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How Does Decarbonization Change the Fiscal Equation?

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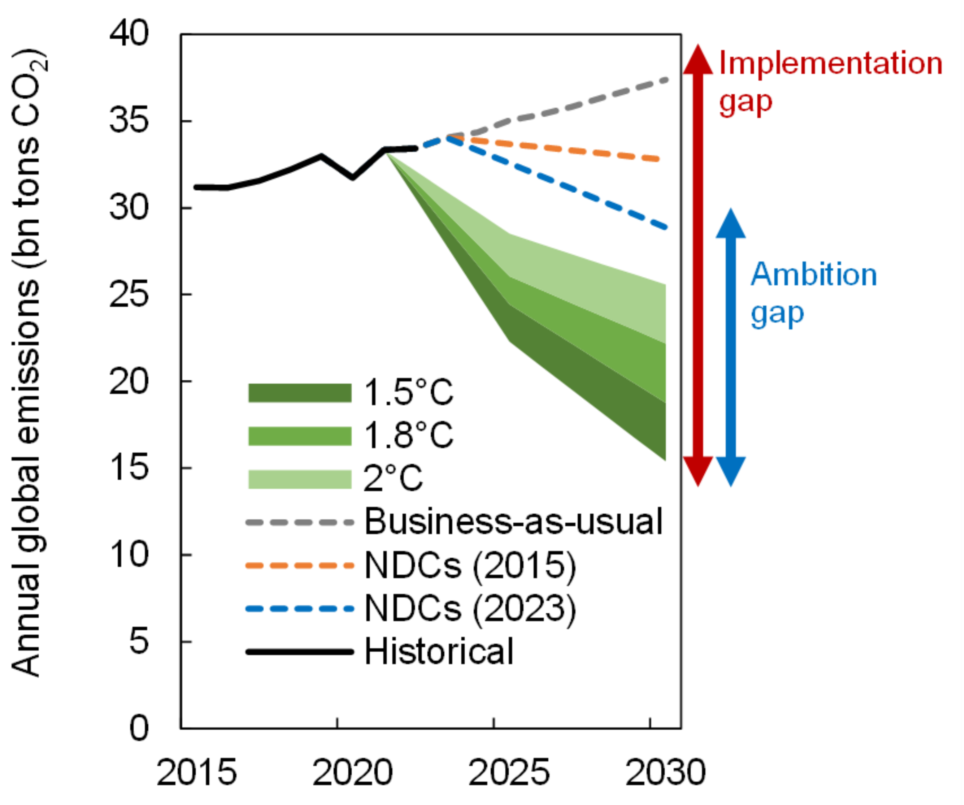
Decarbonization in advanced economies is progressing, but …

- **Identified policies** reduce CO_2 emissions by between 20-50% in major advanced economies (AEs) in 2030 relative to a no-policy baseline
- Several AEs achieve (more than) their **NDCs**, but:
  - Several other AEs fall short of it
  - Most emerging market economies (EMEs) don't
  - Not in the aggregate (→ Implementation gap)

- **Much more is needed** (and soon!) to …

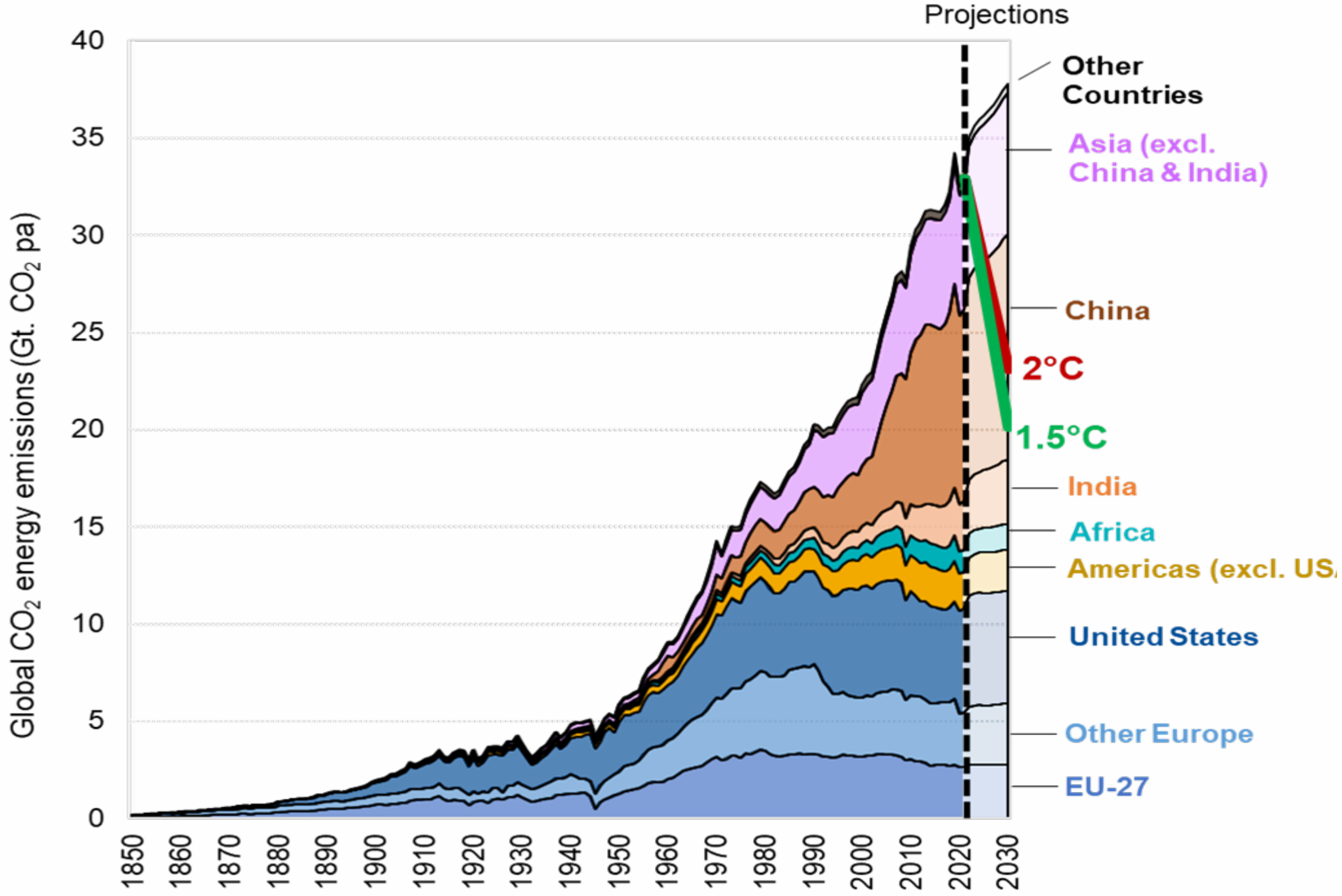
1. … put us on a **path to well below 2.0°C** above pre-industrial temperatures, agreed in Paris 2015 (→ Ambition gap)
2. … achieve **net zero emissions** (NZE) by 2050 (or earlier) as pledged by many AEs

Twin Gaps in Global Climate Policy
(Global CO2 Emissions vs. Needed for Temperature Goals)



