



Carbon Pricing

**The 13th IMF-Japan High-Level
Tax Conference For Asian Countries
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Yuko Kinoshita
Fiscal Affairs Department, IMF

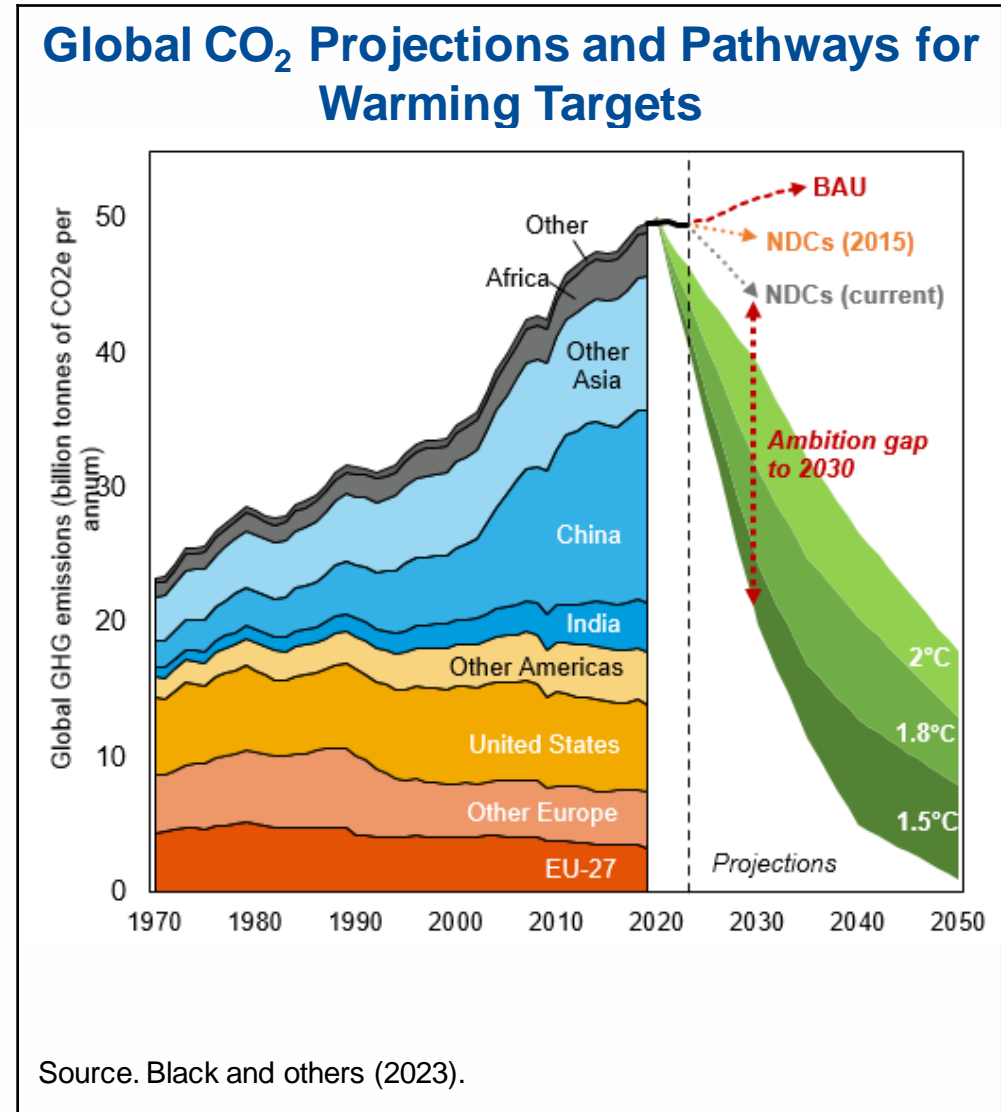
Contents

- Global picture and need for international coordination
- Role of carbon pricing and fossil fuel subsidy reform in comprehensive strategies
- Impacts of pricing

Global Picture

Problem – We need to cut global GHG emissions drastically to mitigate climate change

- Limiting global warming to **2°C or 1.5°C** requires cutting global carbon dioxide (CO₂) and other greenhouse gases (GHGs) **25 or 50 percent** below 2019 levels by 2030
- Last window to keep alive 1.5-2°C is about to close—current pledges only achieve 11%
- Asian countries have pivotal role
- Obstacles to scaling up global mitigation
 - ▶ Ambition: Too many parties (195) and too many parameters (one pledge per party)
 - ▶ Unilateral policy action: competitiveness and uncertainty about other's actions



A Global Deal to Complement the Paris Agreement is Needed

Facilitating Elements

Coordination

Start with small group of major emitters, including developing and developed countries

Flexibility

Allow for country preferences in choice of mitigation policies, forms of finance and technology choices; protection for vulnerable groups

Equity

Stricter emissions policies in advanced countries; assistance to developing countries and affected regions

A Global Deal



Key Outcomes

Mitigation

Emissions reductions consistent with 1.5-2C Paris temperature goals

Climate Finance and Technology

Develop flows needed for investment in mitigation and adaptation in developing countries. Support innovation and availability of technology for clean energy transition and resilience

