

# The role of non-CO<sub>2</sub> greenhouse gases in the international climate change negotiations

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# A quick look at the international climate change policy regime

1992	UN Framework Convention on Climate Change signed	Rio de Janeiro
1994	UN Framework Convention on Climate Change in force	
1995	COP-1: Decision to strengthen Convention via Protocol	Berlijn
1997	COP-3: Protocol signed	Kyoto
2001	COP-6 bis/ COP7: agreement on KP implementation	Bonn/ Marrakech
2005	Kyoto protocol in force/ COP/MOP-1	
2007	Bali Action Plan	Bali

# UN Framework Convention on Climate Change

- Ultimate objective: stabilising greenhouse gas concentrations in the atmosphere at a 'safe' level
- Precautionary principle
- Principle of 'common but differentiated responsibility'
  - Industrialised countries (Annex-I) first: emissions in 2000 back at 1990 level
  - Annex-II countries assist developing countries with financing and technology (GEF)
  - Developing countries try to minimise emissions, but poverty eradication has priority
- Reporting mechanism
- Universal membership

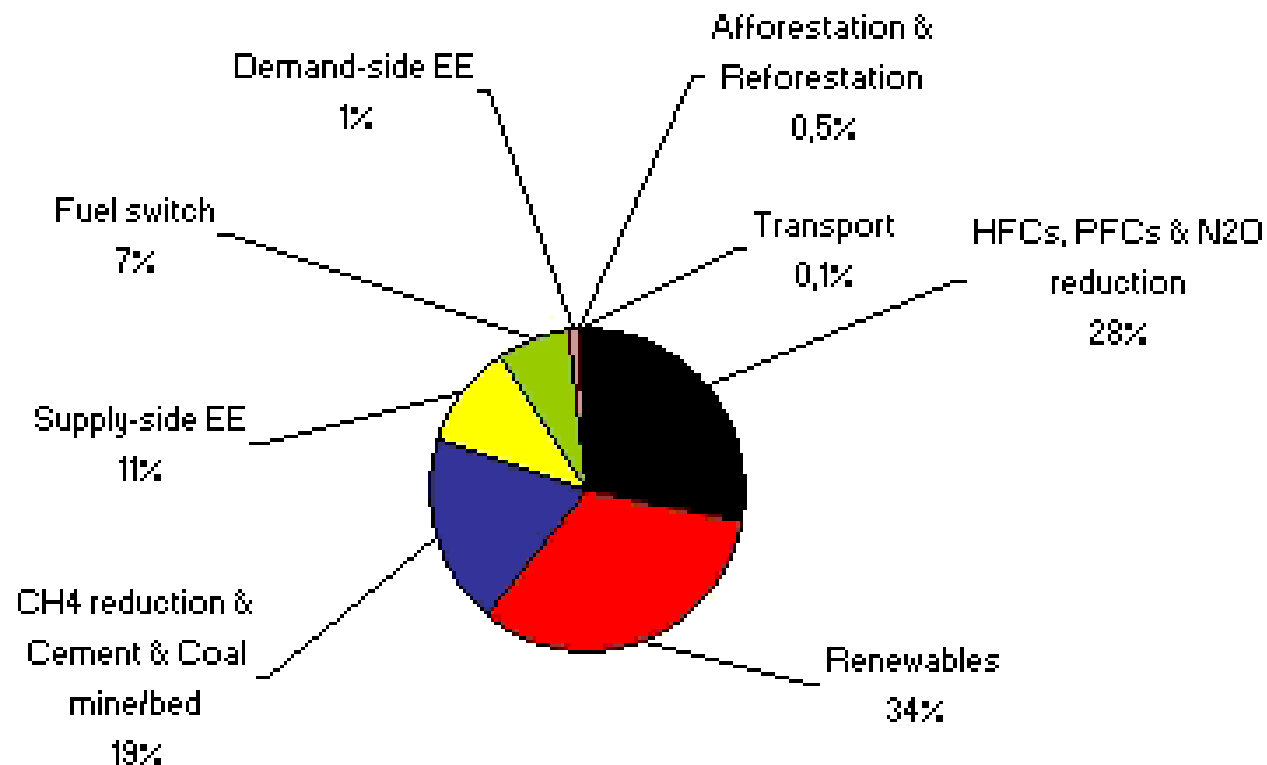
# Kyoto Protocol

- Basket of gases: CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>
- Industrialised countries (Annex-I) reduce emissions in 2008-2012 (on average) with 5% wrt 1990/1995 for 6 gases + some 'sinks'
- Differentiation of targets: EU:-8%, [US:-7%], Japan:-6%, Canada:-6%; Russia:0% (surplus!), Australia:+8%
- Flexibility Mechanisms : Emission trading, Joint Implementation, Clean Development Mechanism
- Compliance: compensation + 30% penalty
- Additional funds for developing countries (Adaptation Fund, Special Climate Change Fund)

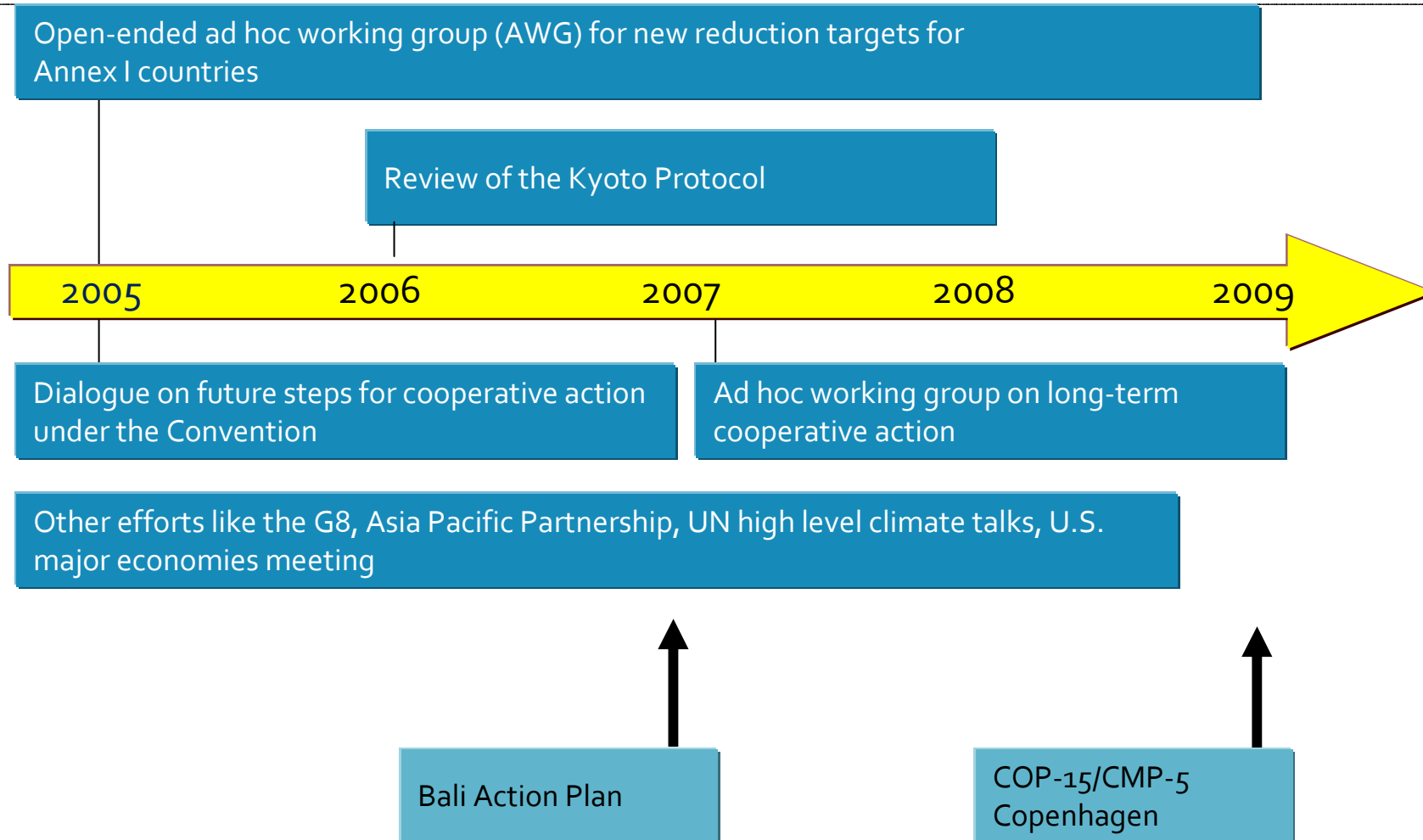
# Kyoto Protocol in operation

- 181 Parties
- Annex-I (collectively) on track to meet obligations
  - Energy efficiency
  - Shift to low carbon energy
  - Reducing industrial/ agricultural emissions
  - Planting forests
- CDM market:
  - Strong growth of volume (>3500 projects; >300 MtCO<sub>2</sub>eq/yr till 2012, >700 MtCO<sub>2</sub>eq/yr after 2012) ),
  - But questions about additionality