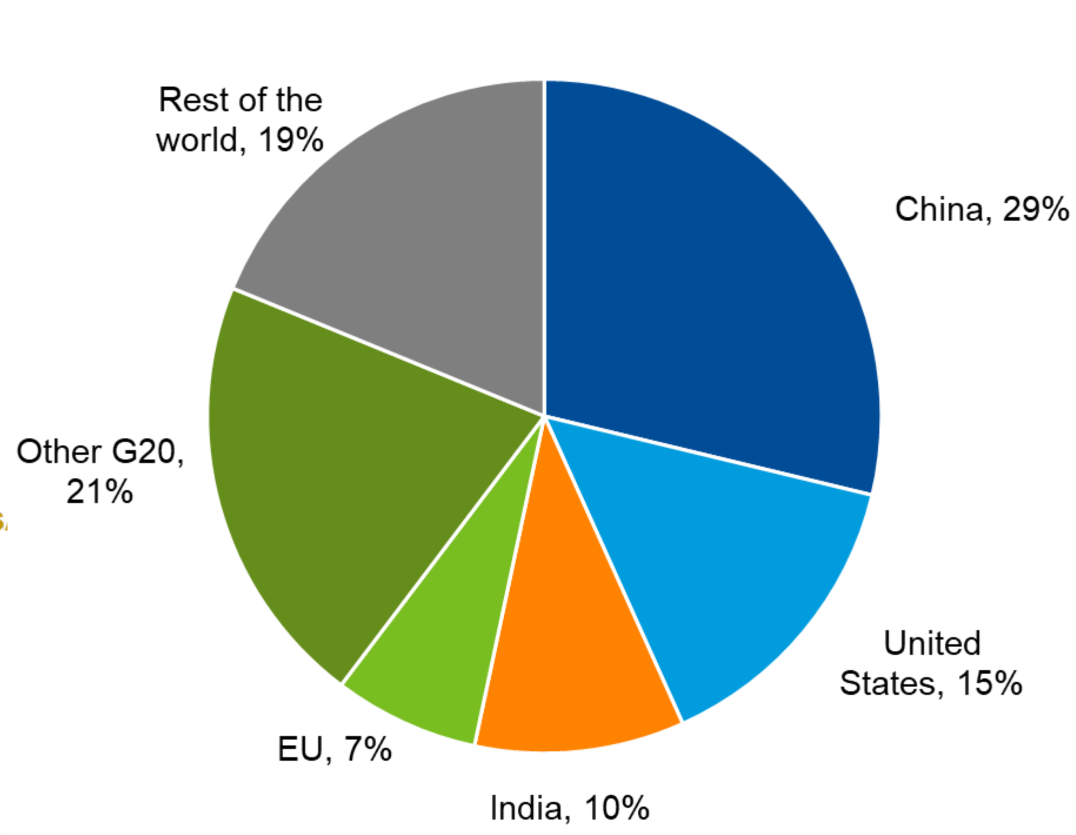
… advanced countries cannot do it alone

Historical and Projected Annual Global CO2 Emissions (1850-2030, $GtCO_2$/yr)



Source : IMF CPAT-Tool; Sustainable Development Needs (2021); Global Carbon Budget (2021); Our World in Data (2022); International Energy Agency (2022) & IMF Staff Calculations
Note: Data uses fossil CO2 emissions from energy-related and industrial processes, excluding international aviation and maritime. Projections are for a baseline scenario without further mitigation policies or strengthening of existing policies.

Projected Contributions to Global Carbon Emissions in 2030 with Unchanged Policies, By Major Emitter