Role of Carbon Pricing

Carbon Pricing

Central role in mitigation policy

- Across-the-board incentives, cost-effective, revenue, co-benefits

Basic design details are important

- Cover power, industry, transport building
- Predictable and progressively rising price
- Use revenues productively

Administration

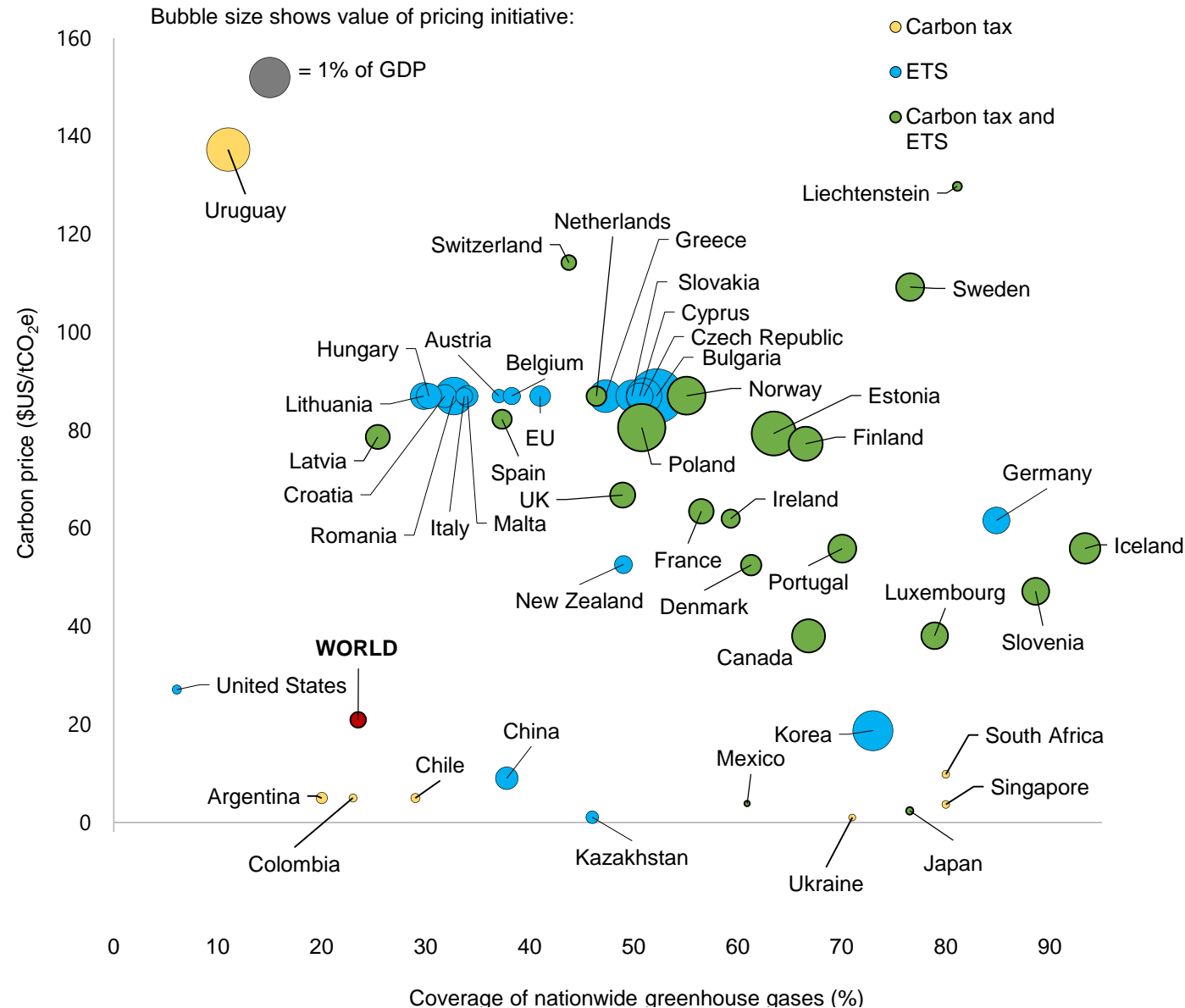
- Carbon taxes: build off fuel tax collection
- ETS: requires new capacity for monitoring emissions and trading markets
 - May not be practical if limited capacity or thin trading markets

Comparison between Carbon Taxes and ETS

Design issue	Instrument	
	Carbon tax	ETS
Administration	Administration is more straightforward (for example, as extension of fuel taxes)	May not be practical for capacity constrained countries
Price certainty	Specify tax rate trajectory	Price volatility but price floor or cap adjustments can limit price volatility
Emission reduction	Emissions uncertain but tax rate can be periodically adjusted	Certainty over emissions levels
Revenue generation	Revenue usually accrues to finance ministry	Free permit allocation may help with acceptability but lowers revenue
Political economy	Can be politically challenging to implement new taxes; use of revenues and communications critical	Can be more politically acceptable than taxes, especially under free allocation

