# Information paper from the IG Science on possible messages on the IPCC and from the IPCC's Special Report on Global Warming of 1.5°C

## Introduction

- The IPCC Special Report on 1.5°C global warming (SR1.5)[1, 2] was accepted and its Summary for Policy Makers adopted line by line by governments at the 48th session of the IPCC in Incheon, Republic of Korea. The report was released on 8 October 2018.
- This document provides possible messages on the role of the IPCC and of the Special Report on Global Warming of 1.5°C as well as messages from the draft SR1.5 which could be communicated by MS in the IPCC process. EU MS do not coordinate positions within the IPCC, and this document is intended to be a helpful background document for MS for their communication on the SR1.5. The document has been developed by the IG Science upon invitation by the WPIEI on 04/07/2018 and updated after the approval of the report to be distributed to EGMIT, EGA, EGC and WPIEI for information.
- All MS have committed to the Paris Agreement, and it is therefore in our common interest that the SR1.5 provides relevant information to support the Talanoa Dialogue (TD) and policy makers worldwide.
- The possible messages provided are based on the approved Summary for Policy Makers of the report including its headline statements that taken together provide an overview of the key findings. It reflects the IG Science's assessment of the most relevant information from the SR1.5.

## Possible Messages on the Role of the IPCC and of the Special Report on Global Warming of 1.5°C

- The role of the IPCC is to assess in a comprehensive, objective, open and transparent matter the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. IPCC reports are neutral with respect to policy, although they may need to deal objectively with scientific, technical and socio-economic factors relevant to the application of particular policies[3].
- The SR1.5 is a key scientific input for the Talanoa Dialogue as a moment for building shared understanding on how to achieve the Paris Agreement's long-term mitigation goal. The SR1.5 will also provide information that is relevant for the individual MS's in the context of national climate policy debates.
- The Summary for Policy Makers of the SR1.5 is the key tool to communicate the findings of the report and will be an important product in its own right. Its relevance will profit from focused, high-level messages from the report to governments and stakeholders.

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1 IPCC SPECIAL REPORT ON GLOBAL WARMING OF 1.5°C: An IPCC special report on the impacts of global warming of 1.5ºC above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

2 The SR1.5 is prepared by the IPCC on invitation by COP21 (decision UNFCCC/1/CP.21).The IPCC plenary has broadened the scope of the report by providing the context as reflected in its title: "IPCC Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty" (decision IPCC/XLIV-4). For more information about the SR1.5, see http://ipcc.ch/report/sr15/.

3 See Principles Governing IPCC Work http://ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf

**Possible Messages from the IPCC's Special Report on 1.5°C global warming**

**1. Where are we?**

- Human activities have caused global warming of approximately 1°C above pre-industrial levels. Regional warming over land is higher than the global average in many land regions, in particular the Arctic which experiences a two to three times higher warming than the global average.
- If the current warming rate of about 0.2 °C per decade continues, human-induced warming will exceed 1.5°C between 2030 and 2052.
- Warming from anthropogenic emissions will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, but these past emissions alone are unlikely to cause global warming of 1.5°C.
- In model pathways that limit warming to 1.5°C (2 °C) $CO_2$ emissions decline by about 45 % (20 %) from 2010 levels by 2030 reaching net zero around 2050 (2075). Non-CO2 emissions show deep reductions that are similar in 1.5 °C and 2 °C pathways.
- Fulfilling the current pledges under the Paris Agreement () will not be sufficient to limit global warming to 1.5°C even if supplemented by very challenging increases in the scale and ambition of mitigation after 2030. The greenhouse gas emissions resulting from the current NDCs of about 50-58 Gt $CO_2$eq in 2030 would be about twice as high as in 1.5°C pathways .
- The remaining carbon budget for a one-in-two chance of limiting global warming to 1.5°C is about 770 Gt $CO_2$ for a one-in-two chance and 570 Gt CO2 for a two-in-three chance. These estimates are larger than those estimated in the AR5[4] and they are subject to an uncertainty that is of a similar size as the budget estimates themselves. Further updates can be expected as research progresses, but with current emissions of about 42 Gt $CO_2$ per year the budget for 1.5°C would be depleted in less than two decades.