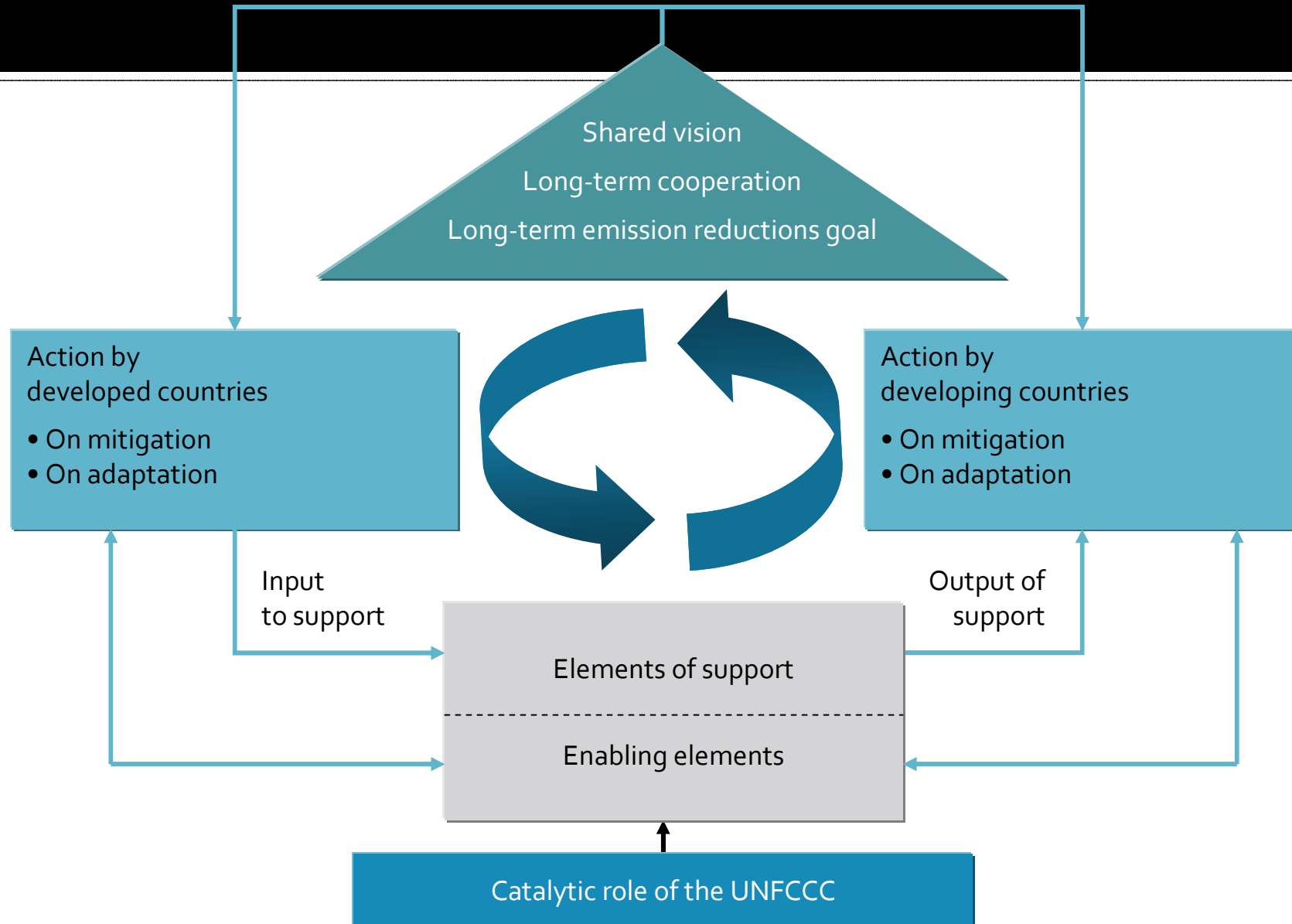
# Share of CERs expected until 2012 from CDM projects



# A complex road to Copenhagen



# Elements of the Bali Action Plan





# Actions

## Action by developed countries

- *Measurable, reportable, verifiable* mitigation action/commitments
- Implementation of action on adaptation
- Action to support action by developing countries

## Action by developing countries

- *Nationally appropriate* mitigation actions supported and enabled by technology, financing and capacity building (*measurable, reportable, verifiable*)
- Reducing emissions from deforestation and forest degradation (REDD)
- Implementation of action on adaptation

## National/international action

- Cooperative sectoral approaches and sector-specific actions on mitigation

# Key issues

## ■ Shared Vision

- Long term goal ('50% reduction by 2050')
- Concern of DCs about 'room to grow'
- Climate vs development focus

## ■ Mitigation

- Comparable efforts Annex-I countries
- Appropriate action developing countries and financial, technology support
- Including REDD
- EU: -30% (1990) by 2020; US : back to 1990 by 2020; Japan: -15% (2005) by 2020
- Reluctance of DCs to make this legally binding; depends on Annex-I action and funding ; no solution on support
- Baseline; leakage; carbon market vs fund

## ■ Adaptation

- Funding
- How to connect it to development?
- No solution for adequate funding
- Reluctance of DCs re link to development
- Unclear what to spend the money on

# Key issues (2)

## ■ Technology

- How to speed up diffusion of existing technology?
- How to speed up commercialisation of new technologies
- 'Mechanism' vs 'enabling conditions'
- IPR 'buy-out' vs market approach (access)
- No good model for speeding up commercialisation internationally

