The Abdus Salam
International Centre
for Theoretical Physics
50th Anniversary 1964–2014

2580-3

Joint ICTP-IAEA College on Identification and Assessment of Nationally Appropriate Mitigation Actions (NAMAs) in Energy System Development to Help Combat Climate Change

5 - 9 May 2014

International Efforts for Combating Climate Change and Major Issues for an Equitable International Climate Regime

H-Holger Rogner
International Institute for Applied Systems Analysis (IIASA)
Royal Institute of Technology (KTH)
Stockholm

Strada Costiera, 11 - 34151 - Trieste - Italy • Tel. +39 0402240111 • Fax. +39 040224163 • sci_info@ictp.it • www.ictp.it
ICTP is governed by UNESCO, IAEA, and Italy, and it is a UNESCO Category 1 Institute

International Efforts for Combating Climate Change and Major Issues for an Equitable International Climate Regime

H-Holger Rogner

International Institute for Applied Systems Analysis (IIASA)

Royal Institute of Technology (KTH), Stockholm

ICTP, 5 – 9 April 2014

Where it started

- 1886 Svante Arrhenius hypothesis – carbon dioxide could increase Earth average temperature
- 1930 – Lonely voice of G. S. Callendar (warming in the US was due to increased concentration of CO_2 in the atmosphere)
- 1950 – More money for the climate research on the weather and the sea
- 1960 – First simple mathematical models
- 1970s – The rise of environmentalism
- 1979 – The First World Climate Conference identified climate change as an urgent world problem (World Climate Programme set up)
- 1981 – Energy in a Finite World (IIASA)
- 1988 – The Toronto Conference recommended to develop comprehensive global framework convention to protect the atmosphere

How it has continued

- 1988 – IPCC established by the UN General Assembly Resolution 43/53
- 1990 – First assessment Report by the IPCC
- 1990 – UN Resolution 45/212 – INC for FCCC established
- 1992 – UNFCCC adopted at Rio Earth Summit
- 1994 – 21 March – Convention entered into force
- 1997 – Kyoto Protocol (KP)
- 2005 – Entry into force of the KP
- 2011 – Cancun pledges
- 2012 – Doha Amendment to the KP
- 2013/14 5th IPCC Assessment Report
- 2015 – A new internationally binding environmental agreement at CoP-21 in Paris?

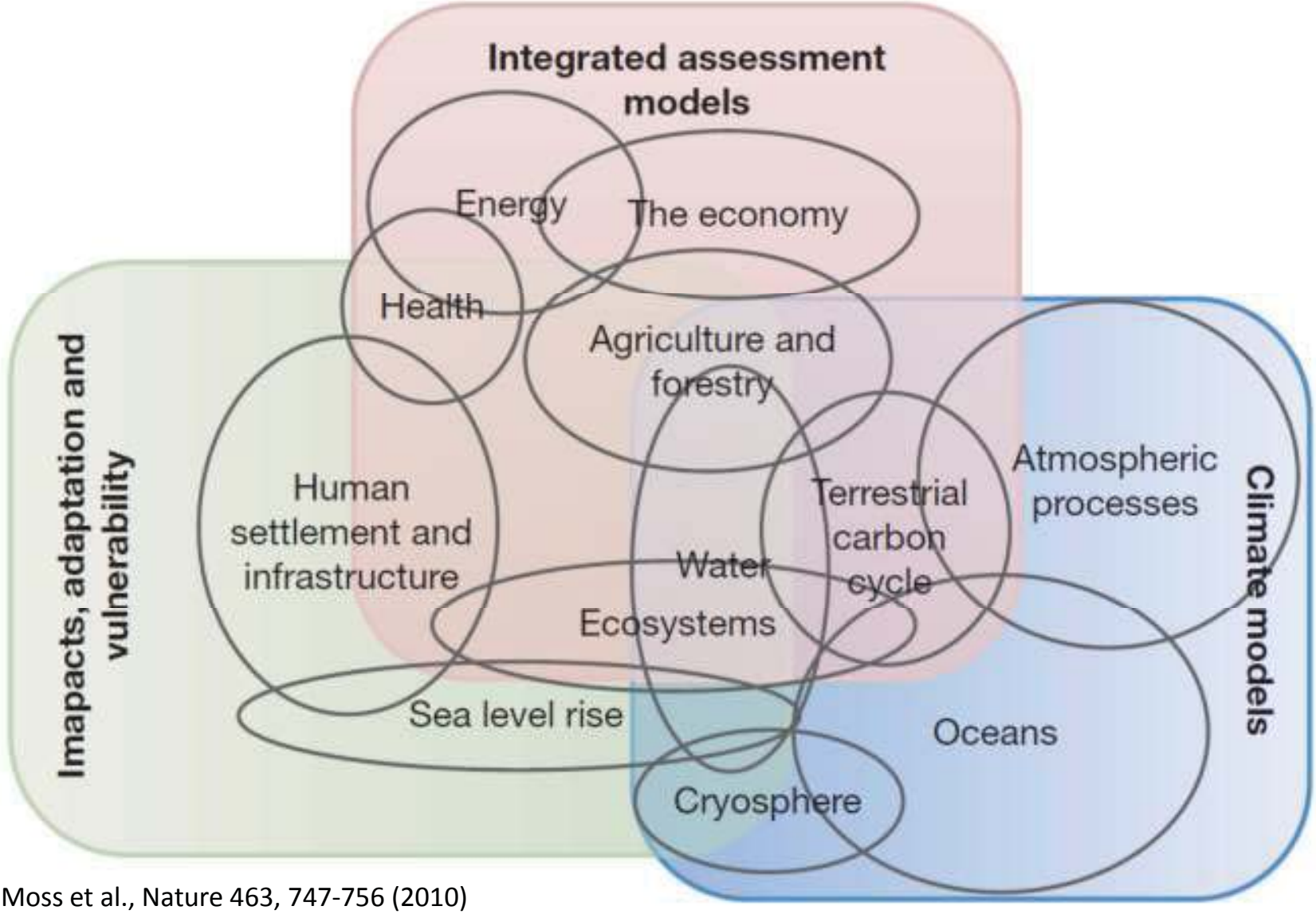
Intergovernmental Panel on Climate Change (IPCC)

- The IPCC is a multinational scientific body organized under the auspices of the United Nations (UNEP/WMO)
- The mission of the IPCC is to convene scientists and other experts to publish reports assessing the state of the science on climate change and to evaluate economic and technical issues on the subject.
- So far IPCC has issued five “Assessment Reports” plus several Special Reports which have greatly influenced the evolution of the international climate change regime

IPCC assessments have influenced global action on an unprecedented scale

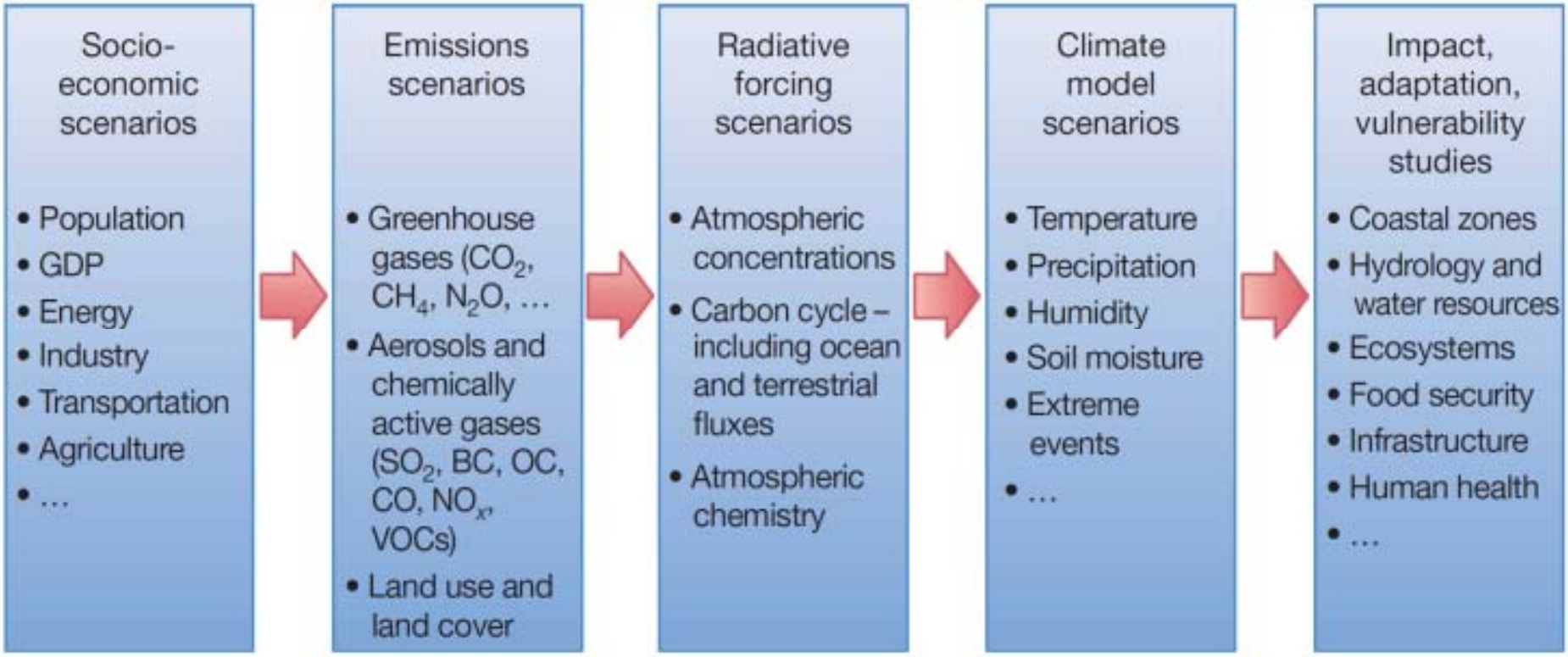
1. First Assessment Report (1990) had a major impact in defining the content of the UNFCCC
2. The Second Assessment Report (1996) was largely influential in defining the provisions of the Kyoto Protocol
3. The Third Assessment Report (2001) focused on the impacts of climate change and the need for adaptation
4. The Fourth Assessment Report (2007) created a strong basis for a post Kyoto Protocol agreement
5. The Fifth Assessment Report looked into RCPs and may help shape a post-Kyoto agreement

Models, frameworks and scenarios



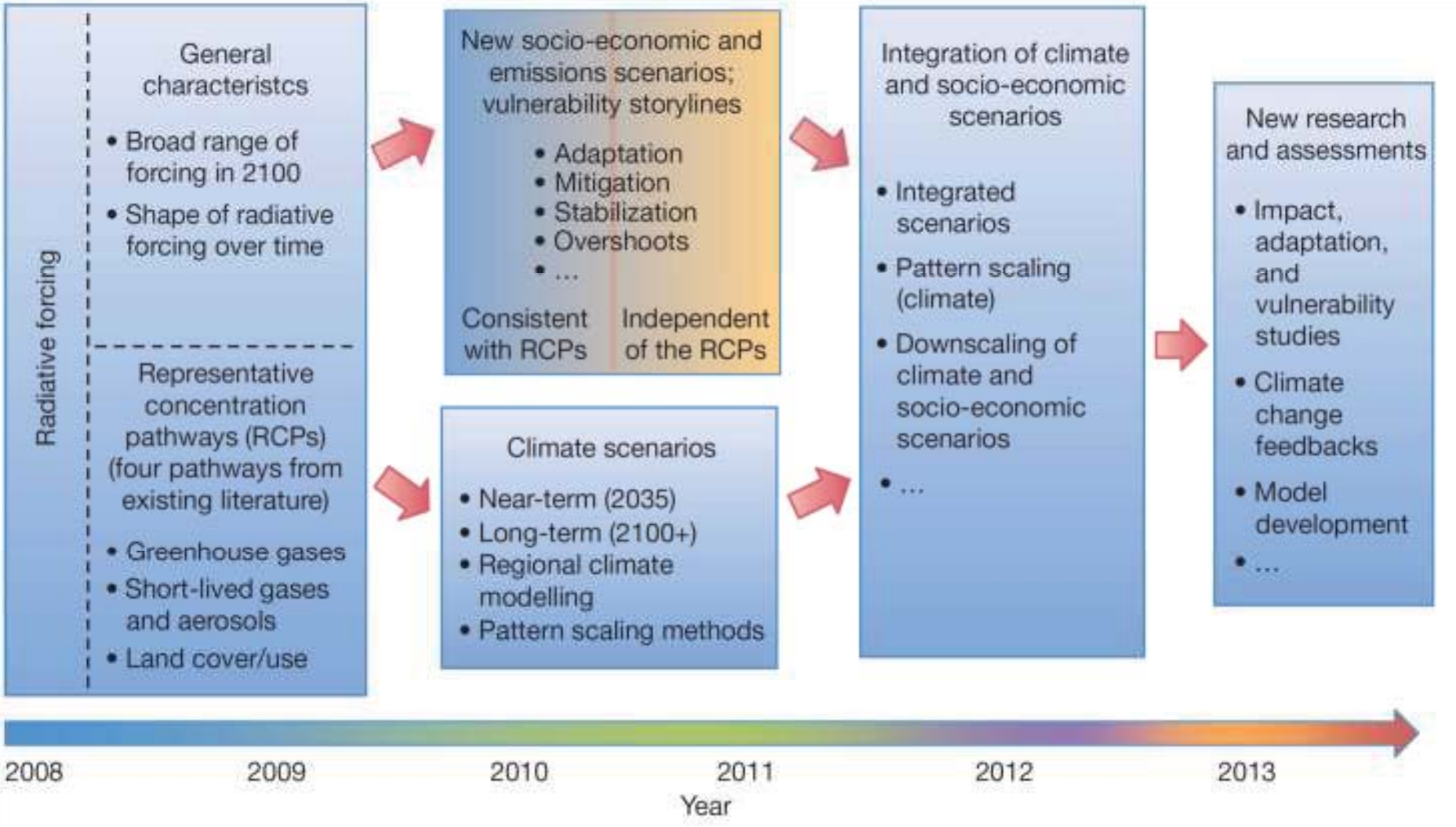
Source: Moss et al., Nature 463, 747-756 (2010)

Sequential approach to scenario development



Source: Moss et al., Nature 463, 747-756 (2010)

The parallel process



Source: Moss et al., Nature 463, 747-756 (2010)

United Nations Framework Convention on Climate Change (UNFCCC)

- **IPCC's First Assessment Report in 1990**
  - **GHG emissions from human activities were substantially increasing atmospheric concentrations which would enhance the greenhouse effect and result in additional global warming**
- **In response, the United Nations General Assembly initiated negotiations in 1990 on what would eventually become the UNFCCC.**
- **Negotiations on the UNFCCC were conducted between February 1991 and May 1992.**
- **The UNFCCC was opened for signature at the 1992 U.N. Conference on Environment and Development in Rio de Janeiro (the "Earth Summit")**

United Nations Framework Convention on Climate Change (UNFCCC)

- The UNFCCC does not establish binding greenhouse gas (GHG) emission limitations for any country, instead forming a framework for further action and cooperation by signatory countries on climate change.
- The UNFCCC established a Conference of the Parties (COP) – a legislative-like body that meets annually and is charged with devising ways to implement the UNFCCC's goals.