Carbon Pricing Has Key Role and is Proliferating

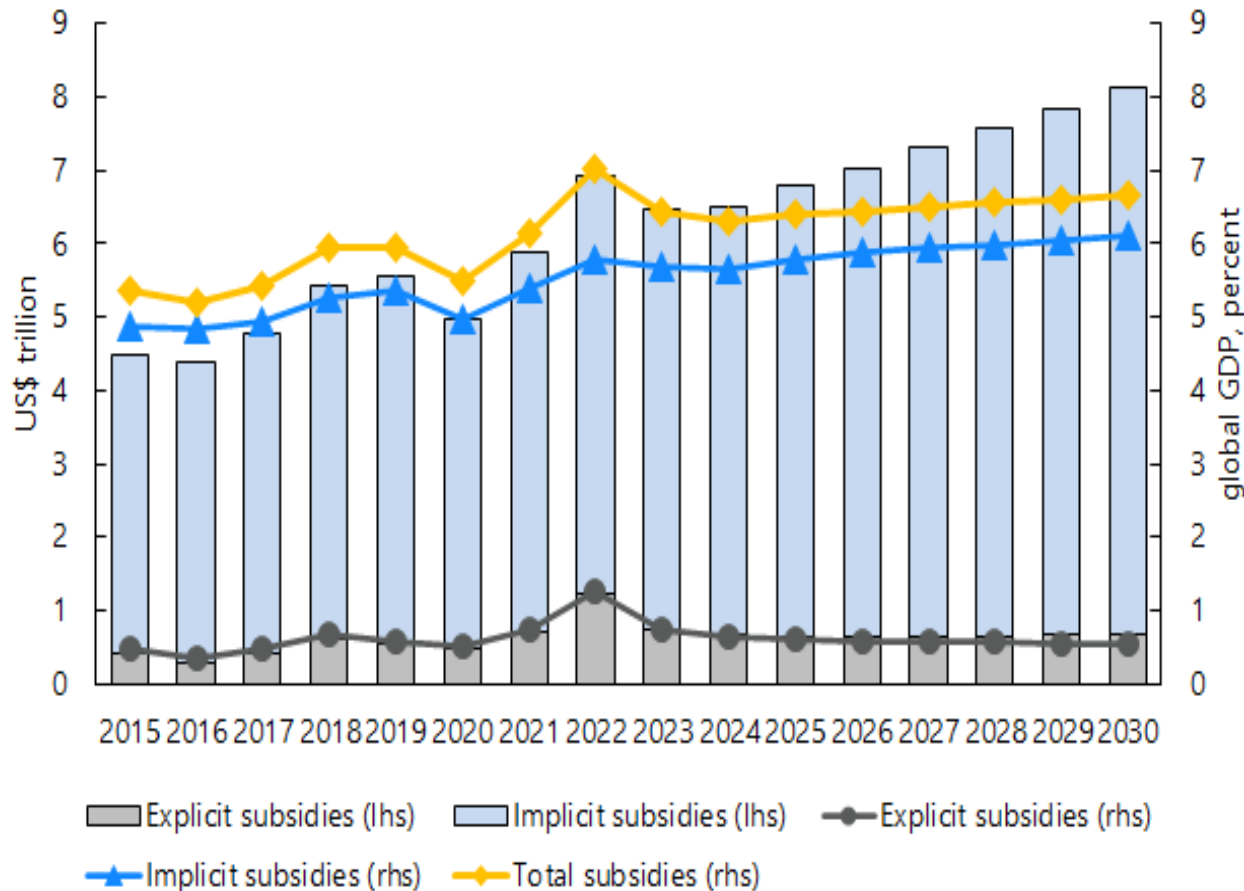
Explicit carbon pricing schemes (2022, national subnational and regional)



- ASIA**
- Carbon tax**
- Indonesia
 - Japan
 - Singapore
- ETS**
- China
 - Korea
 - New Zealand
 - Australia (2024-)
- Under consideration**
- India
 - Malaysia
 - Philippines
 - Thailand
 - Vietnam

Sources: WBG (2023); IMF Staff; National sources

Fossil Fuel Subsidy Reform can also mitigate climate change



- Fossil fuel subsidies (explicit and implicit subsidies) keep energy prices low at a fiscal cost and are large globally
- These subsidies can be reformed to yield revenues that could be used for better targeted social spending, reductions in inefficient taxes and productive investments.

Reinforcing Sectoral Instruments

- Needed because of acceptability constraints on pricing
- Feebates (or analog—tradable emission rate standards)
 - ▶ Revenue neutral sliding scale of fees/rebates for products/activities with $>/<$ average CO₂ rates
- Attractions
 - ▶ Cost effectively promote all responses for reducing emissions intensity (though no demand response)
 - ▶ Avoid a fiscal cost
 - ▶ No tax burden on average household/firm

Pricing Beyond Fossil Fuel CO₂

Energy Sector

- Vehicles (commonly integrated into registration fees)
- Power generation/industry (limits increase in prices/production costs)
- Buildings (encourage renovations, clean heating, efficient appliances)
- Industry (limits competitiveness/leakage concerns)

Broader Sectors

- Forestry
 - ▶ Landowners: fee = CO₂ price × (baseline carbon storage – current storage)
 - ▶ But needs well-defined property rights, monitoring of forest carbon storage
- Extractives (methane)
 - ▶ Methane taxes integrated into fiscal regimes
 - ▶ Based on self-monitoring of emissions (e.g., Norway)
 - ▶ Or tax suppliers using default emission rates with rebates for cleaner firms