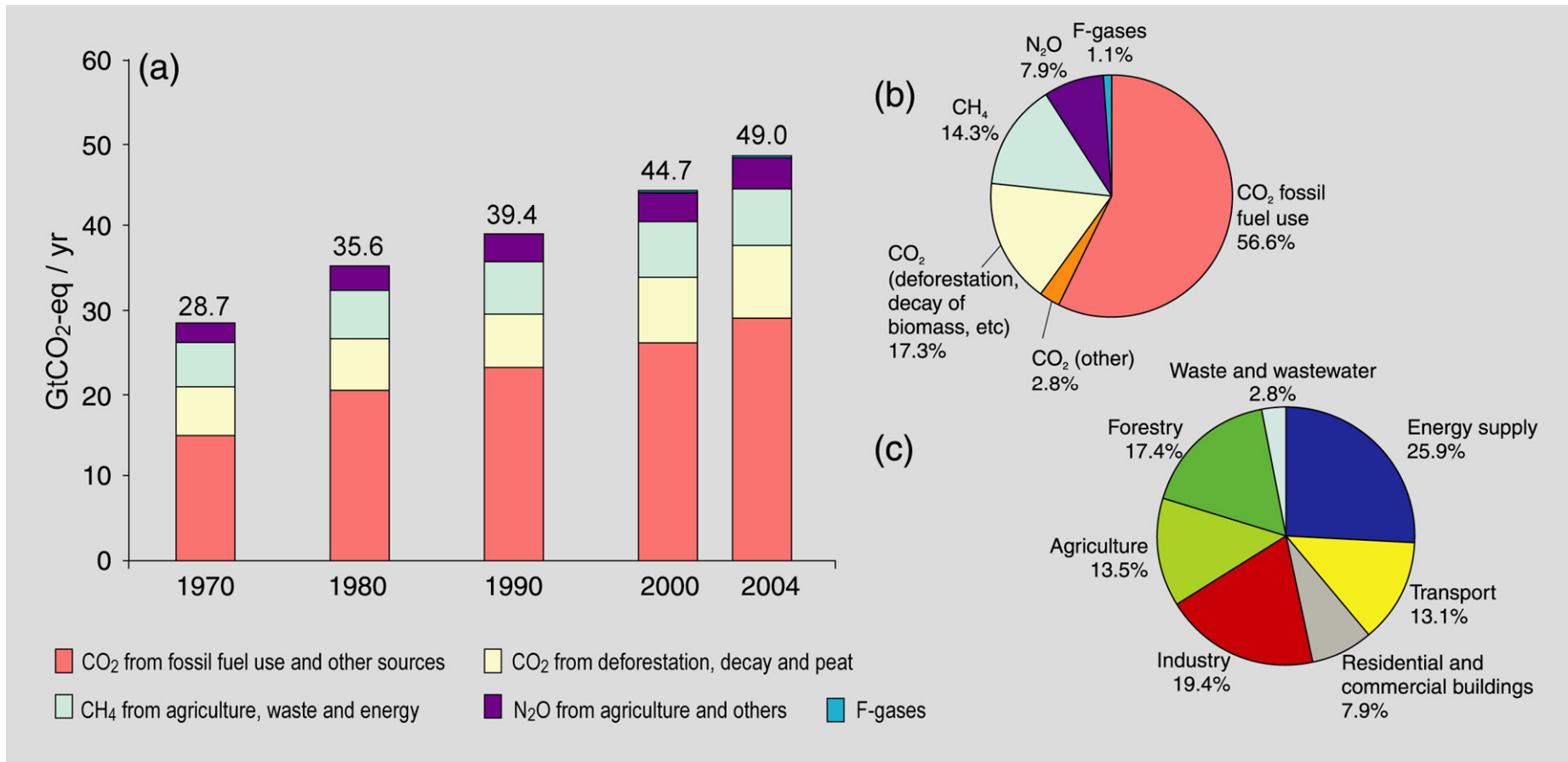
## ■ Finance

- How much money needed?
- How to generate the funds (carbon markets vs funds)
- No good data on money needed
- Ideological debate on markets vs funds

# Non-CO<sub>2</sub> gases virtually absent from negotiation

- Focus on CO<sub>2</sub> equivalent (flexibility)
- Some proposals for additional gases:
  - Nitrogen trifluoride (NF<sub>3</sub>)
  - Hydrofluoroethers and fluorinated ethers (HFEs)
  - Perfluoropolyethers (PFPMIE)
- EU Proposal for specific HFC regulations
- Proposal to move HFC regulation to Montreal Protocol

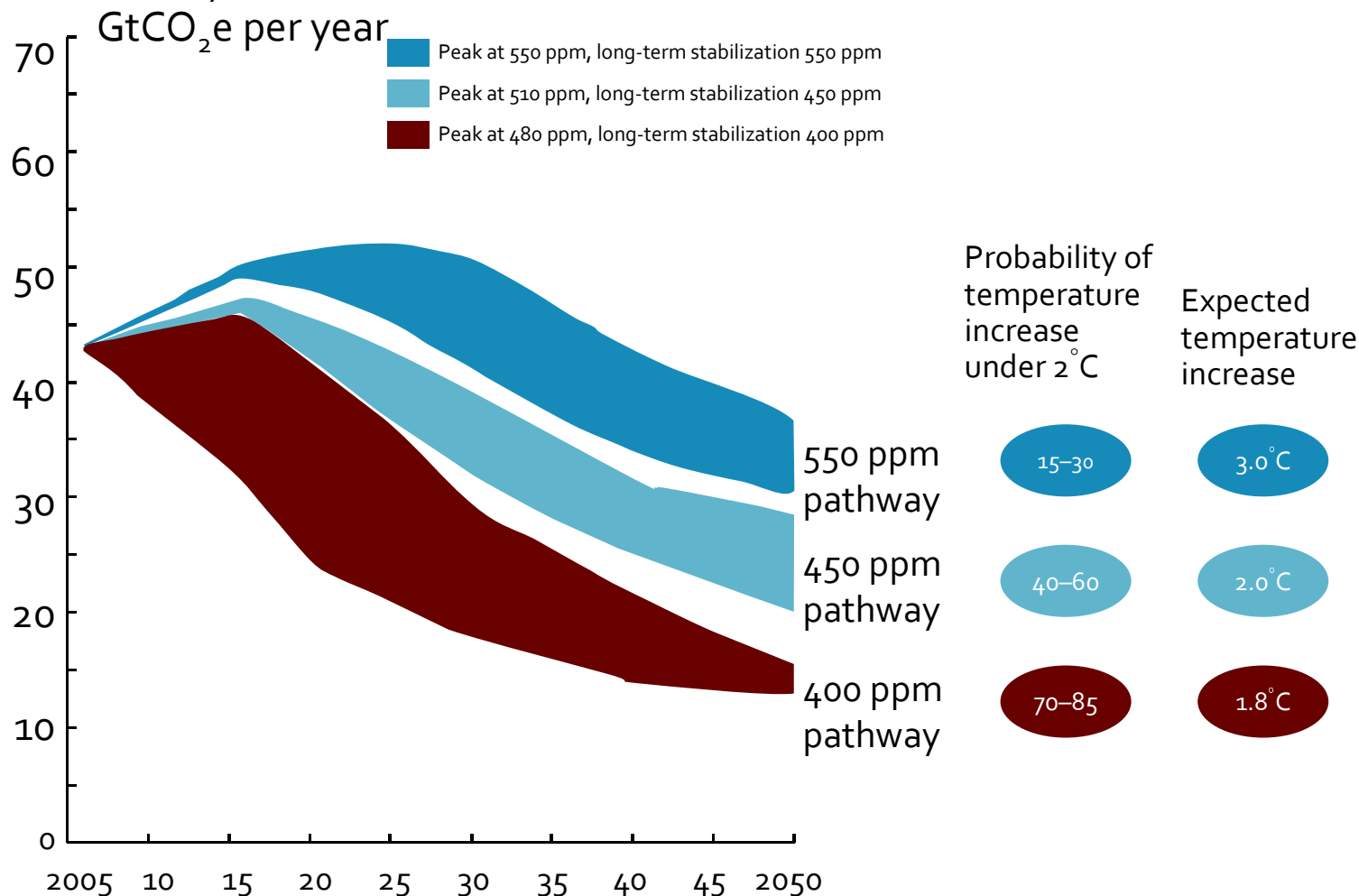
# Current GHG emission trends



Source: IPCC AR<sub>4</sub>

# A 450ppm CO<sub>2</sub>e stabilisation pathway with over-shoot gives a 40–60% probability to limit global warming to 2°

