Trends and Drivers in Global Energy Investment

Chairman, Intergovernmental Panel on Climate Change

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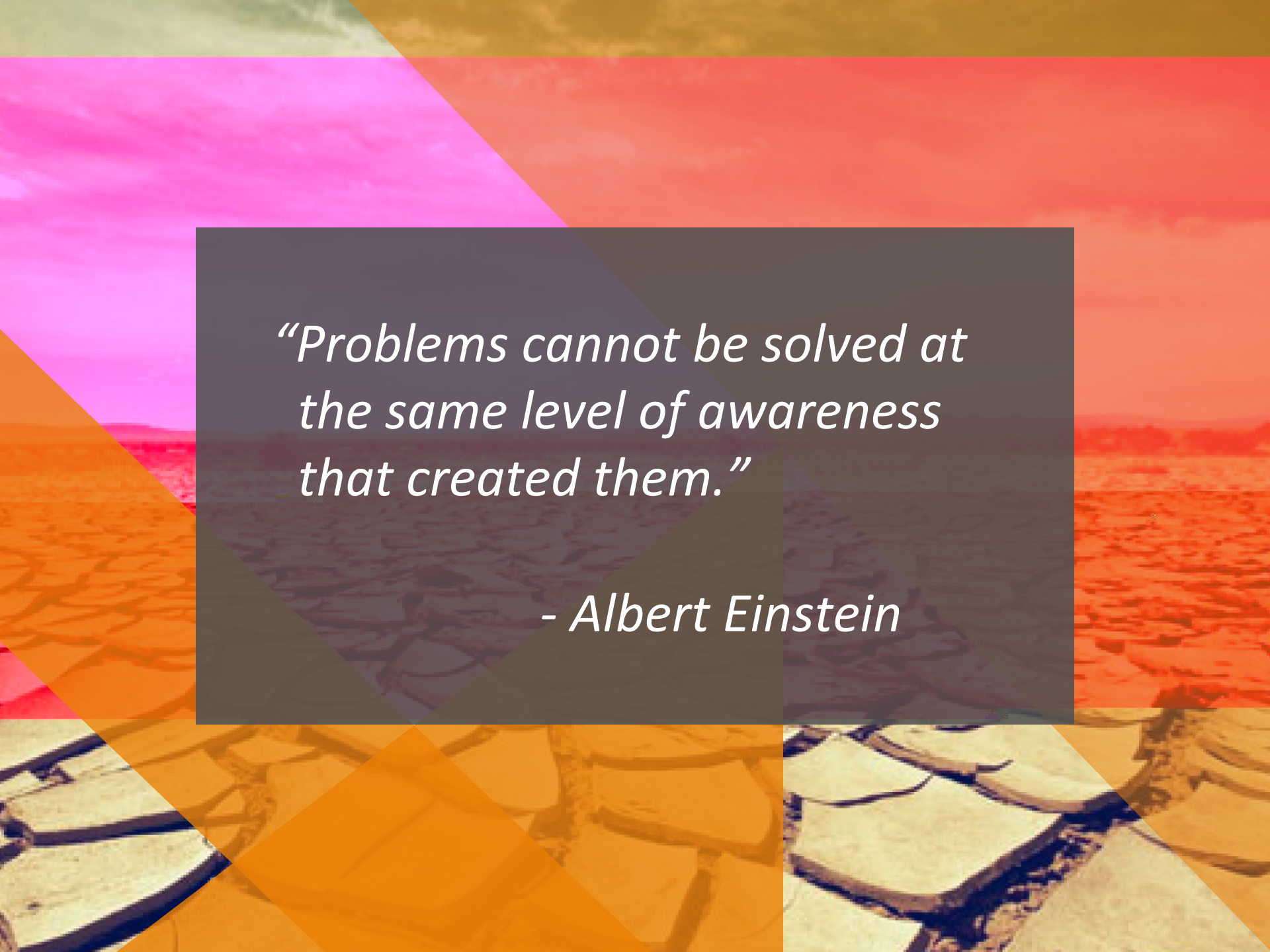
“Problems cannot be solved at the same level of awareness that created them.”
- Albert Einstein

