judgments not only at the global level, but also at the regional and local levels

- The global climate determines regionally experienced risks. However, a key element of these perspectives is the value judgment of when the scale (e.g. frequency and severity) of climate impacts moves from 'acceptable' to 'unacceptable'.
- The importance of the regional risk assessments has been underscored
- A greater appreciation of the role played by all decision makers, including subnational authorities and cities should be taken when assessing these risk levels.

## 3. The 2 °C limit should be seen as a defense line, while less warming would avoid substantial impacts

- The 'guardrail' concept, in which up to and including 2 °C of warming is considered 'safe', is inadequate and would therefore be better seen as a line that needs to be stringently defended, while less warming would be preferable.
  - Arguably this conclusion was already recognized in Copenhagen where many governments insisted that the 2° C warming goal be qualified as limiting warming "below 2°C". The SED findings confirm this policy judgment from 2009 and extend it by referencing the substantially reduced impacts and risks at 1.5°C.
- Significant climate impacts are already occurring at the current level of global warming and additional magnitudes of warming will only increase the risk of severe, pervasive and irreversible impacts.

## 4. Limiting global warming to 1.5 °C is feasible with technologies same as 2°C pathway but deployed sooner and faster.

- Limiting warming below 2°C, and to 1.5°C, is still technically and economically feasible and will bring about many co-benefits, but poses substantial technological, economic and institutional challenges
- The costs are manageable, even without taking into account the co-benefits of mitigation, and various policy options could be deployed to manage the risks of the necessary mitigation action.
- The technologies required for the 1.5°C scenarios are the same as for the 2°C pathway, but need to be deployed faster, and energy demand needs to be reduced earlier, implying a higher direct mitigation cost than in the 2°C scenarios.



- On the comparison of costs and avoided impacts between the 1.5°C and 2°C warming limits, the IPCC drew a distinction between mitigation costs and net benefits, noting that limitations with the latter concept meant that this cannot be used to determine whether to pursue the 1.5°C warming limit.

## Background Information: Extracts from the SED Technical Summary report

This section contains some key messages and statements lifted directly from the SED technical summary without commentary or modification.

### 1. Key Messages Theme 1

#### 1.1. “A long-term global goal defined by a temperature limit serves its purpose well”

*“Adding other limits to the long-term global goal, such as sea level rise or ocean acidification, only reinforces the basic finding emerging from the analysis of the temperature limit, namely that we need to take urgent and strong action to reduce GHG emissions. However, the limitations of working only with a temperature limit could be taken into account, for example, by aiming to limit global warming to below 2 °C.”*

#### 1.2. “Imperatives of achieving the long-term global goal are explicitly articulated and at our disposal, and demonstrate the cumulative nature of the challenge and the need to act soon and decisively”

*“Limiting global warming to below 2 °C necessitates a radical transition (deep decarbonization now and going forward), not merely a fine tuning of current trends.”*

#### 1.3. “Assessing the adequacy of the long-term global goal implies risk assessments and value judgments not only at the global level, but also at the regional and local levels”

*“The global climate determines regionally experienced risks. ... A key element of these perspectives is the value judgment of when the scale (e.g. frequency and severity) of climate impacts results in a transition from ‘acceptable’ to ‘unacceptable’.”*

#### 1.4. Climate change impacts are hitting home

*“Significant climate impacts are already occurring at the current level of global warming and additional magnitudes of warming will only increase the risk of severe, pervasive and irreversible impacts. Therefore, the ‘guardrail’ concept, which implies a warming limit that guarantees full protection from dangerous anthropogenic interference, no longer works. This calls for a consideration of societally or otherwise acceptable risks of climate impacts.”*

#### 1.5. The 2 °C limit should be seen as a defense line

*“The ‘guardrail’ concept, in which up to 2 °C of warming is considered safe, is inadequate and would therefore be better seen as an upper limit, a defense line that needs to be stringently defended, while less warming would be preferable.”*



## **1.6. Limiting global warming to below 2 °C is still feasible and will bring about many co-benefits, but poses substantial technological, economic and institutional challenges**

*“The costs are manageable, even without taking into account the co-benefits of mitigation, and various policy options could be deployed to manage the risks of the necessary mitigation action.”*

## **2. Key Messages Theme 2**

### **2.1. We know how to measure progress on mitigation but challenges still exist in measuring progress on adaptation**

*“A generally accepted metric exists for aggregating and measuring overall progress on mitigation, but no single metric exists to quantify and aggregate the overall progress on adaptation. Similarly, a widely accepted metric to measure overall progress on reducing risks of climate impacts by adaptation would be required in the context of a global risk management framework.”*

### **2.2. The world is not on track to achieve the long-term global goal, but successful mitigation policies are known and must be scaled up urgently**

*“Greenhouse gas emission growth has accelerated, reaching a record high during the decade 2000–2010. The Cancun pledges are only consistent with the long-term global goal with pathways that require a much higher mitigation response later. Moreover, policies in place have had a limited impact on bending the emissions curve downward. However, successful mitigation policies have been identified and progress is being made on scaling them up, in particular in relation to putting a price on carbon and promoting otherwise low-carbon technologies, so that their share becomes dominant. We need benchmarks for sound climate policy in the light of national circumstances.”*

### **2.3. We learned from various processes, in particular those under the Convention, about efforts to scale up provision of finance, technology and capacity-building for climate action**