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Toward a global agreement

Contours of a global deal scenario

Coordinated

25% emission reduction in 2030 relative to 2019

Carbon price – gradually rising

Initiated by small group countries

Equitable

Differentiated: AE -50%; EME -25%; LICs +15%

Revenue sharing and/or financial/technological transfers

Embedded in SDGs

Flexible

“Equivalent” measures

Compensate low-income households

Protect/relieve trade-exposed firms

Comprehensive

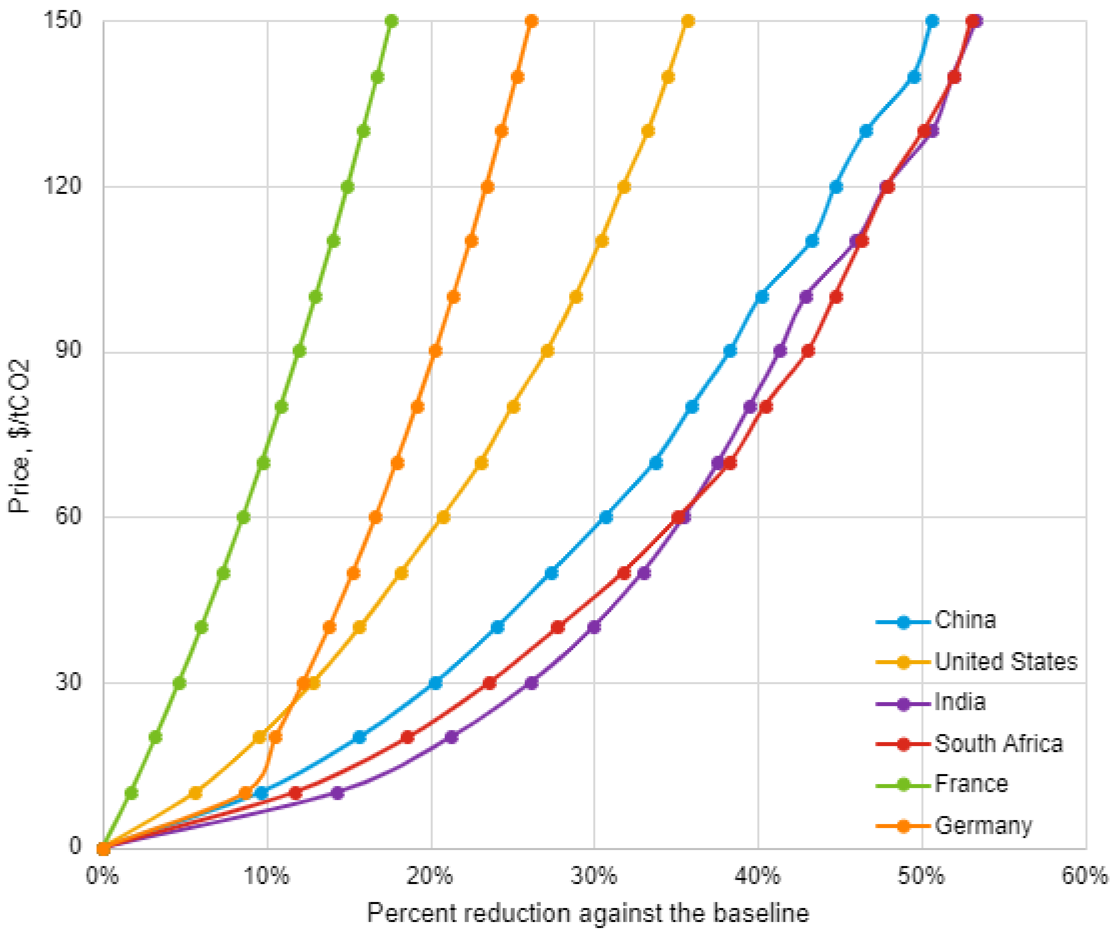
Green public infrastructure

Address innovation and other market failures

Analysis of reform using the CPAT model

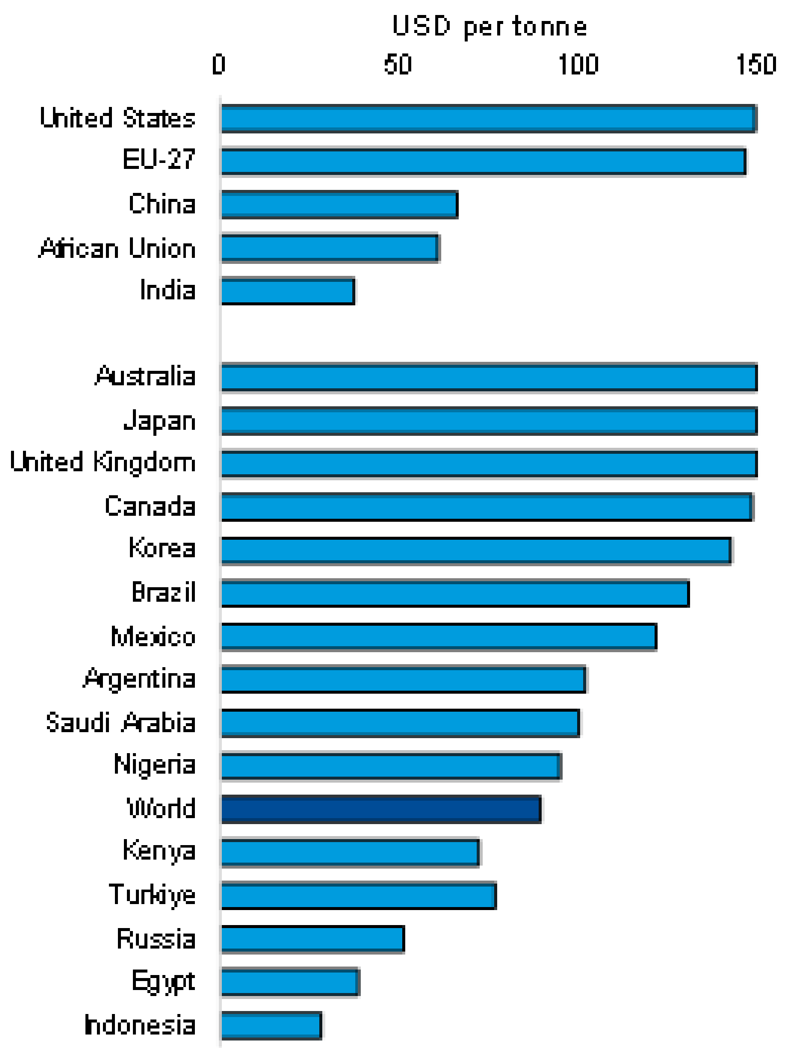
- **Reduced-form model** that projects future fuel use, GHG emissions, and fiscal revenue/costs
  - 200 countries & several sectors (power, transport, industry, buildings, agriculture)
  - Variety of general/sectoral policies
- **Baseline emissions**: GDP growth, income elasticities, autonomous energy saving
- **Price responses** calibrated based on mid-range of empirical literature
  - Non-price instrument equivalent 'shadow-price'
- **Economic costs** of decarbonization determined by marginal abatement cost curves calibrated by country
- **Environmental co-benefits** modeled, related to cost of local air pollution, congestion, etc.
- **Distributional impact**: using household surveys