Human influence of the climate system is clear

Understanding the causes

Source : IPCC AR5

- 95% certainty that human influence has been the dominant cause of the observed warming since the mid-20th century
- Since the 1950s, many of the observed changes are unprecedented over decades to millennia.
- Limiting climate change will require sustained and substantial reductions in greenhouse gas emissions

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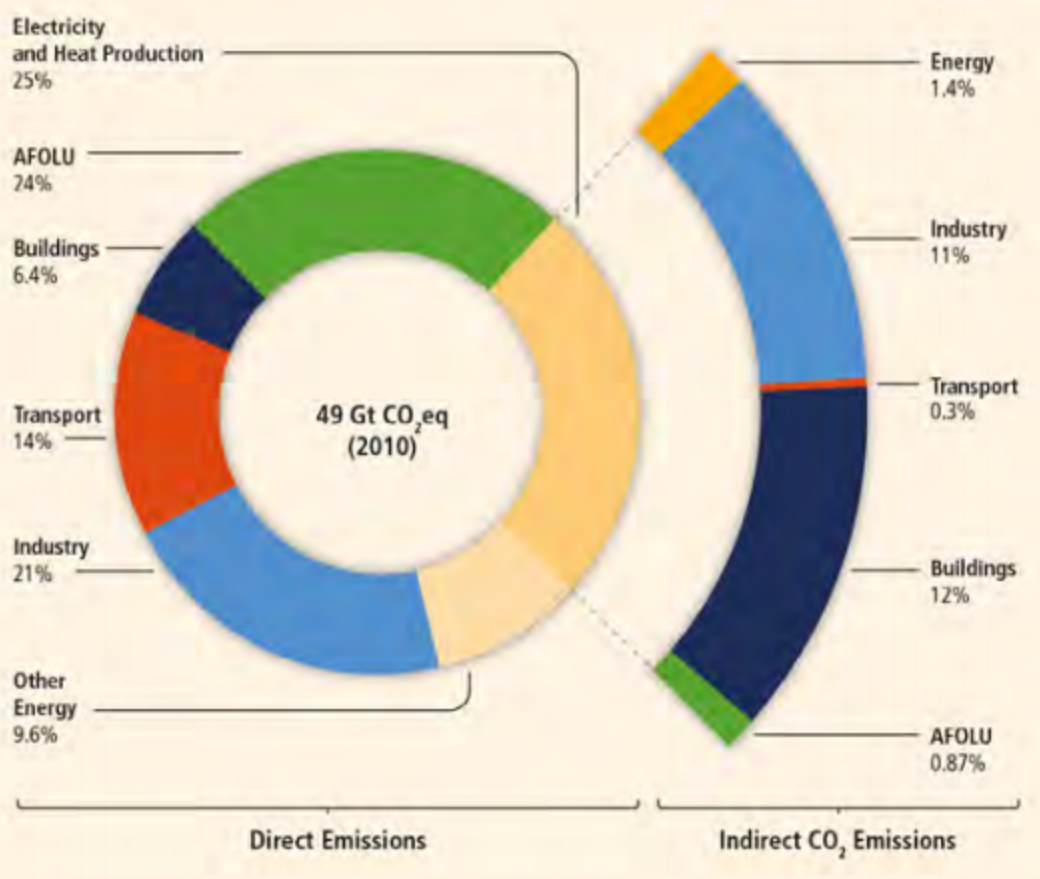
Trends in GHGs and their drivers

Total anthropogenic GHG emissions were the highest in human history from 2000 to 2010

Greenhouse gas emissions by economic sectors



- Economic and population growth are the main drivers of increases in CO2 emissions from fossil fuel combustions.
- They will continue to drive emissions growth if no additional efforts to reduce GHG emissions are implemented.

