CLIMATE CHANGE 2014

Mitigation of Climate Change

Climate Change Adaptation and Mitigation: Key messages from IPCC’s AR5
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Working Group III contribution to the IPCC Fifth Assessment Report
Exploring the solution space

Working Group III contribution to the IPCC Fifth Assessment Report
IPCC reports are the result of extensive work of many scientists from around the world.

1 Summary for Policymakers
   1 Technical Summary

16 Chapters
235 Authors
900 Reviewers
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GHG emissions accelerate despite reduction efforts. Most emission growth is CO$_2$ from fossil fuel combustion.

Figure SPM.1
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Cumulative CO$_2$ emissions have more than doubled since 1970.

Figure TS.2
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Regional patterns of GHG emissions are shifting along with changes in the world economy.

Figure TS.3
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National per-capita GHG emissions are highly variable within and between income groups.

Figure TS.4
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A growing share of CO₂ emissions from fossil fuel combustion and industrial processes in low and middle income countries has been released in the production of goods and services exported, notably from upper-middle income countries to high income countries.

Figure TS.5

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GHG emissions rise with growth in GDP and population; long-standing trend of decarbonisation of energy reversed.

Figure SPM.3
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Without more mitigation, global mean surface temperature might increase by 3.7° to 4.8°C over the 21st century.

Figure SPM.4
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Mitigation requires major technological and institutional changes including the upscaling of low- and zero carbon energy.

Figure SPM.4
Working Group III contribution to the IPCC Fifth Assessment Report
In cost-effective 2°C mitigation strategies, emissions have peaked and emission levels in 2030 tend to be lower than today.

Figure SPM.5
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Delayed mitigation

Cost-effective mitigation

50 GtCO₂e
Delayed mitigation significantly increases the challenge to reach low concentration targets

GHG Emissions Pathways to 2030

Figure SPM.5
Working Group III contribution to the IPCC Fifth Assessment Report
Delayed mitigation significantly increases the challenge to reach low concentration targets

Current Cancun Pledges imply increased mitigation challenges for reaching 2°C

Figure SPM.5
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Estimates for mitigation costs vary widely.

• Reaching 450ppm CO$_2$eq entails consumption losses of 1.7% (1%-4%) by 2030, 3.4% (2% to 6%) by 2050 and 4.8% (3%-11%) by 2100 relative to baseline (which grows between 300% to 900% over the course of the century).

• This is equivalent to a reduction in consumption growth over the 21st century by about 0.06 (0.04-0.14) percentage points a year (relative to annualized consumption growth that is between 1.6% and 3% per year).

• Cost estimates exclude benefits of mitigation (reduced impacts from climate change). They also exclude other benefits (e.g. improvements for local air quality).

• Cost estimates are based on a series of assumptions.
Limited availability of technologies increases costs.

Figure TS.13
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Mitigation can result in large co-benefits for human health and other societal goals.

Figure TS.14
Figure 12.23
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Mitigation requires changes throughout the economy. Efforts in one sector determine mitigation efforts in others.

Figure SPM.7
Working Group III contribution to the IPCC Fifth Assessment Report
Substantial reductions in emissions would require large changes in investment patterns.

Figure SPM.9
Working Group III contribution to the IPCC Fifth Assessment Report
Since AR4, there has been an increased focus on policies designed to integrate multiple objectives, increase co-benefits and reduce adverse side-effects.

- Sector-specific policies have been more widely used than economy-wide policies.
- Regulatory approaches and information measures are widely used, and are often environmentally effective.
- Since AR4, cap and trade systems for GHGs have been established in a number of countries and regions.
- In some countries, tax-based policies specifically aimed at reducing GHG emissions—alongside technology and other policies—have helped to weaken the link between GHG emissions and GDP.
- The reduction of subsidies for GHG-related activities in various sectors can achieve emission reductions, depending on the social and economic context.
Climate change is a global commons problem that implies the need for international cooperation.
Effective mitigation will not be achieved if individual agents advance their own interests independently.

- Existing and proposed international climate change cooperation arrangements vary in their focus and degree of centralization and coordination.
- Issues of equity, justice, and fairness arise with respect to mitigation and adaptation.
- Climate policy may be informed by a consideration of a diverse array of risks and uncertainties, some of which are difficult to measure, notably events that are of low probability but which would have a significant impact if they occur.