United Nations Framework Convention on Climate Change (UNFCCC)

- The UNFCCC divides the parties into two groups: Annex I countries (primarily developed countries), and non-Annex I countries (primarily developing countries).
- The treaty commits both Annex I and non-Annex I countries to develop and submit national inventories of GHG emissions by sources, promote and cooperate in technology transfer, and promote and cooperate in scientific research on climate change.

Convention – Ultimate objective

Article 2:

„The ultimate objective ... is to achieve …… stabilization of greenhouse gas concentrations in the atmosphere at a level that would *prevent dangerous anthropogenic interference with the climate system*.

Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.“

Convention – Principles

- ***Precautionary Principle*** **– the lack of full scientific certainty should not be used as an excuse to postpone action when there is a threat of serious or irreversible damage**
- ***Principle of Common but Differentiated Responsibilities*** **(CBDR) and respective capabilities – the developed country Parties should take the lead in combating climate change and the adverse effects thereof**
- ***Principle of Sustainable Development*** **– policies and measures to protect the climate system should be appropriate for the specific conditions of each Party and should be integrated with national development programmes**

United Nations Framework Convention on Climate Change (UNFCCC)

- The CBDR reflects the view that developed countries bear greater responsibility for GHG emissions and a greater capacity to take action
- Thus, Annex I countries made (nonbinding) commitments to adopt national policies to mitigate climate change by reducing GHG emissions to 1990 levels by the year 2000
- No such restrictions were imposed on developing countries, such as China and India, which could choose to become Annex I countries when sufficiently developed
- But nothing happened …..

United Nations Framework Convention on Climate Change (UNFCCC)

- IPCC's Second Assessment Report in 1995 concluded that "the balance of evidence suggests that there is a discernible human influence on the global climate"
- At the first COP meeting in Berlin in 1995, Parties to the UNFCCC collectively determined that a more forceful international response to the climate change threat was needed
- This led to the "Berlin Mandate," a commitment to develop a protocol with binding GHG emission limits which should apply only to developed-country parties
- Negotiations subsequent to the "Berlin Mandate" resulted in the Kyoto Protocol (1997)

Kyoto Protocol

- The Kyoto Protocol, adopted by COP-3 in Kyoto sets mandatory targets for industrialized nations to reduce GHG emissions
- Because emission targets did not apply to developing and heavily polluting nations such as China, Brazil or India, the U.S. Senate passed a unanimous resolution (95-0) directing the government not to enter into the Protocol.
- Later confirmed by the Bush administration “because it exempts 80 percent of the world, including major population centers such as China and India, from compliance, and would cause serious harm to the U.S. economy”

Kyoto Protocol

- KP's emissions commitments apply as annual averages to be achieved over a five-year period which allows a rise or fall in any particular year because of difficult-to-control factors.
- The KP's binding GHG emission limits for Annex I Parties is at least a collective net 5.2% reduction from 1990 levels by 2008-2012 – the so-called "*first commitment period*" or now known as KP1
- A compliance system- designed to strengthen the Protocol's environmental integrity, support the carbon market's credibility and ensure transparency of accounting by Parties.

Kyoto Protocol

- By the end of the Kyoto COP meeting, many key details of the Protocol had yet to be resolved
- COP-7 in Marrakesh in 2001 produced the "Marrakesh Accords," a detailed rulebook on procedures and rules for trading mechanisms, compliance systems, and other key elements of the Protocol
- The ratification of the Protocol by Russia in February 2005 provided the necessary number of Annex I country ratifications to allow it to enter into force
- Includes all industrialized countries except the USA

Kyoto Protocol

- The Protocol establishes an international emissions trading system in which permits covering emissions are allocated to Annex I parties which may trade them freely with one another.
- For example, if Japan can reduce its GHG emissions by 100 tons at a lower cost than Germany, the two countries can agree on the sale of the permits for this amount from Japan to Germany. Germany gets the credit for the emissions reduction toward its assigned amount under the Protocol.
- Protocol rules limit the amounts of credits that most countries can sell to no more than 10 percent of their assigned reduction amounts.

Kyoto Protocol

- Developed country parties have full discretion in developing combinations of national policies and measures to meet their respective assigned reduction amounts (calculated individually for each party with reference to their 1990 emissions levels)
- No particular policies or measures are proscribed, although “preferred policies” are encouraged, such as energy efficiency, sinks and reservoirs of GHGs, and increased use of renewable energy
- Quasi exclusion of nuclear from CDM and JI

Kyoto Protocol

- Perhaps the most important innovation in international environmental law is the establishment of “flexible mechanisms” (market based approaches) as a means of meeting emissions reduction targets
- Unlike most other pollution emissions, GHG emissions such as CO_2 or CH_4 accumulate in the same atmosphere irrespective of the location of the emission source.
- Economic reasoning, therefore, suggests that mitigation should occur wherever it is least costly.

Clean Development Mechanism (CDM)

- The CDM introduces flexibility as to where mitigation action is taking place (as long as it is additional to domestic action in Annex-I countries)
- Thus, Annex I countries can meet their reduction targets by investing in emission reduction or sequestration opportunities in other countries.
- The Protocol states that market based approaches should be “supplemental” to direct reduction efforts by countries, but no quantitative limit on the extent to which parties may rely on trading is established.

CDM and additionality

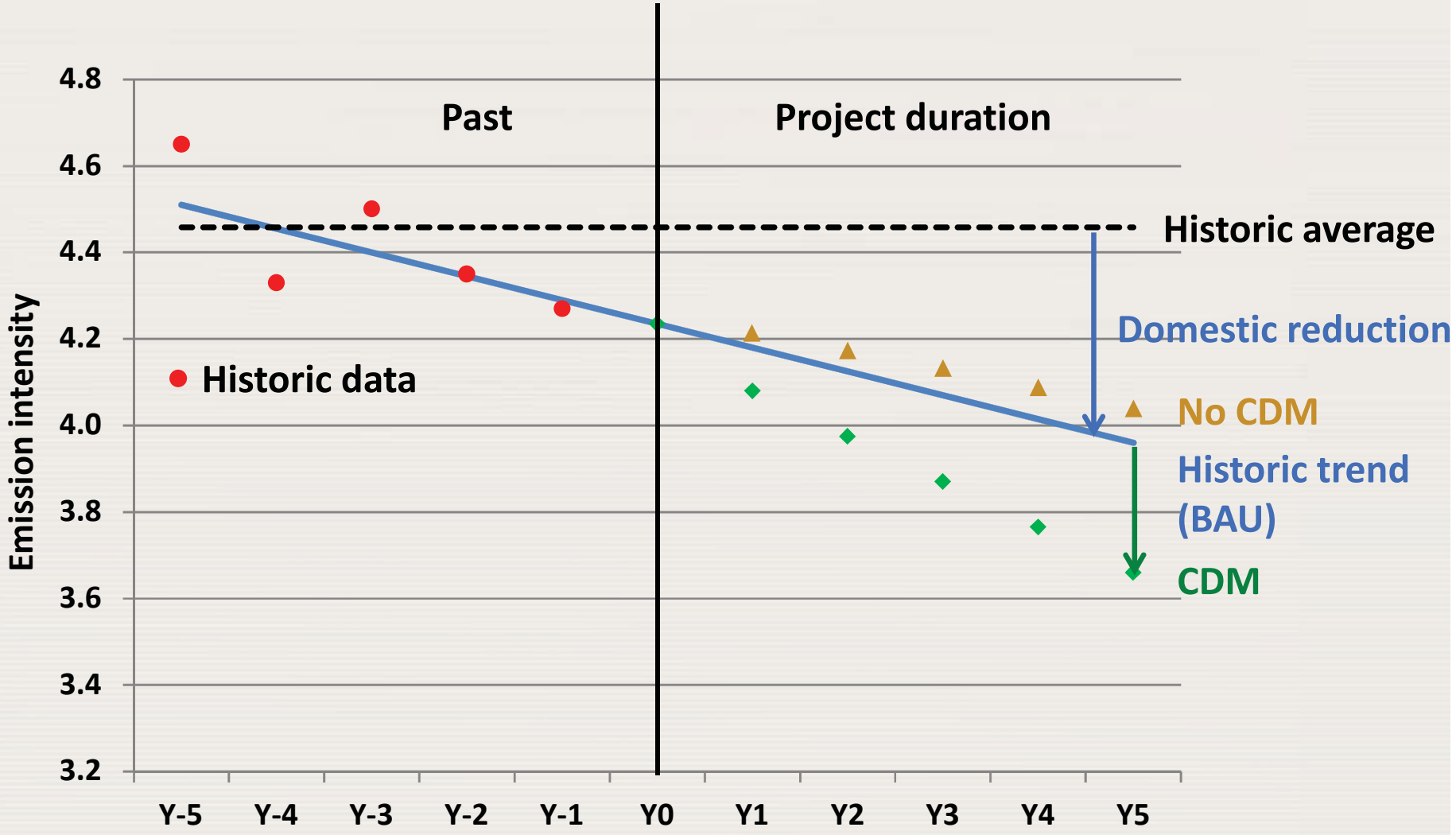
Emission reductions must be certified by the Executive Board, on the basis that

- **real, measurable, and long-term benefits accrue from the project and that the emission reductions are *additional to any that would occur in the absence of the certified project activity***

This is to say that

- **Projects which are economically competitive in their own rights do NOT qualify under CDM**
- **CDM is not a means for the finance of regular development projects**

CDM and additionality – A hypothetical example



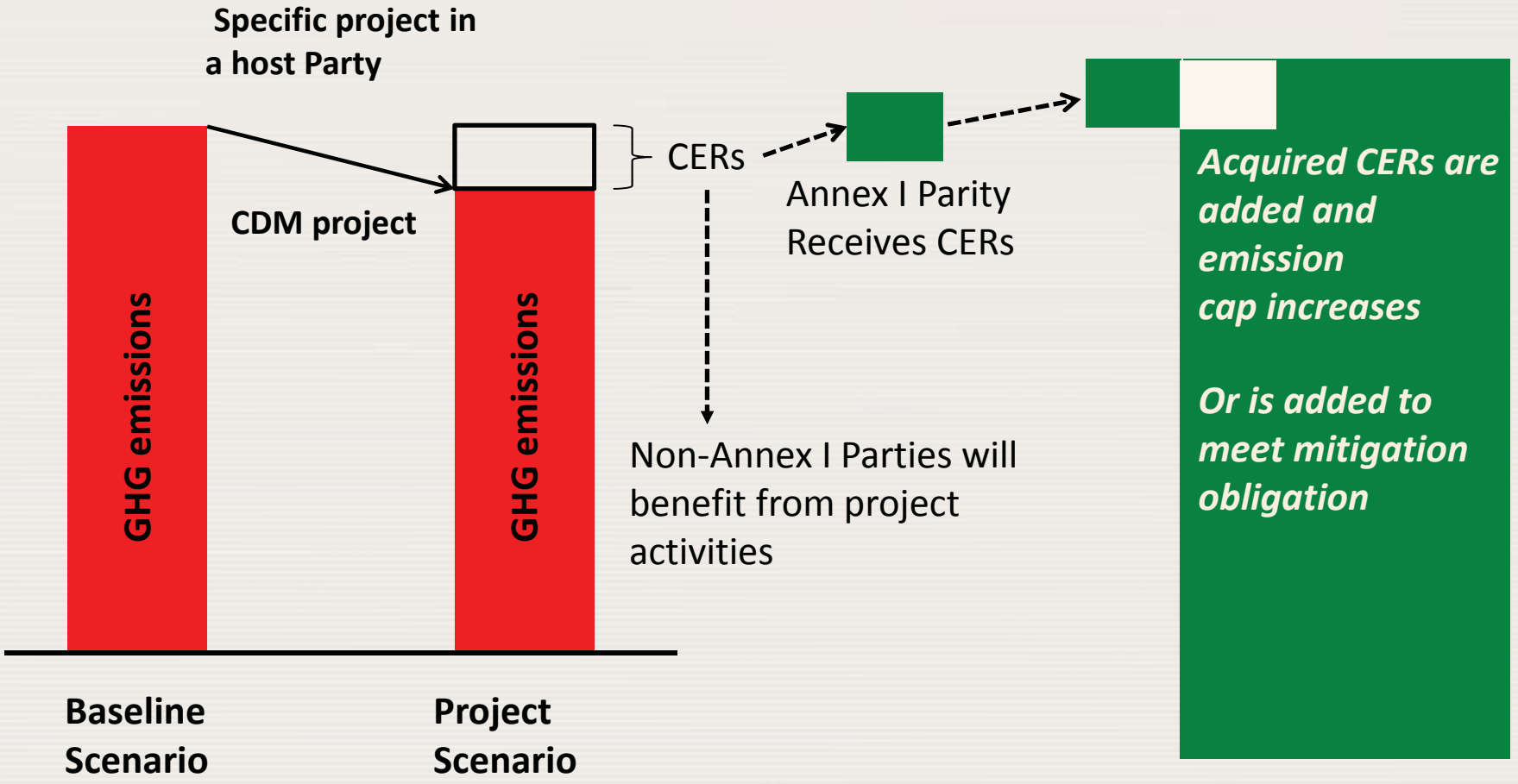
Flexible mechanism CDM

- Annex I Parties with GHG emissions (emission caps) assist non-Annex I Parties (no emission caps) to implement project activities to reduce GHG emissions (or remove by sinks), and credits will be issued based on emission reductions (or removals by sinks) achieved by the project activities.
  - A Party where CDM project is implemented, is called a host Party.
  - The credit from the CDM is called certified emission reduction (CER).
  - Reductions in emissions shall be additional to any that would occur in the absence of the certified project activity.
- Annex I Parties can use CERs to contribute to compliance of their quantified GHG emissions reduction targets of the KP.
  - As a result, the amount of emission cap of Annex I Parties will increase.
  - CERs issued based on activities during the period from the year 2000 up to 2012 can be used in achieving compliance of Annex I Parties in the 1st commitment period.