Source : IPCC AR5

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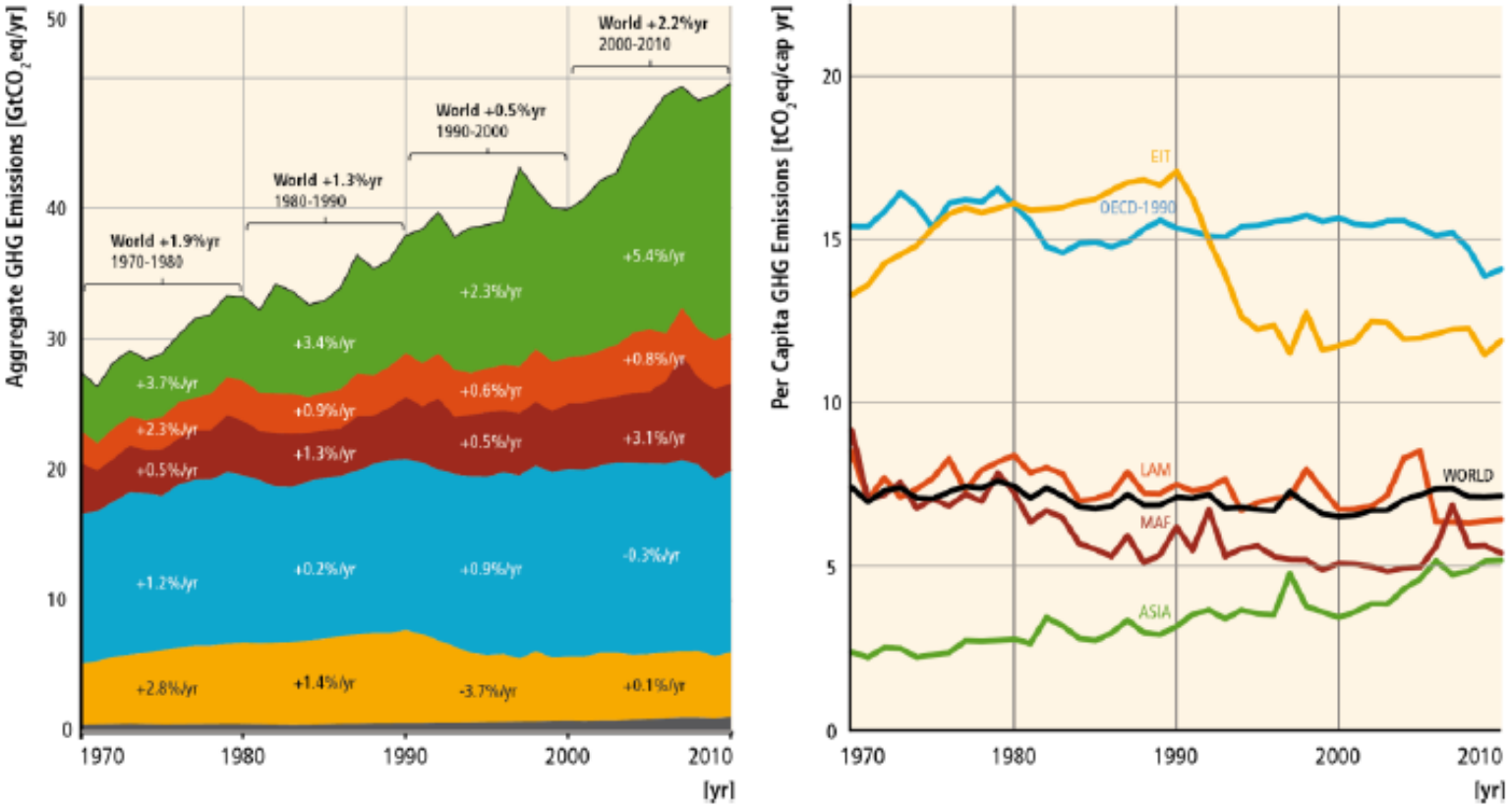
Trends in GHGs and their drivers

GHG emissions have grown in every region over the last 40 years: 330% in Asia • 70% in Middle East and Africa • 57% in Latin America and Caribbean • 22% in OECD • 4% in EIT



WGIII Figure 5.2. Left panel: GHG emissions per region over 1970-2010, including fossil, agriculture and land-use/land-use change sectors, aggregated using 100-year GWP values. Right panel: The same data presented as per-capita GHG emissions.

