21st Century Economic Development and Climate Strategies: The Maritime Role

Presented at Massachusetts Maritime Academy, Boston, USA, September 22nd, 2021, 4pm at Flanagan Hall

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Joyashree Roy, Bangabandhu Chair Professor at Asian Institute of Technology, Thailand and Professor of Economics at Jadavpur University, Kolkata, India, National Fellow of the Indian Council of Social Sciences Research

History, Mandate and How to be Involved in the Work of the IPCC

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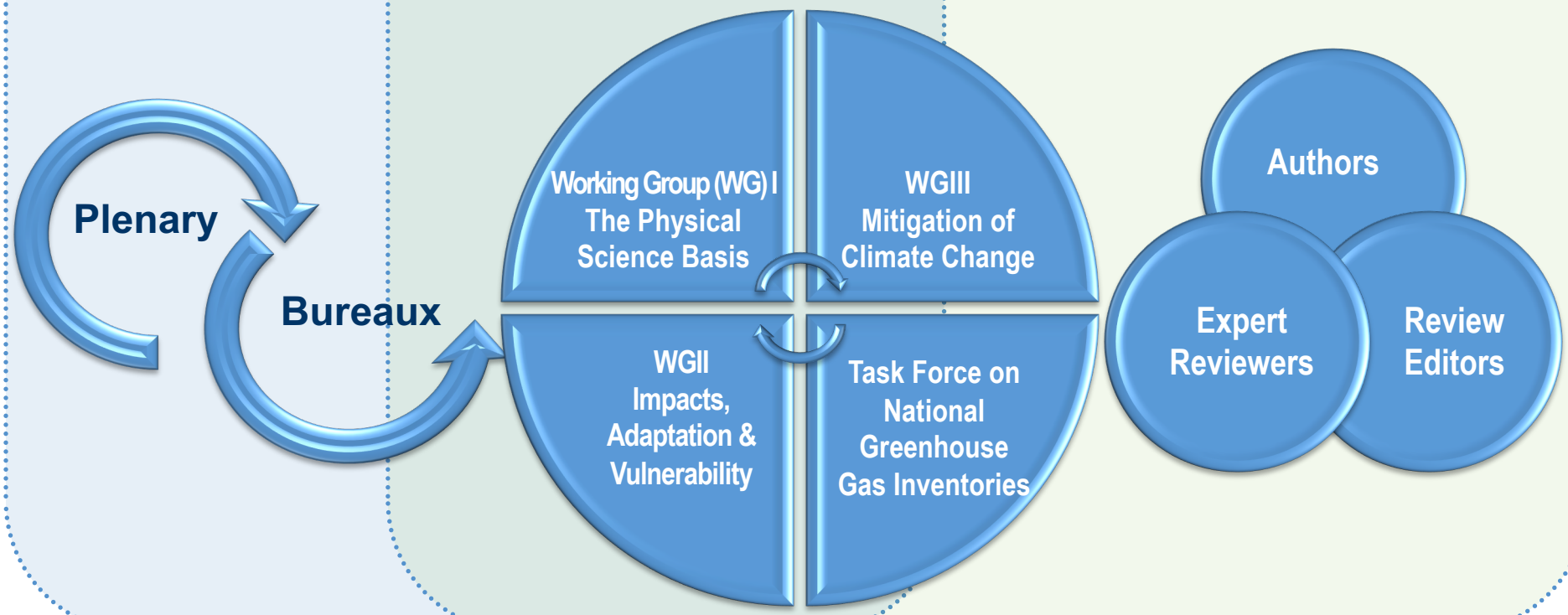
Science/Policy Interface

IPCC – jointly established by **WMO and UNEP**, action endorsed by the **UN General Assembly**

Intergovernmental Panel: 195 member States appointing National Focal Points

Hundreds of **scientists and experts from around the world** are involved in the preparation of IPCC reports



The role of the IPCC is …

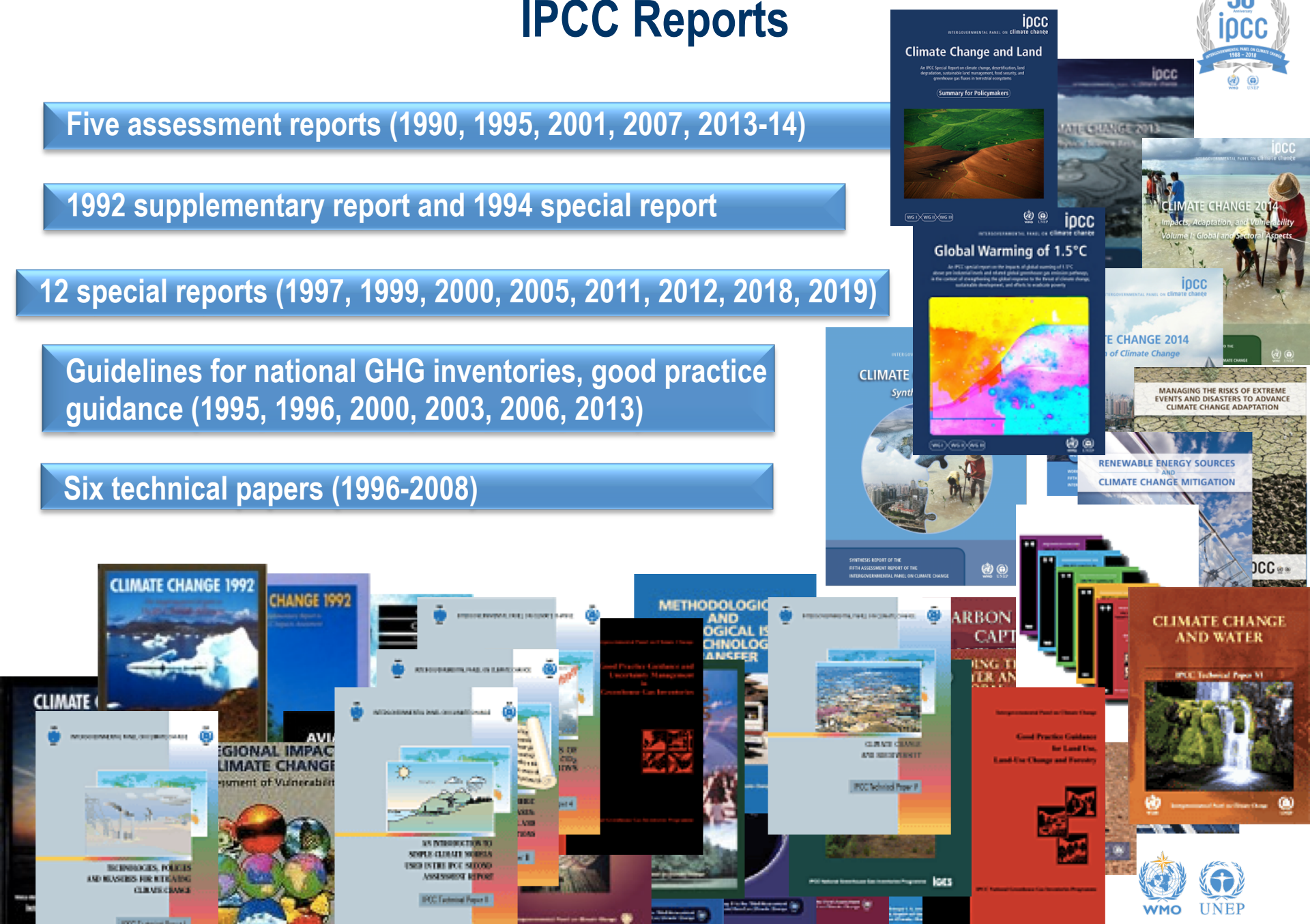
"… to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation."

