



# Mitigation of Climate Change < 2

IPCC fifth Assessment Working Group 3 report -Climate Change 2014



wbcd climate & energy



# IPCC Fifth Assessment Working Group 3 report Mitigation of Climate Change

The IPCC Fifth Assessment reports include new evidence of climate change, based on a growing number of independent scientific analyses that indicate: a greater than 95% certainty that human influence is the main cause of global warming; climate change is already occurring on all continents and across the oceans; the world is largely unprepared for climate change; and mitigation must start now, with the whole world together.

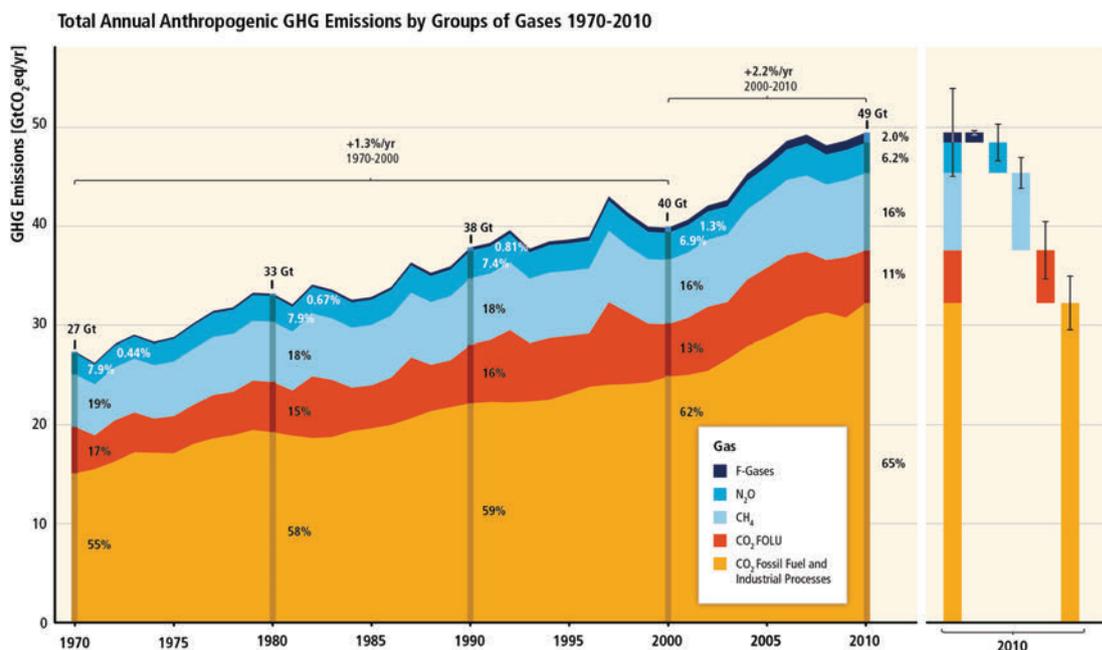
## Important messages from WBCSD

**Climate change is no longer a potential risk; it's a reality.**

- **The time for actions is now.** There is no time to lose. A suite of mitigation options are still available, but delaying action will reduce the potential options, make the task to keep global warming under 2 degrees more difficult, and increase the transitional and longer term impacts.
- **The time for leadership is now.** Governments and business leaders should urgently scale up action to mitigate emissions and to prepare for more frequent and unpredictable extreme events. We need a broad set of low carbon technologies

combined in different ways that work for different countries. International cooperation including global carbon pricing would accelerate their deployment.

- **The time for business solutions is now.** The WBCSD's Action2020 Climate Change business solutions are aligned with the IPCC's reports. The Climate Change Must-Have is backed by the same science. Keeping global warming below 2°C is going to require massive transformation of the energy and industry systems. Slippage towards 3°C make the transformation no less formidable. Action2020 business solutions contribute to this transformation (Table 1).



## Where are we headed?

- **Toward 6 degrees...**Global GHG emissions rose more rapidly between 2000 and 2010 than during previous decades. Current GHG emissions trends are at the high end of projected levels for the last decade and reached 49 GtCO<sub>2</sub>eq in 2010. GHG emissions grew on average 2.2% per year between 2000 and 2010 compared to 1.3% per year over the entire period 1970 to 2000.
- Gradual decarbonisation of the world's energy supply over 2000-2010 reversed in recent years, driven by economic and population growth, and increased use of coal.
- Ethical issues of wellbeing, justice, fairness, and rights and responsibilities will be part of the political discussions and choices to be made.
- The **fundamental drivers of emissions growth will persist** if there are no explicit efforts to reduce GHG emissions, despite major improvements in energy supply and end-use technologies.