Global GHG emissions and pathways for GHG stability  
GtCO<sub>2</sub>e per year

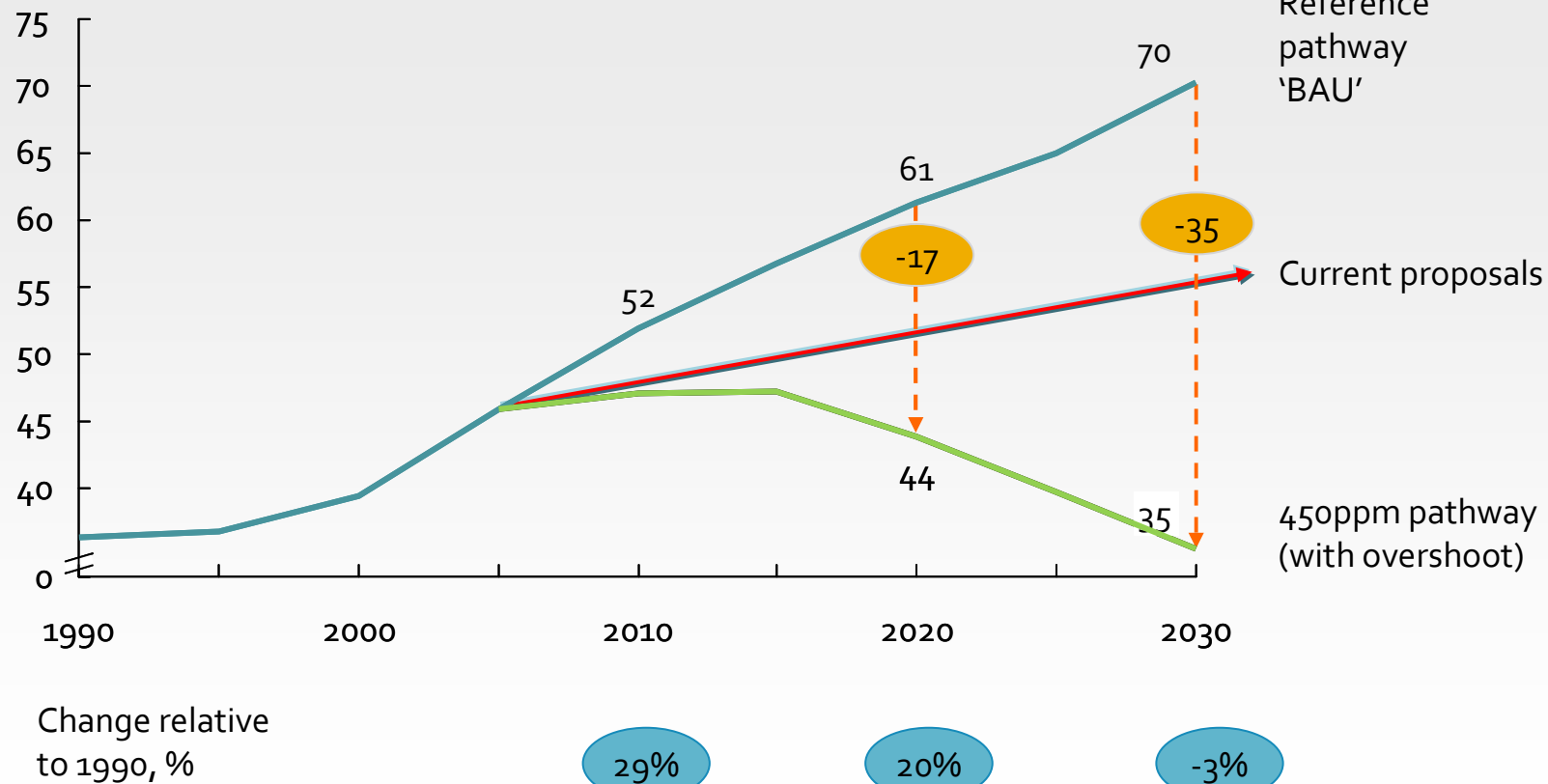


- 450ppm is not safe – it has a 40–60% probability of warming exceeding 2°C
- Even 2°C will require significant investment in adaptation

\* Climate impact estimates for current proposals calculated using C-ROADS model Source: IPCC WG3 AR4,, den Elzen, van Vuuren; Meinshausen; Global GHG Abatement Cost Curve v2.0, Catalyst analysis

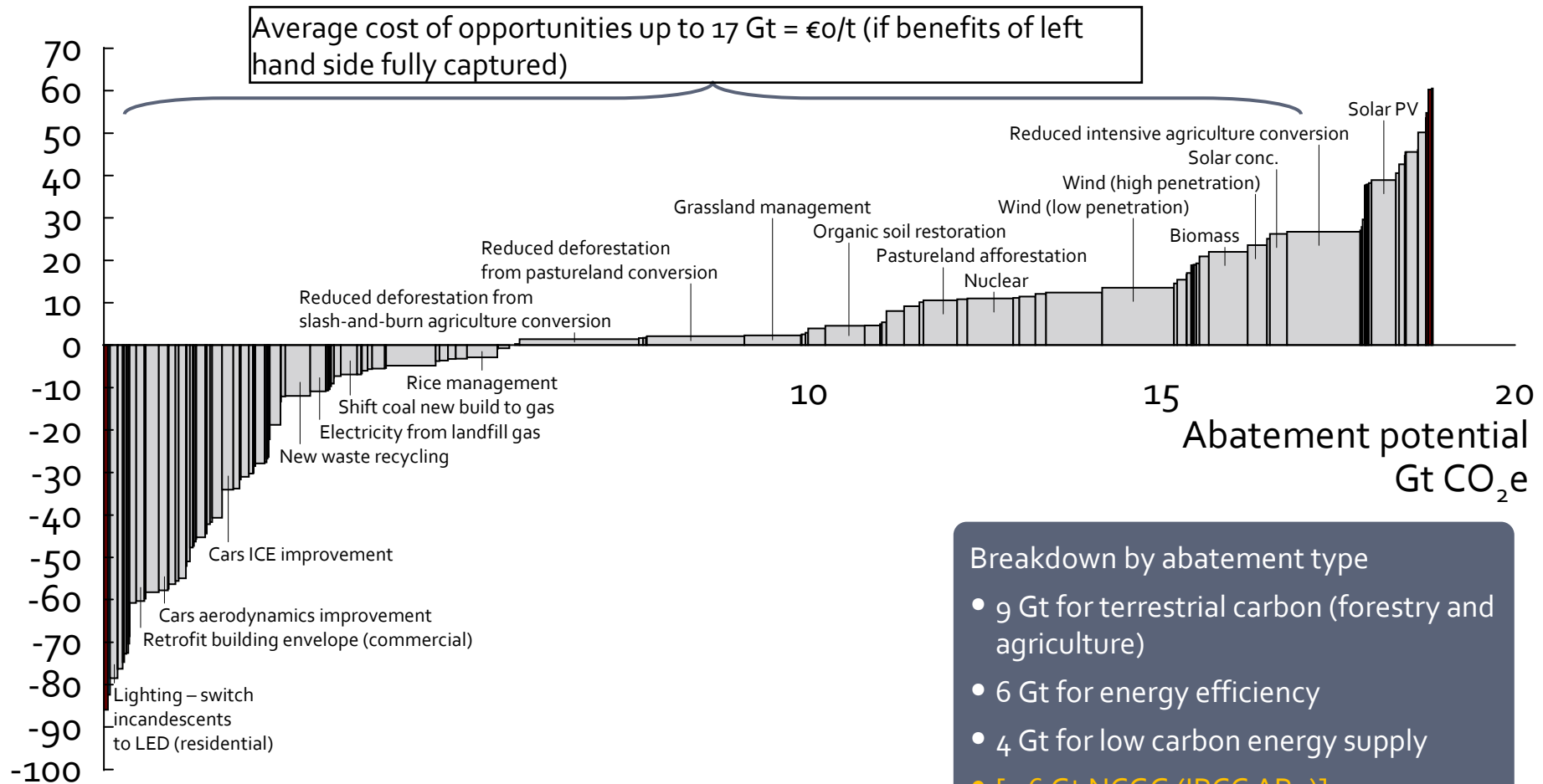
# 17 Gt of reductions below 'BAU' in 2020 are required for 450ppm