"IPCC reports should be neutral with respect to policy, although they may need to deal objectively with scientific, technical and socio-economic factors relevant to the application of particular policies."

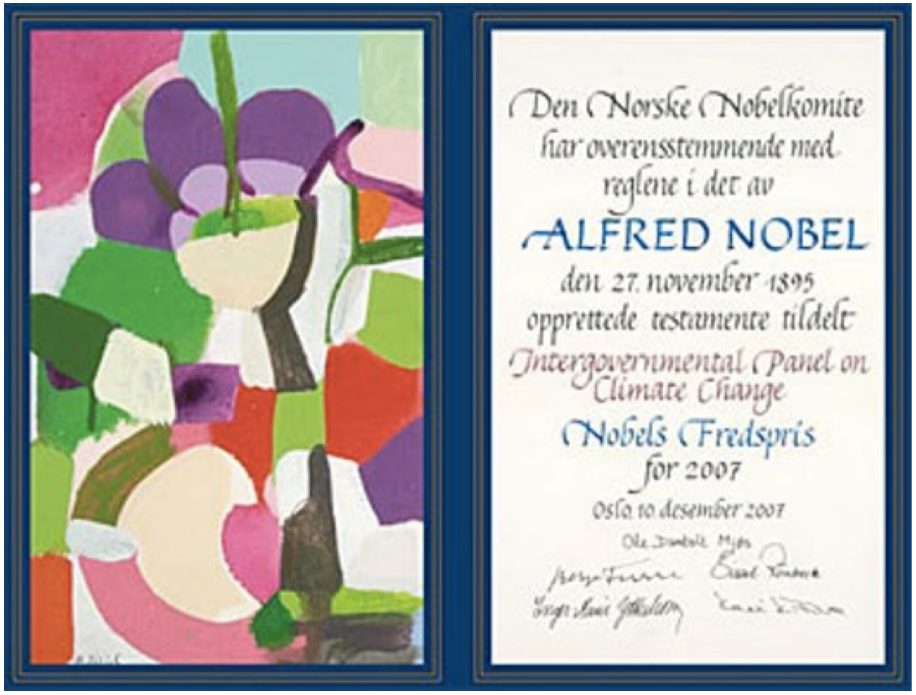
Principles Governing IPCC Work, paragraph 2
Source: http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles.pdf

IPCC Reports

- Five assessment reports (1990, 1995, 2001, 2007, 2013-14)
- 1992 supplementary report and 1994 special report
- 12 special reports (1997, 1999, 2000, 2005, 2011, 2012, 2018, 2019)
- Guidelines for national GHG inventories, good practice guidance (1995, 1996, 2000, 2003, 2006, 2013)
- Six technical papers (1996-2008)



Achievements: 2007 Nobel Peace Prize



The **Intergovernmental Panel on Climate Change** and Albert Arnold (Al) Gore Jr. were awarded the **Nobel Peace Prize** "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change".

IPCC reports have made an impact

FAR (1990)	led to	UNFCCC
SAR (1995)	input for	Kyoto Protocol
TAR (2001)	focused attention on	Impacts of climate change and need for adaptation
AR4 (2007)	input for	Decision on 2ºC limit; basis for post Kyoto Protocol agreement
AR5 (2013/2014)	input for	
SR1.5	input for	COP24/Talanoa Dialogue

Sixth Assessment Cycle (AR6)

3 Special Reports

Global Warming of 1.5 °C (SR15)	Climate Change and Land (SRCCL)	Ocean and Cryosphere (SROCC)
October 2018	August 2019	September 2019

UNFCCC COP24 - Talanoa (facilitative) dialogue

Methodology Report update

May 2019: 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Cities

Attention on cities in AR6 including a conference and special report on cities in AR7

AR6 Main Report

2021: Working Group I, II, and III contribution to the Sixth Assessment Report
April 2022: Synthesis Report to the Sixth Assessment Report

UNFCCC global stocktake 2023

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Getting involved

1

Contribute to existing literature

IPCC assessments are as good as the literature available. Look out for the various cut off dates for literature for the different reports.

2

As Authors or Review Editors

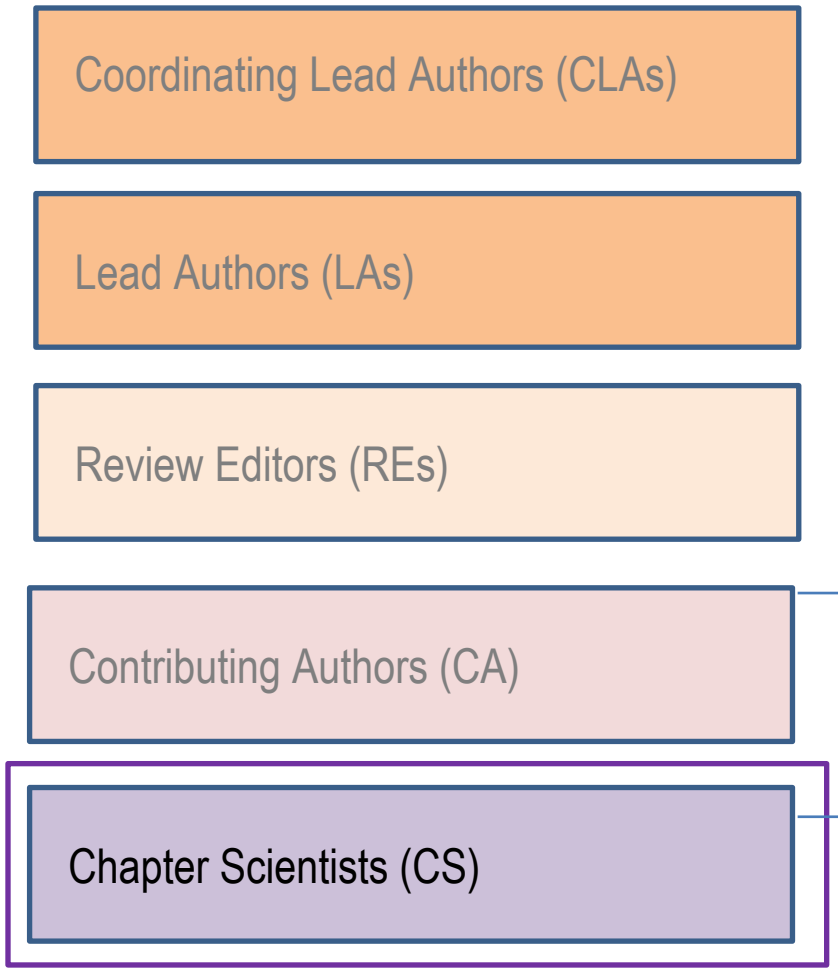
Bureaux selects Authors and Review Editors from lists of nominations provided by governments and observer organizations. Look out for the calls for nomination of authors and contact your IPCC Focal Point if you are interested in being nominated.

3

As Expert Reviewers

To be involved in the two review stages: Expert Review of the First Order Draft and Government and Expert Review of the Second Order Draft

Author teams – CS



Scientific assistants who provide support to the author teams

- Technical aspects including cross-checking between findings in different parts of the report
- Additional fact-checking
- Reference management
- Are early career researchers who benefit from the experience

Recruited

- Directly by CLAs
- Through a call issued by the TSUs

http://wg1.ipcc.ch/
http://www.ipcc-wg2.awi.de/
http://www.ipcc-wg3.ac.uk/
http://www.ipcc-nggip.iges.or.jp/

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2018 1.5 report in numbers

91 Authors from **40** Countries

133 Contributing authors

6000 Studies

1 113 Reviewers

42 001 Comments

THANK YOU FOR YOUR ATTENTION!