## The task at hand

- The majority of scenarios that lead to atmospheric concentration levels between 450 ppm CO<sub>2</sub>eq and 500 ppm CO<sub>2</sub>eq in 2100 – considered a necessary condition to contain warming to 2 degrees – are characterized by 2030 emissions roughly between 30 to 50 GtCO<sub>2</sub>eq and reducing sharply thereafter. Emissions in 2010 **were at 49 GtCO<sub>2</sub>eq**.
- Reaching atmospheric concentrations of 430-530 ppm by 2100 will **require large scale changes in the global energy system and cuts in GHG emissions** over the coming decades.
- The reductions needed imply three to four times as much zero- and low-carbon energy supply in the system – from renewables, nuclear and fossil fuel with CCS by 2050 compared to 2010.

- Significant efforts to mitigate climate change **need to start immediately**. Delaying action to 2030 significantly decreases the likelihood of staying below 2 degrees warming compared to starting in 2020. Another decade of delay will **increase the challenges, reduce options and increase costs**.

## There is hope...mitigation options exist...which align with WBCSD business solutions

- **Mitigation options that will limit peak concentrations and cumulative emissions over the course of the century are critical.**
- **The IPCC sees systemic and cross-sectoral approaches – which the WBCSD's Climate Change solutions are – as likely to be the most cost-efficient** and effective means of addressing emissions. The IPCC's integrated models identify the following categories, which align with our business solutions: decarbonisation of the energy supply including CCS, final energy demand reductions and switching to low-carbon fuels, including electricity, in the energy end use sectors and the availability of carbon dioxide removal technologies.
- **Cities as opportunities.** There is a window of opportunity in next two decades for urban mitigation, because most of the world's urban areas and their infrastructure have yet to be constructed.
- Avoidance of infrastructure lock-in, demand reductions and behavioural changes will also be important contributors to mitigation efforts.
- Transport, Buildings, and Industry options revolve around energy supply, intensity and efficiency approaches coupled with lifestyle changes. Agriculture and forestry options revolve around forest management, reducing deforestation, improved soil carbon and a role for bioenergy.

## Positive change since AR4 in 2007 Bright spots in the story

- The availability of **energy efficiency policy portfolios and their implementation have advanced considerably since AR4.** Building codes and appliance standards have been shown to be the most effective instruments. In some developed countries they contributed to a stabilization or reduction in total building energy use. This shows that WBCSD efforts on Energy Efficiency in Buildings (EEB) is an important area where scaling up can have a significant impact.
- **Good news from the biosphere.** Since AR4, emissions from AFOLU (agriculture, forestry and other land use) have stabilized and the share of anthropogenic emissions has decreased. This trend set to continue; net annual baseline CO<sub>2</sub> emissions from AFOLU are projected to decline over time, with emissions potentially less than half of the 2010 level by 2050 and the possibility of the terrestrial system becoming a net sink before the end of century.