**2. What are the benefits from limiting warming to 1.5°C?**

- Risks depend on the rate, peak and duration of warming. Risks are higher in pathways where the temperature exceeds 1.5 °C before returning back to 1.5 °C (overshoot), especially if the peak temperature is high.
- Tipping could be triggered around 1.5°C to 2°C of global warming. This includes risk of irreversible loss of many ecosystems or ice sheet instabilities that could result in multi-meter rise in sea level over hundreds to thousands of years.
- Risks are significantly lower for natural and human systems for a global warming of 1.5°C than for 2°C, including the frequency and intensity of extremes, impacts on terrestrial and marine biodiversity, ecosystems and their services, health, livelihoods, food and water supply, human security, infrastructure, and economic growth.
- However, limits to adaptation and associated losses exist even for 1.5°C warming with site-specific implications for vulnerable regions and populations. Some impacts will continue beyond 2100, like sea level rise, or be irreversible, even if we limit warming to 1.5°C.

**3. How can we limit global warming to 1.5°C?**

- The transformation required for 1.5°C is qualitatively very similar to that for 2°C, but more pronounced and faster over the coming decades. These systems transitions are unprecedented and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options.
- All 1.5°C-compatible reduction pathways require a radical reduction in CO2 emissions, with net-zero CO2 emissions around the middle of the century and concurrent deep reductions in emissions of non-CO2-forcers, particularly methane and black carbon. 1.5°C-pathways are

[4] The choice of the measure of global temperature affects the estimated remaining carbon budget. Using global mean surface air temperature, as in AR5, gives an estimate of the remaining carbon budget of 580 Gt $CO_2$ for a 50% probability of limiting warming to 1.5°C, and 420 GtCO2 for a 66% probability

characterized by far-reaching transitions in energy, land, urbane (transport and building) and industrial systems-. Low energy demand, low material consumption and low GHG-intensive food consumption facilitate limiting warming to as close as possible to 1.5°C. Limiting global warming to 1.5°C would require timely enhanced action by countries and non-state actors and unprecedented system transitions , in terms of scale, but not of speed, during the coming one to two decades

- If temperatures rise beyond 1.5°C, CO2 would need to be removed from the atmosphere, later in the century, to return the temperature back to 1.5°C following an overshoot. Limitations of the speed, scale and social acceptability, determine the ability to return back to 1.5°C-. The higher the temperature overshoot (i.e., larger exceedance of the carbon budget), the greater the reliance on negative emissions technologies, unproven to work at large scale.
- All pathways that limit global warming to 1.5°C contain the use of carbon dioxide removal (CDR) on the order of 100–1000 GtCO2 over the 21st century. CDR would be used to compensate for residual emissions and, in most cases, achieve net negative emissions to return global warming to 1.5°C following a peak. CDR deployment of several hundreds of GtCO2 is subject to multiple feasibility and sustainability constraints. Significant near-term emissions reductions and measures to lower energy and land demand can limit CDR deployment to a few hundred GtCO2 without reliance on bioenergy with carbon capture and storage (BECCS).

**4. How can we limit climate change to 1.5°C and foster sustainable development?**

- Synergies and conflicting goals with sustainable development depend heavily on the mitigation and adaptation portfolio. Actions by governmental and non-state actors that work across sectors and scales are enabled by change, such as gender, finance, technology and transfer. Mitigation consistent with 1.5°C global warming pathways is associated with multiple synergies across a range of UN SDGs; while the total number of possible synergies exceeds the number of trade-offs..
- Climate-resilient development pathways (CRDPs) are pathways that aim at limiting warming to 1.5°C while adapting to its consequences and simultaneously achieve sustainable development. CDRPs require a massive boost of near term mitigation action to avoid impacts due to further warming, in particular temperature overshoot and associated risks, and to decrease the dependence on CDR-technologies. Such pathways would entail lower transitional challenges after 2030 due to a smaller pace and magnitude of change in the long term. CDRPs emphasize low energy demand, low material consumption, and low emission-intensive food consumption. .
- International cooperation, strengthening the institutional capacities of national, subnational and local actors from civil society, the private sector, , local communities and indigenous peoples, as well as the consideration of poverty reduction and equity are central to CRDPs.