*“Many of the technologies required to achieve the long-term global goal are already available, but their deployment is not on track. Various barriers to their deployment and transfer have been identified. There is no widely accepted definition of climate finance, and uncertainties remain in the tracking of climate finance flows, in particular for adaptation finance and private finance, and to a lesser extent also for mitigation finance. Discussions are ongoing in various processes under the Convention regarding the resources required to address climate change under emission scenarios that limit the temperature increase to below 2 °C.”*

## **3. Key Messages 1.5°C**

### **3.1. While science on the 1.5 °C warming limit is less robust, efforts should be made to push the defense line as low as possible**

*“Nevertheless, limiting global warming to below 1.5 °C would come with several advantages in terms of coming closer to a safer ‘guardrail’. It would avoid or reduce risks, for example, to food production or unique and threatened systems such as coral reefs or many parts of the cryosphere, including the*

risk of sea level rise. On the other hand, this implies a more pronounced reliance on negative emissions with associated risks, including those from land- use change, as well as increases in mitigation costs in comparison with the 2 °C warming limit, and requires a larger temperature overshoot, which also carries certain risks.”

“Parties may wish to take a precautionary route by aiming for limiting global warming as far below 2 °C as possible, reaffirming the notion of a defense line or even a buffer zone keeping warming well below 2 °C.”

## 4. Synthesis statements

“We are therefore of the view that Parties would profit from restating the long-term global goal as a ‘defense line’ or ‘buffer zone’, instead of a ‘guardrail’ up to which all would be safe. This new understanding would then probably also favor emission pathways that will limit warming to a range of temperatures below 2 °C. In the very near term, such aspirations would keep open as long as possible the option of a warming limit of 1.5 °C, and would avoid embarking on a pathway that unnecessarily excludes a warming limit below 2 °C.”

## 5. Additional Information on 1.5°C

“The difference in projected risks between 1.5 °C and 2 °C of warming is significant for highly temperature-sensitive systems, such as the polar regions, high mountains and the tropics, as well as for some other regions, in particular low-lying coastal regions.<sup>166</sup> The IPCC further stressed that regional food security risks are significantly different between 1.5 °C and 2 °C of warming, pointing to the example of Africa, where in some countries the reduction in staple crop yields is projected to be higher than the global average. “

- Most terrestrial and marine species would be able to follow the speed of climate change; up to half of coral reefs may remain; sea level rise may remain below 1 m; some Arctic sea ice may remain; ocean acidification impacts would stay at moderate levels; and more scope for adaptation would exist, especially in the agricultural sector.
- Current levels of warming are already causing impacts beyond the current adaptive capacity of many people, and that there would be significant residual impacts even with 1.5 °C of warming (e.g. for sub-Saharan farmers), emphasizing that reducing the limit to 1.5 °C would be nonetheless preferable. The CBD secretariat drew attention to the increased risk of extinction when going from 1.5 °C to 2 °C of warming, while noting the uncertainties on how this will happen.
- The technologies required for the 1.5 °C scenarios are the same as for the 2 °C pathway, but need to be deployed faster, and energy demand needs to be reduced earlier, implying a higher cost than in the 2 °C scenarios.
- On the comparison of costs and avoided impacts between the 1.5 °C and 2 °C warming limits, the IPCC drew a distinction between mitigation costs and net benefits, noting that cost implications would not determine whether or not to pursue the 1.5 °C warming limit.

## 6. Additional Information on 2°C

### 6.1. Risks and Impacts

- In a world 2 °C warmer than in pre-industrial times, the rate of climate change would become too rapid for some species to move sufficiently fast and migrate to their preferred temperature zones; long-term sea level rise may exceed 1 m; Arctic summer sea ice will be



*further significantly reduced; some unique systems would be at high risk; the risks of combined ocean warming and acidification would become high, and, for some phenomena such as mass coral bleaching, very high; and crop production would be at high risk with some potential for adaptation. Many more moderate and high risks would emerge: indigenous people would be at risk of loss of land and cultural and natural heritage, and cultural practices embedded in livelihoods would be disrupted. The IPCC expert named as damage the residual risk that remains with a 2 °C temperature rise accompanied by 'high' adaptation.*

- *Unique and threatened systems would be at high risk, in particular systems with limited or barely any adaptive capacity (e.g. Arctic sea ice and coral reefs)*
- *Extreme weather events would pose a high risk for human health, urban housing and infrastructure in megacities, also in relation to the urban heat island effect, air pollution and differential vulnerabilities; displacement and permanent migration; livelihood struggles and conflict in resource-dependent livelihoods, such as agriculture and pastoralism; and high impacts on livelihood (trapped populations are more vulnerable to environmental change because of their inability to move)*
- *The risks will be increasingly unevenly distributed, and are generally greater for disadvantaged people and communities in countries at all levels of development; populations that experience shifts from transient to chronic poverty and related social marginalization and food insecurity; and the elderly, children, the socially marginalized, and outdoor workers, who are disproportionately at risk from heat stress*
- *Global aggregate impacts show a moderate economic impact, but these aggregates may mask impacts across sectors and regions (evaluations are incomplete, in part because they do not take into account large-scale singular events affecting several sectors at once or other effects from disrupted interdependencies);*
- *The risk of large-scale singular events, such as the disintegration of ice sheets in Greenland and Antarctica, would be moderate.*