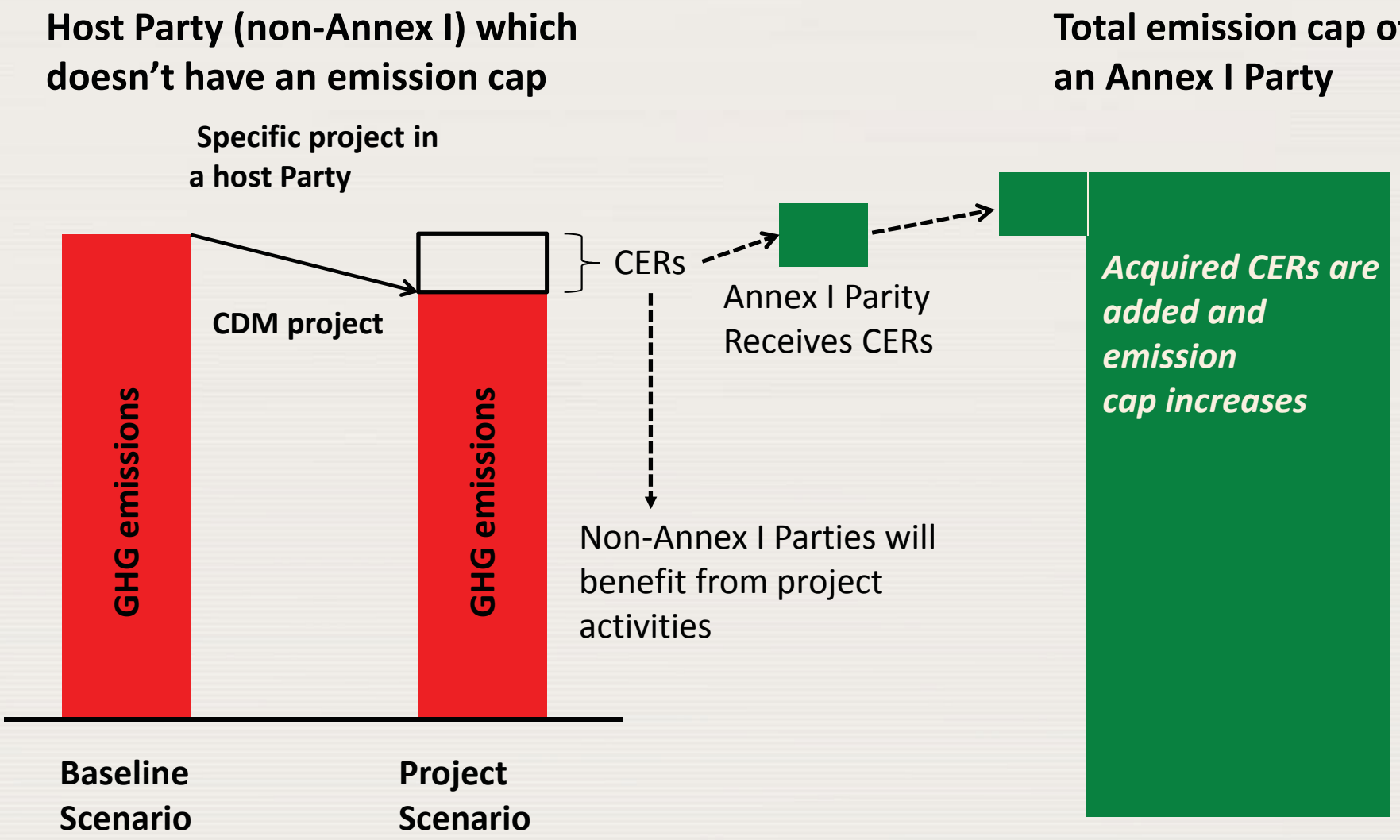
Workings of CDM

Host Party (non-Annex I) which doesn't have an emission cap

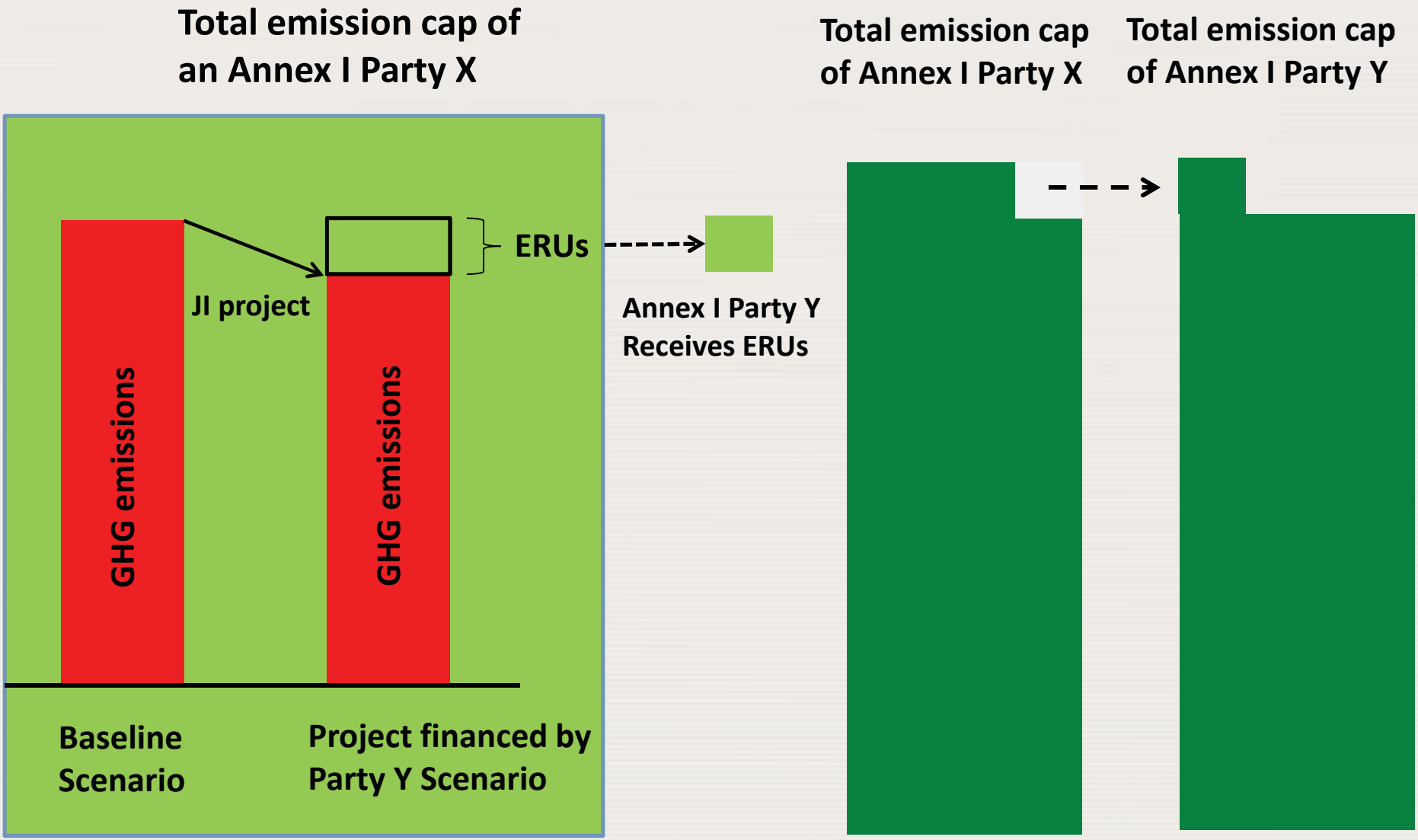
Total emission cap of an Annex I Party



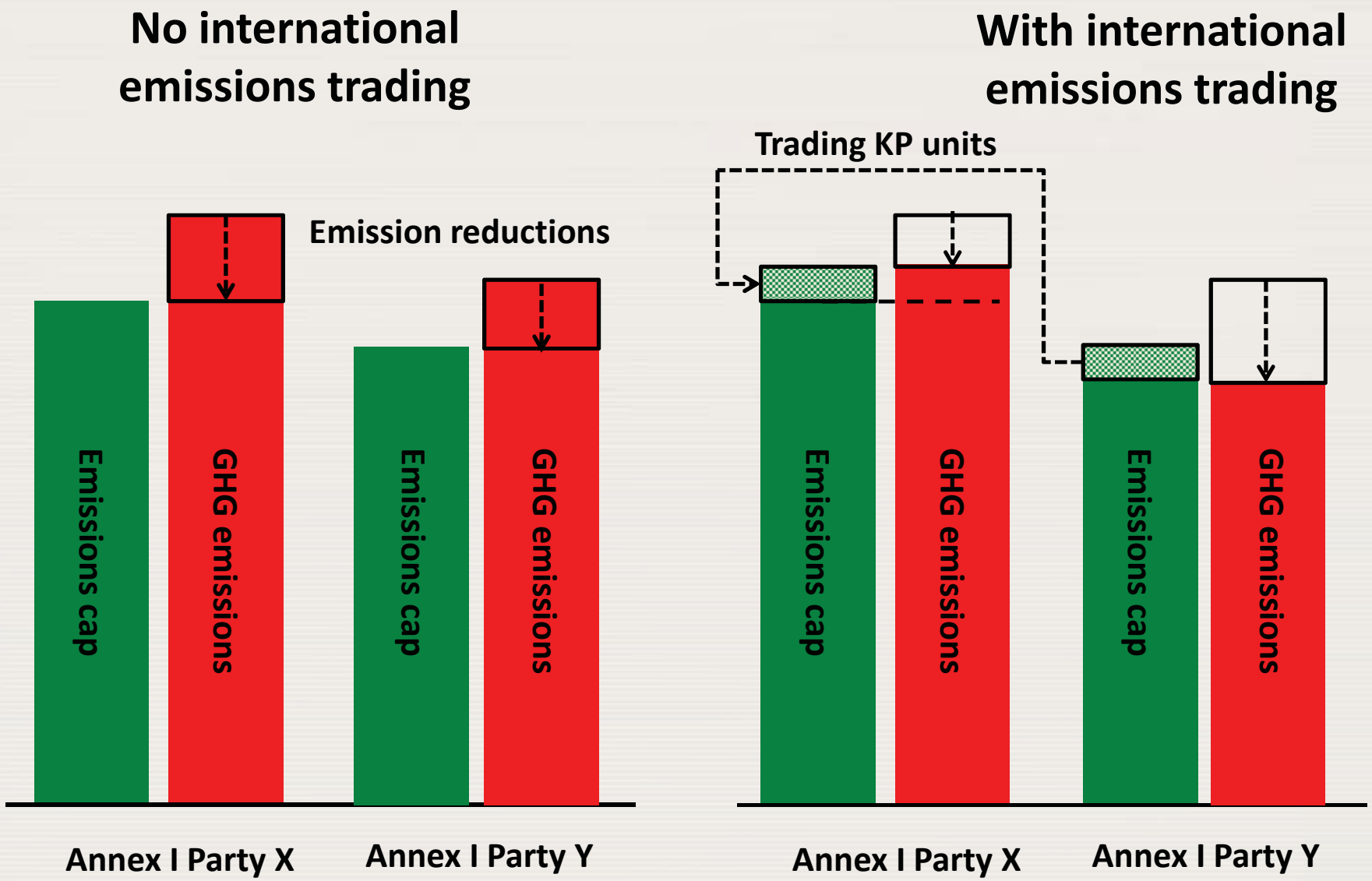
Workings of CDM



Workings of JI



Emissions trading



Strengths of the Kyoto Protocol

- **Market-based approaches intended to lower the cost of the global climate regime:**
  - **emissions trading among Annex I countries that commit to targets under the Protocol,**
  - **“joint implementation,” which allows for project-level trades among the Annex I countries, and**
  - **the Clean Development Mechanism (CDM), which provides for the use of project-level emissions offset created in non-Annex I (developing) countries to help meet the compliance obligations of firms in Annex I countries.**

Strengths of the Kyoto Protocol

- Non-prescriptive - the KP recognizes domestic sovereignty and provides flexibility at the national level for countries to meet their emission reduction commitments or targets —in whatever manner they choose.
- Consistent with the UNFCCC principle of "common but differentiated responsibilities and respective capabilities"

Weaknesses of the Kyoto Protocol

- Some of the worlds leading emitters either have not ratified the treaty or have not committed to specific emission reduction targets:
  - USA have not ratified the KP
  - The developing world has already overtaken the Annex-1 countries in total GHG emissions
  - China GHG emitter No 1 followed by the USA
- Even if Annex I, incl. US, were to reduce GHG emissions to zero by 2030, the climate target of stabilizing atmospheric CO_2 concentrations at 450 ppm is impossible

Weaknesses of the Kyoto Protocol

- Small number of countries take action under the Protocol
- "Narrow but deep" approach drives up costs of producing carbon-intensive goods and services in Annex I countries
- Non-Annex I countries enjoy comparative advantage in the production of carbon-intensive goods and services
- Carbon leakage – reduces effectiveness of the KP
- Puts non-Annex I countries on a more carbon-intensive growth paths, rendering it more difficult to later join the coalition of countries taking mitigation action
- International emissions trading ineffective - trading is among national governments.

