IPCC Fifth Assessment Report Synthesis Report - Topic 4: Adaptation and Mitigation

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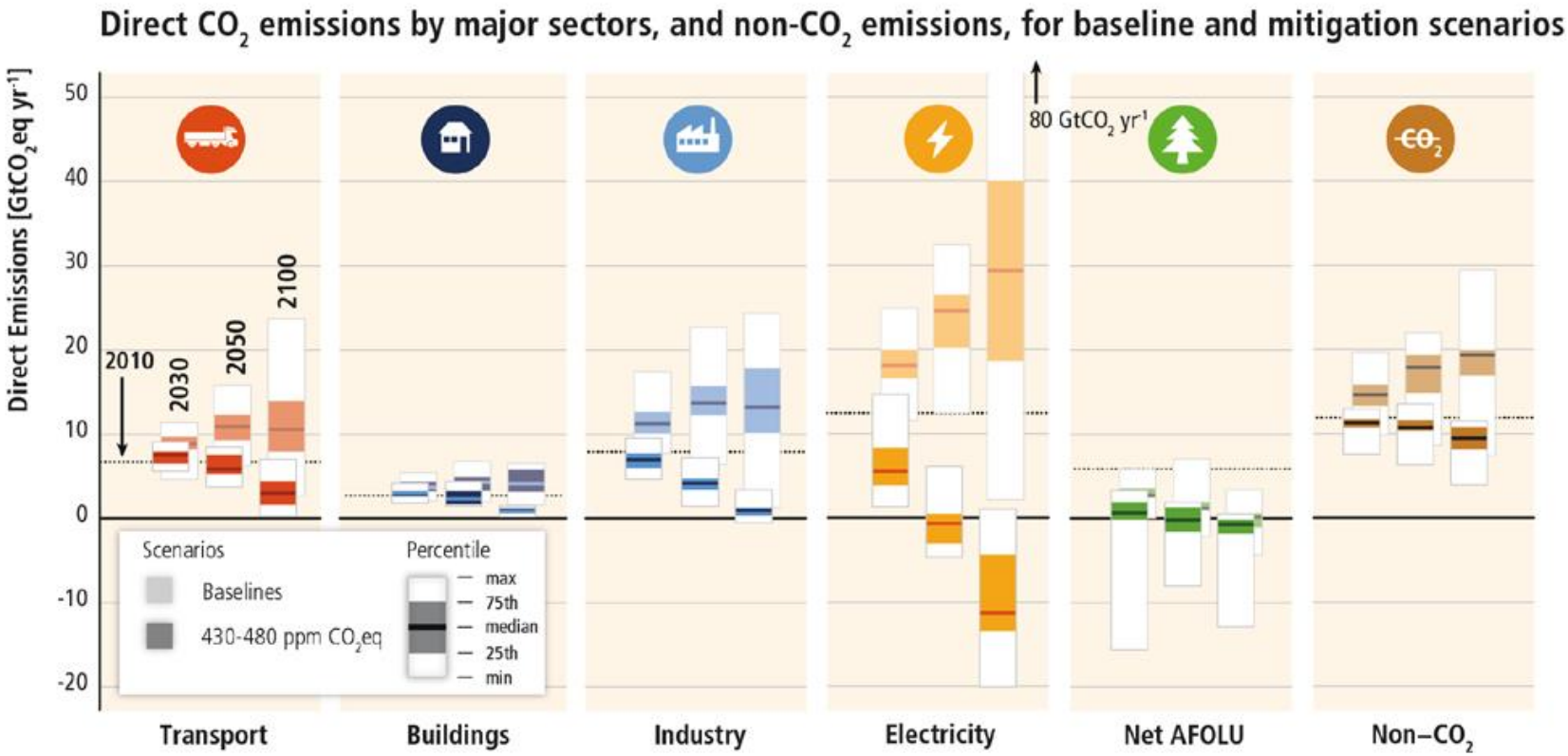
IPCC SYR TOPIC 4: ADAPTATION AND MITIGATION

- **Many adaptation and mitigation options can help address climate change, but <u>no single option is sufficient by itself</u>.**