For more information:

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IPCC Secretariat: ipcc-sec@wmo.int

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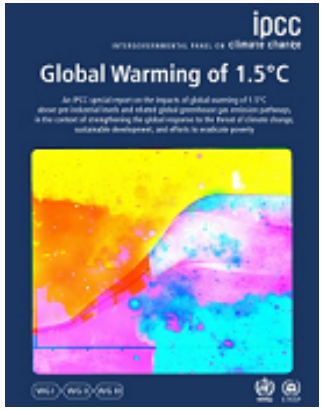

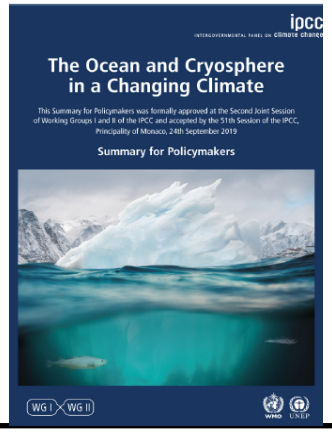

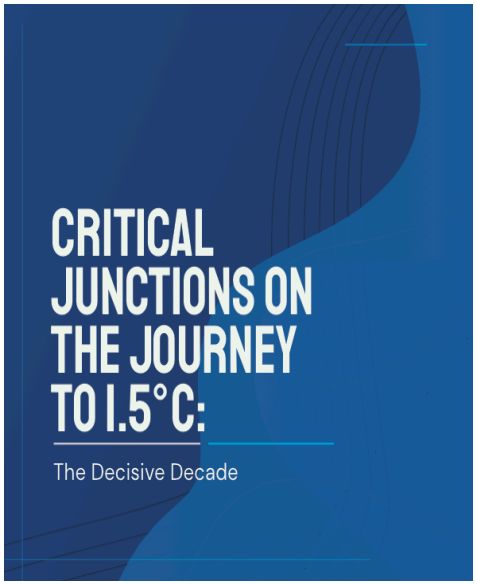

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Climate Change: Unprecedented Challenge to Human Society

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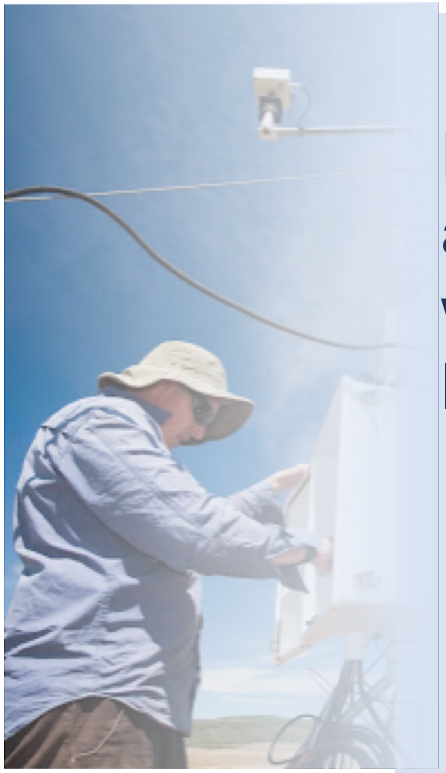


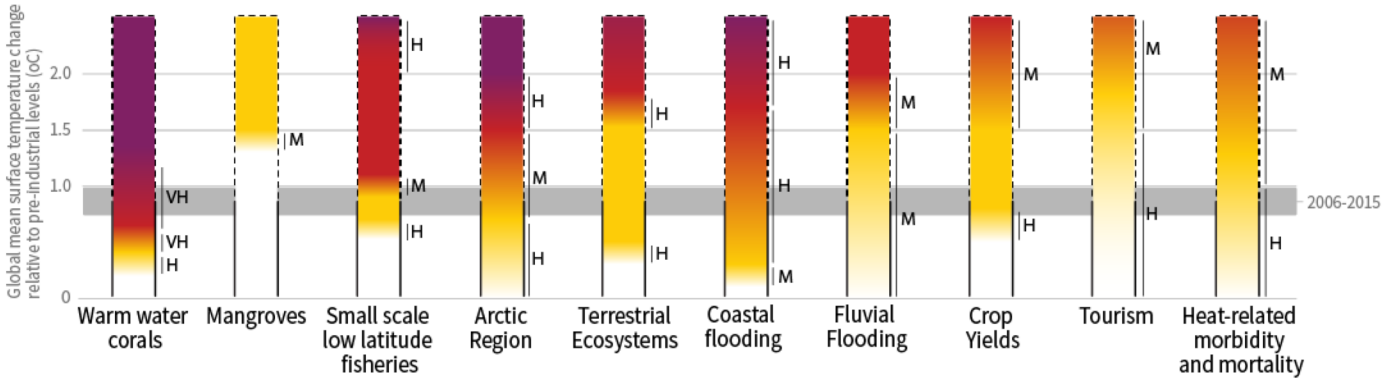
Ashley Cooper / Aurora Photos

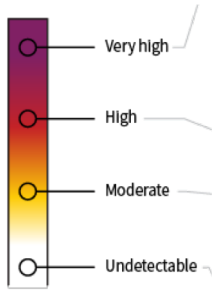
Where are we now?

Human activities have caused approximately 1.0°C of global warming since pre-industrial level.

Already seeing consequences for people, nature and livelihoods

Impacts and risks for selected natural, managed and human systems





www.ipcc.ch/report/SR15

- Every bit of warming matters
- Every year matters
- Every choice matters

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2015 : THREE GLOBAL ACTION AGENDA

: PARIS AGREEMENT
: SANDEI FRAMEWORK FOR DRR- DISASTER RISK REDUCTION
: SDG- SUSTAINABLE DEVELOPMENT GOALS

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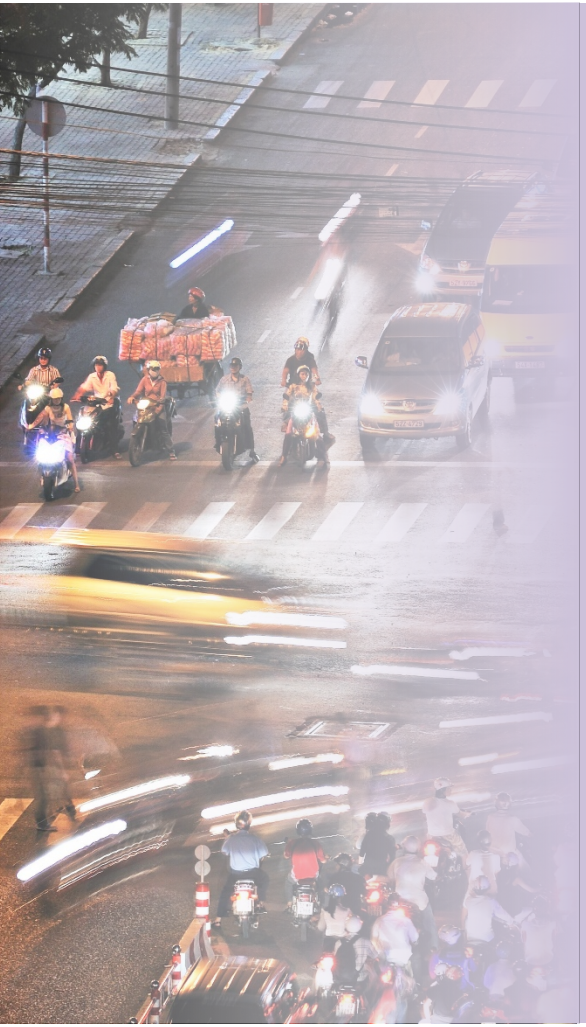
2030 Goals: SDGs