Weaknesses of the Kyoto Protocol

- Cost effectiveness of cap-and-trade systems depends on the participants being cost-minimizing entities
  - Nation-states are not cost minimizers
  - ETS with too many AAUs
  - Grandfathering versus auctioning
- The world has changed since 1992 –some fifty non-Annex I countries now have higher per capita income than the poorest of the Annex I countries.
- CDM and additionality

After entry into force

- Negotiation at the CoP and the UNFCCC Subsidiary bodies SBSTA and SBI continued with the objective to develop a post 2012 MEA
- Entry into force also created a new body MoP (Meeting of the Parties to the KP)
- At CoP10/MoP1 in Montreal a two-tear approach with two Ad-hoc Working Groups (AWGs)
  - AWG-KP under the Protocol
  - AWG-LCA – Long-term Cooperative Action under the Convention

Mandate AWG-KP

- Initiate a process to consider further commitments of Annex I countries for the period beyond 2012 in an open-ended ad hoc working group of Parties to the KP which shall aim to complete its work as early as possible and in time to ensure that there is no gap between the first and second commitment periods
- No new commitments by non-Annex I countries

Mandate AWG-LCA

- To launch a comprehensive process on long-term cooperative action with particular emphasis on devising a "shared vision for long-term cooperative action" based on four key pillars (detailed in the Bali Action Plan in 2007)
  - Mitigation
  - Adaptation
  - Finance and
  - Technology transfer.
- Capacity building was later added as a fifth pillar
- The main task of the AWG-LCA is to negotiate a post-2012 greenhouse gas mitigation (GHG) scheme that includes *all countries, developed and developing*.

Next milestones

- **2007 — Bali CoP13**
- **Bali Action Plan (BAP) for the first time introduced the notion of "developed" and "developing countries," under the Convention as opposed to "Annex I" and "non-Annex I parties."**
- **Substance added to the four pillars**
- **Anchored in the principle of common but differentiated responsibilities, *both* developing and developed countries ultimately agreed to undertake mitigation efforts.**
- **DCs agreed to "nationally appropriate mitigation actions" (NAMAs) in the context of sustainable development, supported by technology and enabled by finance and capacity building in a measureable, reportable and verifiable manner."**

Next milestones

- 2009 — Copenhagen Accord COP15
- Key deliverable: A new international environmental agreement ("seal the deal") with ambitious mid-term greenhouse gas (GHG) emission reductions to come into force when KP's first commitment ends in 2012
- A failure for most: No new agreement
- A success for some
  - Quantification of "dangerous interference" = max 2°C global warming
  - First quantification of NAMAs
  - Voluntary action and pledges
  - Financial support of $100 billion by 2020

The ADP

- Durban 2011: The Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) is a new subsidiary body to develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties.
- The ADP is to complete its work as early as possible but no later than 2015 in order to adopt this protocol, legal instrument or agreed outcome with legal force at the twenty-first session of the Conference of the Parties and for it to come into effect and be implemented from 2020.

Next milestones

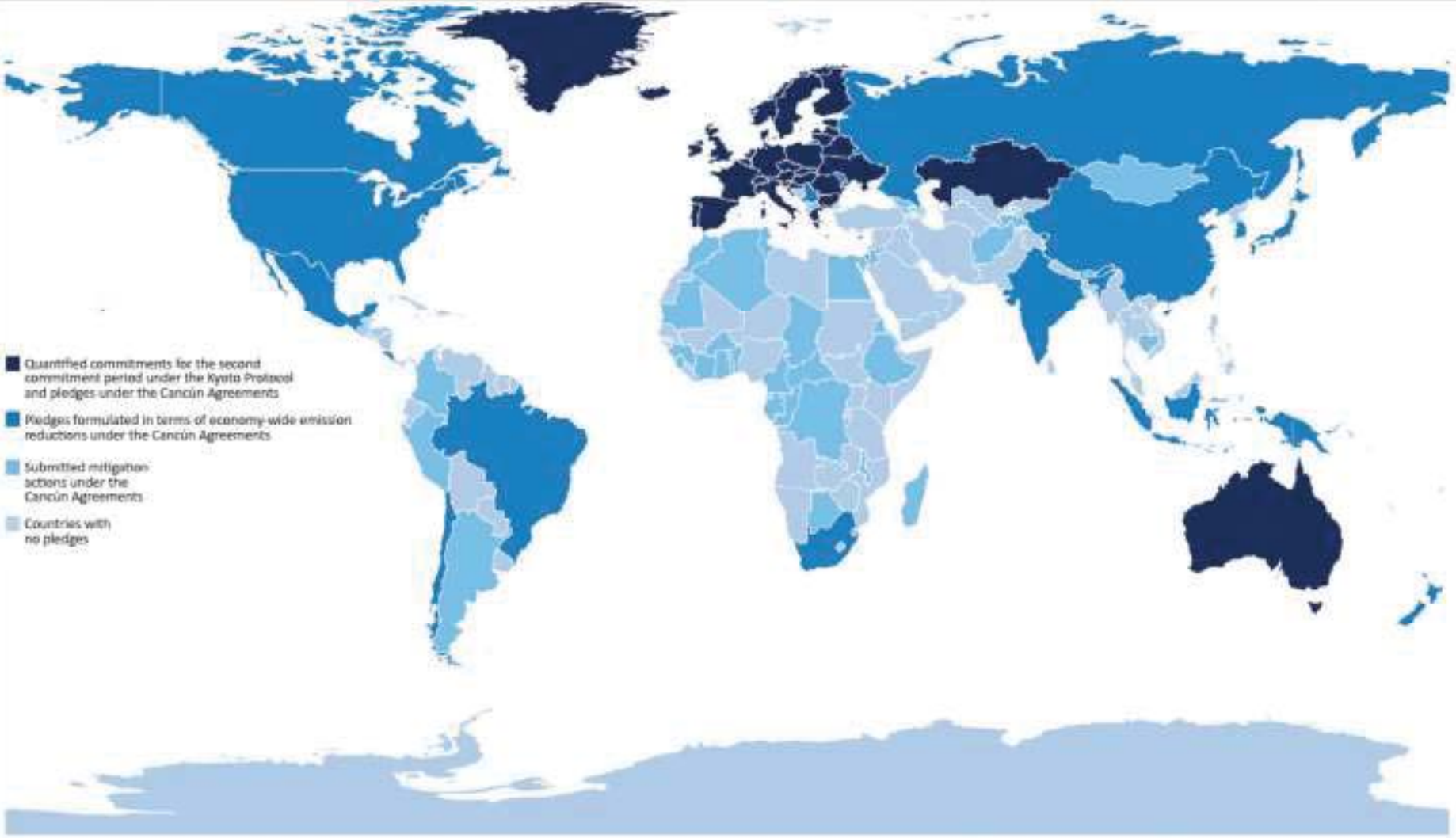
- **2012 — Doha CoP18 'transitional CoP'**
  - extension of KP 2013-2020 (KP2)
  - key Parties left KP2: Japan, Canada, New Zealand and Russia (KP2 covers only 15% of global GHG emissions)
  - 18% emissions reduction under KP2 by 2020 insufficient for a 450 ppm future
  - how to deal with surplus AAUs from KP1
  - ADP continued negotiations
  - cost of addressing climate change
  - AWGs put to rest – no legacy of AWG-LCA
  - pledges (conditional and unconditional) so far inadequate for emission trajectory consistent with a 450 ppm target

Next milestones cont'd

- Some 85 developing and developed countries presented emission reduction pledges under the Convention.
- Many of these pledges are unclear, contain targets to be achieved on conditionality
- Measurable, Reportable and Verifiable (MRV) accounting rules, etc. continue to be controversial

2013 - Warsaw CoP19: Transition continued

Cancun GHG reduction pledges



Note:

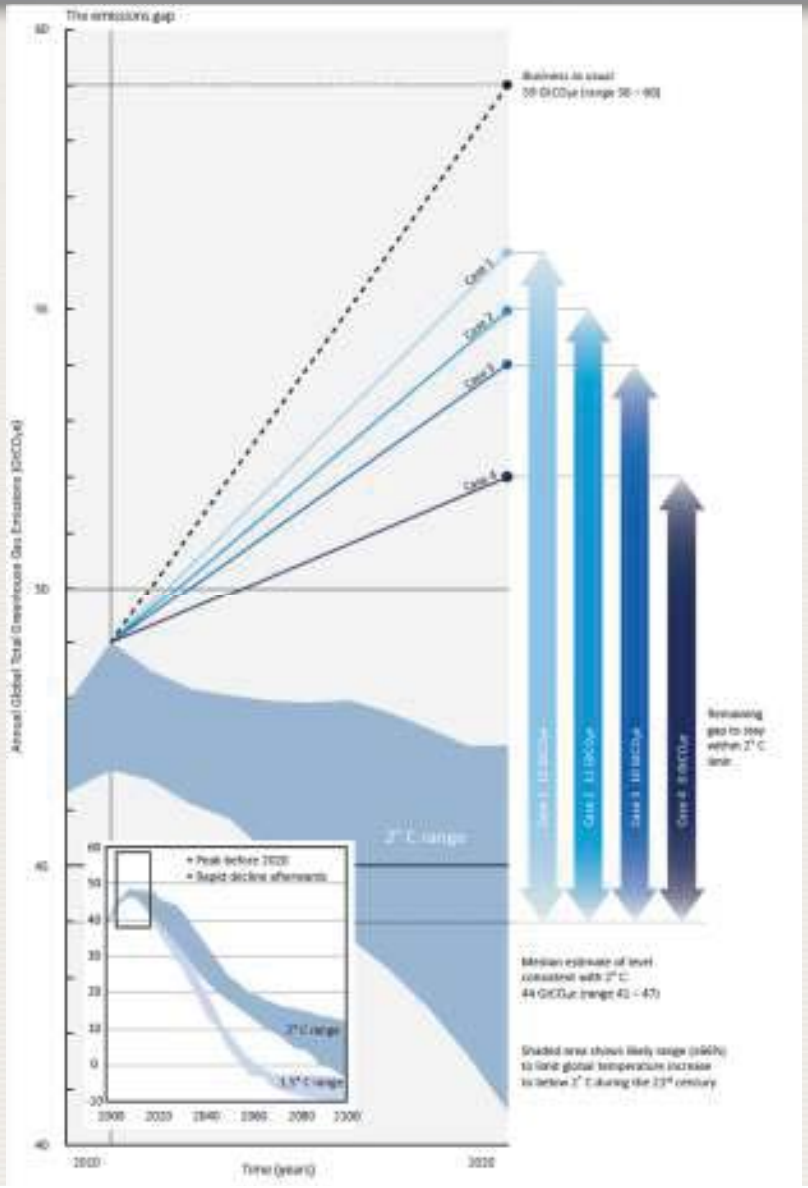
Following the 2012 conference of the parties to the Climate Convention in Doha, a group of countries has adopted reduction commitments for the second commitment period under the Kyoto Protocol

Emissions reductions with respect to business-as-usual and emissions gap in 2020, by pledge case

Case	Pledge type	Rule type	Median emission levels and range ($GtCO_2e$ per year)	Reductions with respect to business-as-usual in 2020 ($GtCO_2e$ per year)	Emissions gap in 2020 ($GtCO_2e$ per year)
Case 1	Unconditional	Lenient	56 (54–56)	3	12
Case 2	Unconditional	Strict	55 (53–55)	4	11
Case 3	Conditional	Lenient	54 (52–54)	5	10
Case 4	Conditional	Strict	52 (50–52)	7	8

Source : UNEP, The Emissions Gap Report 2013

Emissions reductions with respect to business-as-usual and emissions gap in 2020, by pledge case



Replacing the Kyoto Protocol

- The KP is a short-term approach to what is a long-term problem
- The magnitude of technological change for climate change mitigation commands long-term price signals that stimulate the necessary sustained investment and innovation
- Insufficient incentives for compliance - KP's enforcement mechanism to make up any deficit in subsequent compliance periods is unlikely to induce target compliant policies.

A new MEA: Point of departure: Kyoto Protocol

- Opinions divided: Good start or “too flawed”
- Question of participation
- KP effects on climate change have been trivial
- First commitment window (KP1) to short
- Now second commitment window (KP2) with further reduced participation
- Generally agreed: Current framework is not sufficient and further steps are needed
- While parties negotiate – emissions continue to rise

Arguments brought forward….