Impacts of Pricing

IMF-WB Climate Policy Assessment Tool (CPAT)

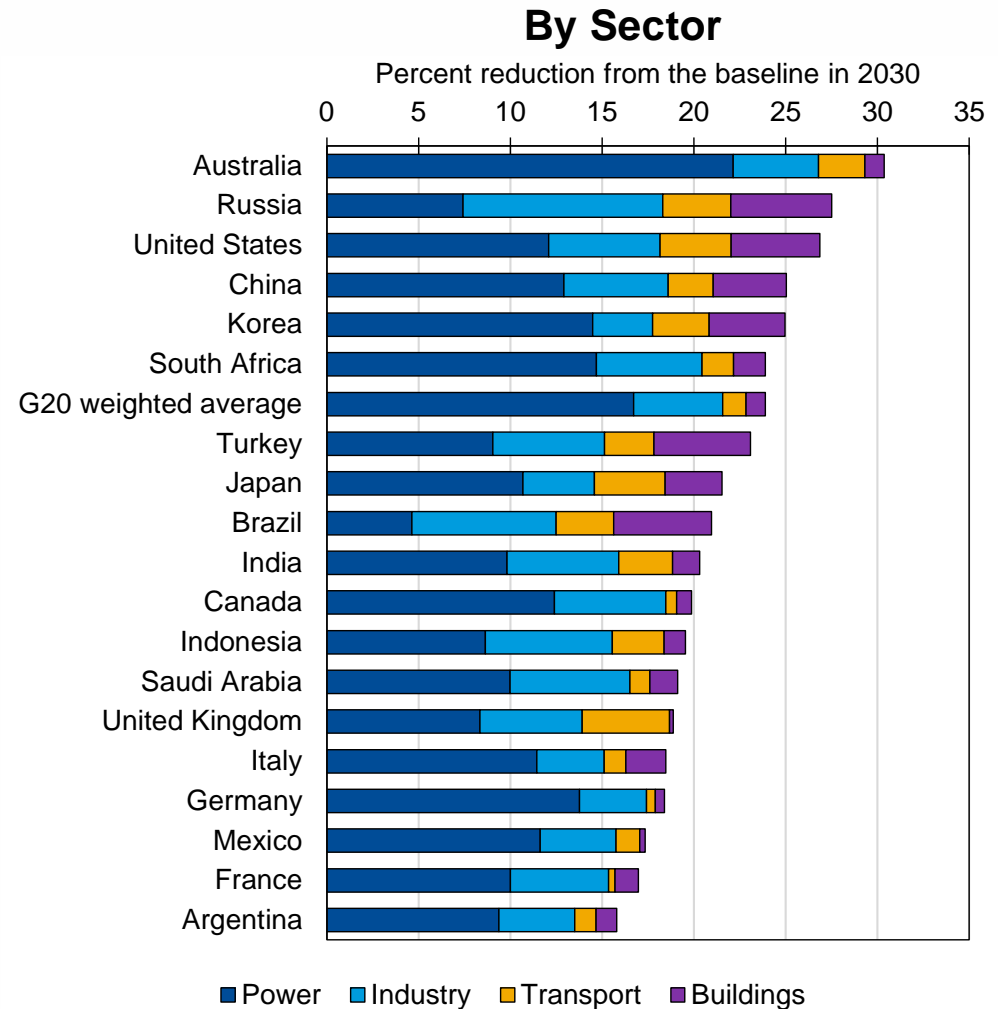
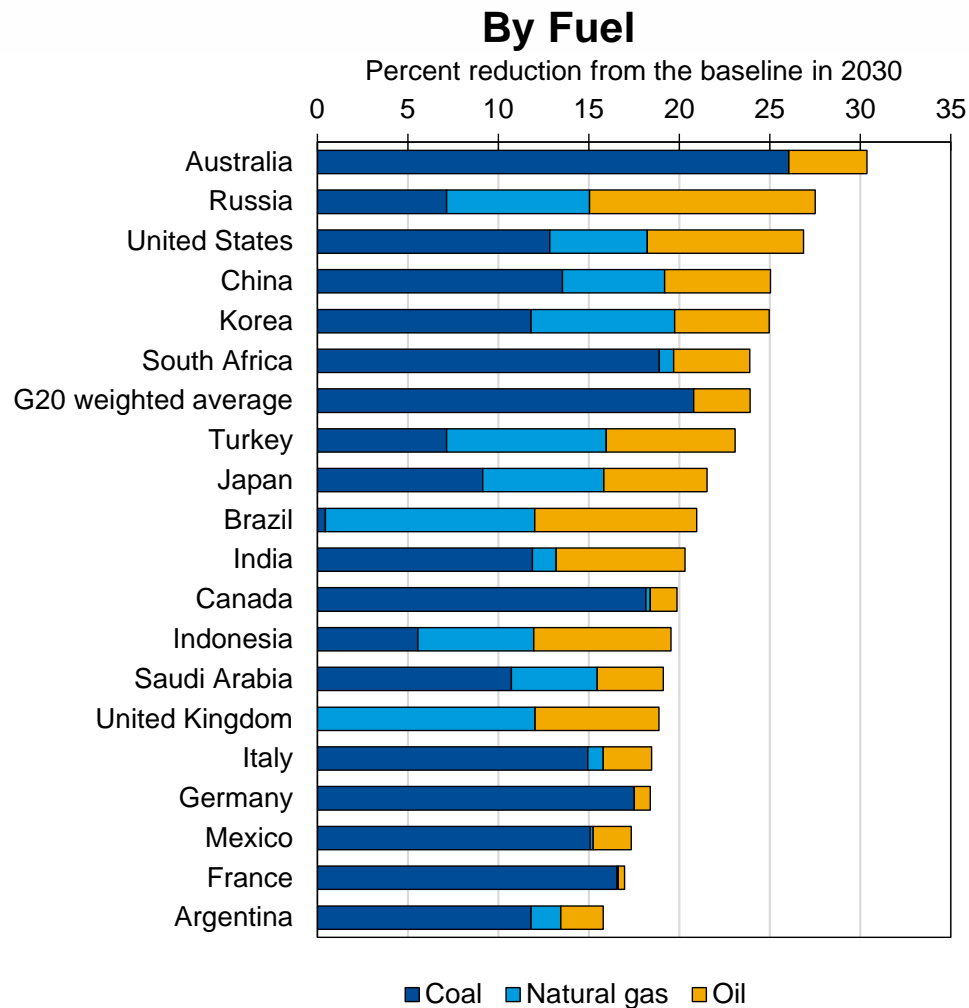
The Climate Policy Assessment Tool (CPAT)