Gerhard Zwerger-Schoner / Aurora Photos

Greenhouse gas emissions pathways

- To limit warming to 1.5°C, CO_2 emissions fall by about 45% by 2030 (from 2010 levels)

  ↳

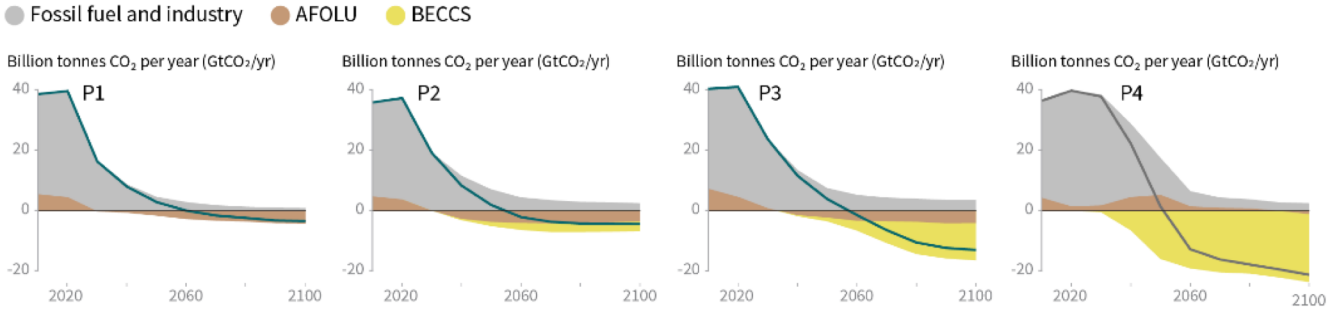
- To limit warming to 1.5°C, CO_2 emissions would need to reach 'net zero' around 2050

  ↳ Compared to around 2075 for 2°C

SPM3b|

Characteristics of four illustrative model pathways

Breakdown of contributions to global net CO_2 emissions in four illustrative model pathways



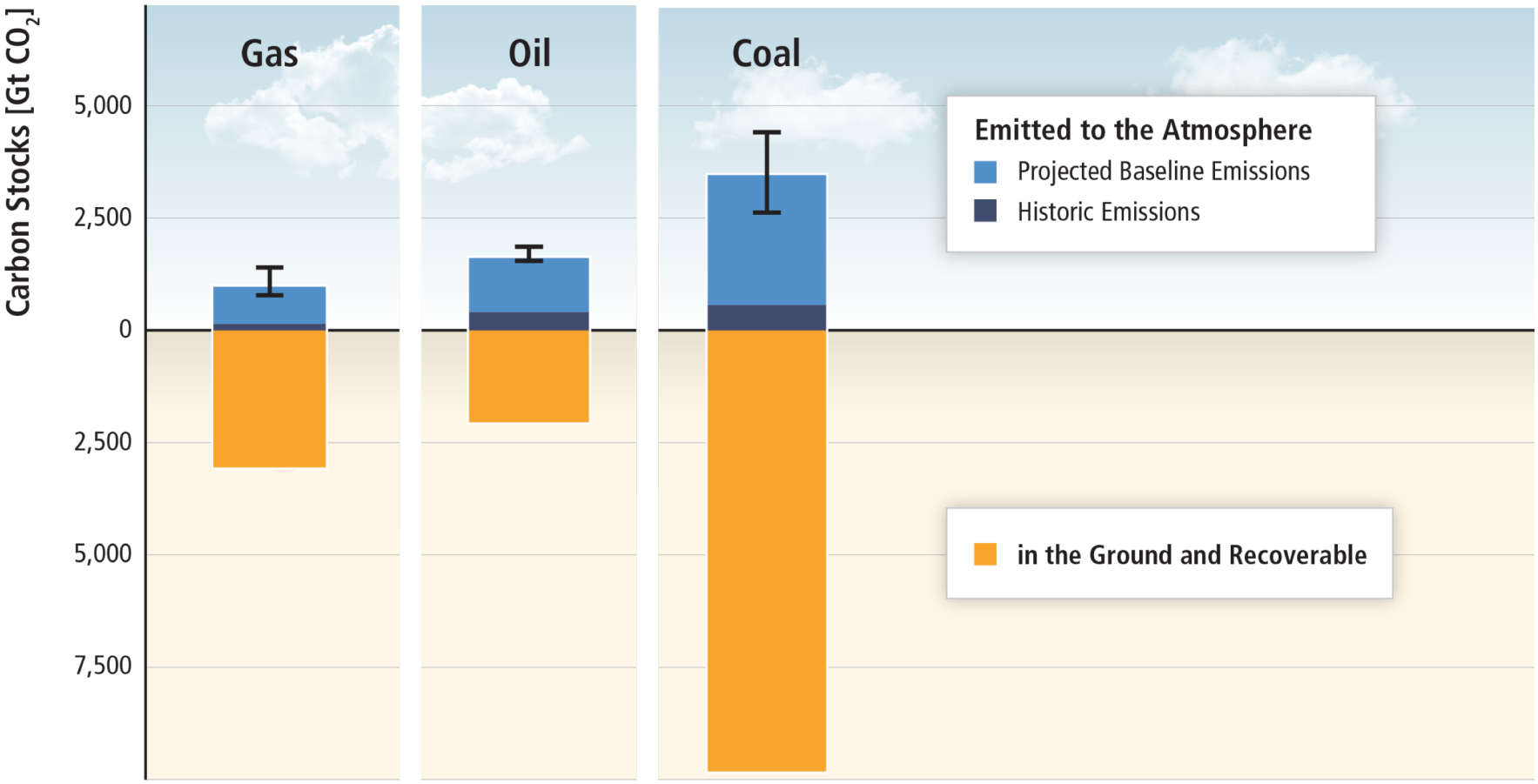
P1: A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

P2: A scenario with a broad focus on sustainability including energy intensity, human development, economic convergence and international cooperation, as well as shifts towards sustainable and healthy consumption patterns, low-carbon technology innovation, and well-managed land systems with limited societal acceptability for BECCS.

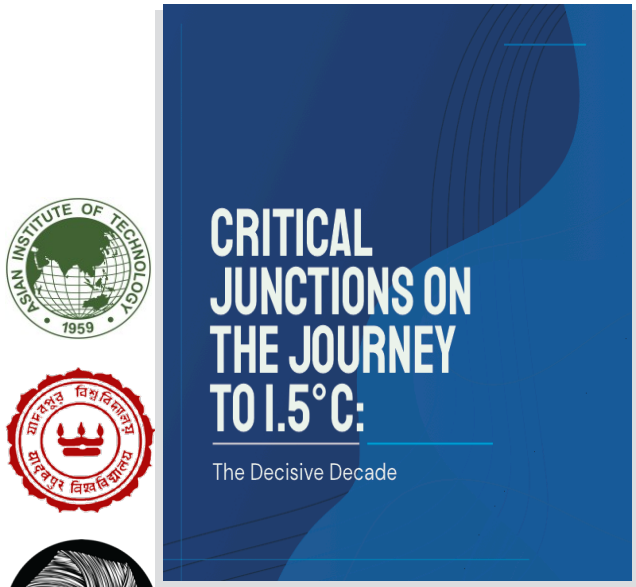
P3: A middle-of-the-road scenario in which societal as well as technological development follows historical patterns. Emissions reductions are mainly achieved by changing the way in which energy and products are produced, and to a lesser degree by reductions in demand.