Source : IPCC AR5

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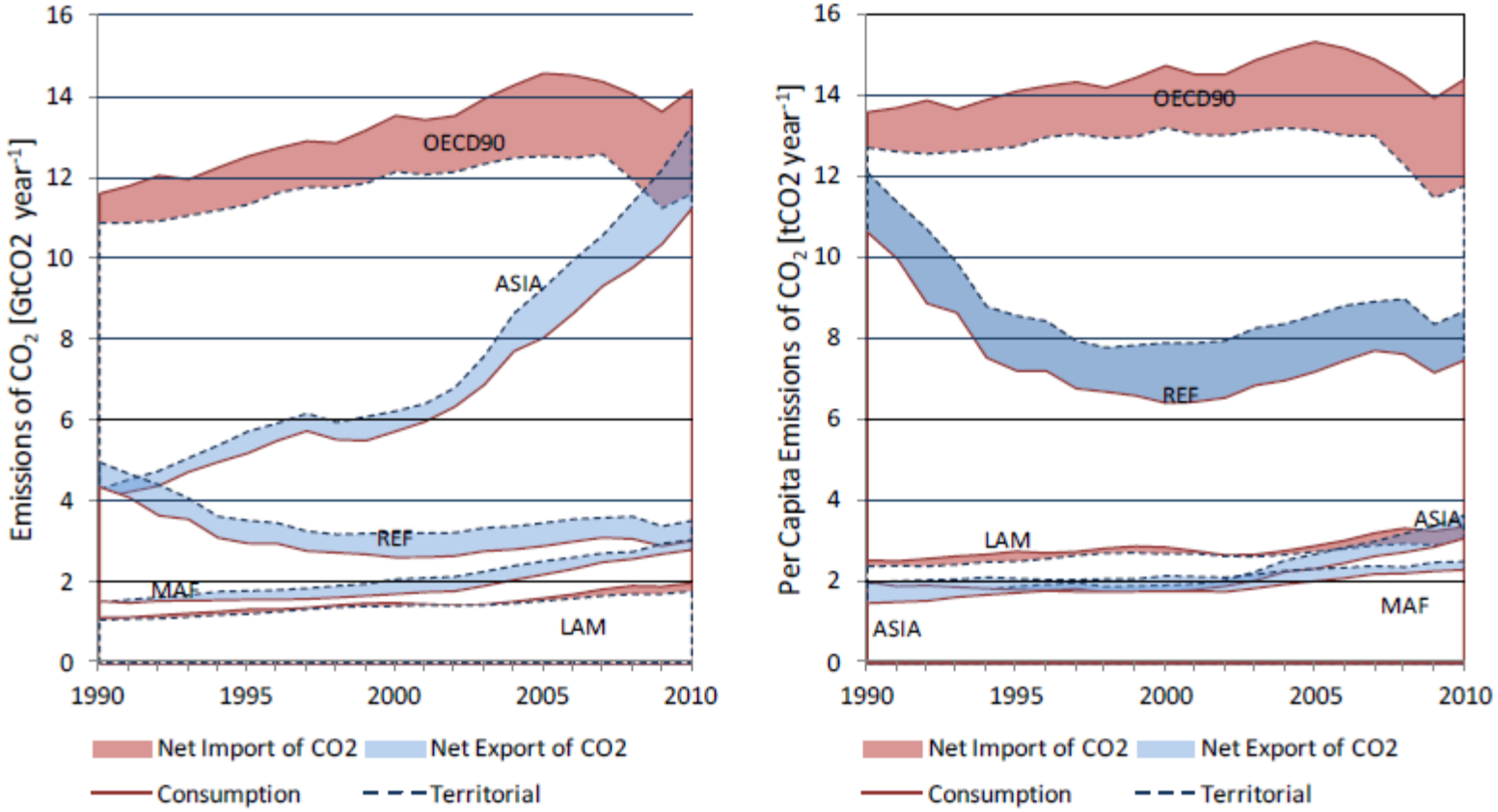
Territorial vs consumption-based emissions

A considerable share of CO2 emissions from fossil fuels combustion in developing countries is released in the production of goods exported to developed countries.