- A spreadsheet-based 'model of models' for over 200 countries, being developed jointly by IMF & World Bank
- Allows for **estimating the effects of climate mitigation policies** – carbon pricing and fossil fuel subsidy reform:
 - **impact on energy & emissions** – prices, consumption, global pollutants (GHGs), local pollutants (PM2.5, NOx, etc.)
 - **macroeconomic impacts** – GDP, revenues, trade balance
 - **distributional impacts** – effects of policies including revenue recycling across on households (across income distribution and urban vs. rural) and firms
 - **development co-benefits** – reductions in mortality & morbidity from improved in air quality and road safety, reduced congestion
- **Helps policymakers assess impacts and design, compare, and implement** policies to achieve their climate mitigation targets (Paris Agreement NDCs) and development goals (SDGs) jointly



Impacts of Carbon Pricing: Emission Reduction

CO₂ Reductions for \$75/50/25 Carbon Prices (According to Development Level)



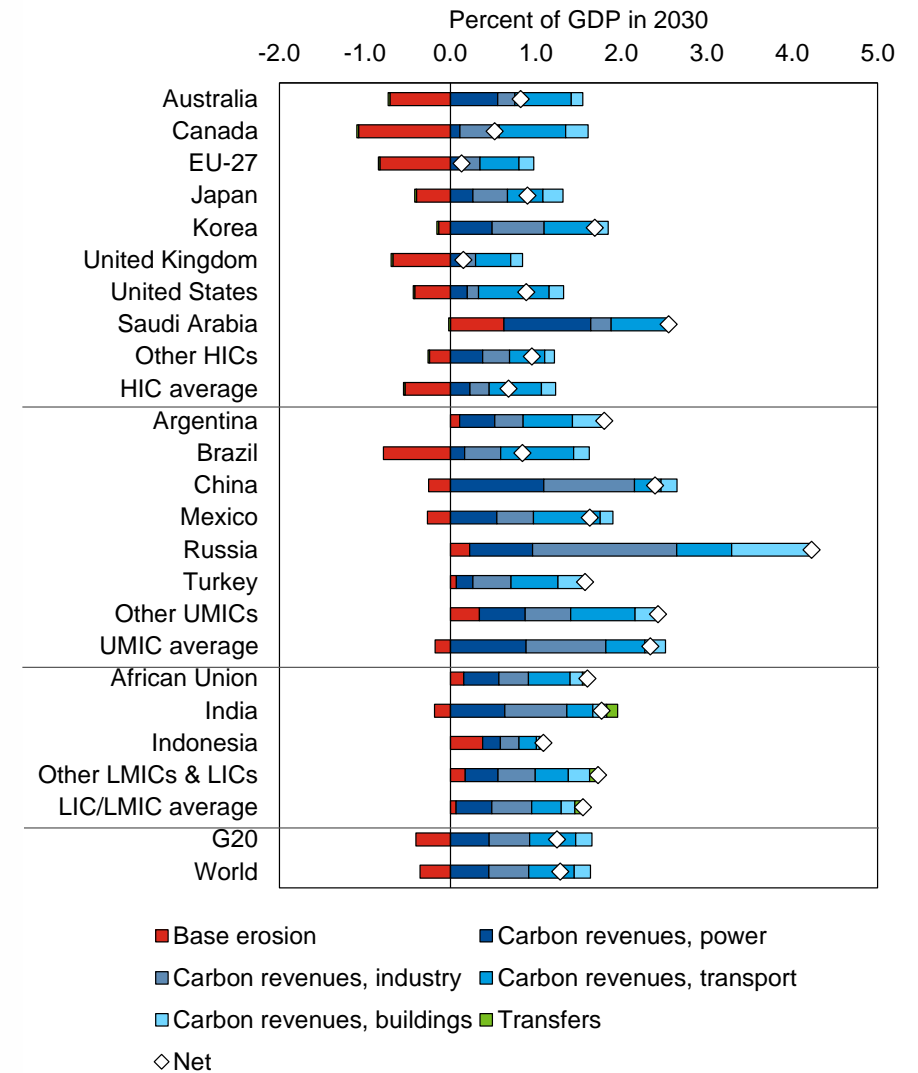
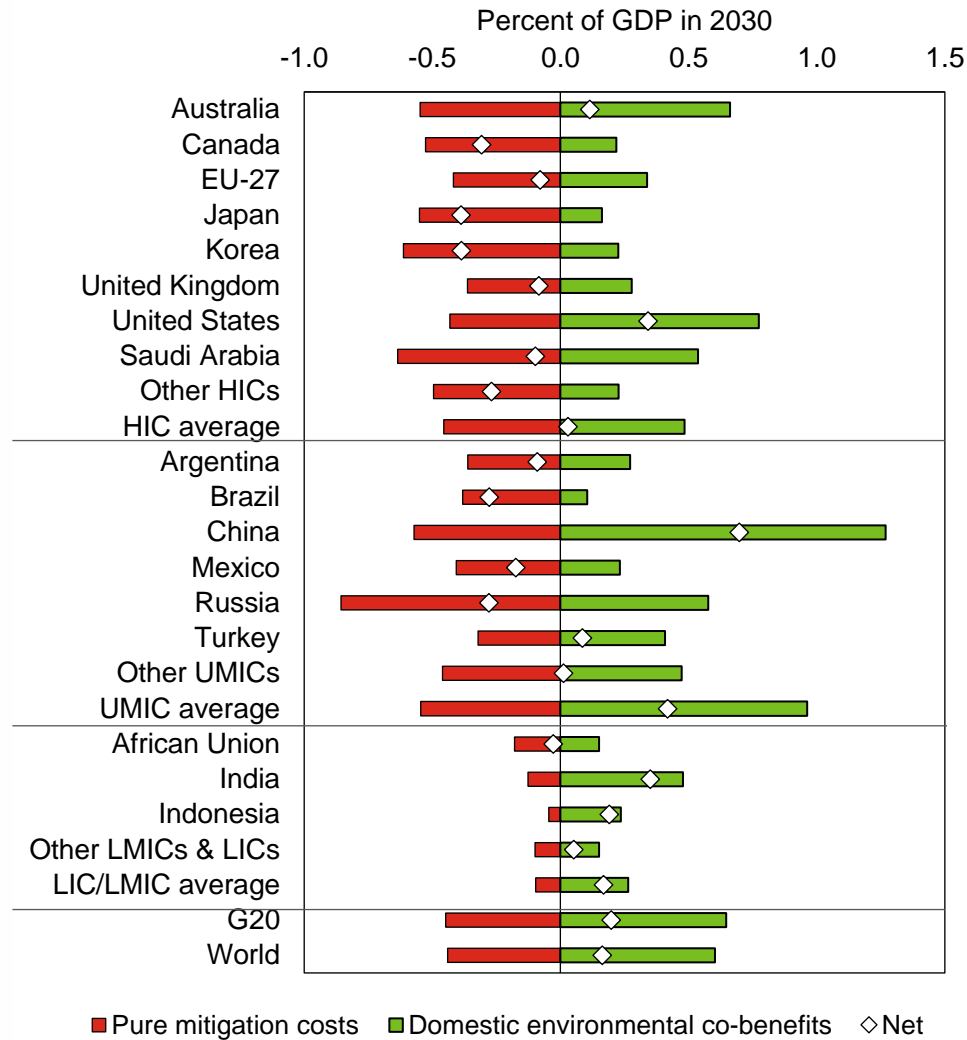
Source. IMF staff using CPAT.

Note. Estimates are for a \$75/50/25 carbon price for advanced/emerging high-income/low-income economies. Right panel is for direct emissions. Buildings includes fossil fuel CO₂ emissions from residences, services, agriculture, and forestry but emissions from industrial buildings are included under industry.

Impacts of Carbon Pricing: Welfare and Fiscal

Costs and Domestic Environmental Co-Benefits

Revenue Impacts



Carbon pricing can be progressive and support the poorest with revenue recycling

- Recycling:

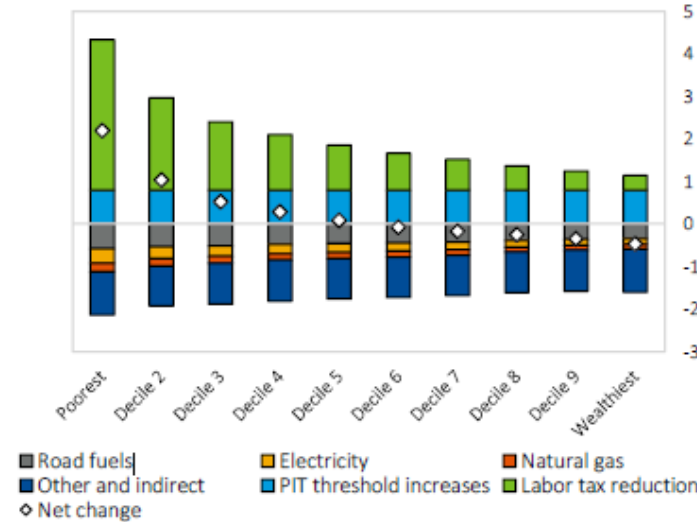
- Targeted assistance (e.g., social safety nets).
- Other revenues for broad tax cuts/SDG investments.