P4: A resource- and energy-intensive scenario in which economic growth and globalization lead to widespread adoption of greenhouse-gas-intensive lifestyles, including high demand for transportation fuels and livestock products. Emissions reductions are mainly achieved through technological means, making strong use of CDR through the deployment of BECCS.

There is far more carbon in the ground than emitted in any baseline scenario.



Based on SRREN Figure 1.7



When?
Decisive Decade
2020-2030

What?
GHG emissions reductions

How?
Areas of intervention

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Our Determined Journey: Resolve to Accelerate to Deliver net zero

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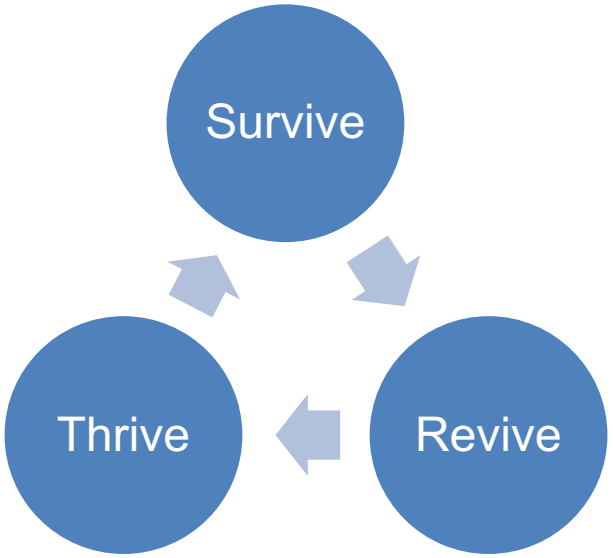
Tripple Bottom Line



To deliver this

This decade will require the fastest economic transition in history.

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2020: a significant year

World battled the Covid-19 Pandemic

Marked a turning point in GHG emissions

Our Determined Collective Journey is to repeat each year this rate of decline for next two decades starting from 2021

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How?

Sensitive Intervention Points: **Triggering Systemic Change in this Decisive Decade**

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In 2020: 25% electricity was from Renewables but needs to be 65% by 2030.

Simultaneous Actions needed :

- **Electrification of energy service systems, energy efficient appliances, upward revision of energy efficiency standards, preference shift from ownership to usership, new business models for electricity trading**

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Electrification of transport sector with falling battery price

Doubling of public transport

Aviation: efficient but need demand reduction

Shipping: pledging to become more efficient , large co.s taking

Mid century net zero pledge

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A major shift from animal-sourced products to plant-based diets and the reduction of food waste can significantly reduce emissions.

US, UK and Sweden have been showing signs of reducing meat consumption within a range of 14-23%

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Energy intensive industries like cement, iron and steel must commit to carbon neutrality through technological innovations such as electrification, green hydrogen and carbon removal.

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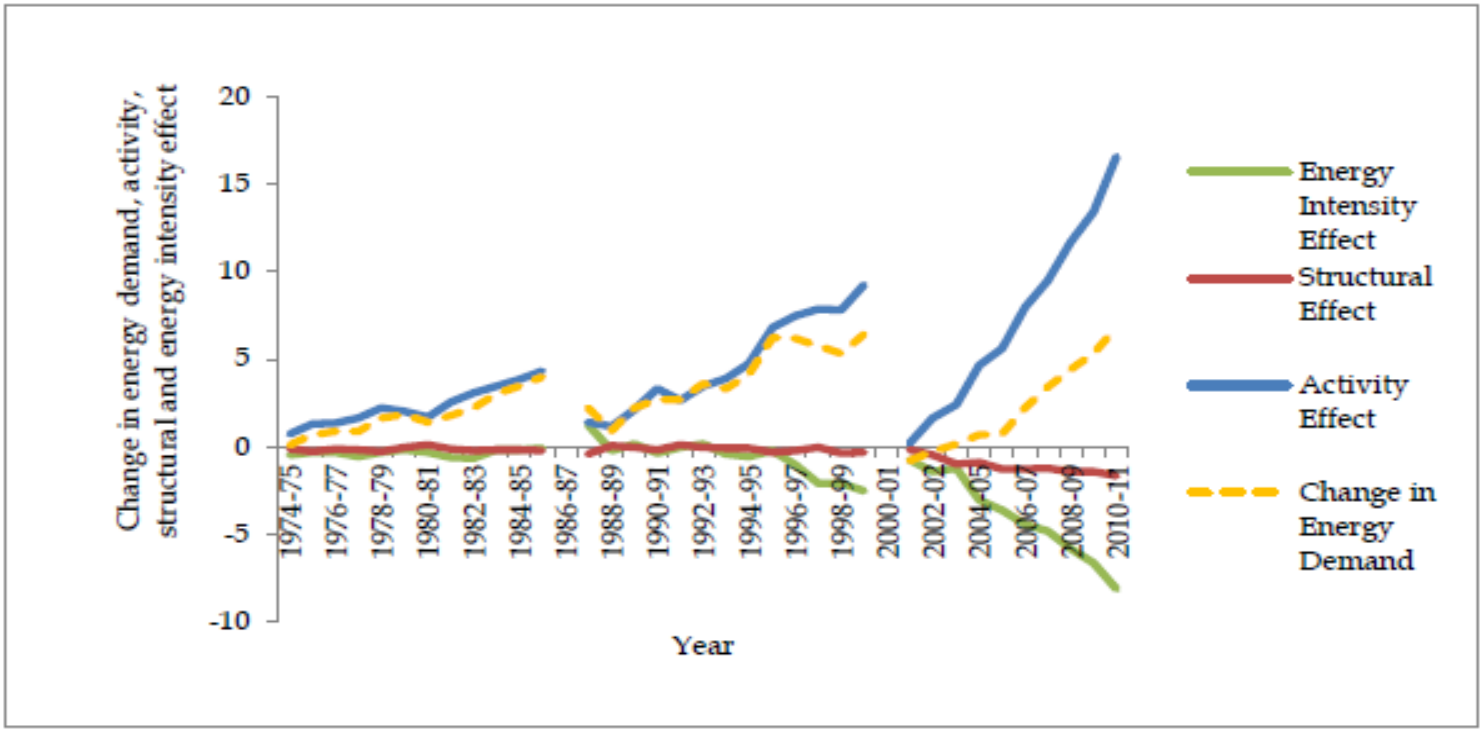
India: Energy Efficiency



S Dasgupta and J Roy (2016)

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Zero emissions buildings and infrastructure.

Existing building stocks need to decarbonize by at least 3% annually starting now.

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Restoration of forests and coastal ecosystems can shift land use from being a source of emissions to a net sink for storing carbon.