Global GHG emissions, Gt CO<sub>2</sub>e per year



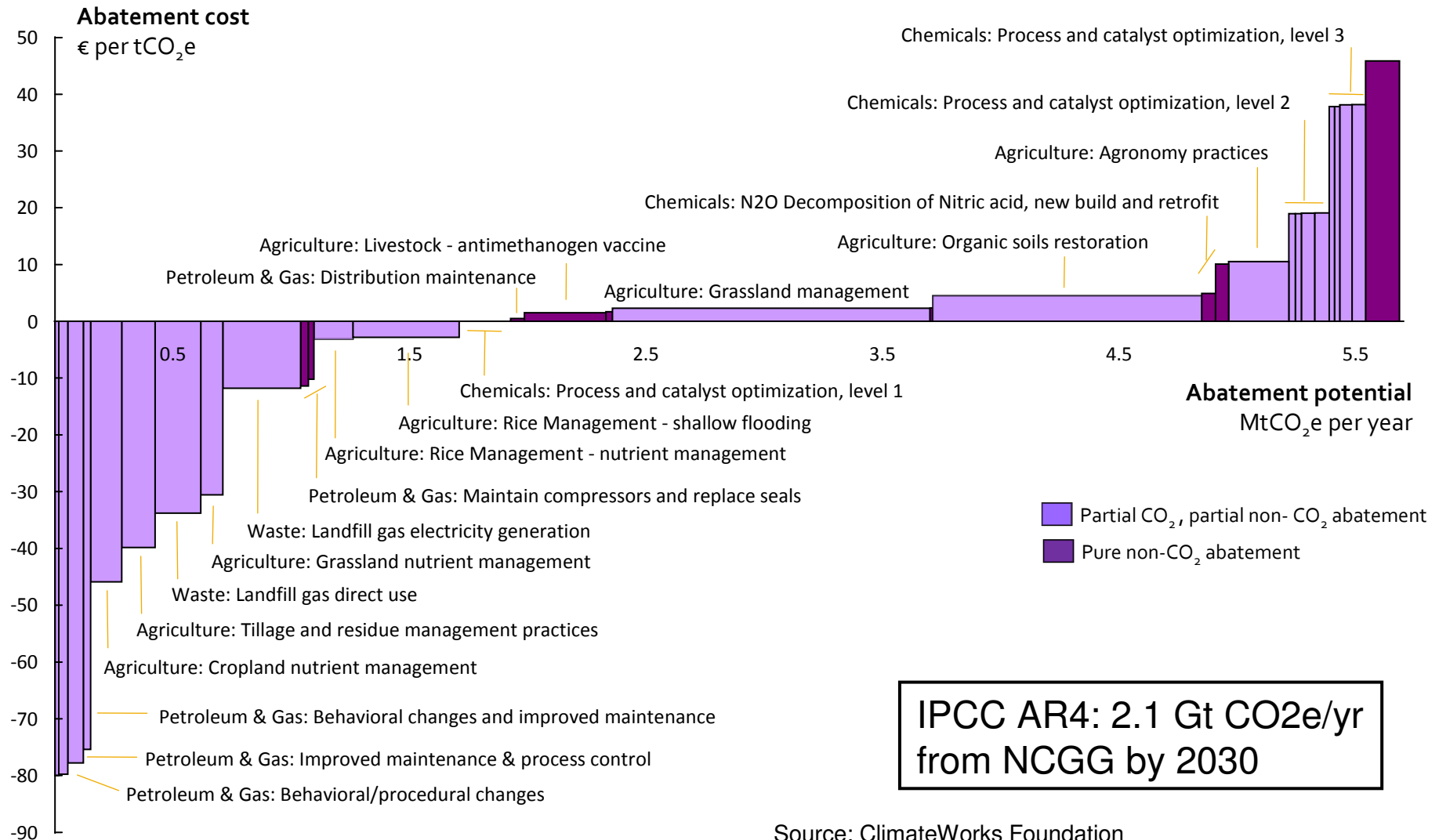
# Opportunities to achieve a 450ppm pathway exist at under €60/t

Global abatement cost curve, 2020 (up to costs of €60/t, excluding transaction costs, 4% discount rate)





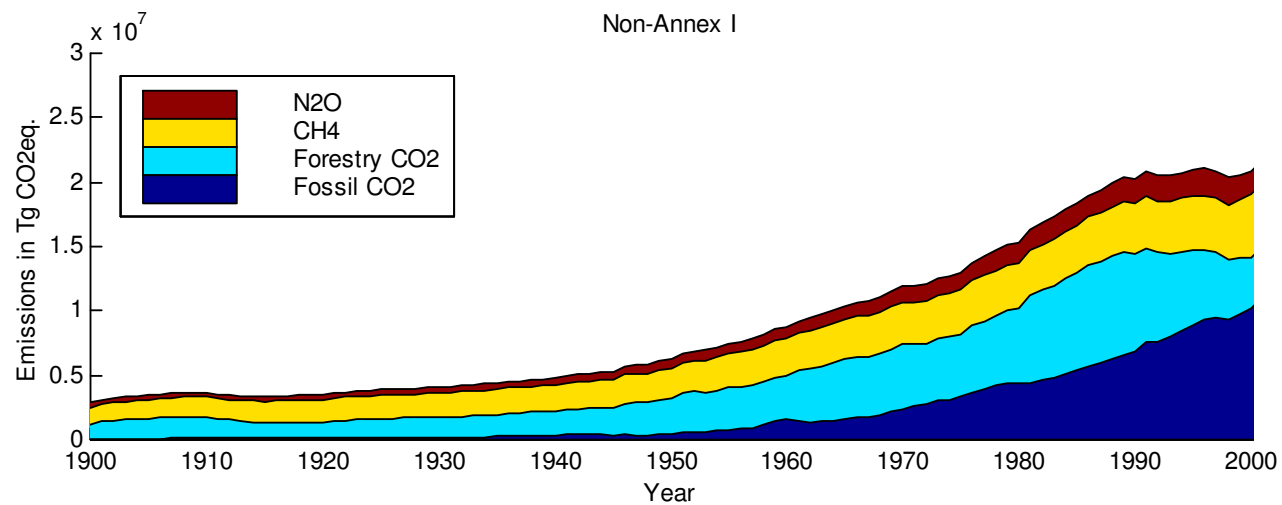
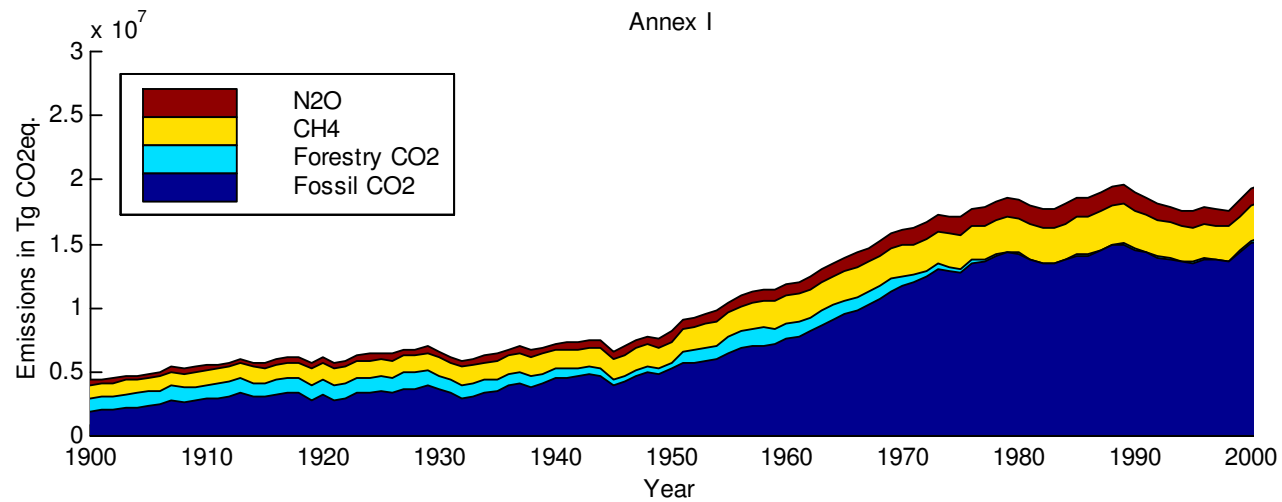
# Technologies to reduce non-CO<sub>2</sub> emissions – Global 2030 cost curve



