Climate change is a global commons problem.
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
More than 2000 pages
Close to 10,000 references
More than 38,000 comments
GHG emissions growth has accelerated despite reduction efforts.
GHG emissions growth between 2000 and 2010 has been larger than in the previous three decades.
About half of cumulative anthropogenic CO$_2$ emissions between 1750 and 2010 have occurred in the last 40 years.

Based on Figure 5.3
The wide-scale application of available best-practice low-GHG technologies could lead to substantial emission reductions.
Examples from power supply: Many technologies exist to reduce GHG emissions, but do so to different degrees.

Some Mitigation Technologies for Electricity Generation

Emission Intensity [gCO₂/kWh]

- Solar Photovoltaic - Utility Scale
- Dedicated Biomass
- Pulverized Hard Coal with CCS
- Nuclear
- Wind Onshore
- Gas Combined Cycle
- Hydropower
- Pulverized Hard Coal

2010 Average Intensity
2030 Average Intensity
2050 Average Intensity

* Median Value in Mitigation Scenarios (430-530 ppm CO₂ eq by 2100)

1 In gCO₂/kWh: Based on Lifecycle Emissions
Costs of many power supply technologies decreased substantially, some can already compete with conventional technologies.

Some Mitigation Technologies for Electricity Generation

<table>
<thead>
<tr>
<th>Emission Intensity [gCO₂/KWh]</th>
<th>Cost of Electricity [USD_{2010}/MWh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
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<tr>
<td>800</td>
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</tbody>
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- Max
- 75%
- Median
- 25%
- Min

2200

2010 Average Intensity 2030 Average Intensity 2050 Average Intensity

Solar Photovoltaic - Utility Scale
- Dedicated Biomass
- Pulverized Hard Coal with CCS
- Nuclear
- Wind Onshore
- Gas Combined Cycle
- Hydropower
- Pulverized Hard Coal

* Median Value in Mitigation Scenarios (430-530 ppm CO₂ eq by 2100)
1 In gCO₂/kWh: Based on Lifecycle Emissions
2 Levelized Cost of Electricity in USD_{2010}/MWh: Based on High Full Load Hours

Based on Figure 7.7
Fossil and Biomass Gasification to power or liquid fuels
Large uncertainties – need data and assessments on integrated operating plants at scale, monitoring overall performance
Private costs of reducing emissions in transport vary widely. Societal costs remain uncertain.

Some Mitigation Technologies for Light Duty Vehicles

Options in 2010

- Emissions Intensity
- Mitigation Cost

Options in 2030

- Emissions Intensity
- Average Intensities of 2010 Stock

1 Levelized cost of conserved carbon; calculated against 2010 new gasoline (2030 optimized gasoline) for 2010 (2030) options. Mitigation cost are based on point estimates ±100 USD\(_{2010}/t\text{CO}_2\) and are highly sensitive to assumptions.

Based on Figure TS.21
Limiting warming to 2°C involves substantial technological, economic and institutional challenges.
Stabilization of atmospheric concentrations requires moving away from the baseline – regardless of the mitigation goal.
Mitigation involves substantial upscaling of low-carbon energy.

Based on Figure 7.16
Delivering mitigation is estimated to increase the difficulty and narrow the options for limiting warming to 2°C.
Mitigation cost estimates vary, but do not strongly affect global GDP growth.
Global costs rise with the ambition of the mitigation goal.

Based on Table SPM.2
Availability of technology can greatly influence mitigation costs.

Based on Figure 6.24
Low stabilization scenarios are dependent upon a full decarbonization of energy supply in the long term.
Mitigation requires changes throughout the economy. Efforts in one sector determine mitigation efforts in others.

Figure SPM.7. Direct emissions of CO₂ by sector and total non-CO₂ GHGs (Kyoto gases) across sectors in baseline (left panel) and mitigation scenarios that reach around 450 (430–480) ppm CO₂ eq with CCS (middle panel) and without CCS (right panel). The numbers at the bottom of the graphs refer to the number of scenarios included in the range which differs across sectors and time due to different sectoral resolution and time horizon of models. Note that many models cannot reach 450 ppm CO₂ eq concentration by 2100 in the absence of CCS, resulting in a low number of scenarios for the right panel [Figures 6.34 and 6.35]. [Subject to final quality check and copy edit.]
Decarbonization of energy supply is a key requirement for limiting warming to 2°C.

Based on Figure 7.11
Energy demand reductions can provide flexibility, hedge against risks, avoid lock-in and provide co-benefits.

Based on Figure 7.11
Reducing energy demand through efficiency enhancements and behavioural changes are a key mitigation strategy.
Mapping policy pathways to allow for iterative learning process
References

From www.mitigation2014.org

(1) Summary for Policymakers and (2) Final Draft Report (some edits)

Chapter 7. Energy Systems

Chapter 11. Agriculture, Forestry, and Other Land Use includes bioenergy Appendix
Bioenergy Appendix and other authors wrote a review article that shows disagreements to levels of bioenergy higher than those presented in the bulk of this presentation.


Agriculture chapter authors prior publication:

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