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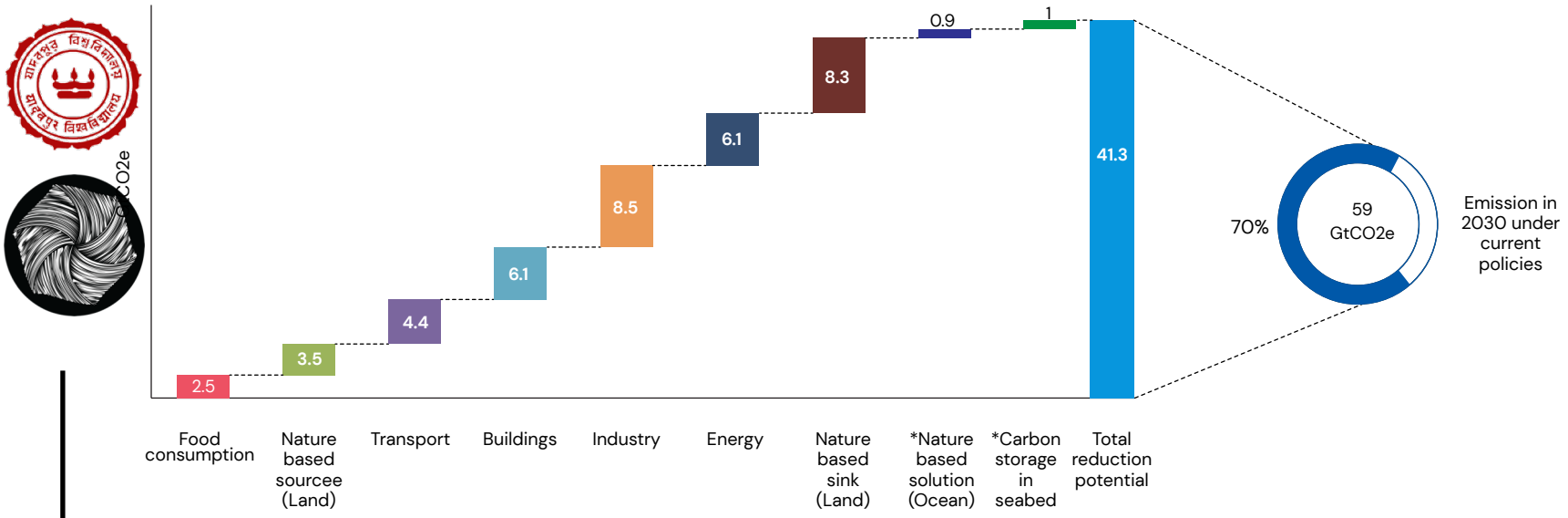
How to enable these shifts in 2021-2030



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We will only
succeed if all of us take part
in the
process of accelerating
transition of our global
economy

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Changes in the ocean

- To date, the ocean has taken up **more than 90%** of the excess heat in the climate system. By 2100, the ocean will take up **2 to 4 times** more heat if global warming is limited to 2°C and **up to 5 to 7 times** at higher emissions.
- Ocean warming reduces mixing between water layers and therefore the supply of **oxygen and nutrients for marine life.**
- **Marine heatwaves** are becoming more frequent and severe, especially harming warm-water corals, kelp forests and the distribution of marine life.
- The ocean takes up human-induced carbon emissions. This increases ocean acidity. It has taken up 20 to 30% of these emissions and continued uptake will exacerbate this.

Photo: Yungdrung Tsewang

Photo: Glenn R. Specht

Photo: Jess Melbourne Thomas

Sea level rise and coastal extremes

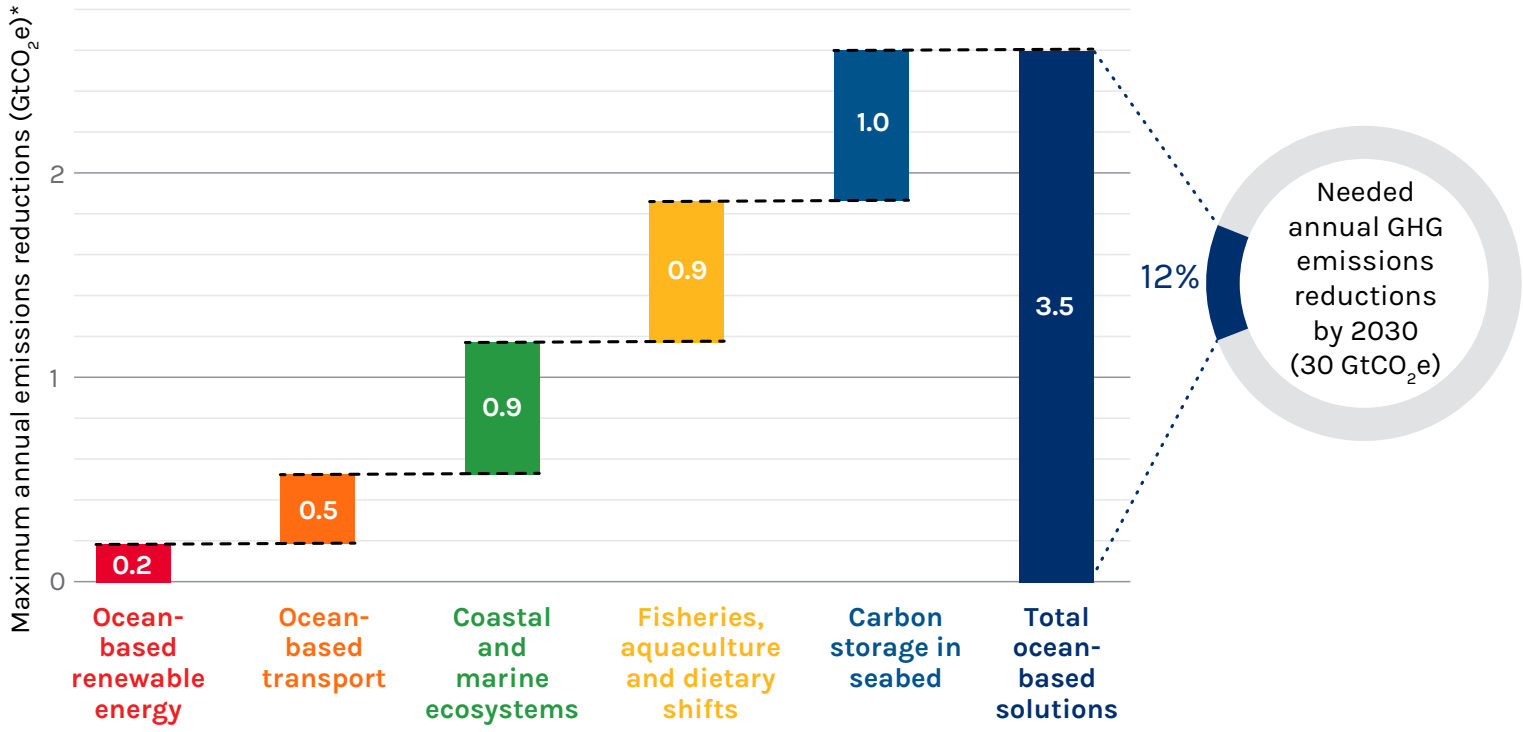
- During the 20th century, the global mean sea level rose by about **15cm**.
- Sea level is currently rising **more than twice as fast** and will further **accelerate** reaching up to 1.10m in 2100 if emissions are not sharply reduced.
- Extreme sea level events which now occur rarely during high tides and intense storms will become more common.
- Many low-lying coastal cities and small islands will be exposed to risks of flooding and land loss annually by 2050, especially without strong adaptation.


Photo: Mr. JK
Ocean and
Marine Life

Changes in marine life

- Changes in the ocean cause **shifts in fish populations**. This has reduced the global catch potential. In the future some regions will see further decreases but there will be increases in others.
- Communities that depend highly on seafood may face **risks to nutritional health and food security**.
- Reducing other pressures such as **pollution** will further help marine life deal with changes in their environment.
- Policy frameworks for **fisheries management** and **marine protected areas** offer opportunities for people to adapt.

