For Our Environment

New Findings of the IPCC Special Report “Global Warming of 1.5°C

23 November 2018, 10:30 to 12:00 CET

Hosted by Kati Mattern
Section I 2.1 Climate Protection
The role of the German Environment Agency in the IPCC processes

**Development of the report**

- **Preparation**
  - Proposals authors / topics, Research and Development projects, participation as experts

- **Review by the government**
  - Commenting, consolidating

- **Post processing**
  - Policy advice, information of the general public

**Adoption of the reports in IPCC negotiations**

- **Preparation**
  - Supporting the formulation of the German position

- **Negotiations**
  - Acceptance of agenda items, participation in working groups

- **Postprocessing**
  - Supporting the information of federal ministries

Source: UBA, 2018
TOP I Background of the IPCC Special Report “Global Warming of 1.5°C” (SR 1.5)
Background of the IPCC Special Report “Global Warming of 1.5 °C”
TOP II  Policy relevant findings of SR 1.5 regarding the effects of 1.5 and 2°C on the climate system, environment and society
Change in the risk assessment for the reasons for concern in SR 1.5

Impacts and risks associated with the Reasons for Concern (RFCs)

- **RFC1**: Unique and threatened systems
- **RFC2**: Extreme weather events
- **RFC3**: Distribution of impacts
- **RFC4**: Global aggregate impacts
- **RFC5**:Large scale singular events

**Global mean surface temperature change**
- Relative to pre-industrial levels (°C)
- Levels:
  - **H**: Very high
  - **M**: High
  - **M-H**: Moderate
  - **IM**: Undetectable

**Level of additional impact/risk due to climate change**
- **Purple**: Indicates very high risks of severe impacts/risk and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risk.
- **Red**: Indicates severe and widespread impacts/risk.
- **Yellow**: Indicates that impacts/risks are detectable and attributable to climate change with at least medium confidence.
- **White**: Indicates that no impacts are detectable and attributable to climate change.

Source: IPCC SR1.5, SPM.2
TOP II
Policy relevant results of SR 1.5 regarding the effects of 1.5 and 2°C on the climate system, environment and society

Examples for risk assessments in SR 1.5

Impacts and risks for selected natural, managed and human systems

Coral Reefs
- Total loss at + 2.0 °C
- 70-90% loss at + 1.5 °C

Fisheries
- Lower reduction of fishery fees at + 1.5 °C
- (Reduction of losses up to 50% at + 1.5 °C)

Arctic Region
- Increased risk of permafrost and Greenland ice sheet at + 2.0 °C

Global Sea Level Rise
- By 2100 about 0.1 m lower increase at + 1.5 °C than at + 2.0 °C

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Food Security
- Stable crop yields and lower risk for livestock at + 1.5 °C

Source: IPCC SR1.5, SPM.2, modified
TOP III  Policy-relevant findings of SR 1.5 in relation to climate protection
Necessary emission reductions for different time horizons

<table>
<thead>
<tr>
<th></th>
<th>1.5 degrees scenarios</th>
<th>2 degrees scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decrease by 2030</strong></td>
<td>-45% (-40 to -60%) compared to 2010</td>
<td>-20% (-10 to -30%) compared to 2010</td>
</tr>
<tr>
<td><strong>Reaching net zero</strong></td>
<td>~ 2050 (2045 – 2055)</td>
<td>~ 2075 (2065 – 2080)</td>
</tr>
</tbody>
</table>

Source: IPCC SR 1.5, SPM.2, modified
Breakdown of contributions to global net CO₂ emissions in four illustrative model pathways

1. **P1: LED low energy demand (limited / without exceeding)**
   - Innovations in different areas result in lower energy demand up to 2050.
   - Living standards rise, especially in the global South.
   - Down-sized energy system enables rapid decarbonisation.
   - Afforestation is the only CDR option considered.

2. **P2: Nachhaltigkeitsorientiert (begrenzte oder ohne Überschreitung)**
   - Broad focus on sustainability:
     - Energy intensity, human development, economic convergence.
     - Shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems.
   - Limited societal acceptability for BECCS.

3. **P3: Mittlere Herausforderung (begrenzte oder ohne Überschreitung)**
   - Societal as well as technological development follows historical Patterns.
   - Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

4. **P4: Ressourcen- und energieintensives Szenario (erhebliche Überschreitung (fast 2°C))**
   - Resource and energy-intensive Scenario:
     - Economic growth and globalization lead to widespread adoption of greenhouse-gas intensive lifestyles.
     - Emissions reductions are mainly achieved through technological Means (CDR, BECCS).

Source: IPCC SR1.5, SPM 3b, modified
Current State

2100 WARMING PROJECTIONS
Emissions and expected warming based on pledges and current policies

- Historical
- Baseline: 4.1 – 4.8°C
- Current policies: 3.1 – 3.7°C
- Pledges: 2.6 – 3.2°C
- 2°C consistent: 1.5 – 1.7°C
- 1.5°C consistent: 1.3 – 1.5°C

Quelle: climateactiontracker.org
Which need for action arises from the necessary emission reductions?