There are at least four reasons for expanded developing country participation:

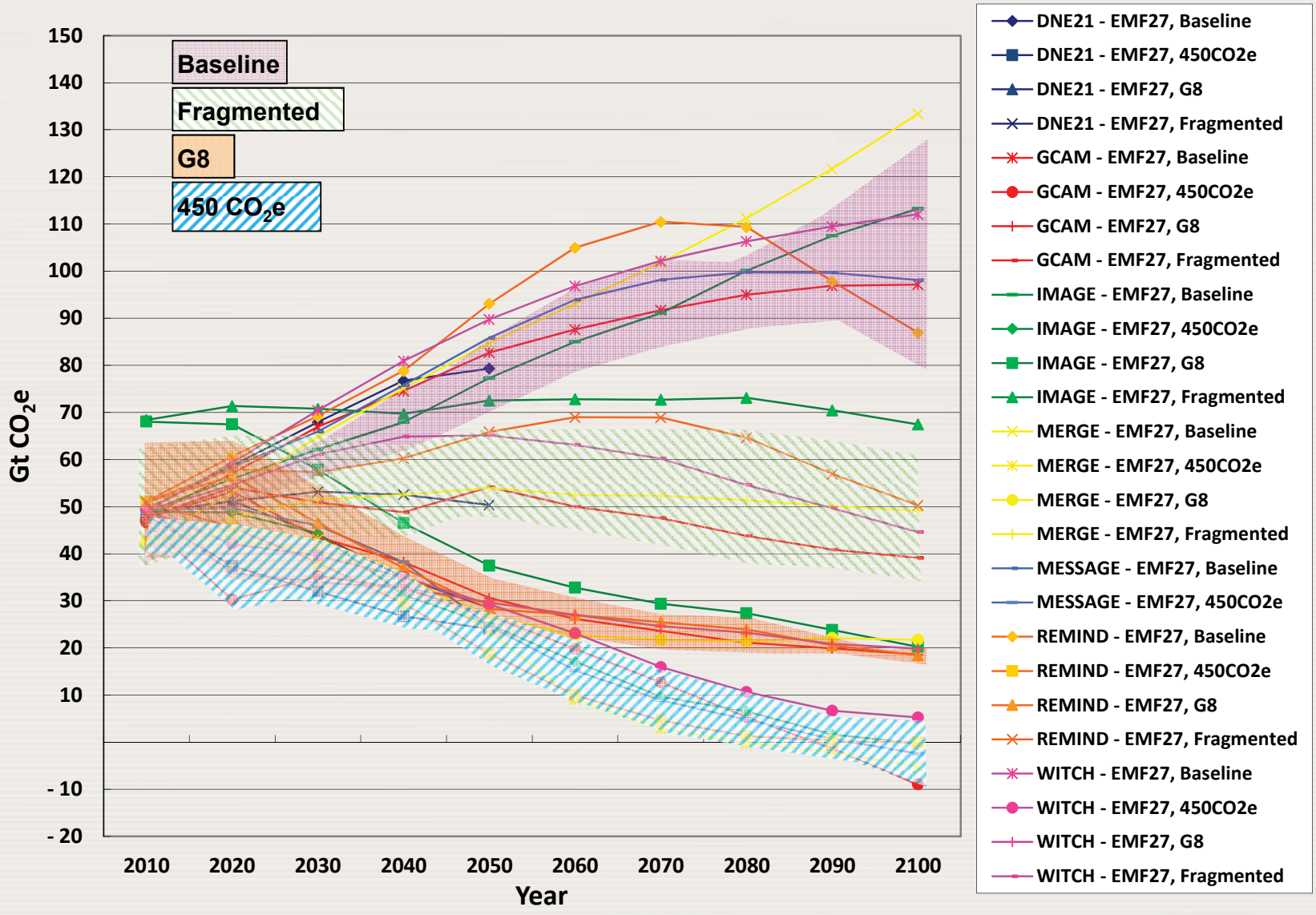
a) the magnitude of their current emissions and the expected rates of growth in their emissions,

b) their lower costs of emissions reductions,

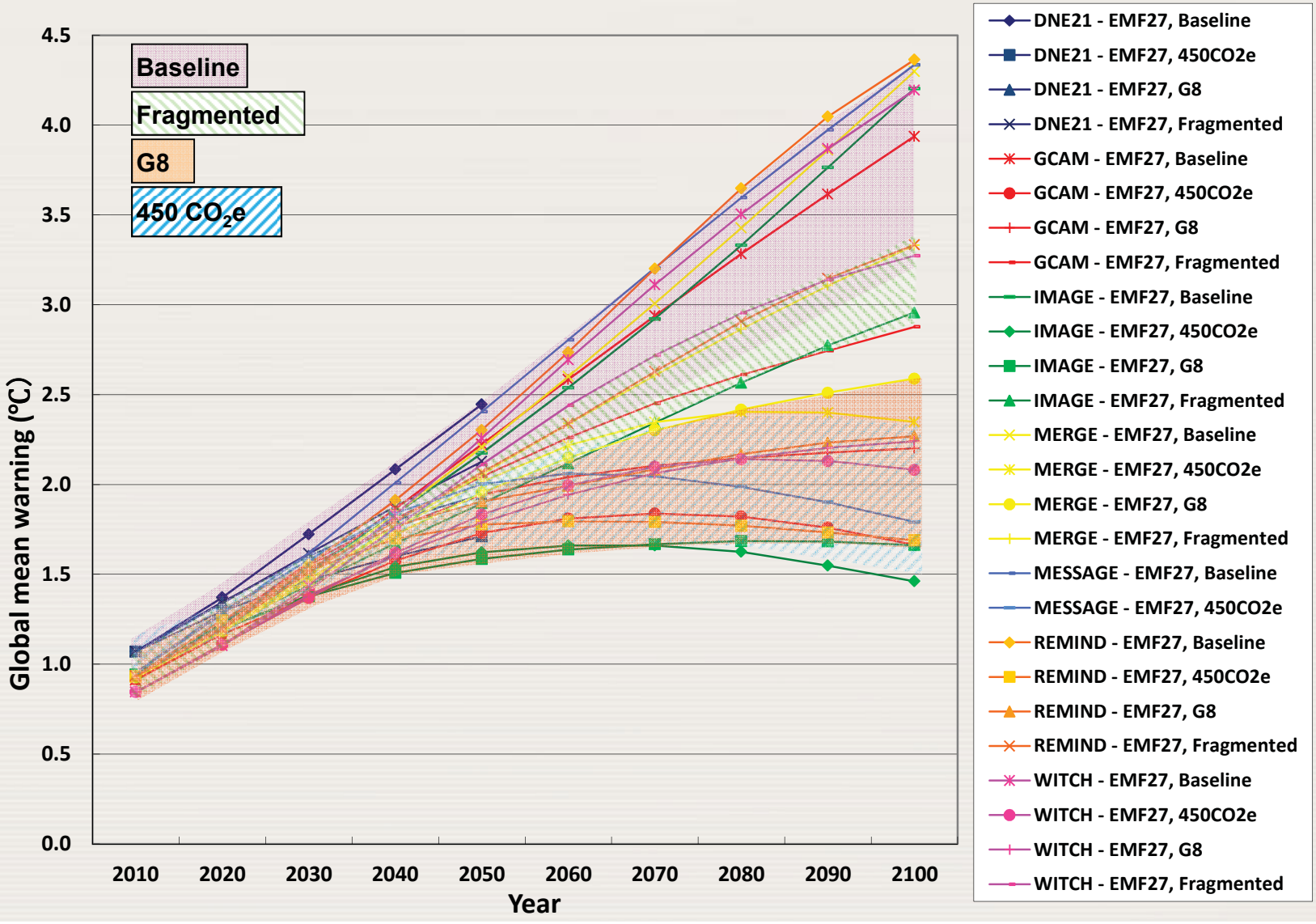
c) the increased likelihood of U.S. participation and willingness by other industrialized countries to engage in deeper emissions reductions, and

d) the possibility of carbon leakage.

Future GHG emission scenario ranges



Temperature ranges associated with the emission scenarios



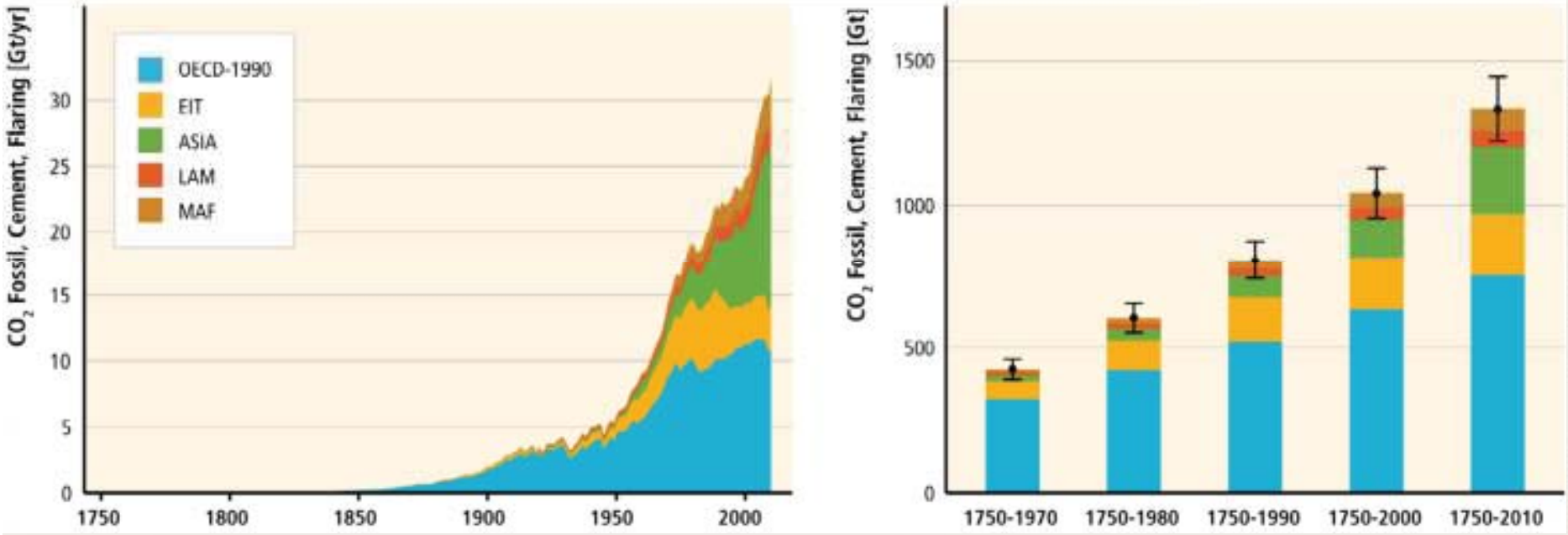
Policy conundrum

- Participation of DCs developing countries in any post-2020 international climate policy framework essential
  - environmental performance and cost effectiveness
- Unreasonable to expect DCs to endure significant emissions-reduction costs → consequences for economic development.
- On an ethical basis ICs should take the first emission-reduction steps on their own because they are responsible loading the atmosphere with GHGs

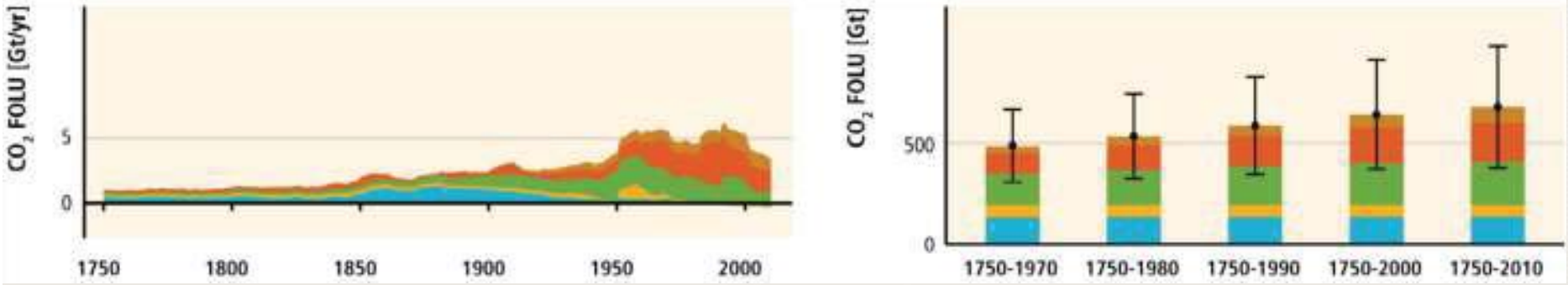
Approaches to equitable burden sharing

- Historical responsibility for climate change
- Polluter-pays-principle
- Capability-to-pay-principle
- Capability-to-mitigate-principle
- Equal cumulative emission per capita principle
- Adequate and precautionary

Historic fossil CO_2 emissions per region



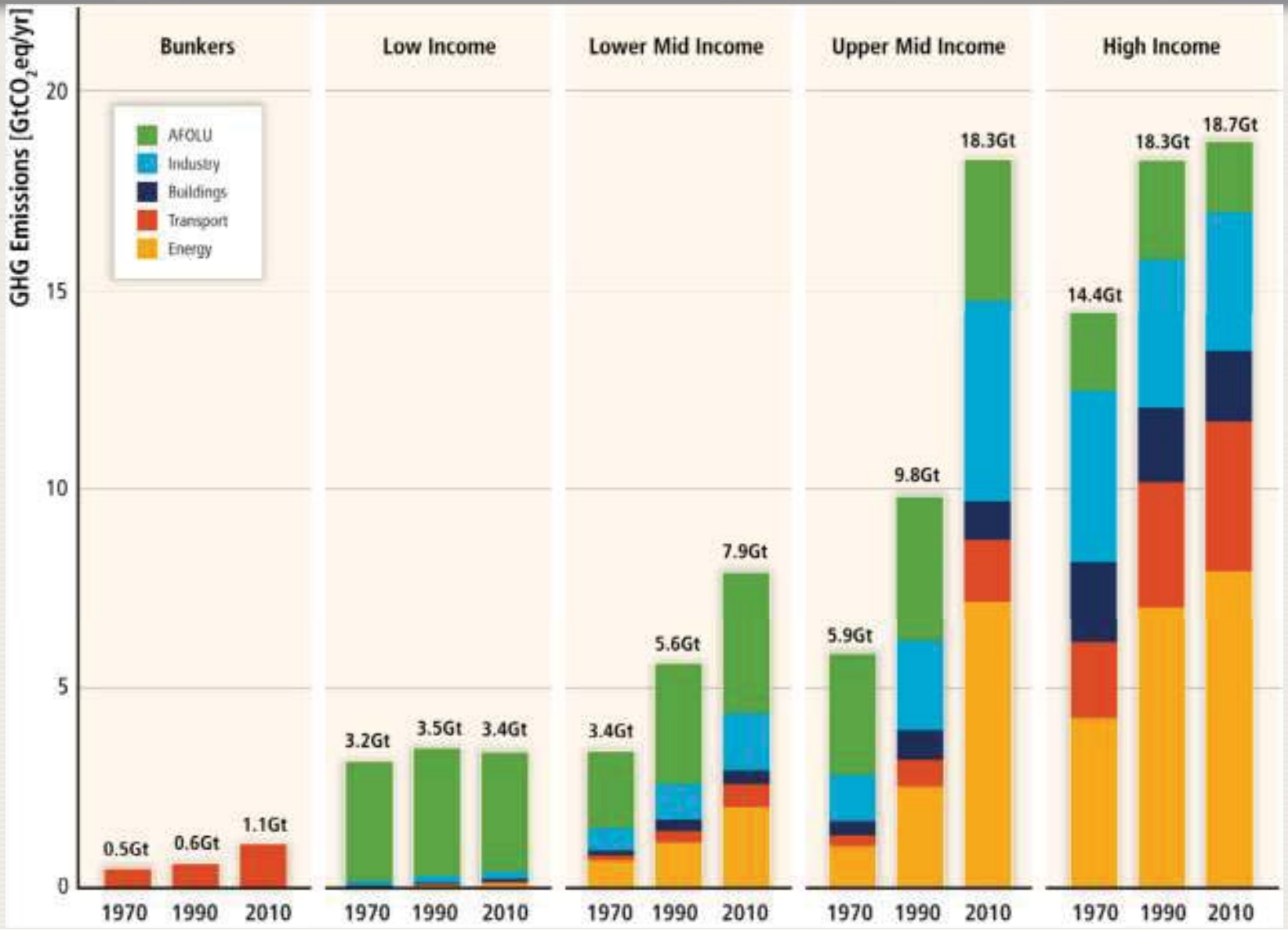
Illustrative estimate of historical land-use-change emissions