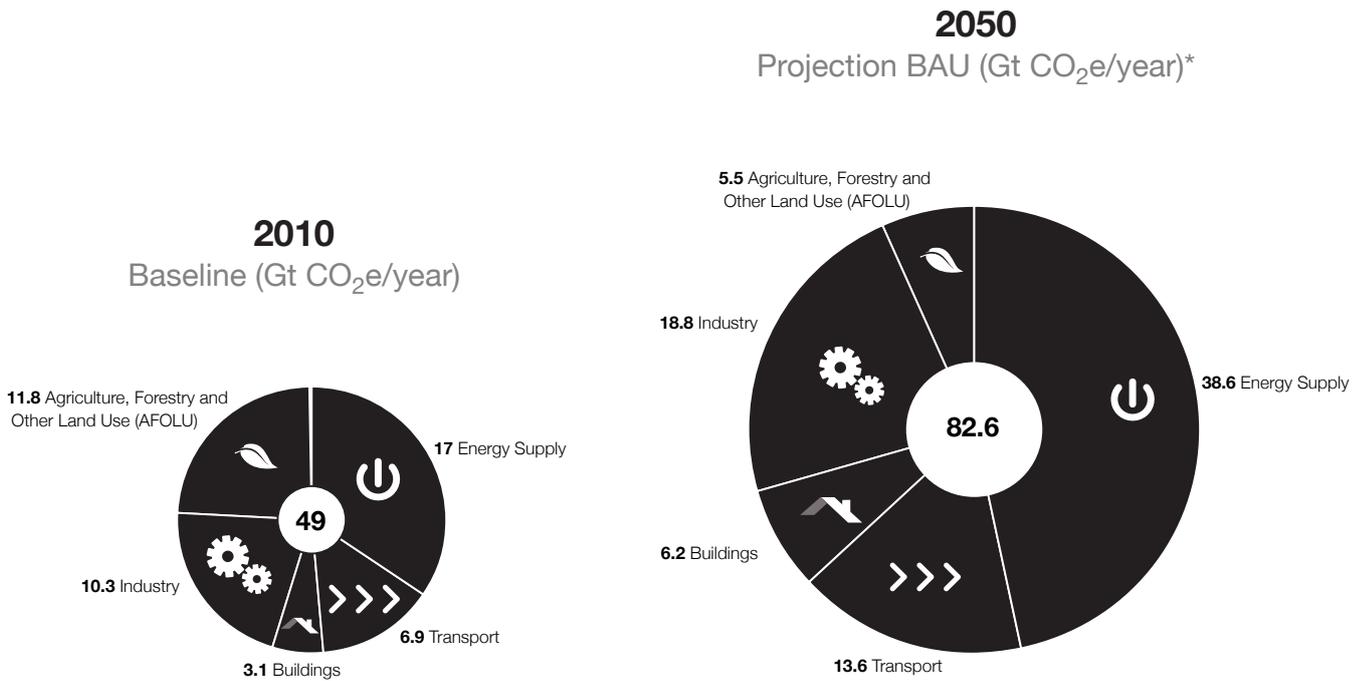
## Particular challenges

- **Additional challenge presented by industry.** Industry related emissions will continue to grow, just as they did over the past few decades, unless action is taken. Direct and indirect CO<sub>2</sub> emissions from industry are projected to increase from 13 GtCO<sub>2</sub> per year in 2010 by 50-150% in 2050, unless energy intensity improvements can be significantly accelerated beyond the historical development. Emissions from industry are larger than emissions from either the buildings or transport end-use sectors and represented just over 30% of global GHG emissions in 2010.
- A transformation to a low-carbon economy implies new patterns of investment. Massive shifts in investment from conventional technologies in energy supply sector (a reduction of US\$ 30 billion annual spending) to low carbon electricity supply (increase of US\$ 147 billion annual spending).

## Some policy observations from IPCC observations

- **Narrow policy making.** There has been a proliferation of narrow sector specific policies although economy-wide market-based policies are generally more cost-effective. Main cause: political economy obstacles.
- **Lack of policy coordination.** IPCC recognizes that adding a mitigation policy to another may not necessarily enhance mitigation. For instance, if a cap and trade system has a sufficiently stringent cap then other policies such as renewable subsidies have no further impact on total emissions.
- **Technology policies are needed.** There is a distinct role for technology policy as a complement to other mitigation policies. Technology policy includes technology-push (e.g., publicly funded R&D) and demand-pull (e.g., governmental procurement programs). Such policies address market failures particularly related to innovation and early demonstration and deployment.
- **Carbon pricing** such as cap & trade systems can achieve mitigation in a cost effective way, while tax-based policies aimed at reducing emissions, together with technology and other policies have helped decouple emissions from growth objectives.
- **Enabling institutional frameworks.** A country's broader context—including the efficiency of its institutions, security of property rights, credibility of policies and other factors—have a substantial impact on whether private firms invest in new technologies and infrastructures. Those same broader factors have large impacts on whether and where investment occurs in response to mitigation policies.
- **Key role of private sector.** IPCC recognises that the private sector plays a central role in mitigation within an appropriate enabling environment. In 2010 and 2011, about 74% of global mitigation finance came from the private sector.

**Disclaimer** –This publication is an information document prepared with due care and diligence based on the IPCC WG III report and press conference. It does not reflect the views of WBCSD members.



Mitigation levers IPCC for 450 ppm scenario

Action2020 Business Solutions

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**Energy Supply**
  - Renewables
  - Nuclear
  - Highly efficient natural gas CCPP or CHP
  - CCS
  - Bio energy with CCS
  
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**Transport**
  - Energy efficiency and vehicle performance
  - Integrated urban and transport planning
  - Low carbon fuels
  
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**Buildings**
  - New buildings: very low energy building codes
  - Existing buildings: retrofits and heating/cooling en. reduction
  - Behavioral change
  
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**Industry**
  - Reduce energy intensity through BAT and innovation
  - Energy efficiency
  - Material efficiency
  - Recycling/re-use of materials and products
  - Product/service demand reduction
  - Non-CO<sub>2</sub> GHGs reduction
  - Waste management: reduction, re-use, recycling and energy recovery
  
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**Agriculture, Forestry Land Use**
  - Forestry: Afforestation, Sustainable forest management, Reducing deforestation
  - Agriculture: Cropland management, Grazing land management, Restoration of organic soils
  - Demand-side: Diet changes, Supply chain food loss reduction
  - Bioenergy
  
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**Human Settlements, Infrastructure and Spatial Planning**
  - Mutually reinforcing policies
  - Co-locating high residential with high employment densities
  - High diversity and integration of land uses
  - Increasing accessibility and investing in public transport
  - Other demand management measures
  - Compared to 2010 by 2050 (-56.5%) by 2100 (-98%)\*

- Electrifying Cities towards Zero Emissions
- Low Carbon Electrification of Remote Areas
- Scaling up Renewables in the Electricity Sector
  
- Carbon Capture and Storage
  
- Sustainable Mobility
  
- Energy Efficiency in Buildings
  
- Carbon Capture and Storage Utilization
  
- Forests as Carbon Sinks
  
- Global Leadership for Sustainable Cities: C20-C30-C40
- Electrifying Cities towards Zero Emissions

business solutions for a sustainable world

**World Business Council for Sustainable Development**

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