Global Warming of 1.5°C

An 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.





Where are we now?

Since pre-industrial times, human activities have caused approximately 1°C of global warming.

- Already seeing consequences for people, nature and livelihoods
- At current rate, would reach 1.5°C between 2030 and 2052
- Past emissions alone do not commit the world to 1.5°C

MENTAL PANEL ON CLIMATE CHA





What are the implications?

- National ambitions expressed in the last three years will not be enough on their own to limit global warming to 1.5°C
- Currently tracking towards 3°C by 2100, with warming continuing afterwards
- In all pathways that limit global warming to 1.5°C with no or limited overshoot, CO₂ emissions fall substantially by 2030



Gerhard Zwerger-Schoner / Aurora Photos

Different pathways and mitigation strategies could limit global warming to 1.5°C







Limiting warming to 1.5°C

Would require rapid, far-reaching and unprecedented changes in all systems

- → A range of technologies and behavioural changes
- Scale up in annual investment in low carbon energy and energy efficiency by factor of five by 2050
 - Renewables supply 70-85% of electricity in 2050
- Coal declines steeply, ~zero in electricity by 2050
- Oil and especially gas persist longer gas use rises by 2050 in some pathways
- Deep emissions cuts in transport and buildings
- Changes in land use and urban planning





1,5°C? Mind the Enabling Conditions

4.1. Strenghtening action in a specific macroeconomic context

- Do 'we' talk of a 'virtual world in a context of short term world tensions: nationalistic drifts embarking the discontents of the globalization, fear of migrations, exacerbated unequalities ...
- Use climate action as a lever to reducing the 'fault lines' of the world economy (R. Rajan)
 - gap between propensity to save and propensity to invest ->
 - fragility of the financial intermediation system (tragedy of the horizons)
 - Too export dependent development strategy in developing countries after the Asian Crisis; A large funding gap on infrastructures (IMF)
 - the traps of non targetted 'quantitative easing' and of 'growth austerity'
- Towards a new growth regime?

• D4. Headline

• Limiting global warming of 1.5°C is characterised by system transitions that are projected to involve an increase of adaptation and mitigation investments, and an overall redirection of world investments. Challenges include mobilising public finances and private savings, and reducing the sectoral and geographic mismatch between capital flows and financial needs. Addressing these challenges, and designing fit-for purpose synergetic policy instruments, can help strengthen the global response to the threat of climate change, and *manage the* potential adverse effects of these transitions (high *confidence*). Adaptation finance continues to be a serious knowledge gap. {2.3, 2.4, 2.5, 3.2, 4.2, 4.4, 4.5}

D 4.1. Limiting global warming of 1.5°C in the context of sustainable development and poverty reduction, is projected to involve additional investments in infrastructure sectors (e.g. energy, transportation, buildings, water and telecommunication) estimated annually (between 2015 and 2035) to about 0.6% of global GDP) (medium confidence). They could also involve an overall redirection of investments within these sectors, over the next two decades and reducing the sectoral and geographic mismatch between capital flows and financial needs. In the energy sector, this is characterised by a 15% increase of the investments assessed for achieving the NDCs and a doubling of investment in low-carbon energy technologies, energy efficiency and energy storage. Over the same period, investments in conventional fuel supply chains are projected to be 20% lower than current levels (medium confidence). {2.5.2, 4.4.5, Box 4.8}

D 4.2. Mobilising these additional investments implies *redirecting an estimated 2.5% of world* savings, towards low carbon investments. Both public and private investment will be needed. *Derisking these low carbon investments*, is key to increase their volume and facilitate the greater involvement of financial sector actors. This would enable mitigation activities to access to capital markets at low interest rates, and enable the emergence of new low-carbon asset classes. (high *confidence*) {2.5.2, 4.4.5}

• D4.3. Adaptation finance consistent with global warming of 1.5°C is difficult to quantify and compare with 2°C. Knowledge gaps include insufficient data to calculate specific climate resilience-enhancing investments, as in the provision of currently underinvested basic infrastructure. Estimates of the costs of adaptation may be lower at global warming of 1.5°C than for 2°C. But this would be higher than the USD 22.5 billion (2014) estimates of bilateral and multilateral funding for climate change adaptation (medium confidence). Currently, 18–25% of climate finance flows to adaptation in developing countries (high *confidence*) {4.4.5, 4.6}

D4.4. The overall systems transition could be enabled by *policy* packages that mitigate the adverse impacts of higher marginal cost of abated emissions, in projected 1.5°C pathways, on growth and social welfare (*high confidence*) {1.3.3, 2.3.4, 2.3.5, 2.5.1.}. These policy packages imply an *evolution of the fiscal and financial systems* : explicit or implicit carbon pricing, reforms of the subsidies and other pricing policies (real estates, land, tolls), de-risking devices, new financial products. They should strengthen the efficacy of associated enabling policies that include performance standards, technology policies and transfers, and financial instruments to derisk investments. They could also include *compensating transfers* and facilitating finance to new low-carbon asset classes. Cross-Chapter Box 8 in Chapter 3 and 11 in Chapter 4, 2.5.1, 2.5.2, 4.4.5, 5.5.2}

How much mitigation investment in energy and other infrastructure? (Source: Box 4.8)

Estimated annualized mitigation investment (2015-2035 in Trillion US\$ 2010MER)

	Energy investments	Of which demand side	Transport	Other infra- structures	Total	Ratio to MER GDP
IAM Baseline (mean)	1.96	0.24		· · · ·	1.96	1.8%
IAM NDC (mean)	2.04	0.28			2.04	1.9%
IAM 2°C (mean)	2.19	0.38			2.19	2.1%
IAM 1.5°C (mean)	2.32	0.45			2.32	2.2%
IEA NDC	2.40	0.72	0.35		2.40	2.3%
IEA 1.5°C	2.76	1.13	0.55		2.76	2.7%
Mean IAM-IEA, 1.5°C	2.38	0.54			2.38	2.53%
Min IAM-IEA, 1.5°C	1.38	0.38			1.38	1.6%
Max IAM-IEA, 1.5°C	3.25	1.13			3.25	4.0%
OECD Baseline	1.91	0.36	2.46	1.37	5.74	5.4%
OECD 2°C	2.13	0.40	2.73	1.52	6.38	6.0%

Finance and overall public policies

- integrated *fiscal and financial policy packages* needed to enhance the efficacy to the investment shifts and mitigate the adverse welfare and growth impacts of a 3-4 times higher marginal cost of abated emissions, *mind the 'propagation effect'!!!!*

- these fiscal and financial policies may *include* carbon pricing, reduction of fossil fuel subsidies, and other synergistic policies (including real estate and land pricing) and de-risking instruments (public guarantees, feed-in tariffs etc...)

- they will *reinforce the efficacy of performance standards*, R&D policies and technology transfers

- they shoud include *compensating transfers* (direct and indirect) and facilitation of the *access to new low-carbon asset classes*

- Some of these policy packages depend upon *sovereign decisions of countries* however *sub-sovereign initiatives* are needed and *international coordination/cooperation* is critical to enhance their overall efficacy