# Shift to a low emission economy

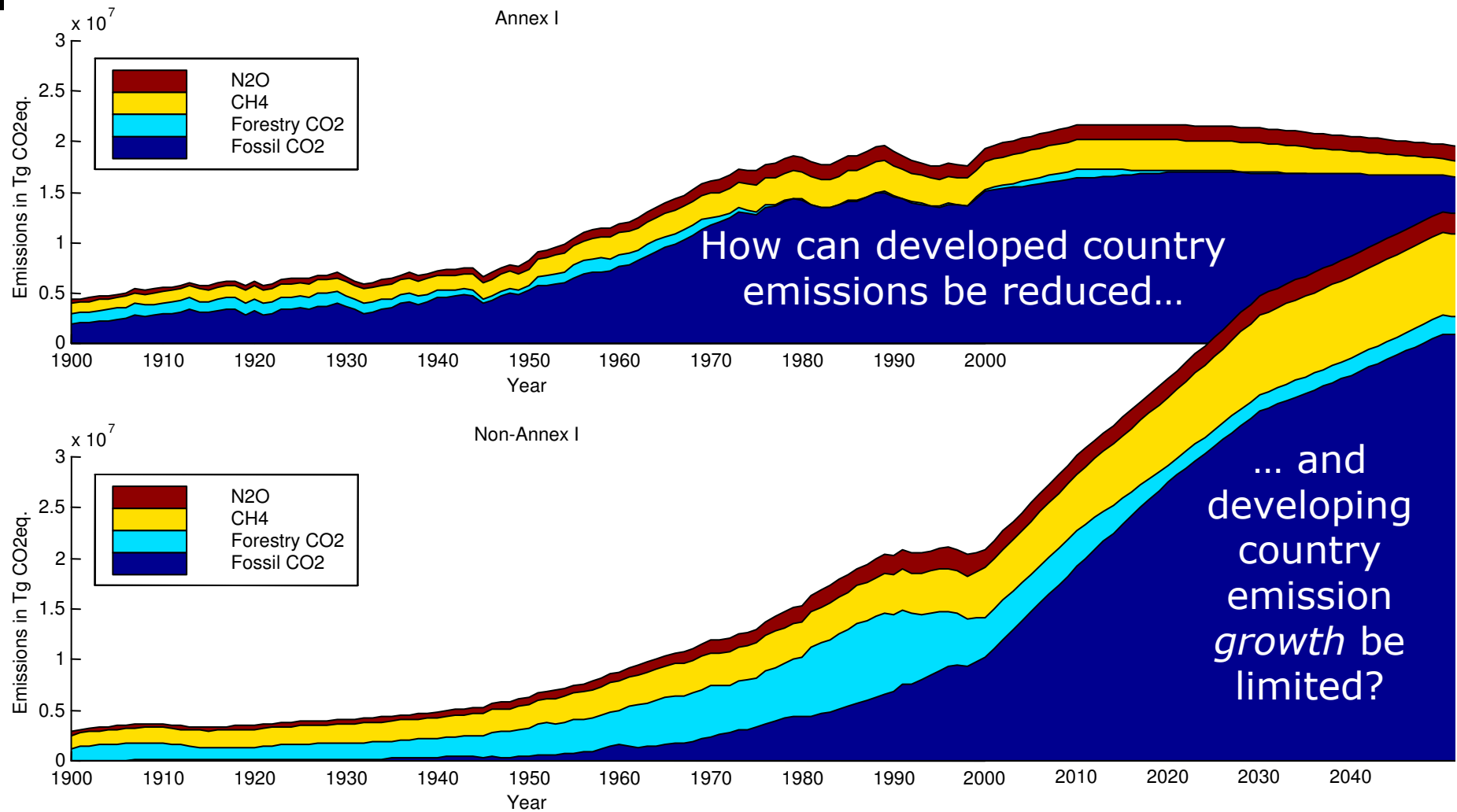
- BAU is not an option
- Transformation of the economy needed over next 40 years
- Also climate resilient economy
- It is about another development path

# Historic emissions



Source: Ecofys/ Marland et al. / Houghton et al. / EDGAR 3.2

# Future emissions



Source: Ecofys/ IPCC SRES A1B scenario

# Developed countries should take on stringent emission caps and provide support

450 ppm pathway as global goal and following equity considerations

## Resulting responsibilities for developed countries

### Caps

- Take on CO<sub>2</sub>e caps which are consistent with a 450 ppm pathway
  - 80-95% below 1990 by 2050
  - 25-40% below 1990 by 2020

### Support on mitigation/adaptation

- Provide financial support to developing countries on adaptation and mitigation

### Leadership on technology

- Develop/ demonstrate emerging low C technologies
- Facilitate the transfer of environmentally sound technologies, know-how, practices and processes to developing countries

# Achieving necessary abatement of 17 Gt relies on both developed and developing nations

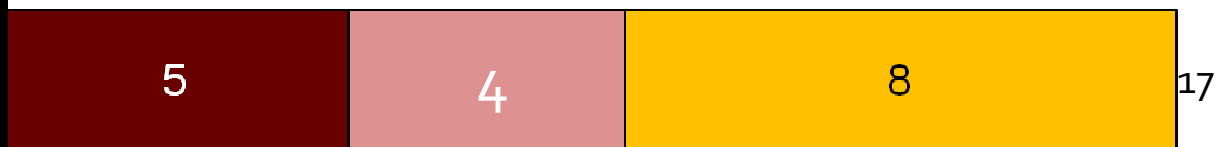
Developed world target in 2020

Required abatement to 450ppm, Gt CO<sub>2</sub>e

13% (as proposed)



IPCC 25%



IPCC 40%

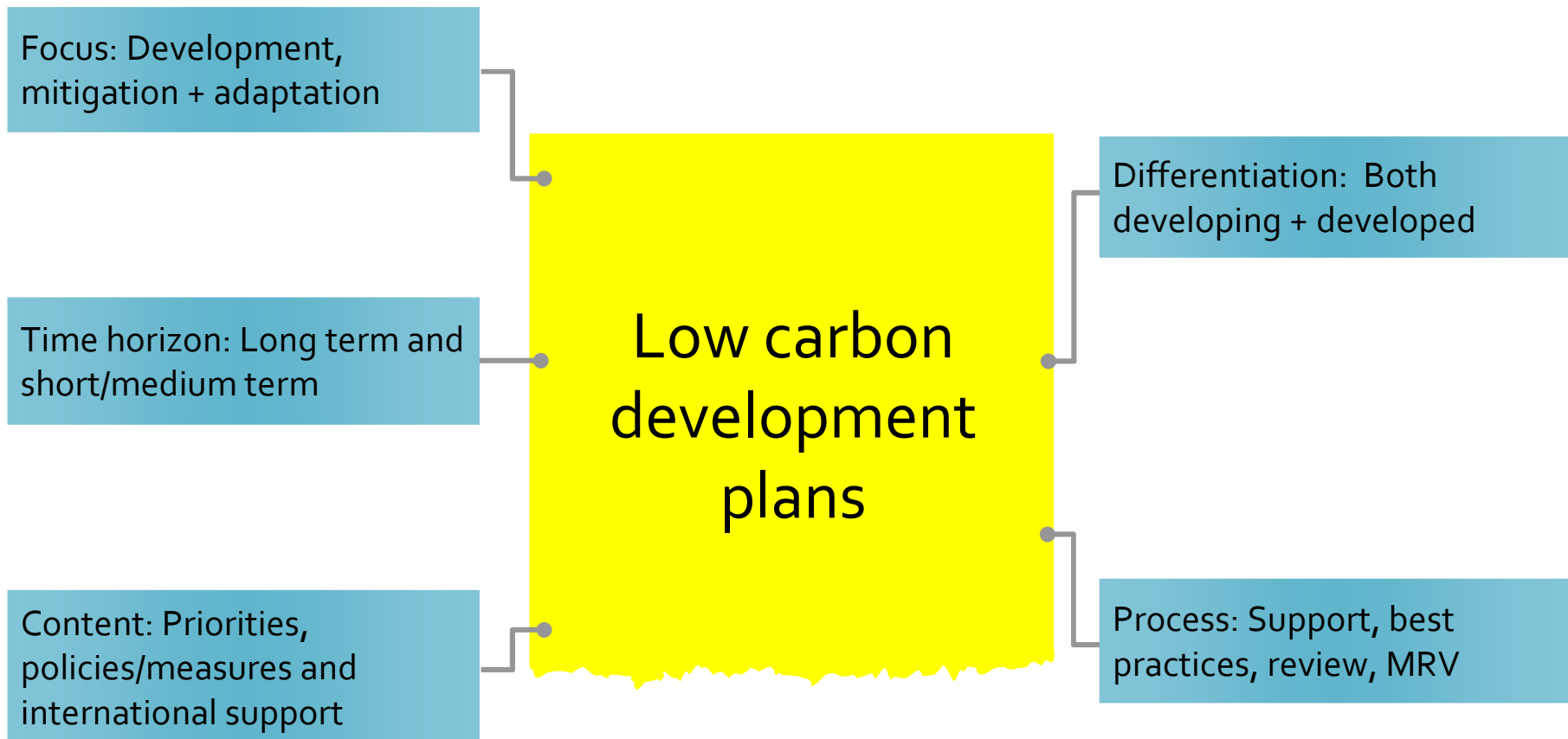


Developed world technical domestic potential at costs of < €60/t

Additional developed world contribution:  
• potential at >€60/t  
• behaviours  
• carbon offsets