### Global Primary Energy Supply in 1,5C Compatible Pathways

<table>
<thead>
<tr>
<th>Energy carrier (primary energy)</th>
<th>Median 2020</th>
<th>Range 2020</th>
<th>Median* 2030</th>
<th>range* 2030</th>
<th>Median 2050</th>
<th>range 2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewables</td>
<td>15%</td>
<td>11-20%</td>
<td>28%</td>
<td>27-37%</td>
<td>61%</td>
<td>28-88%</td>
</tr>
<tr>
<td>Coal</td>
<td>26%</td>
<td>17-31%</td>
<td>10%</td>
<td>3-24%</td>
<td>5%</td>
<td>0-13%</td>
</tr>
<tr>
<td>Oil</td>
<td>34%</td>
<td>28-42%</td>
<td>35%</td>
<td>16-43%</td>
<td>16%</td>
<td>3-27%</td>
</tr>
<tr>
<td>Gas</td>
<td>23%</td>
<td>18-28%</td>
<td>24%</td>
<td>7-28%</td>
<td>13%</td>
<td>3-35%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>2%</td>
<td>1,5-3,4%</td>
<td>3%</td>
<td>2,8-6%</td>
<td>4%</td>
<td>0-14%</td>
</tr>
</tbody>
</table>

* Relative shares after own calculation of absolute values for 2030 in SPM Table 2.6

Source: Primary energy in 1.5C pathways (Table 2.6 SPM; modified)
What need for action arises from the necessary emission reductions?

Source: UBA, 2018
Implications for the EU? – the UBA perspective

Re-aligning the EU Climate Policy to the Paris Agreement

- greenhouse gas-neutrality by 2050
- enabling environment to strengthen 2030 NDC to reductions towards 60% and more (rel. to 1990) to minimize cumulative emissions adequately & exemplarily
- compensating residual emissions only by CDR or additional reduction measures outside the EU
- market mechanisms (Article 6 PA) only to contribute to additional climate ambition abroad.
- high-level engagement by the EU Council

Source: UBA, 2018
TOP III Feedback, Questions and Answers

Communication of policy-relevant contents of SR 1.5 degrees
TOP IV Policy-relevant findings of SR 1.5 regarding the implementation of policy options in the context of sustainable development
Climate-resilient development pathways

- **Today's world**: None, Some, All
- **Business-as-usual**
- **Societal transformation**
- **Achieving the SDGs**
- **Lower emissions**
- **Limiting global warming (°C)**

Source: SR1,5 Kapitel 5 FAQ 5.2
Do we need a limitation to 1.5 degrees global warming to achieve the SDGs?

Effects of global warming up to 1.5 °C

→ significant consequences for the achievement of SDGs
  (e.g. coral reefs)

Limitation to 1.5 °C global warming

→ avoidance of further negative impacts
  or significant reduction (e.g. Reasons for Concern)

Implementation of the SDGs is significantly facilitated by a limitation to 1.5 °C global warming.

Source: UBA, 2018
Impact of climate change measures on sustainable development

Energy Supply
- Trade-offs
- Synergies

Energy Demand
- Trade-offs
- Synergies

Land
- Trade-offs
- Synergies

Quelle: IPCC SR 1.5, SPM.4
Impact of Carbon Dioxide Removal measures on sustainability

Measures to remove CO$_2$ from the atmosphere (CDR) can lead to resource conflicts, depending on the type and scale of the measure (e.g. for water, energy, land, nutrients)

Large-scale use of bioenergy and CCS (BECCS) or afforestation can lead to land use conflicts (food security, ecosystem functions)

Some CDR measures can enable synergies with Sustainable Development Goals (eg. carbon sequestration in soils, restoration of ecosystems)

Measures to reduce pressure on land resources can reduce conflicting goals (e.g. reduced post-harvest food loss)

UBA views rapid mitigation as essential to minimize CDR implementation and related conflicts.

Source: UBA, 2018
Supporting the rapid transition towards a sustainable climate-resilient development

Enabling factors (SR 1.5):
International cooperation - a critical factor in empowering developing and vulnerable regions
Strengthening capacities to act at all levels and with all actors
Use policy instruments for accompanying measures to ensure climate justice

Example:
Sharing of knowledge on adaptation

Example:
Improving effective action at municipal level
TOP IV Feedback, Questions and Answers
New Findings of the SR 1.5 degrees - Summary and Outlook

- **Risks** for climate system, nature and humans between 1.5 °C and 2 °C global warming **higher than previously known.**

- 1.5 °C-compatible emission pathways require **radical reduction** of greenhouse gas emissions worldwide in the next decade. Existing climate protection commitments under the Paris Agreement are insufficient.

- All emission pathways usually involve the **removal of CO₂ from the atmosphere** to a considerable extent with unproven risky technologies.

- Exceeding warming by more than 1.5 °C and the dependency on large scale use of CO₂ depletion can only be avoided if global CO₂ emissions begin to drop **well before 2030.**

- Synergies and goal conflicts with **sustainable development** depend on the reduction and adaptation portfolio.

- Implementation of the rapid social transformation is supported by **improved governance.**
UBA: Communicating policy-relevant information of IPCC SR 1.5

Policy advice

Webinar 1
(26/10/2018)
Experts supporting decision making

Webinar 2
(23/11/2018)
German Experts in the context of climate negotiations

Webinar 3
(03/2019)
Multipliers

Informing the public

Source: UBA, 2018
Thank you for your attention!

German Environment Agency – Climate Protection Section

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https://www.umweltbundesamt.de/themen/klima-energie/klimawandel