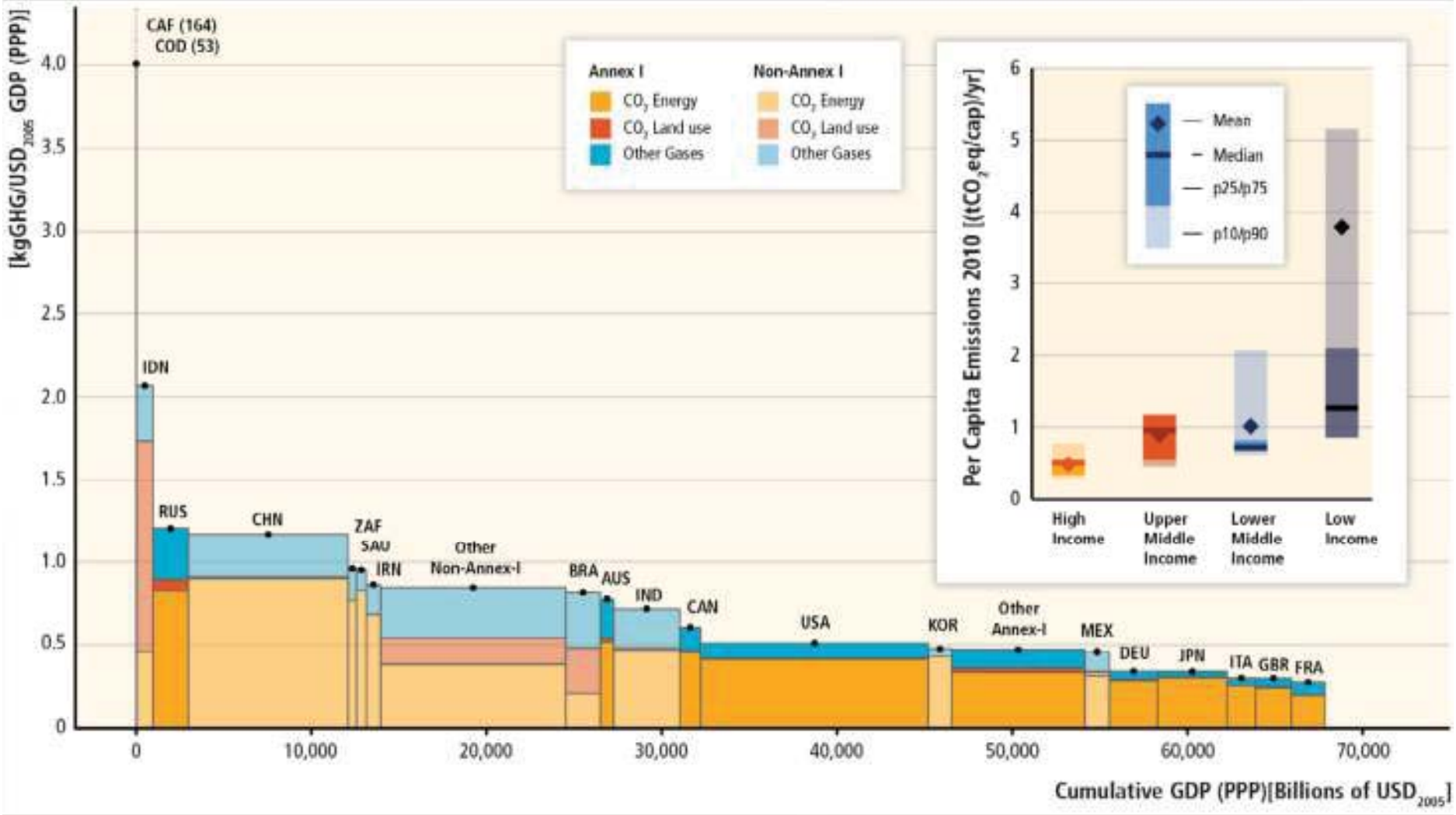
Source: IPCC AR5

- For reasons of distributional equity and political pragmatism developing countries must climb aboard the global climate policy "train" but without necessarily paying full fare (Omstead and Stavins 2011)
- Bosetti and Frankel (2011) propose a formulaic approach to generating emissions targets based on
  - progressivity
  - latecomer catch-up, and
  - gradual movement toward equal per capita emissions
- while constraining targets so as not to impose costs over the century exceeding, e.g., an average of one percent of GDP per year or five percent of GDP for any country in any five year period

Emissions by income groups



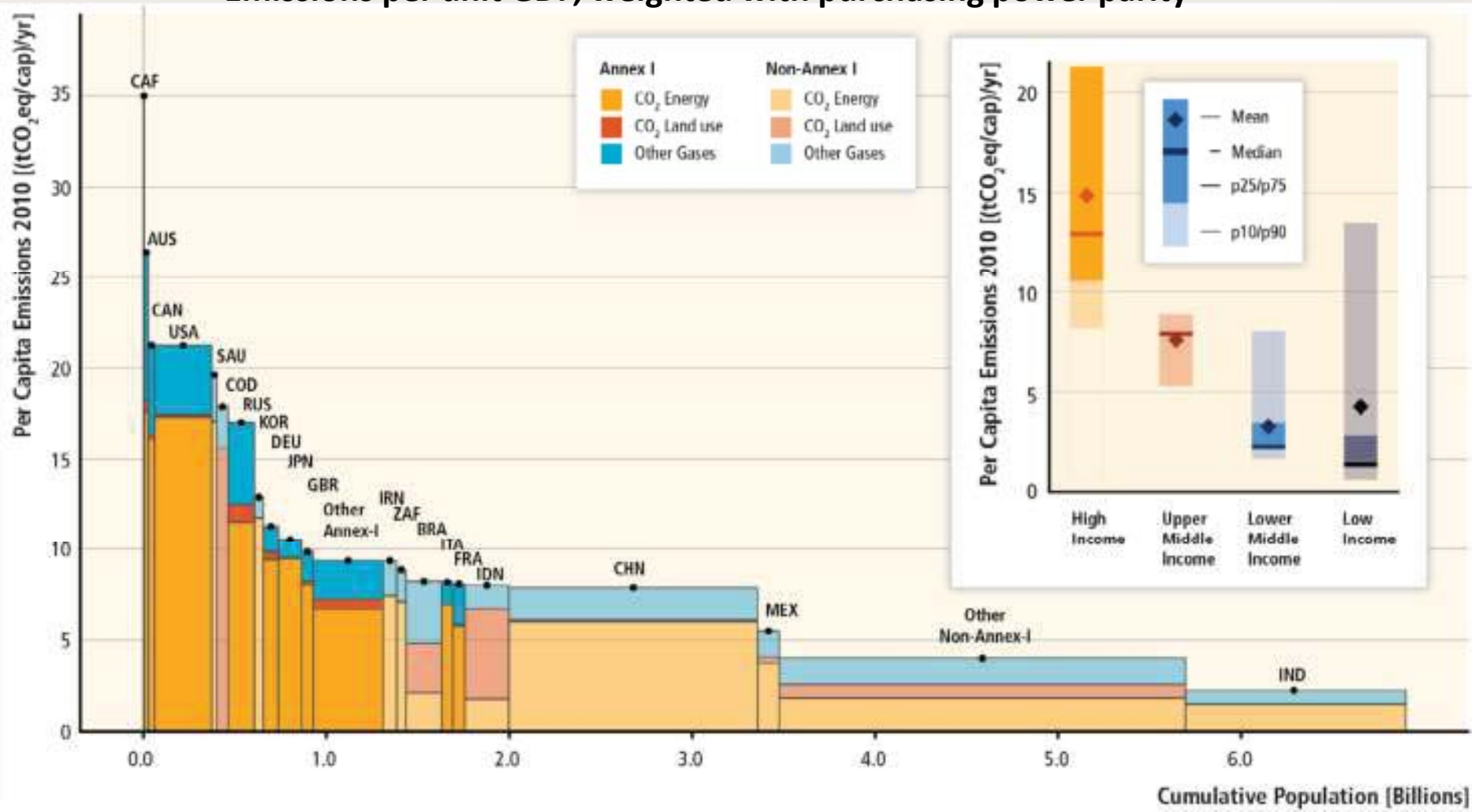
Ranking of per-capita emissions by country/region



Shadings show the 10th to 90th percentile range (light) as well as the 25th to 75th percentile range (dark); horizontal bars identify the median and diamonds the mean

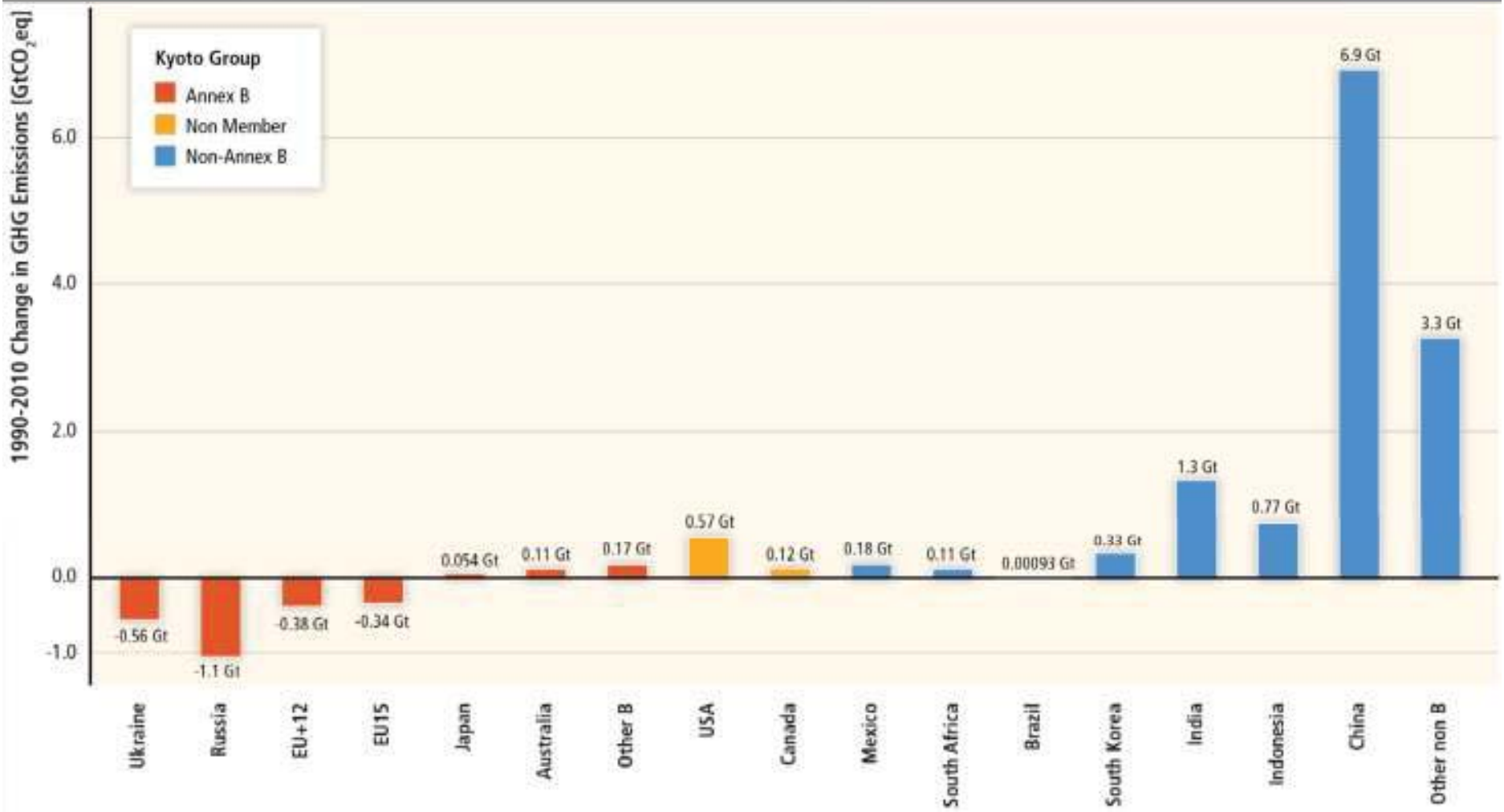
Ranking of carbon intensity of economies as a function of total size of the economy