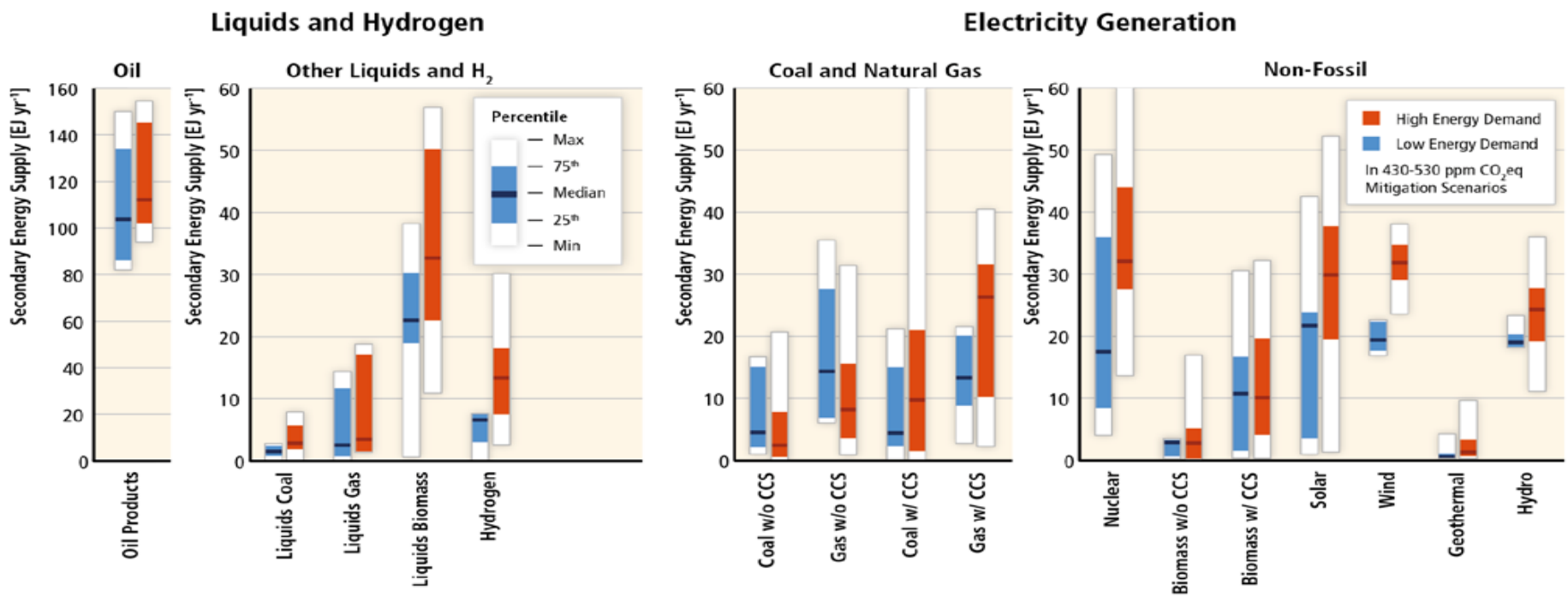
- **Effective implementation depends on <u>policies and cooperation at all scales</u>, and can be enhanced through <u>integrated responses</u> that link adaptation and mitigation with other societal objectives.**

Well-designed systemic and cross-sectoral mitigation strategies are more cost-effective in cutting emissions than a focus on individual technologies and sectors, with efforts in one sector affecting the need for mitigation in others.



CO_2 emissions by sector and total non-CO2 GHGs (Kyoto gases) across sectors in baseline (faded bars) and mitigation scenarios (solid colour bars) that reach about 450 ppm CO2-eq concentrations in 2100 (Fig SYR SPM.14)

Near-term reductions in energy demand are an important element of cost-effective mitigation strategies, provide more flexibility for reducing carbon intensity in the energy supply sector, hedge against related supply-side risks, avoid lock-in to carbon-intensive infrastructures, and are associated with important co-benefits