Marginal abatement cost curves

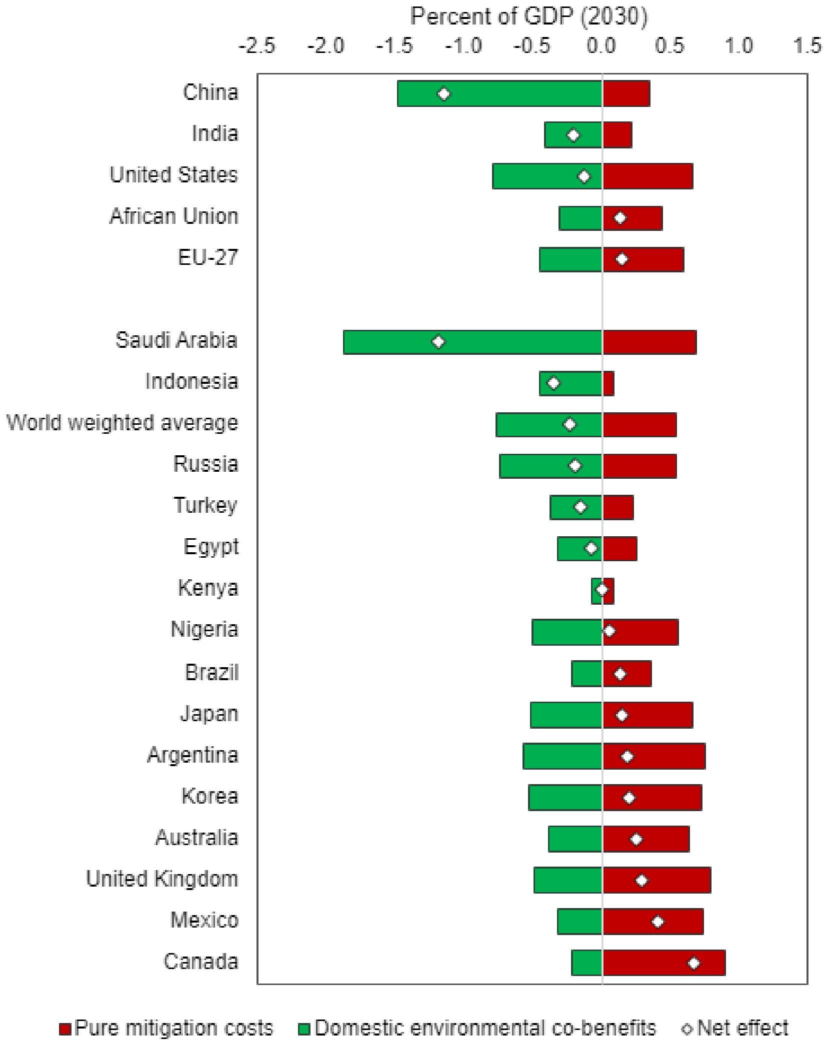


Marginal and total direct economic costs per country of the global deal scenario

Shadow price of abatement



Economic cost in % GDP



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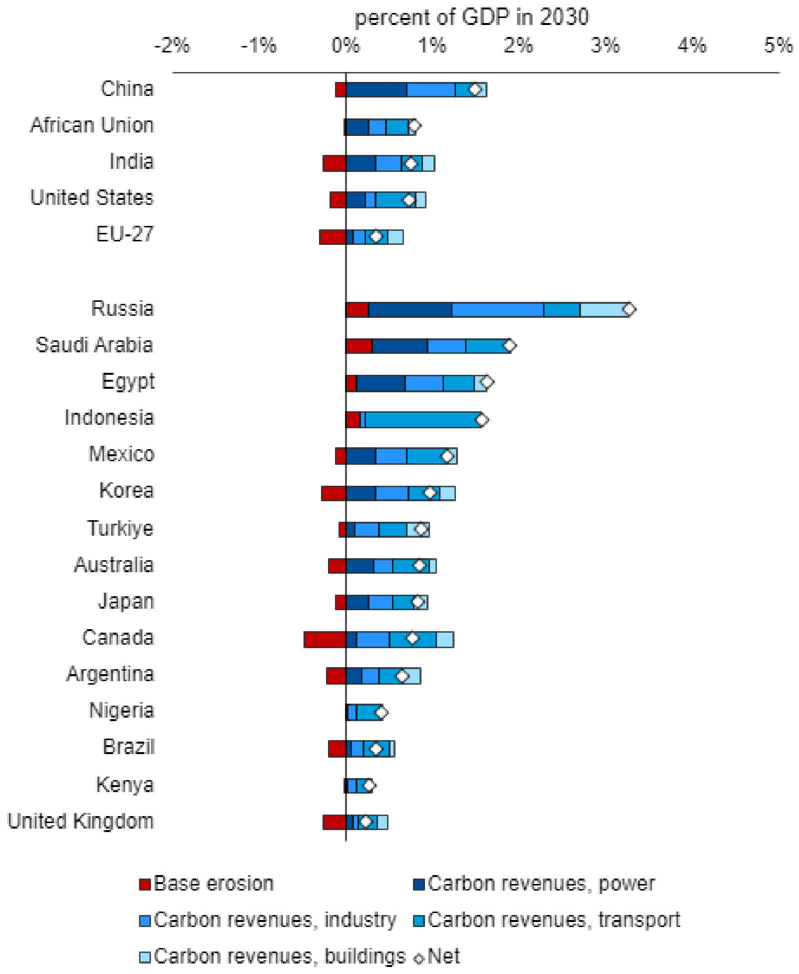
Revenue Effects

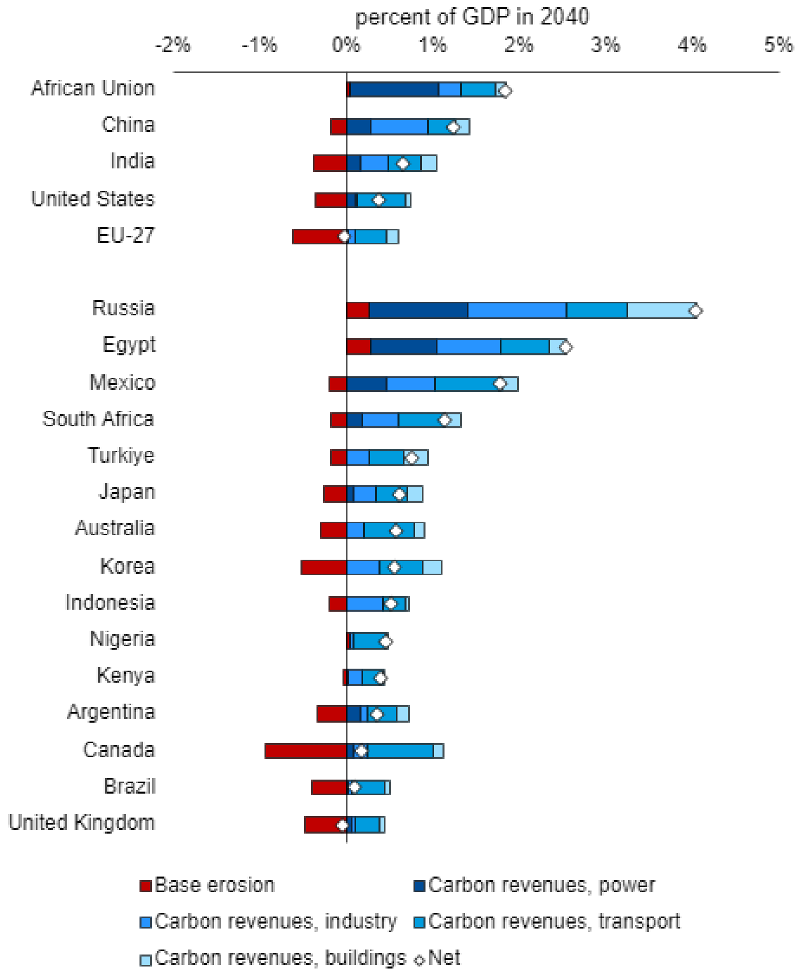
Revenue effects of global deal scenario (carbon tax and existing fuel tax)

Carbon tax $75 in AE, $50 in EME and $25 in LIC (doubled in 2040)