Additional developing world reductions required to achieve 17 Gt

# Low carbon development plans as a way to operationalise developing country mitigation and adaptation actions



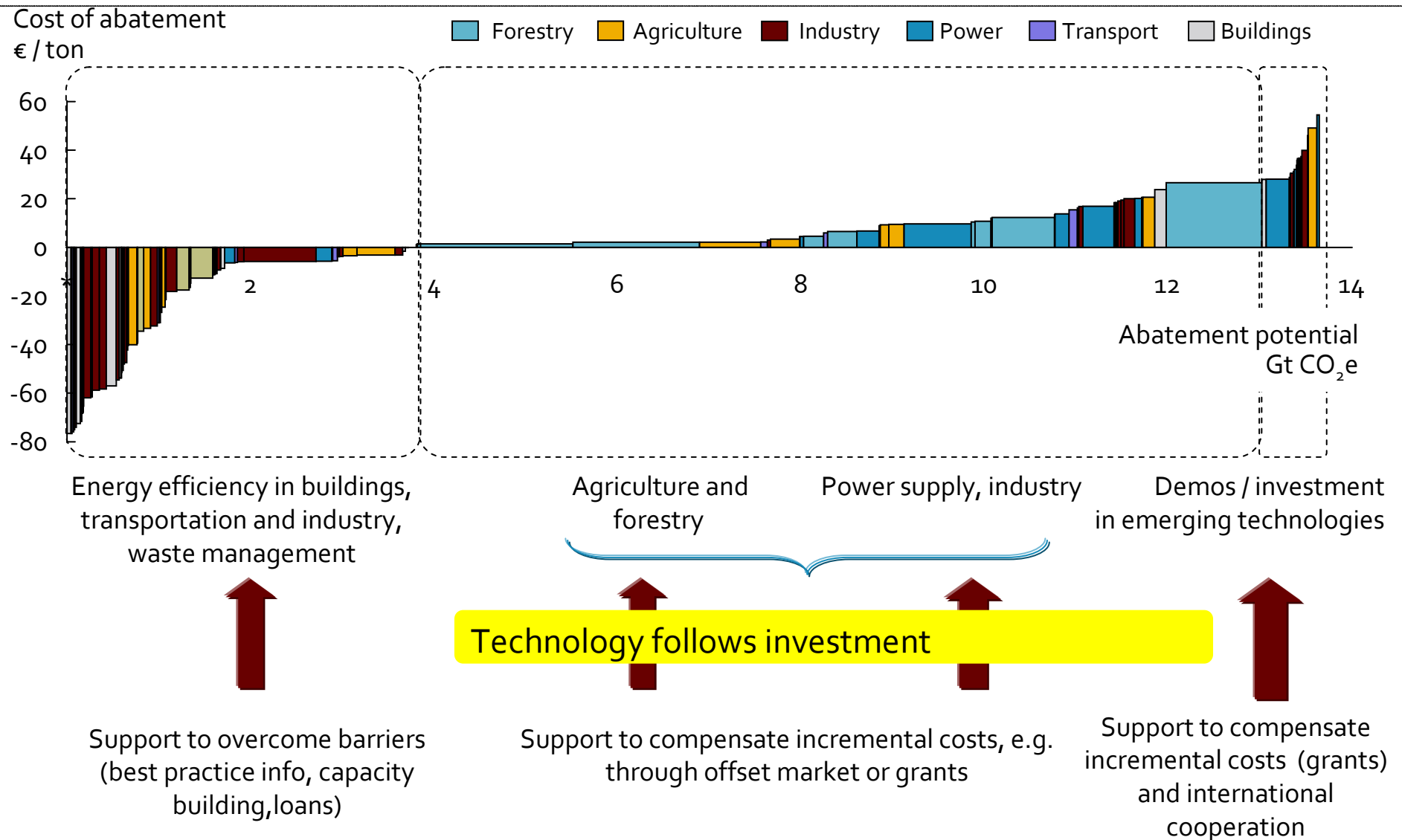
# Non-CO<sub>2</sub> gases important in national plans of developing countries

- Include policies to reduce NCGGs in all sectors
- Use best practices for technology and policy



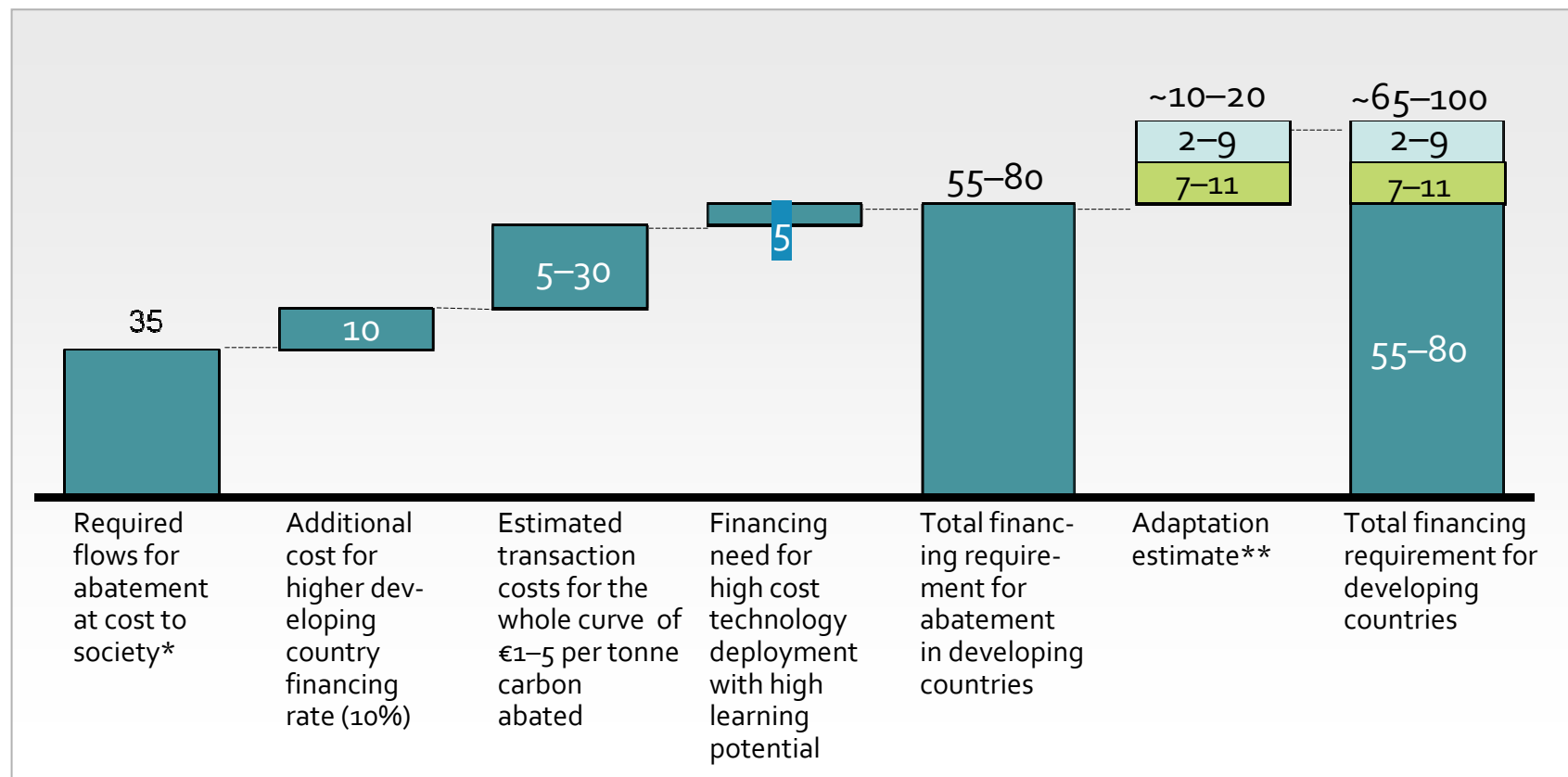
# Developing countries require different types of support for mitigation activities

Developing country abatement cost curve, 2020 (up to costs of €60/t)



# Including elements of adaptation, the total financing need would be €65-100 bn per year 2010-2020

Annual financing flows requirement for developing countries  
 €b on average p.a. 2010–20