Emissions per unit GDP, weighted with purchasing power parity



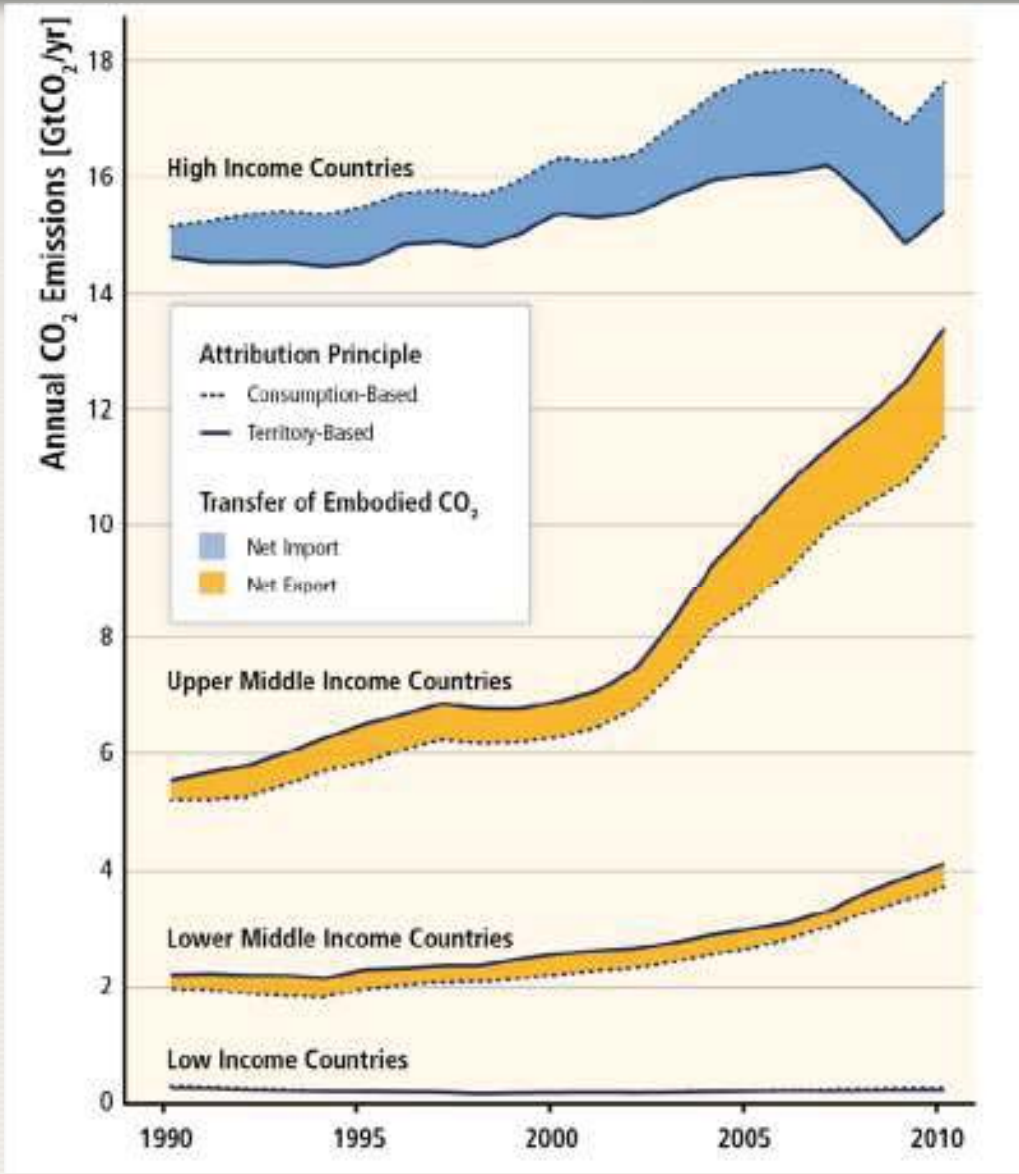
Shadings show the 10th to 90th percentile range (light) as well as the 25th to 75th percentile range (dark); horizontal bars identify the median and diamonds the mean

Emissions changes from 1990 to 2012



Emissions changes from 1990 to 2012 divided into Annex B of the Kyoto Protocol (countries with quantified emission targets, red), countries that were eligible for Annex B but are not members (Canada and the United States, yellow) and non-Annex B countries (blue).

CO_2 emissions from fossil fuel combustion attributed on the basis of territory and final consumption



Key elements of a post-2020 international climate policy architecture

a. a framework that involves key industrialized and developing nations - in differentiated but meaningful ways
b. an emphasis on an extended time path for emissions targets, and
c. the inclusion of flexible market-based policy instruments to help keep costs down and address concerns about international equity.

Irrespective of the post-2020 architecture - a centralized top-down agreement, a set of harmonized national policies, or a decentralized bottom-up approach - these elements will be key.

Easy early on – tough later

- **KP1 targets: "too little, too fast."**
  - Targets did little to reduce global emissions but, due to their excessive focus on the short term, they were unreasonable for those countries that enjoyed significant economic growth after 1990.
- **This problem can be ameliorated through a two-pronged approach:**
  - firm but moderate targets in the short term to avoid rendering large parts of the capital stock prematurely obsolete, and
  - flexible but considerably more stringent targets for the long term to motivate (now and in the future) technological change, which in turn is needed to bring costs down over time

- If they are inflexible, precise numerical emissions targets for long time horizons are impractical due to uncertainty over future economic growth, technological change, and climate science
- Stabilization at 450 ppm is politically infeasible and technologically unlikely
  - current cost estimates
  - little progress in global climate policy and
  - significant increases in global emissions since 450 ppm was first considered

Carrots or sticks?

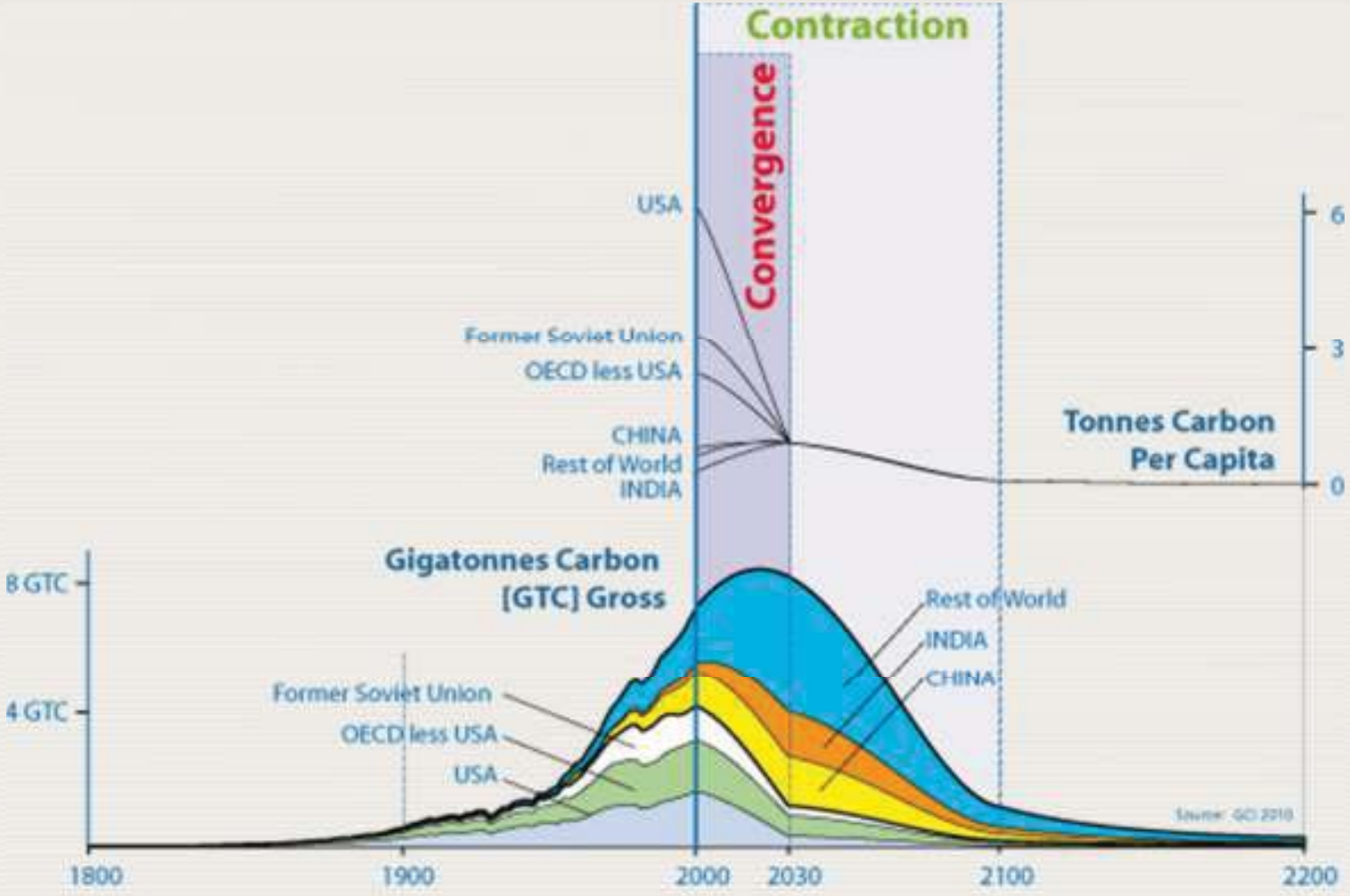
- Carrot - rewarding energy innovation
- Stick (carbon taxes, permits, standards)
- Optimist's view: the economy only needs a gentle guide to change the direction of technological development capacity to develop and disentangle itself from its dependence on fossil fuels – the carrot
- Pessimist's view: the economy needs a strong economic signal – the stick.
- The two options also differ in terms of
  - static and dynamic efficiency,
  - stimulating or hampering economic growth
  - in distributional effects, in their financial and managerial demands on government, and in negotiation strategy.

Alternative criteria for assessing global climate policy regimes

- **The environmental outcome**
  - Clear climate benefits as policies differ w.r.t. time paths of changes in net emissions
  - Leakage – relocation and/or higher availability of HC in non-Annex I
- **Dynamic efficiency**
  - Longevity of infrastructure – lead times
  - Individual time preferences
  - Uncertainty in estimating benefits and costs – let's wait and see
- **Cost-effectiveness**
  - Imperative for comparing policies and measures (PAMs)
  - Cost-effectiveness analysis useless to compare policies with different benefit streams ('fast train to the wrong station")
- **Equity**
- **Policy flexibility in the presence of new information**
- **Participation and compliance**

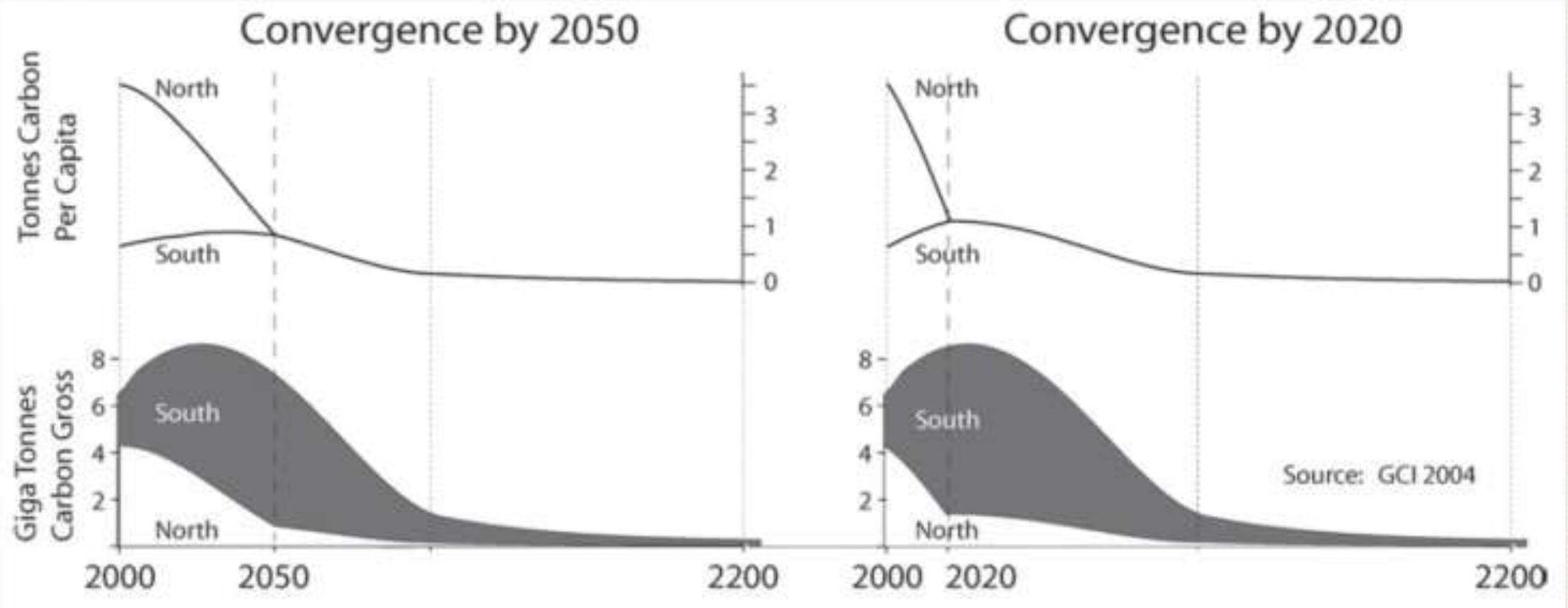
Source: Aldy et al. / Climate Policy 3 (2003)

Convergence and contraction



This example shows regionally negotiated rates of C&C.
It is for a 450ppmv Contraction Budget, with Convergence by 2030.