2030

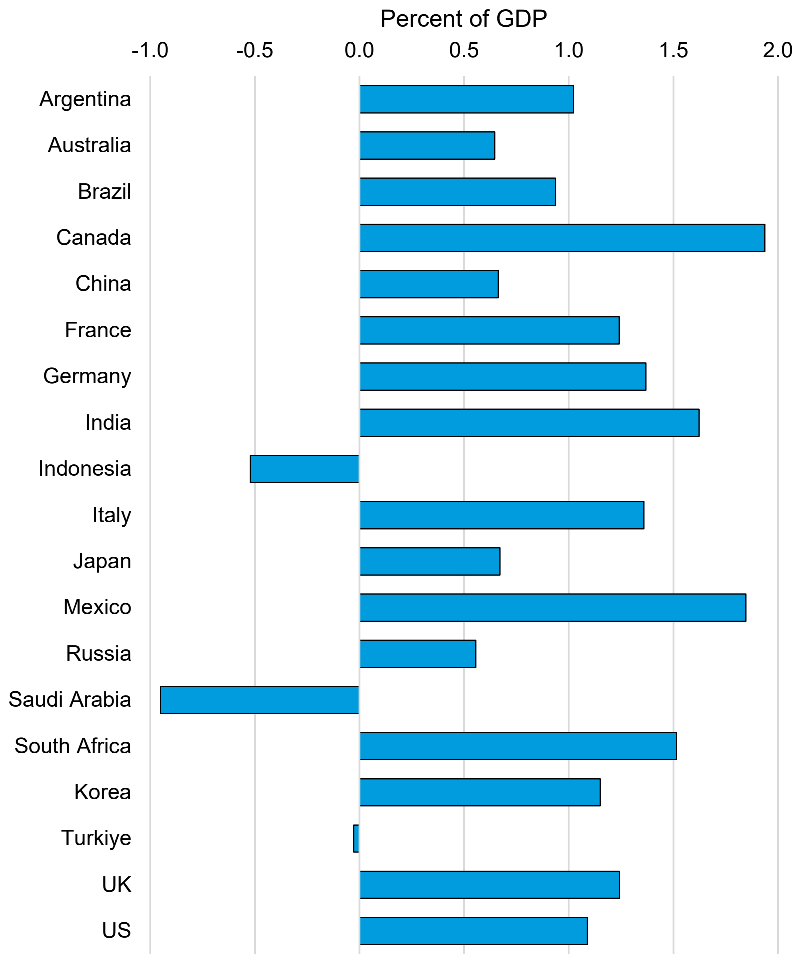


2040



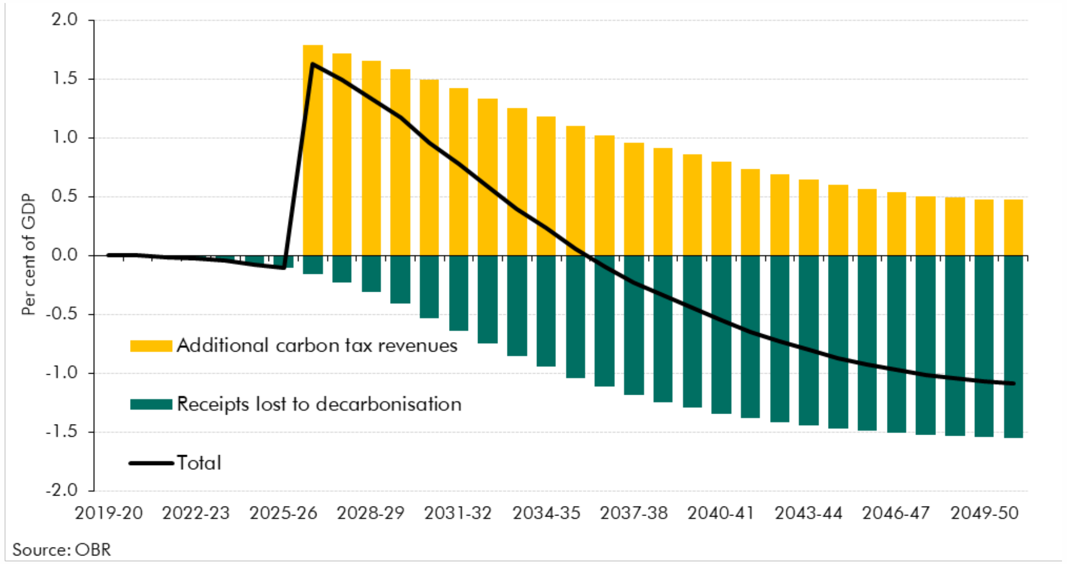
Understanding the erosion of fuel tax base over time

Road Fuel Tax Revenue, 2021



Source. IMF staff using CPAT

Scenario of net revenue gains/losses from decarbonisation in UK (OBR estimates)



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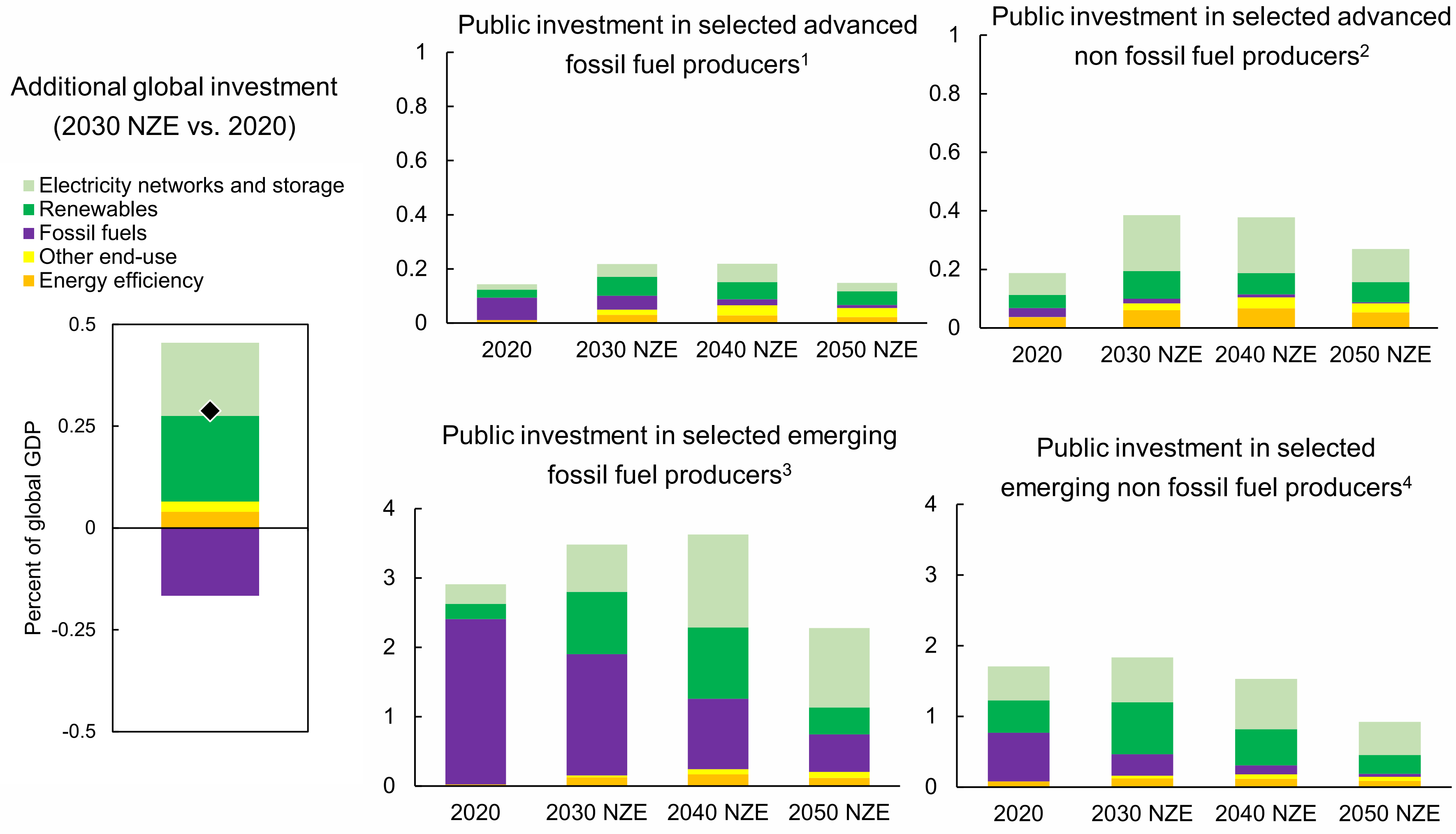
Spending Side

Green infrastructure investment on path to NZE

Needed Public Investment in Energy-Related Sectors (percent of GDP; annual average per decade)



- Enhanced public investment needs in energy for net-zero emissions (NZE) compared to 2020:
  - Globally: increase by 0.3% GDP pa; AEs: 0.2%, EMDEs: 0.1-0.6%

Sources: IEA, 2021. Net Zero by 2050 A Roadmap for the Global Energy Sector.
1/ USA and Canada. 2/ EU, UK, Japan, Korea, Australia, and New Zealand; 3/ Russia and middle east countries; 4/ Brazil, China, India, Indonesia, Mexico, and South Africa

Public spending for green innovation

Two-fold technology challenge:

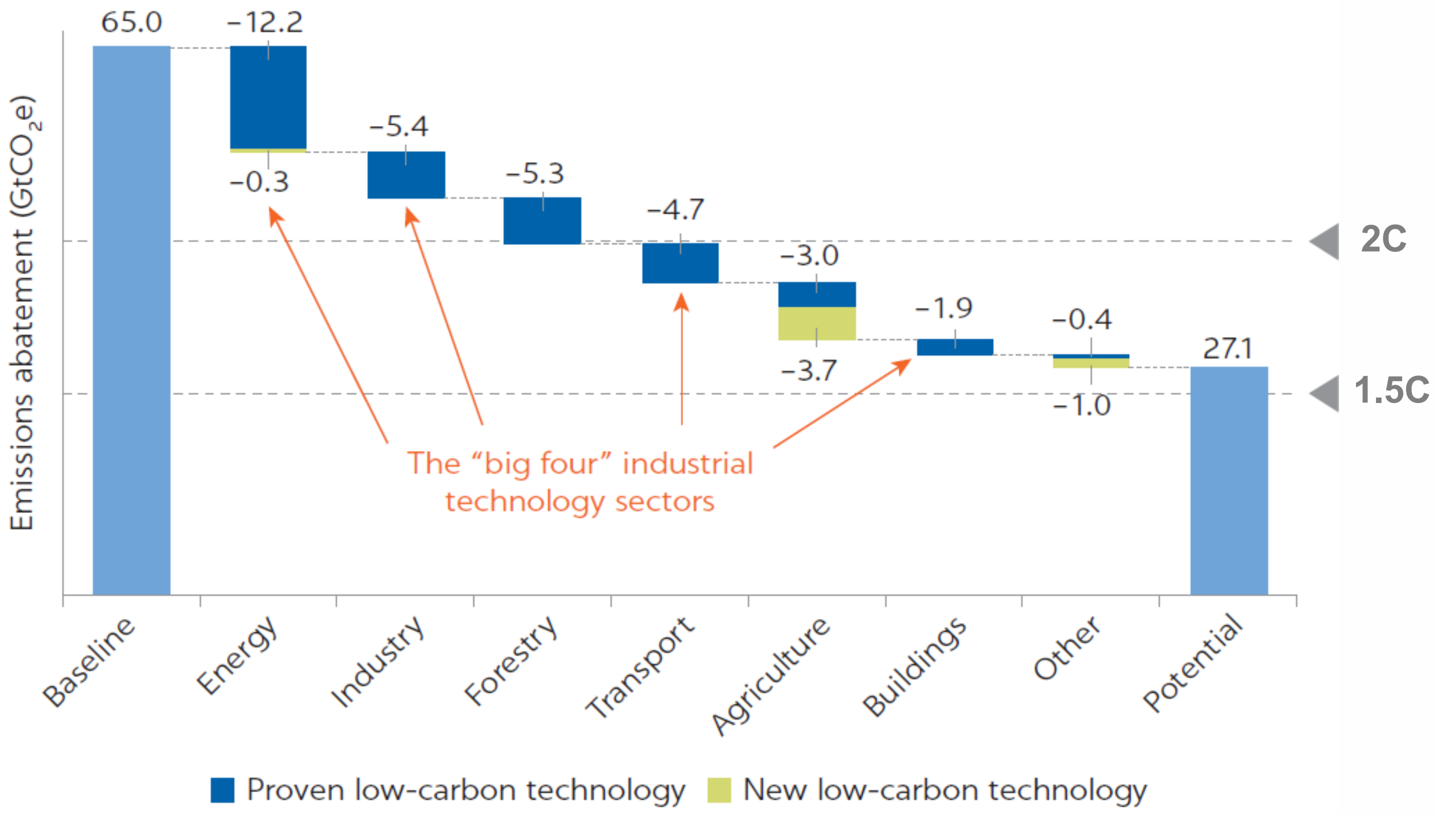
- ➢ **Diffusion** of existing, commercially proven low-carbon technologies
- ➢ **Innovation**: facilitating investment in new, unproven technologies and processes (e.g. direct air capture)

With efficient carbon price, policies to address other market failures:

- ➢ Basic public research
- ➢ R&D subsidies
- ➢ Temporary deployment subsidies to exploit learning-by-doing
- ➢ Technology transfers to LICs

Without carbon price, subsidies and tax incentives as alternative

'We have (most of) the technology': Emissions abatement potential by sector and technology by 2030



Source: IRENA and OECD/IEA 2017 in Pigato, Black et. al 2019.

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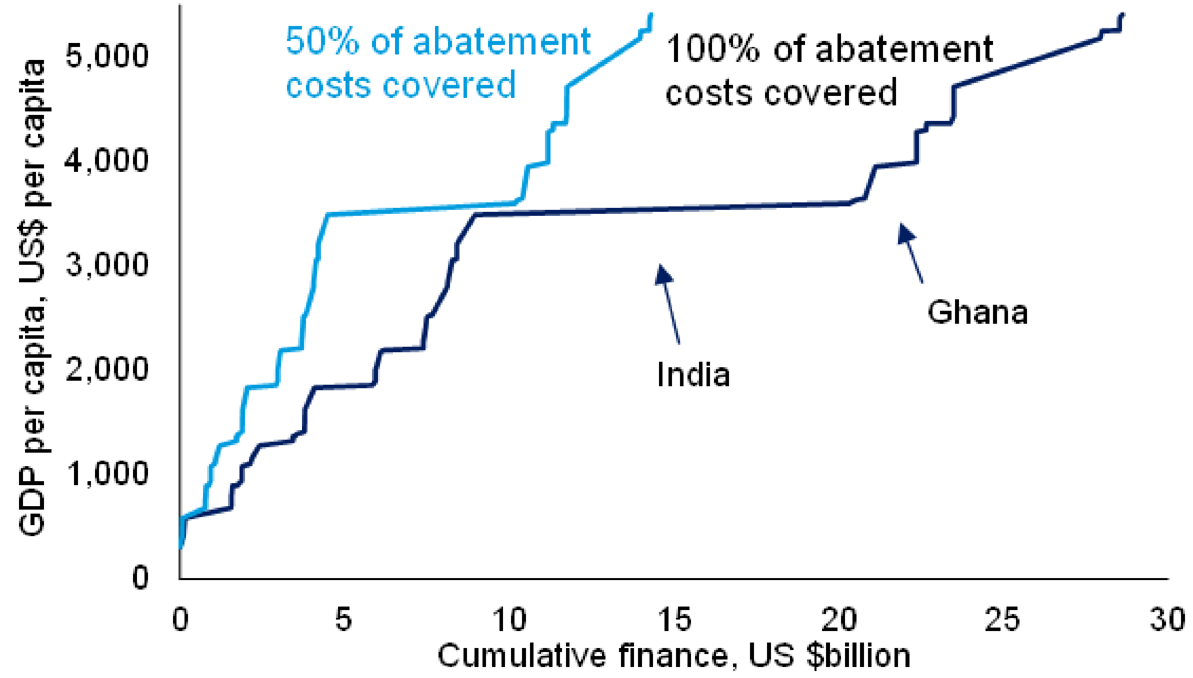
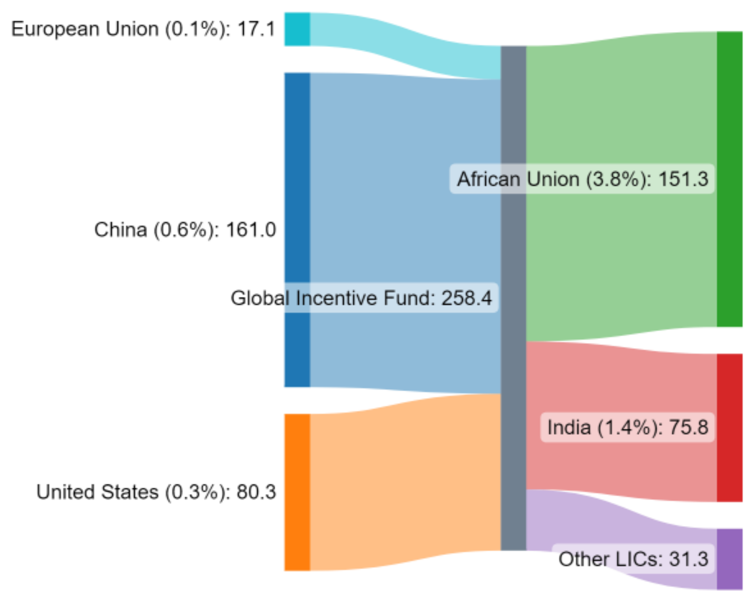
Revenue sharing/recycling