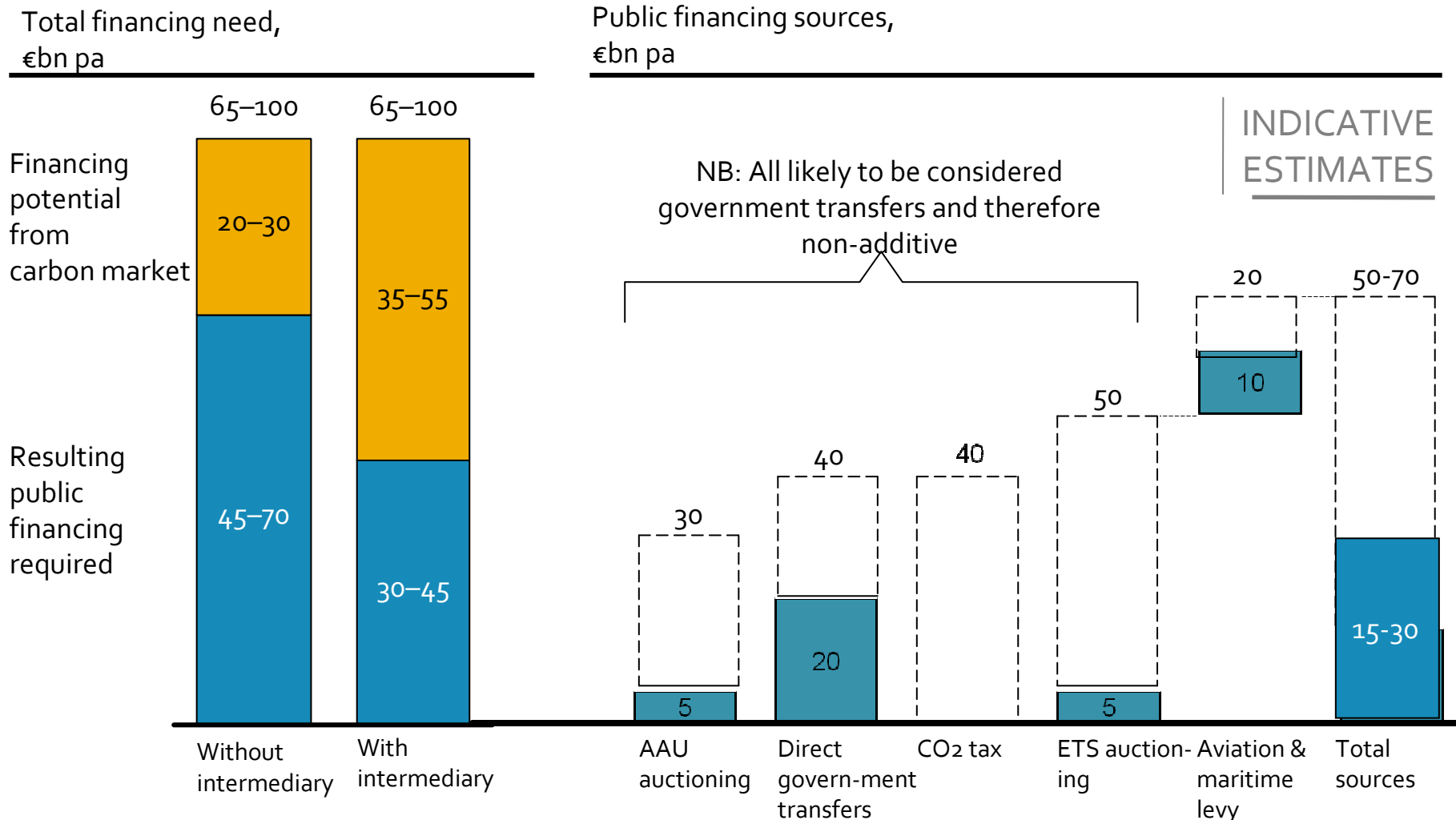


\* Assumes all abatements delivered at average cost; 4% discount rate

\*\* Based on increased financing for global public goods (incl. research), expected funding required priority investments for vulnerable countries (based on NAPA cost estimates), and provision of improved disaster support instruments (based on MCII work)

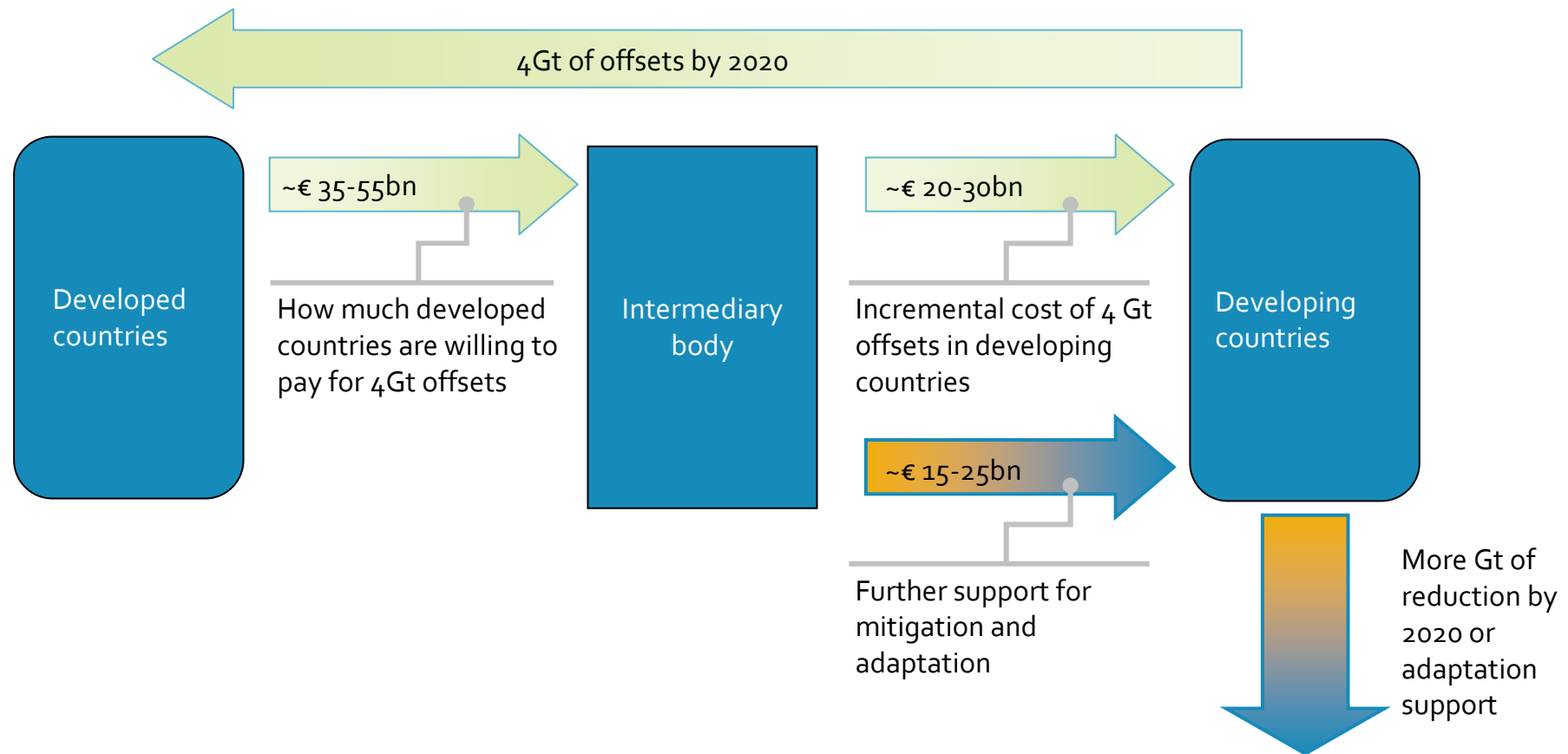
Source: McKinsey Global GHG Abatement Cost Curve v2.0; 'Bosetti; Carraro; Massetti; Tavoni'; UNFCCC; Project Catalyst analysis

# The funding available through public sources is unlikely to meet the amount required without an intermediated carbon market in place



Source: Project Catalyst analysis

# An intermediated carbon market can deliver more funding for the incremental costs of mitigation and adaptation



\* Financing flows are the financing required to make NPV negative projects NPV neutral at a 4% real discount rate; benefits of NPV positive projects are not included since they are assumed to be captured as rent of individual actors

Source: McKinsey Global GHG Abatement Cost Curve v2.0, team analysis

**Thank you**