- Non-pricing approaches: first-round households burdens much smaller.

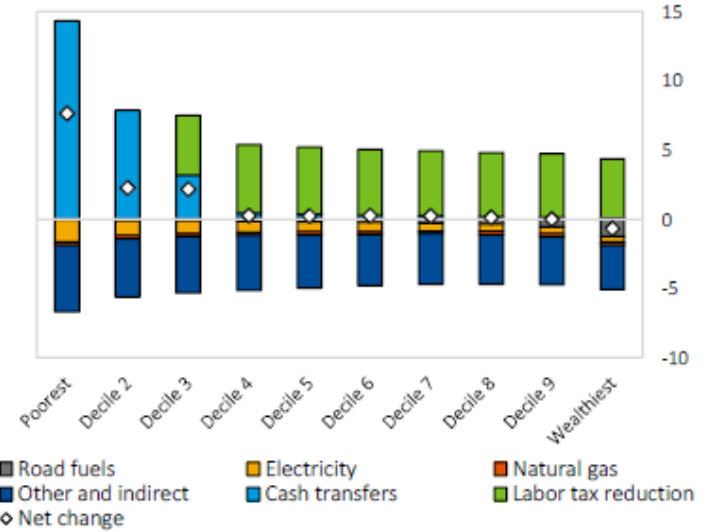
- But no revenues to alter distributional impacts.

Household Burdens from Carbon Pricing, 2030

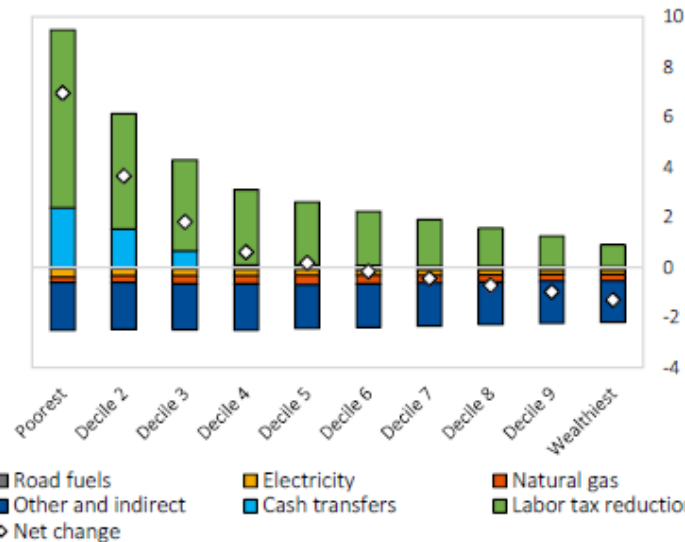
Panel 1. United States (\$75 carbon tax)



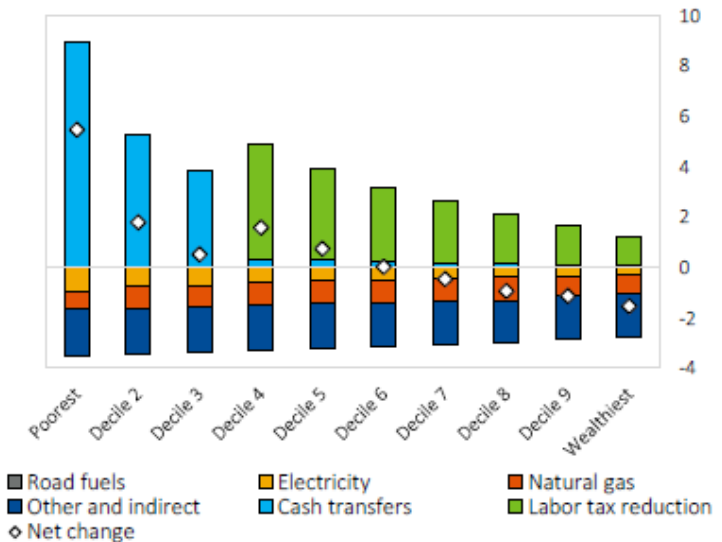
Panel 2. China (\$50 carbon tax)



Panel 3. Turkey (\$50 carbon tax)



Panel 4. Argentina (\$50 carbon tax)

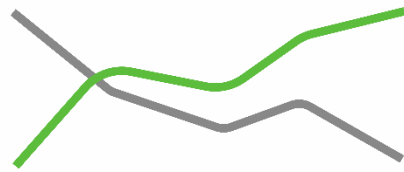


Source: IMF staff using CPAT.