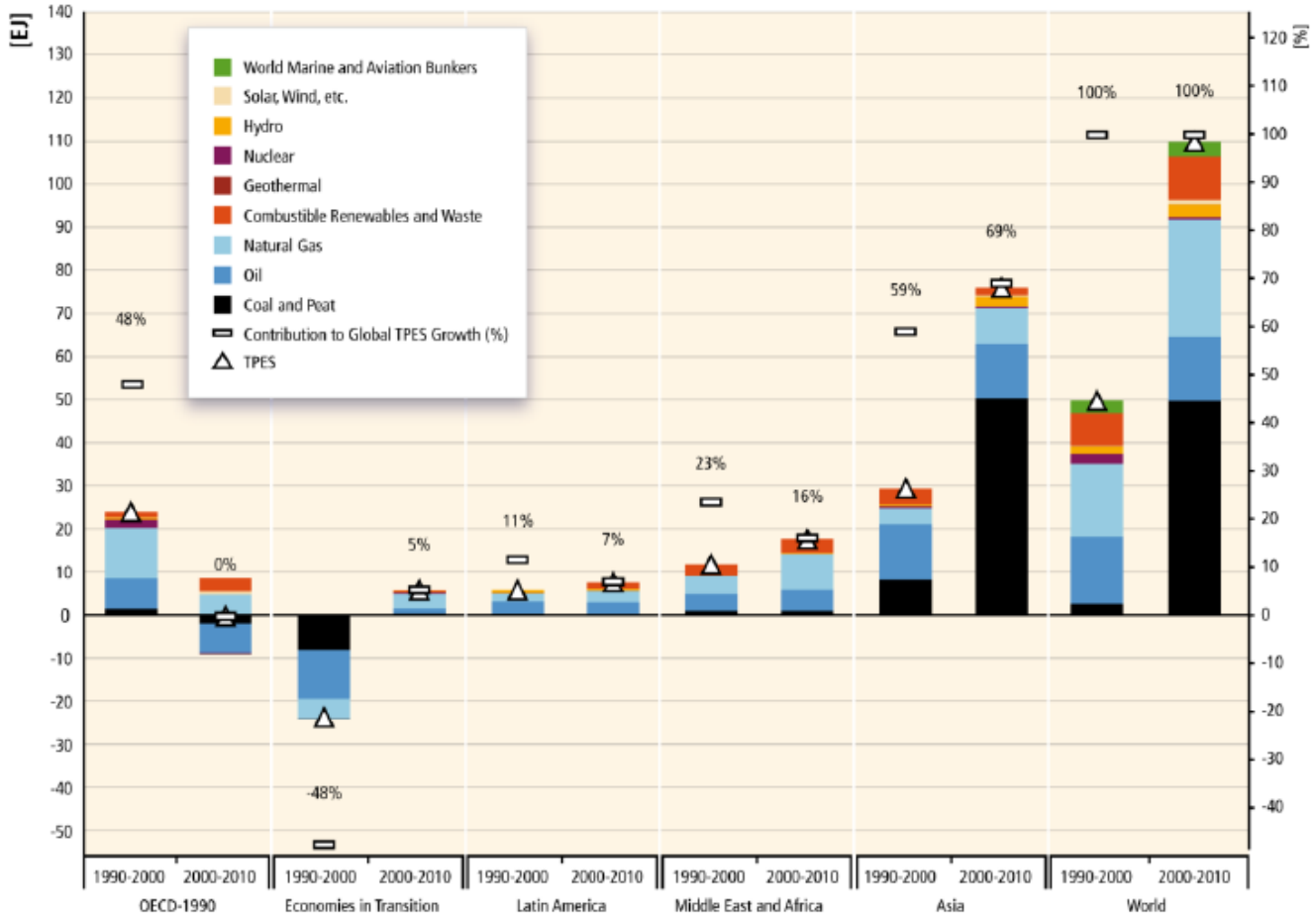


WGIII Figure 5.14. Territorial (blue dotted lines) versus consumption-based (red lines) emissions in five world regions, from 1990 to 2010. The left panel presents total emissions, while the right panel presents per capita emissions. The red areas indicate that a region is a net importer of embedded CO2 emissions. The blue area indicates a region is a net exporter of embedded CO2.