Transfers to LICs / Revenue sharing

Compensation for direct mitigation costs

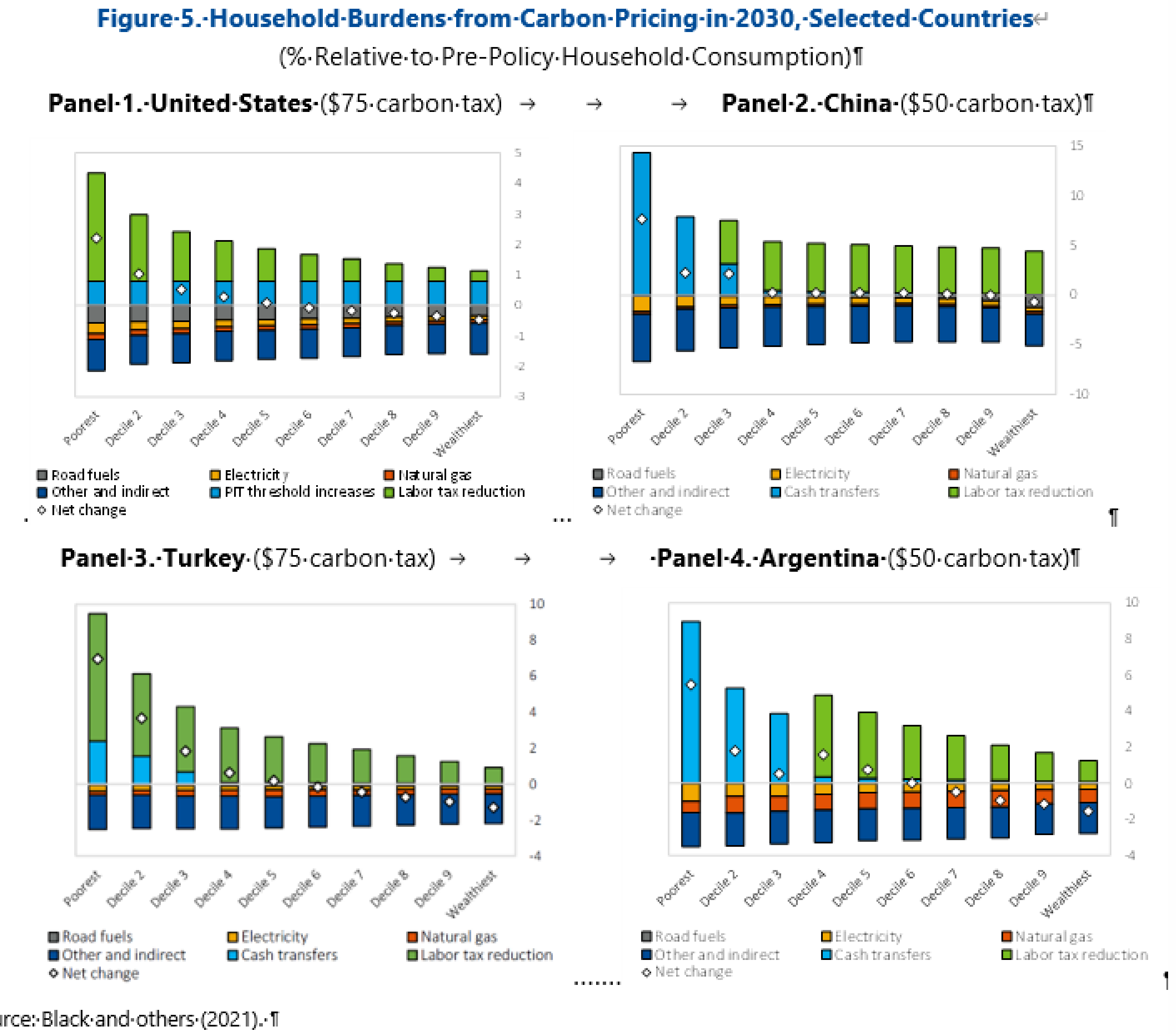


Revenue sharing on per capita basis of $25 per tonne carbon tax



Revenue recycling to compensate households

- **Transfers** targeted to poor
  - Approximately 15 percent of revenue needed to compensate bottom 3 deciles
- **Reducing labor taxes** more efficient
  - Prospect for 'double dividend'
- **Development spending** in infrastructure, health, education, adaptation in LICs and EMEs with large revenue needs
  - Benefit from easy administration and coverage informal sector

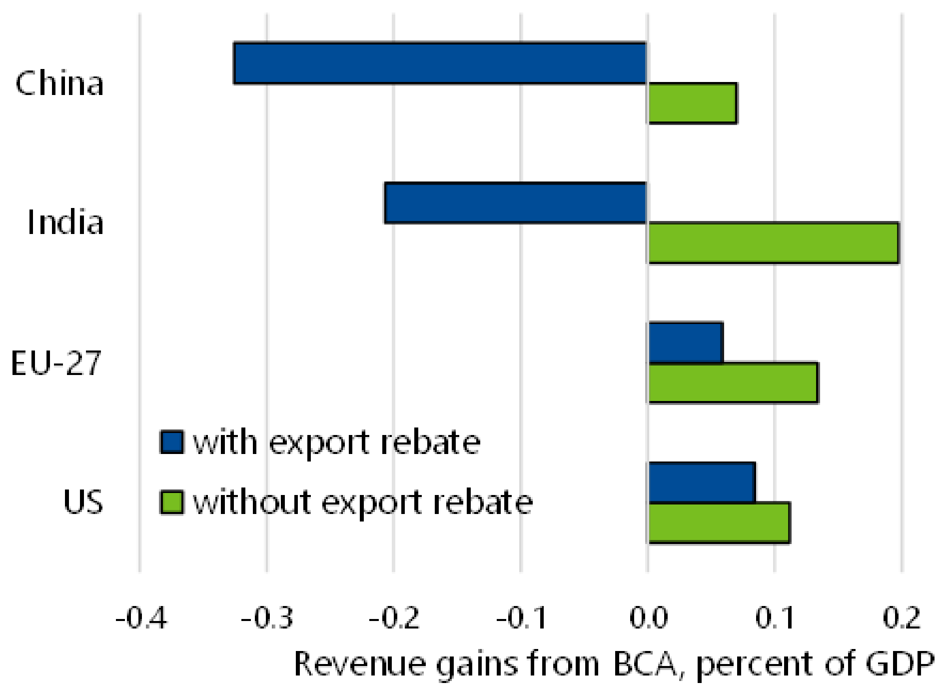


Revenue recycling to compensate firms

- **Without a global agreement**, energy-intensive trade-exposed sector might lose competitiveness (steel, aluminum, cement, chemicals)
  - Relief for carbon tax, free allowances under ETS, or subsidies → fiscal cost
  - Border carbon adjustment to level playing field in domestic market (tax on imports) and foreign markets (rebate on exports)