Negotiating rates of convergence

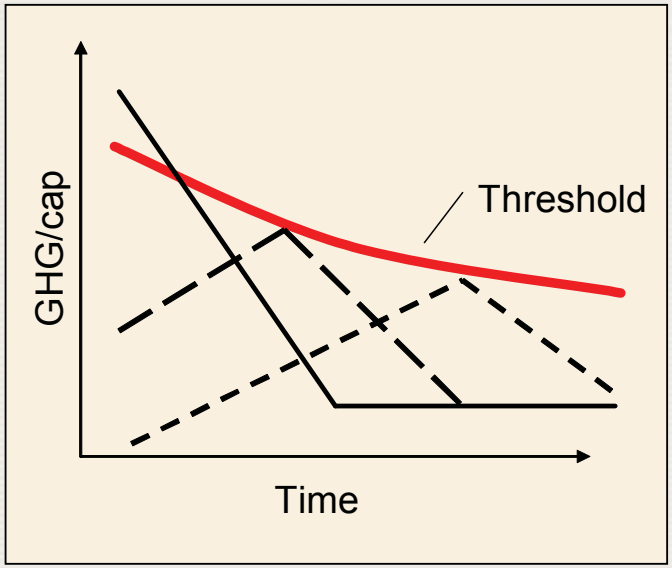


Per capita emissions around the World converge on equality by a negotiated "Convergence Date". Two examples of convergence are shown here, each within a 450ppmv contraction budget.

Common but differentiated convergence (CDC)

- **Three stages**
  - No commitments
  - "No-Lose" targets
  - Convergence of per capita emission level to the same level in e.g. 40 years

- **Participation threshold:**
  - (time dependent) global average per capita emissions



Höhne, den Elzen, Weiss: "Common but differentiated convergence" accepted at Climate Policy 2005

South North Dialogue

	Quantitative commitment	Qualitative commitment	Financial support
1. Least developed countries	-	SD PAMS optional	Receive payments
2. Other developing countries	-	SD PAMS obligatory, co-funded	Receive payments
3. Rapidly industrializing developing countries	Limitation if funding provided	SD PAMS obligatory, co-funded	Receive high payments
4. Newly industrialized countries	Limitation	SD PAMS obligatory	Co-funding
5. Annex I but not Annex II	Absolute reduction	-	Low/no payments
6. Annex II	Strict absolute reduction	-	Make high payments

- Thresholds: CO_2/GDP, GDP/cap, HDI; emission growth, cumulative emissions, GDP/cap, HDI; show members of the groups
- Adaptation commitment

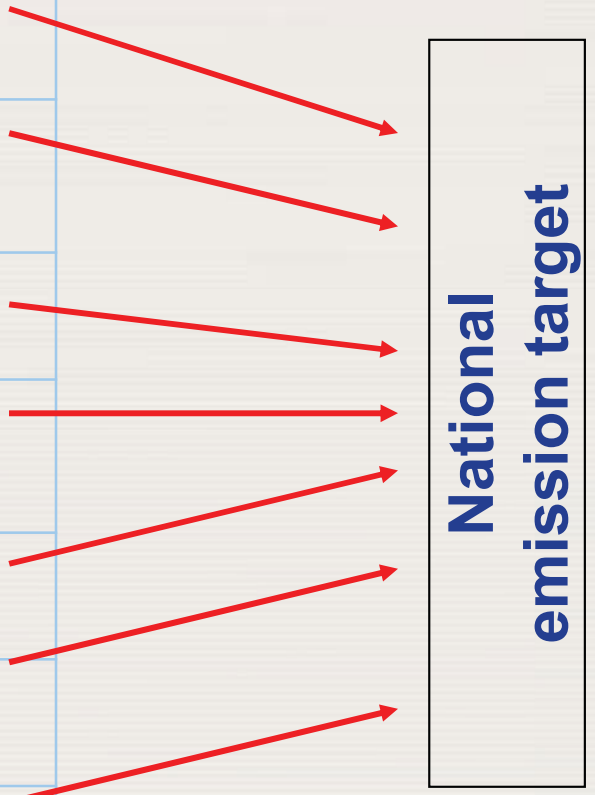
Brazilian Proposal

- Emission reductions by Annex I countries proportional to contribution to temperature increase
- Participation by Non-Annex I countries not defined

- The only proposal still discussed under the UNFCCC, but its implementation unclear

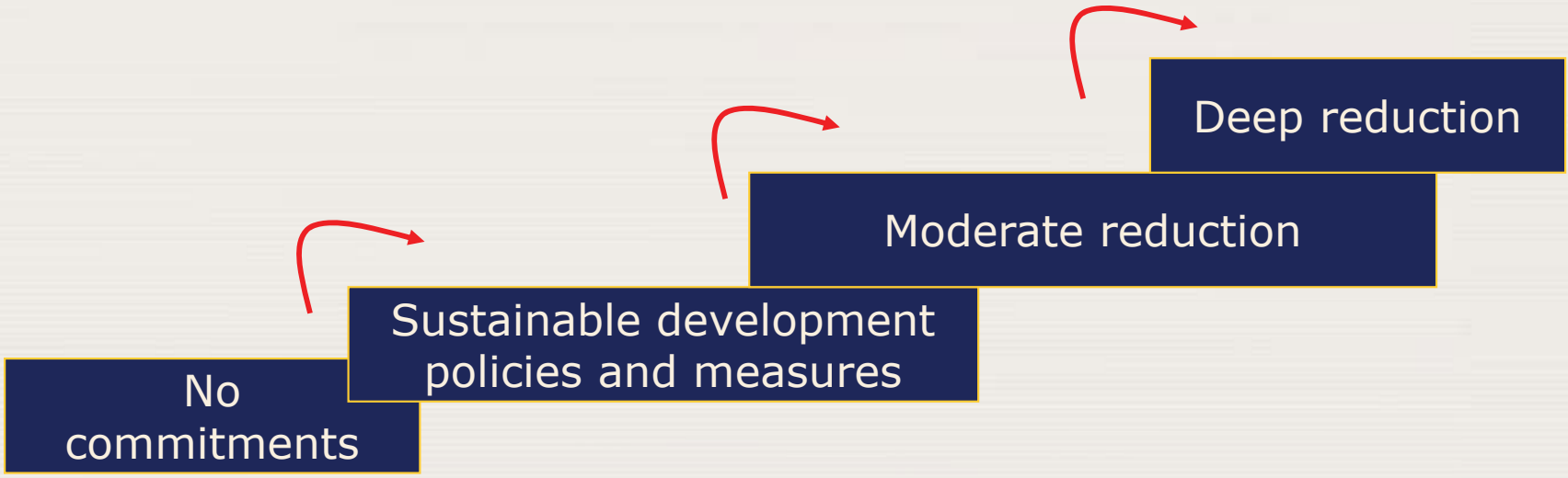
Triptych of sectoral approaches

Industry	Adjusted BAU production growth with efficiency improvement
Electricity	Adjusted BAU production growth with limit on sources
Domestic	Converging per-capita emissions
Fossil fuel production	Decline to low level
Agricultural	Percentage reduction below BAU
Waste	Converging per-capita emissions
Land use change and forestry	Decline to zero *(here excluded)*



Multistage approach

Participation in e.g. four stages:

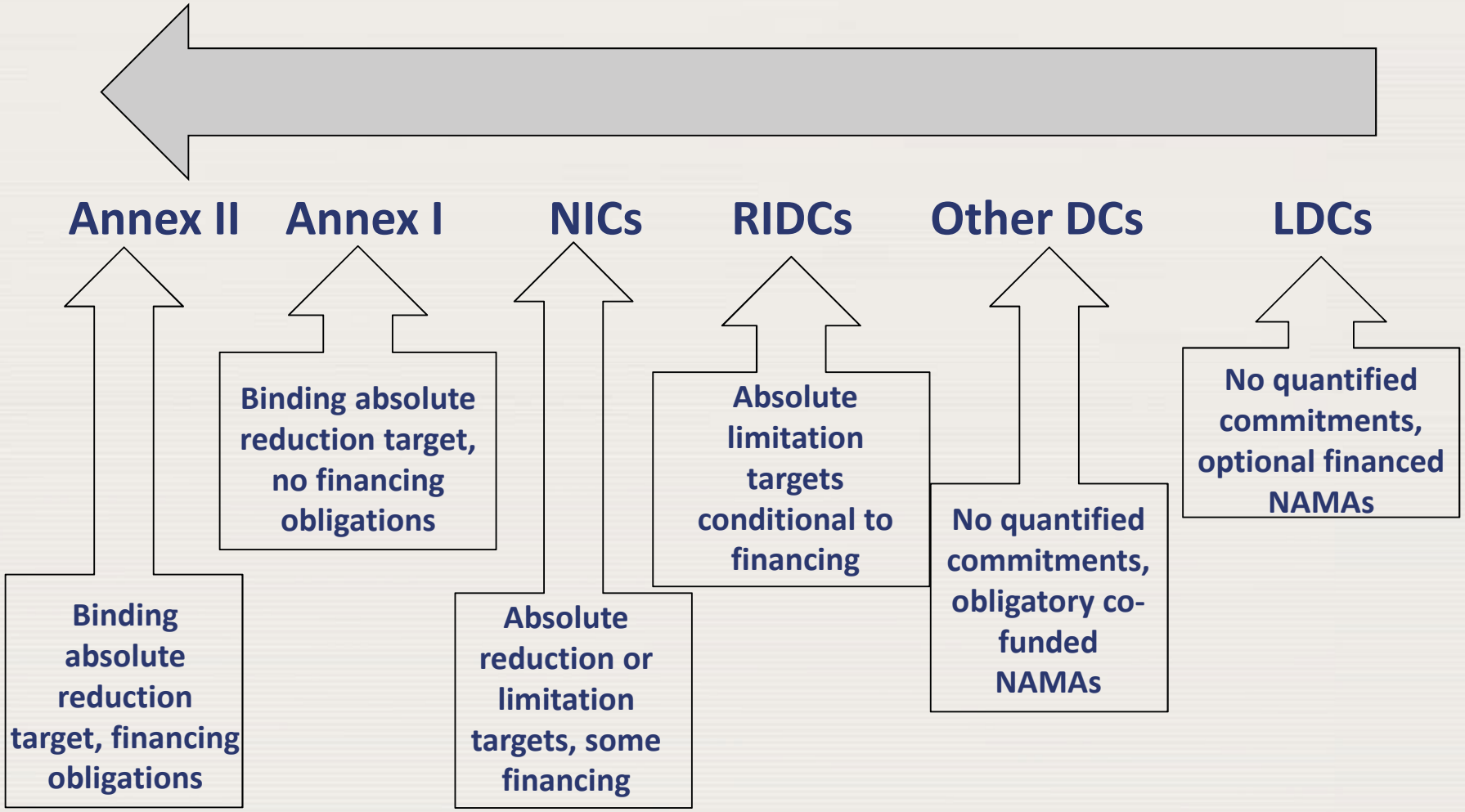


Countries “graduate” to a next step, if threshold is passed, e.g. GDP/cap or emissions/cap

Durban Platform – road to graduation?

- Process / roadmap towards a new regime: 'a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties'
- New Ad Hoc Working Group on the Durban Platform (AWG-DP): finalize work by 2015 – into force 2020
- CBDR not explicitly mentioned – firewall down?
- Open questions:
  - Political will? Coalition of the unwilling in Doha (2012) ?
  - CBDR in Convention – AWG-DP under Convention
  - Yet another roadmap…
  - Agenda of AWG-DP to be decided in 2012

What graduation?



Source: Various publications, especially Winkler et al. (2006)

NIC: newly industrialized countries
RIDC: rapidly industrializing countries

Indicators

- **Who should mitigate and how much?**
  - Rather scientific comparison than political negotiation as a basis of burden-sharing
- **Criteria: responsibility, capability and potential to mitigate?**
  - Cumulative emissions (historical responsibility)
  - GDP PPP or HDI
  - CO_2/GDP
  - various others
- **Also suggested: OECD membership, carbon intense exports, ecosystem services**

Building block approach

- With prevailing interests and power structures a functioning framework for climate governance is unlikely to be constructed all at once, in *a top-down* fashion.
- Rather advance climate stability by disaggregating global climate governance into component parts that can be developed in a more flexible manner, involving different sets of negotiations based on varying political geometries and regime types *(bottom-up*)
  - Do not wait for a single agreement to cover all governance mechanisms
  - Develop individual agreements on matters such as technology innovation and diffusion, adaptation funding, deforestation and sectoral approaches for industrial sectors.

Building block approach

- The bottom-up approach removes a major stimulus for developing more ambitious domestic policies
- Leads to the lowest common denominator
- Turns climate change from a political into a technological challenge and eschews the difficult distributive conflicts that are central to international climate politics
- An effective building blocks approach would have to recognize that domestic policies need to be embedded in a broader international effort, within the UNFCCC or through an affiliated negotiating process

Firewall: Common but differentiated responsibilities (CBDR)

- Only Annex I (developed) countries required to adopt legally binding quantifiable mitigation / stabilization targets – Convention, KP, BAP
- G77+China defend right to develop / equity fiercely: KP2 seen as a safeguard – developed countries must take lead since they are already wealthy + caused the problem
- Annex I: world has changed, cannot reduce emissions enough to stop climate change without emerging economies
- *Graduation* towards Annex I group discussed in 2000s relevant again after Durban

Conclusions

- Numerous proposals for a new MEA exists
- International binding or voluntary quantified emission reduction obligations
- Short term static or long-term dynamic
- Market forces or regulatory measures
- Multilateral UN-based or a more fragmented set of arrangements
- Mitigation or adaptation
- The key to an effective and successful MEA is find ways to accommodate a balanced mix that is equitable and a balanced reflection of the above aspects