Source : IPCC AR5

Energy supply

Aside from becoming higher, energy demand poses many challenges for developing Asia in terms of its composition.



WGIII Figure 7.2. Contribution of energy sources to global and regional primary energy use *increments*. Notes: Modern biomass contributes 40% of the total biomass share.

Source : IPCC AR5

Impacts of climate change on the financial sector

Impacts of climate change will have real and significant effects on investments by introducing previously unforeseen risks.

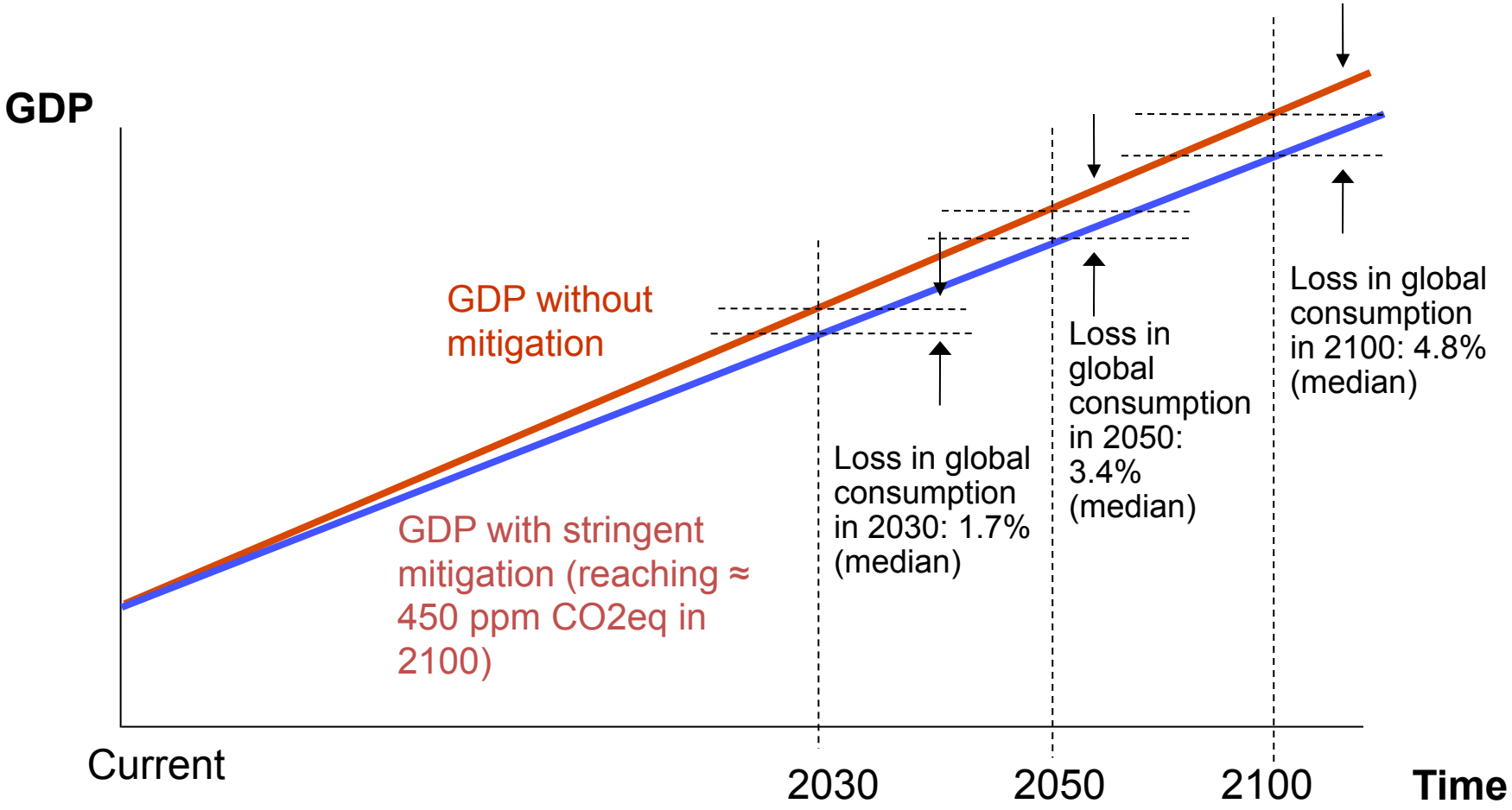
Climate change will affect all sectors of the economy. Risks relevant to investors and financial institutions include:

- Expected reduction in productivity and economic growth
- Direct physical impacts of climate change which will affect assets and investments
- Knock-on effects, such as threat to social stability posed by high and volatile food prices
- Impacts of policies to reduce GHGs from electricity generation, large industrial sources, transport and other economic sectors.

Source : IPCC AR5

Impacts of mitigation on GDP growth

Delaying additional mitigation further increases mitigation costs in the medium to long term



Source : IPCC AR5

Stringent mitigation scenarios

Characteristics of scenarios reaching levels of about 450 ppm CO2eq by 2100 (likely chance to keep temperature change below 2C relative to preindustrial levels):

- Lower global GHGs in 2050 than in 2010 (40% to 70% lower globally)
- Emissions levels near zero GtCO2eq or below in 2100
- More rapid improvements in energy efficiency
- A tripling to nearly a quadrupling of the share of energy supply from renewables by 2050
- Many scenarios reaching 450, 500 and 550 ppm CO2eq by 2100 require widespread deployment of BECCS, afforestation, and other CDR technologies post 2050

Source : IPCC AR5

Stringent mitigation scenarios

Emission patterns that limit temperature increase from pre-industrial level to no more than 2°C require considerably different patterns of investment.

Substantial shifts in annual investment flows during the period 2010 – 2029:

- annual investment in conventional fossil fuel technologies would decline by about USD 30 (2 – 166) billion (median: − 20 % compared to 2010)
- annual investment in low-carbon electricity supply (i. e., renewables, nuclear and electricity generation with CCS) would rise by about USD 147 (31 – 360) billion (median: + 100 % compared to 2010)
- annual incremental energy efficiency investments in transport, buildings and industry is projected to increase by about USD 336 (1 – 641) billion