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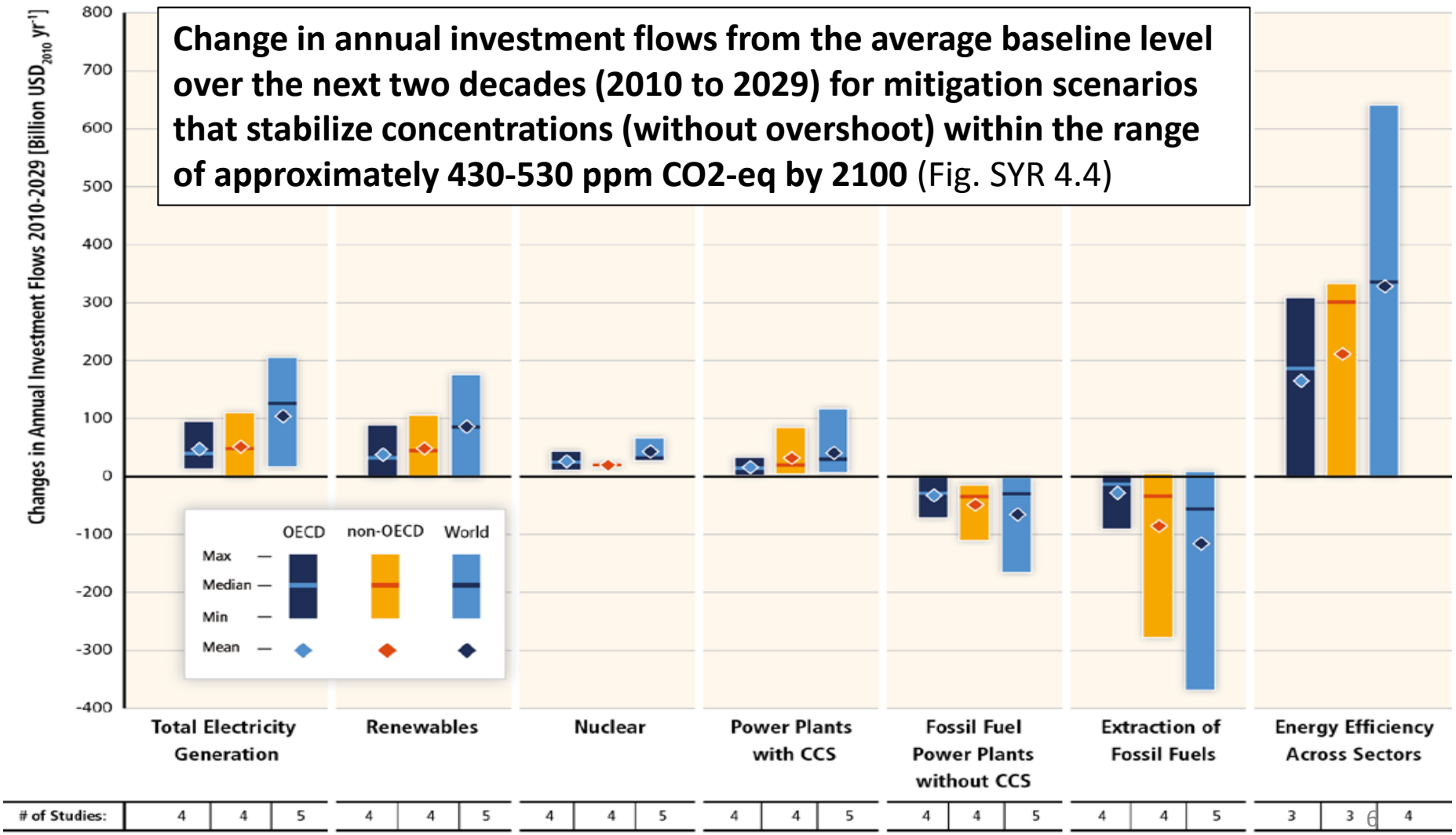
High energy demand scenarios show higher levels of oil supply.	In high energy demand scenarios, alternative liquid and hydrogen technologies are scaled up more rapidly.	High energy demand scenarios show a more rapid up-scaling of CCS technologies but a more rapid phase-out of unabated fossil fuel conversion technologies.	In high energy demand scenarios non-fossil electricity generation technologies are scaled up more rapidly.

Influence of energy demand on the deployment of energy supply technologies in 2050 in mitigation scenarios reaching 450 - 500 ppm CO2-eq concentrations by 2100 (Fig. SYR 4.2).

ENABLING FACTORS

- **Adaptation and mitigation responses are underpinned by common enabling factors. These include:**
  - **effective institutions and governance,**
  - **innovation and investments in environmentally sound technologies and infrastructure,**
  - **sustainable livelihoods, and**
  - **behavioral and lifestyle choices.**

Substantial reductions in emissions would require large changes in investment patterns



Change in annual investment flows from the average baseline level over the next two decades (2010 to 2029) for mitigation scenarios that stabilize concentrations (without overshoot) within the range of approximately 430-530 ppm CO2-eq by 2100 (Fig. SYR 4.4)

ADAPTATION OPTIONS: CO-BENEFITS, SYNERGIES AND TRADE OFFS

- **Adaptation options exist in all sectors, but their <u>context for implementation and potential</u> to reduce climate-related risks <u>differs across sectors and regions.</u>**
- **Some adaptation responses involve significant <u>co-benefits, synergies and trade-offs</u>.**
- **Increasing climate change will increase challenges for many adaptation options.**

MITIGATION OPTIONS – INTEGRATED APPROACH

- **Mitigation options are available in every major sector.**
- **Mitigation can be more cost-effective if using an <u>integrated approach</u> that combines:**
  - **measures to reduce energy use and the GHG intensity of end- use sectors,**
  - **decarbonize energy supply,**
  - **reduce net emissions and enhance carbon sinks in land-based sectors.**

POLICIES, TECHNOLOGY AND FINANCE

- **Effective adaptation and mitigation responses will depend on policies and measures across multiple scales: international, regional, national and sub-national.**
- **Policies across all scales supporting technology development, diffusion and transfer, as well as finance for responses to climate change, can complement and enhance the effectiveness of policies that directly promote adaptation and mitigation.**

MITIGATION POLICIES

- **The number of climate change policies at the national and international level is growing.**

- **So far, these policies have not influenced the emission trends significantly.**

INTERNATIONAL COOPERATION

- International cooperation is critical for effective mitigation.
- The UNFCCC is the main multilateral forum focused on addressing climate change, with nearly universal participation. Other institutions organized at different levels of governance have resulted in diversifying international climate change cooperation.
- The Kyoto Protocol offers lessons towards achieving the ultimate objective of the UNFCCC, particularly with respect to participation, implementation, flexibility mechanisms, and environmental effectiveness (medium evidence, low agreement).

ADAPTATION, MITIGATION AND SUSTAINABLE DEVELOPMENT

- **Climate change is a threat to sustainable development. Nonetheless, there are many opportunities to link mitigation, adaptation and the pursuit of other societal objectives through integrated responses (high confidence).**

- **Successful implementation relies on relevant tools, suitable governance structures and enhanced capacity to respond (medium confidence).**

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