Figure ES-3. Contribution of Five Ocean-based Climate Action Areas to Mitigating Climate Change in 2030 (Maximum $GtCO_2e$)



*Notes: * To stay under a 1.5°C change relative to pre-industrial levels*

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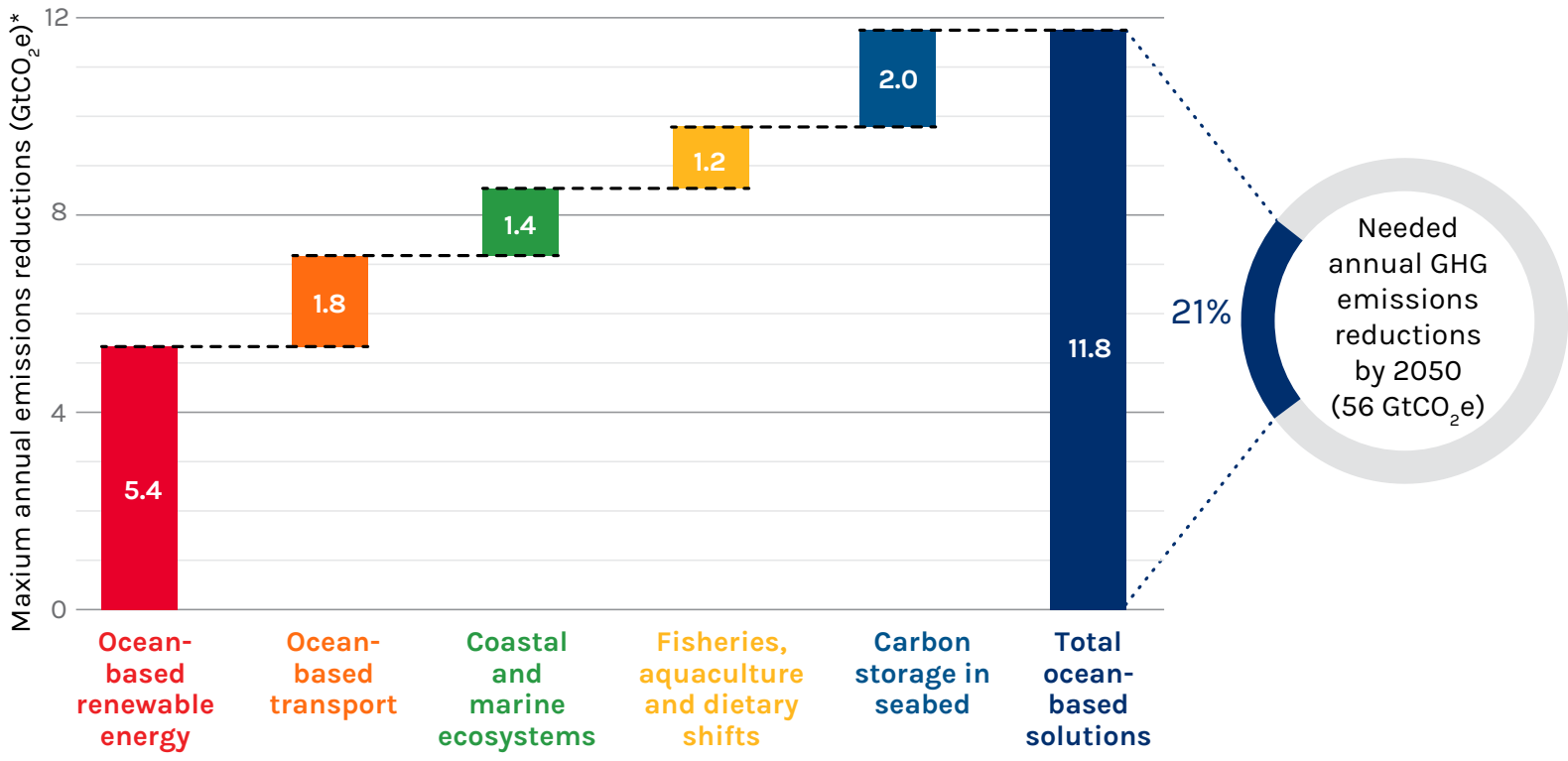
Figure ES-4. Contribution of Five Ocean-based Climate Action Areas to Mitigating Climate Change in 2050 (Maximum $GtCO_2e$)



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90% of freight trade is by ships

Ships carry Natural gas based products all over the world

IMO taking up stringent fuel standards

Challenges and opportunities emerging from the need for global climate action

Ghosh and Roy 2020

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2020 a significant year

Whether 2020 becomes a turning point for global GHG emissions depends on choices for a green recovery from COVID-19

Ocean sector/Blue economy can play an important role in recovery

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2020 a significant year

While many governments have recognized the significance of a "green recovery", to what extent they will seize this opportunity is still an open question.

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2020 a significant year

The global investment requirement for a Paris-compatible pathway has been estimated to be USD 1.4 trillion per year in the period 2020–2024,

global stimulus funds amounting to USD 12.2 trillion

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2020 a significant year

The world has a unique opportunity to reshape the future in new directions.

Youth, labour and indigenous climate movements redoubled in pressuring governments and the private sector to act decisively

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How to enable these shifts in 2021-2030?

Private sector, the financial sector, cities, civil society, and citizens

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Strengthening the Global Response in the Context of Sustainable Development

Indicative linkages between mitigation options and sustainable development using SDGs (The linkages do not show costs and benefits)

Mitigation options deployed in each sector can be associated with potential positive effects (synergies) or negative effects (trade-offs) with the Sustainable Development Goals (SDGs). The degree to which this potential is realized will depend on the selected portfolio of mitigation options, mitigation policy design, and local circumstances and context. Particularly in the energy-demand sector, the potential for synergies is larger than for trade-offs. The bars group individually assessed options by level of confidence and take into account the relative strength of the assessed mitigation-SDG connections.