- **With global agreement:** less need
  - Yet, declining industries and localities still call for compensation

Revenues effects from a $50 per ton border carbon adjustment



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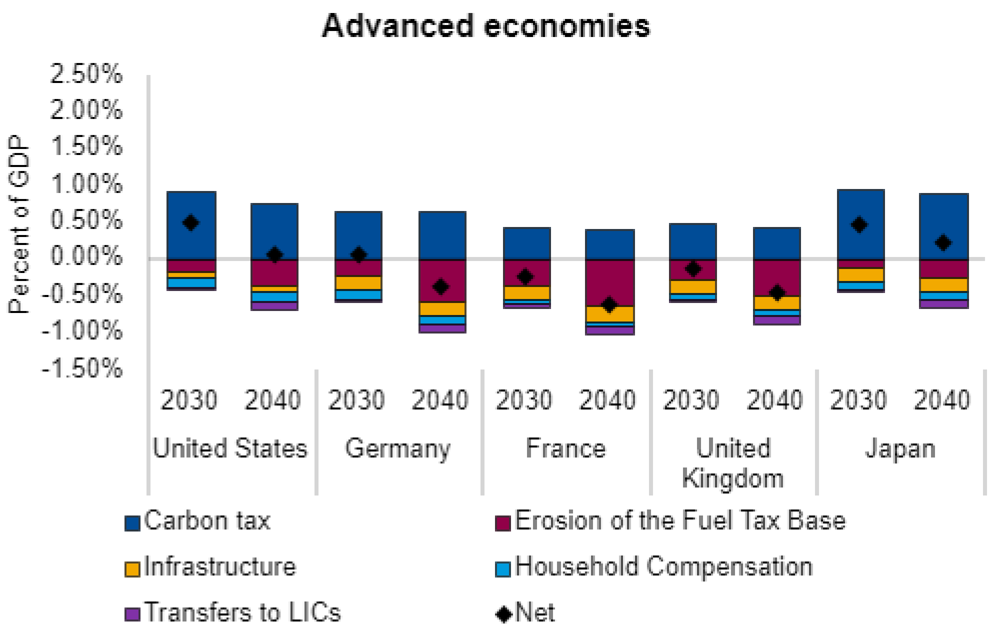
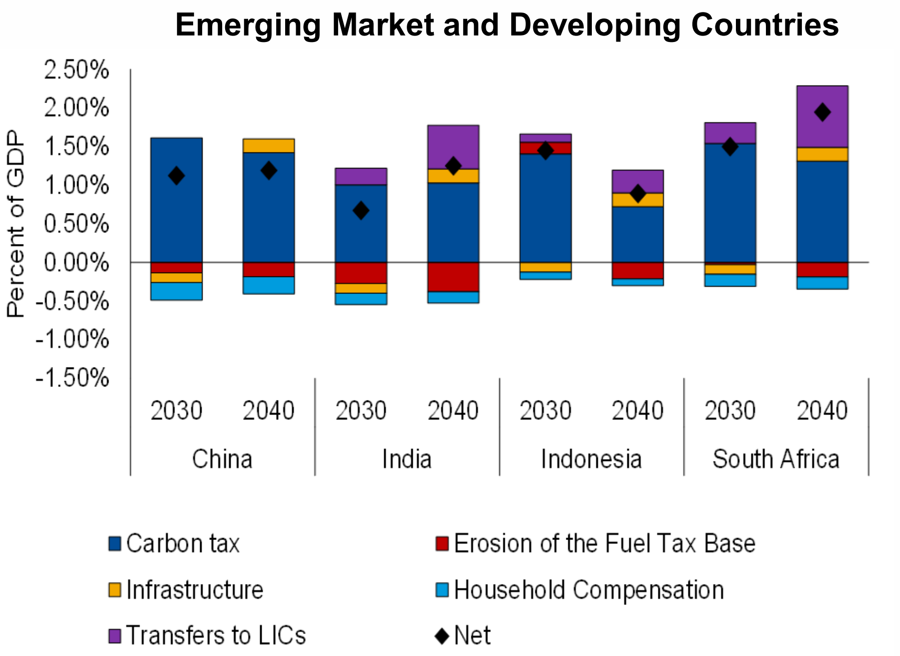
The Fiscal Equation
Summing up

Summarizing fiscal impact under global deal scenario

Change in primary fiscal balance in percent of GDP, 2030 and 2040





Note: Based on Figures for carbon tax, erosion of fuel tax base and infrastructure spending. Household compensation for the first three deciles. Transfers to LICs based on average abatement costs.

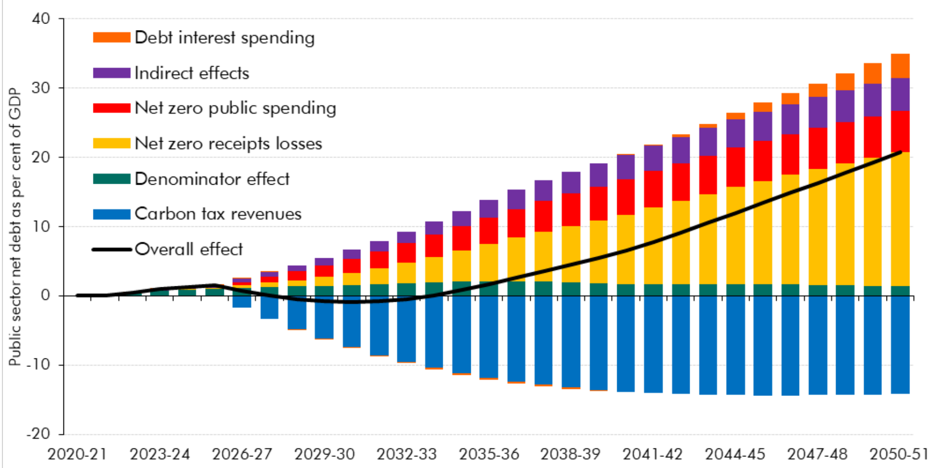
How does decarbonization affect fiscal equation?

- **Advanced economies:**
  - Negative effect on primary balance arises sooner (EU, UK) or later (Japan, US)
  - Fiscal cost likely higher without global deal
  - Alternative revenue sources can offset fiscal cost, e.g. charging per vehicle kilometer traveled

- **Emerging market and developing economies:**
  - Positive effect on primary fiscal balance will likely sustain for longer
  - Enables countries to use global climate deal to foster development agenda

- **Transfers** from AE to EMDEs will reinforce this

Public debt and reaching NZE in UK



Source: OBR

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Thank You!