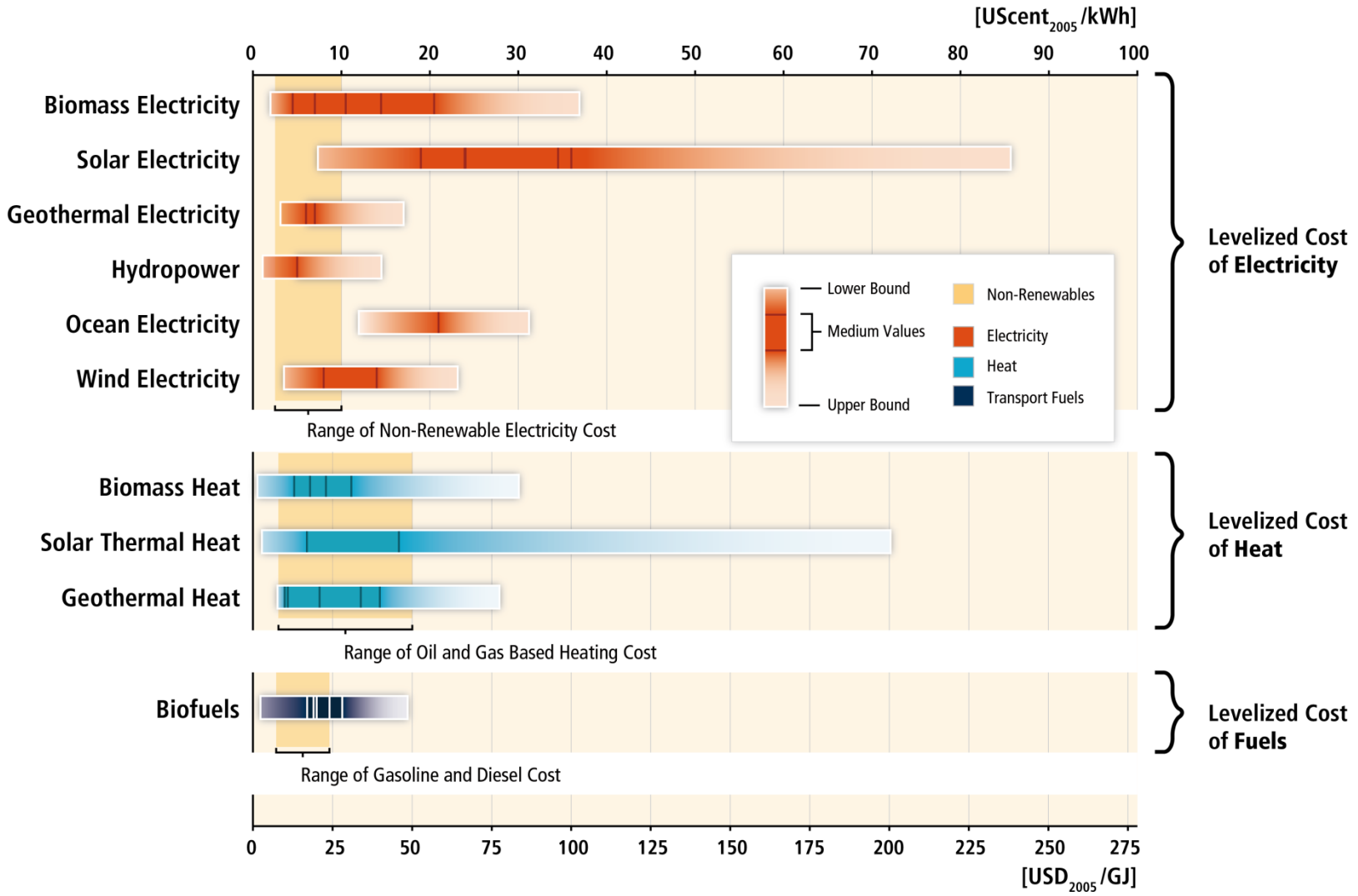
Source : IPCC AR5

Opportunities for the financial sector

- Approximately USD 340 billion was invested in mitigating climate change in 2011/12, with 62% of this amount provided by the private sector.
- Governments will look to the private sector to provide much of the capital required to respond to climate change.
- Private finance has a critical role to play in the transition to a low-carbon economy, which brings benefits such as improved energy security, enhanced employment and better air quality
- But willingness of private investors and financial institutions to provide this capital will depend on how they view the risks associated with policy and the incentives provided.

Source : IPCC AR5

RE costs are still higher than existing energy prices but in various settings RE is already competitive.



Source : IPCC SRREN

Co-benefits and adverse side effects

The intersections of mitigation and adaptation with other societal goals, if well managed, can strengthen the basis for undertaking climate action:

- Improved energy efficiency and security
- Cleaner energy sources
- Air quality and human health
- Reduced energy and water consumption in urban areas
- Sustainable agriculture and forestry
- Protection of ecosystems for carbon storage

Source : IPCC AR5

Climate change and sustainable development

Governing a transition toward an effective climate response and SD pathway is a challenge involving rethinking our relation to nature.

- A stable climate is one component of SD.
- Limiting the effects of climate change is necessary to achieve SD and equity, including poverty eradication.
- Designing an effective climate policy involves “mainstreaming” climate in the design of SD strategies.
- Options for equitable burden-sharing can reduce the potential for the costs of climate action to constrain development.

Source : IPCC AR5

“Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it’s the only thing that ever has.”

- Margaret Mead

“Speed is irrelevant if you are going in the wrong direction”

- Mahatma Gandhi