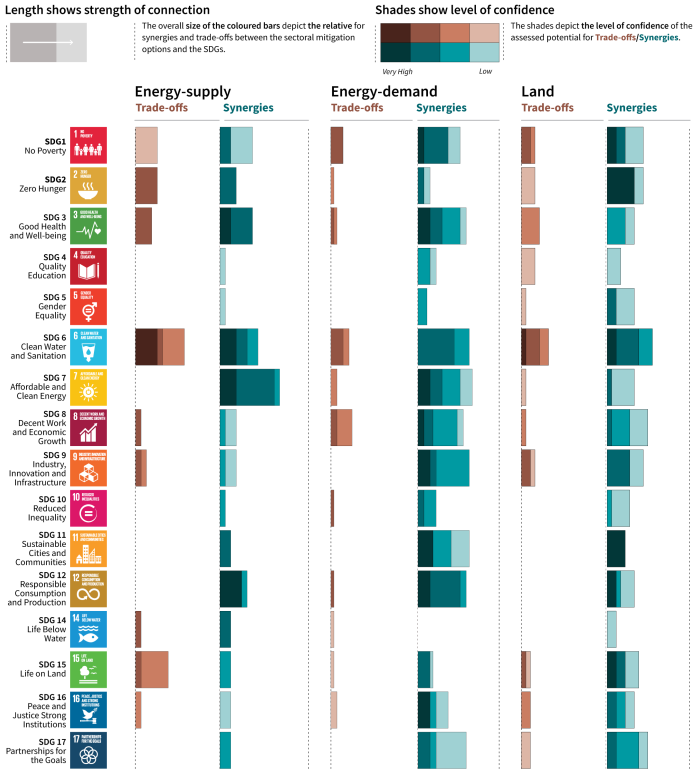

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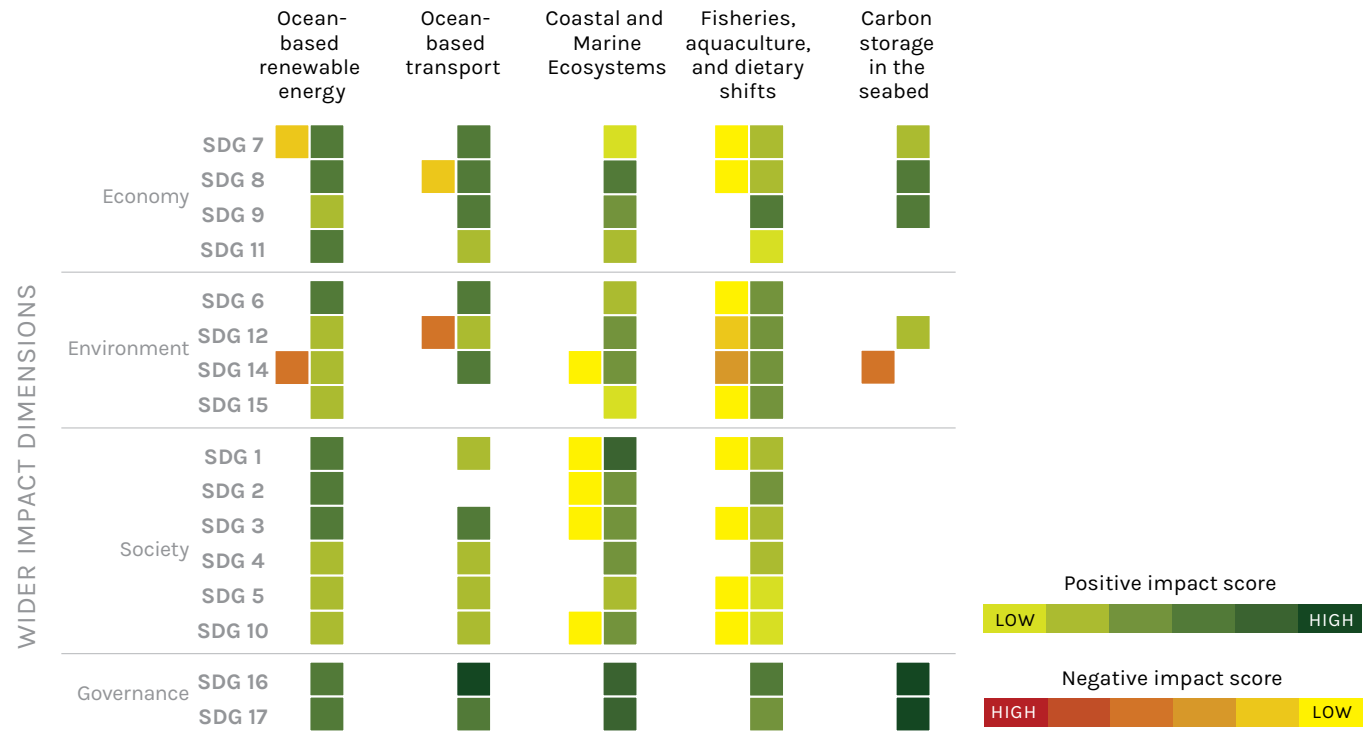
Figure ES-5. Summary of Wider Impact of Ocean-based interventions on Sustainable Development Dimensions



List of Sustainable Development Goals reviewed:

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Thank You!

We are global pollinators of socio-economic change

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The more decisively and earlier we act, the more able we will be to address unavoidable changes, manage risks, improve our lives and achieve sustainability for ecosystems and people around the world – today and in the future.

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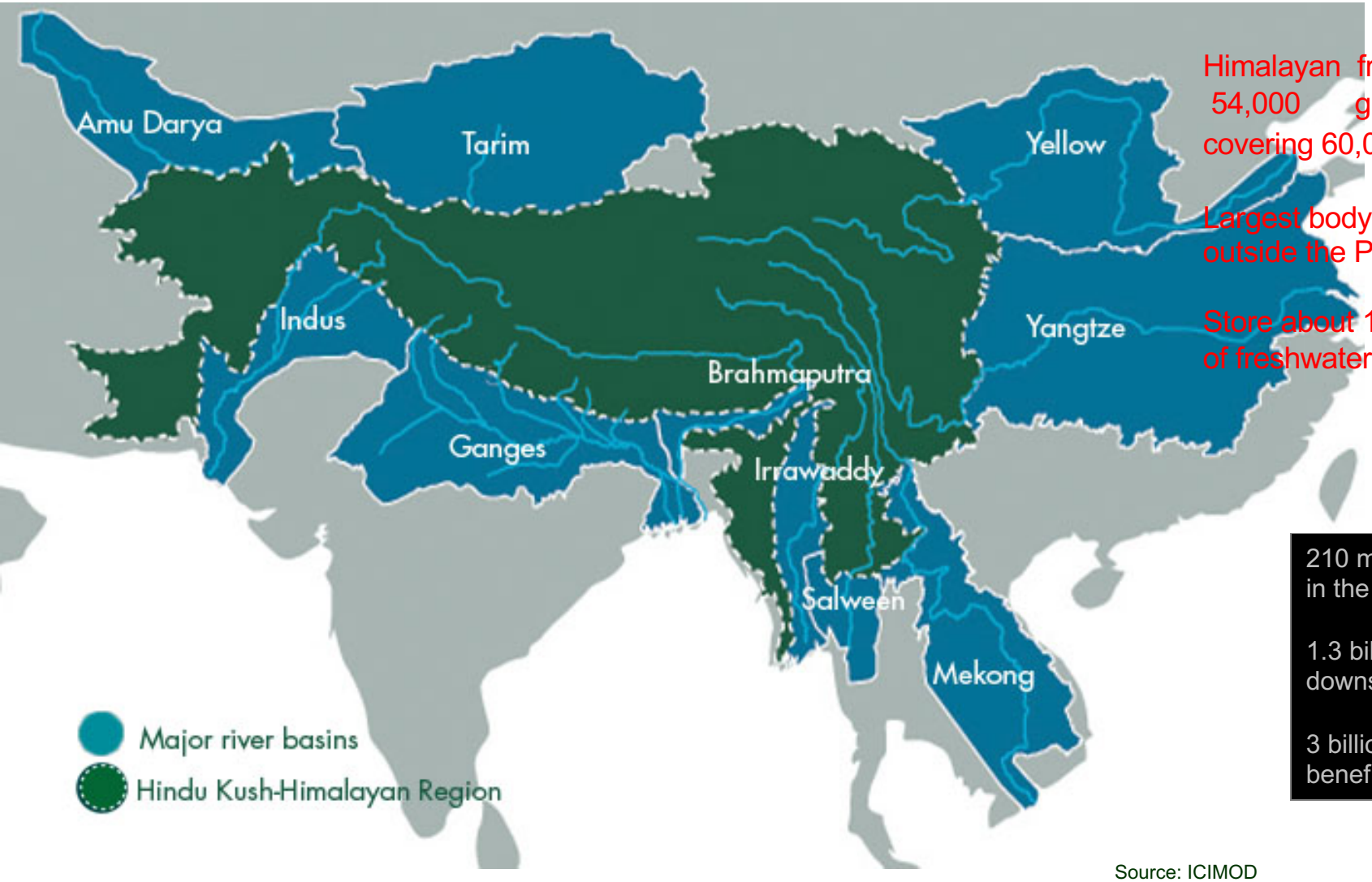

Himalayan freshwater glaciers , 54,000 covering 60,000 Km^2

Largest body of ice outside the Polar caps

Store about 12,000 km3 of freshwater

210 million people in the HKH

1.3 billion people downstream

3 billion people benefit from food

Source: ICIMOD