Conclusions

- Carbon pricing is the most efficient way of climate mitigation:
 - ▶ Price signal critical for mobilizing climate finance
 - ▶ Revenues easily exceed public investment needs → Carbon pricing improves fiscal balances (Gaspar et al. 2024)
- Reducing fossil fuel subsidies can mitigate climate
- Carbon pricing should be reinforced with sectoral instruments

Appendices



CPAT

Climate Policy Assessment Tool

AutoSave CPAT 1.0b_44 - Saving... Search

File Home Insert Page Layout Formulas Data Review View Help DM

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1	Select country ->	Vietnam	5 Exemptions (fuels/sectors) ->	<input type="checkbox"/> Phaseout, starting in: 2021 5 years to phase out ex&ptions (if applicable)
2	Select policy ->	Carbon tax	6 Energy price controls ->	<input type="checkbox"/> Liberalize, starting in: 2021 5 years to liberalize price controls (if applicable)
3	Define policy ->	Year to introduce carbon tax: 2021	7 Fossil fuel subsidies ->	<input type="checkbox"/> Phaseout, starting in: 2021 5 years to phase-out (if applicable)
4		Starting carbon price (real USD* per ton CO2): 15	8 Renewable energy subsidy ->	0.0 US cents (real) per kWh feed-in tariff
5		Target level of carbon tax: 108.3	9 Revenue recycling ->	Labor tax reductions: 50 % revenues used to reduce labor taxes (SSC, PIT)
6		Year to reach target level: 2035		Corporate tax reductions: 0 % revenues used to reduce corporate income (CIT)
7				Public investment: 0 % on e.g. public transport, infrastructure
8	4 Carbon tax policy coverage (other policies have predefined coverage):			Current spending: 0 % on e.g. health, education, social security
9	Fuels: <input checked="" type="checkbox"/> Coal <input checked="" type="checkbox"/> Natural gas <input checked="" type="checkbox"/> Gasoline <input checked="" type="checkbox"/> Diesel <input checked="" type="checkbox"/> LPG <input checked="" type="checkbox"/> Kerosene <input type="checkbox"/> Other oil products			Cash transfers: 50 % on transfer mechanisms (cash, infrastructure, social protection, etc.)
10	Sectors: <input checked="" type="checkbox"/> Power <input checked="" type="checkbox"/> Road <input checked="" type="checkbox"/> Rail <input checked="" type="checkbox"/> Domestic aviation <input checked="" type="checkbox"/> Domestic shipping <input checked="" type="checkbox"/> Other energy use			- targeted percentile: 40 % from bottom of income distribution targeted for transfers
11	Industries: <input checked="" type="checkbox"/> Food & forestry <input checked="" type="checkbox"/> Services (private & public) <input checked="" type="checkbox"/> Mining & chemicals <input checked="" type="checkbox"/> Iron & steel <input checked="" type="checkbox"/> Other metals			- coverage rate: 70 % of targeted percentile that receive transfers
12	<input checked="" type="checkbox"/> Machinery <input checked="" type="checkbox"/> Cement <input checked="" type="checkbox"/> Other manufacturing <input checked="" type="checkbox"/> Construction <input checked="" type="checkbox"/> Fuel transformation & transportation			- leakage rate: 30 % of untargeted percentile that receive transfers

25 < Advanced options Links to charts -> Mitigation Distribution Air pollution Transport

26 Key inputs and outputs

27 A Main policy design & macro drivers:

28 Policy strength: carbon price trajectory (US\$ per tCO2e, 2018-2030), Vietnam

29 Policy coverage: CO2 emissions covered (% of national total)

30 Revenue recycling: tax reductions, expenditures, or transfers (% of total)

31 Baseline GDP and population growth (2016-2030)

32 International energy prices (2016-2030, source: average of IMF, WB, IEA, and EIA)

33 Income elasticities of energy consumption

34 Price elasticities of demand by fuel

35 Effective carbon rate adjusts for sectoral coverage. Residual includes untargeted sectors e.g. military. Shows proportion of revenues allocated to expenditures, transfers, and/or tax reductions. Assumes GDP continues growing at rate in 2025. Shows international energy price projections, which impact domestic energy supply costs. Long-run 5 yrs includes rebound effects. Shows range of elasticities used across sectors.

41 B Headline projected effects

42 GHG emissions vs. Paris pledge (NDC; mtCO2e)

43 Fiscal revenues raised by fuel (left axis) and total as % of GDP (right axis)

44 GDP: net impact on growth rates

45 Impacts on households in 2025 (excludes taxes/expenditures)

46 Co-benefits: averted deaths from air pollution & road accidents

47 Total monetized welfare benefits for US\$108.3 Carbon tax pCO2e by 2035, Vietnam

48 NDC for Vietnam is a target for 2030 vs. business-as-usual. Excludes LULUCF. Shows total additional (vs. baseline) fiscal revenues from the policy net of renewable energy subsidies. Shows estimated impact on projected GDP growth rates from tax plus revenue recycling. Excludes impact from tax reductions and increases in public investment/expenditure. Shows averted deaths from improved air quality (all fuels) and road safety (for motor fuels). Shows monetized net welfare benefits. Economic costs are deadweight losses from the tax before revenue recycling.

55 Mitigation module (macro & energy effects) -> link to module



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NOTES

Black, Simon, Jean Chateau, Florence Jaumotte, Ian Parry, Gregor Schwerhoff, Sneha Thube, and Karlygash Zhunussova. 2022. "Getting on Track to Net Zero: Accelerating a Global Just Transition in This Decade." IMF Staff Climate Note, 39.
<https://www.imf.org/en/Publications/staff-climate-notes/Issues/2022/10/31/Getting-on-Track-to-Net-Zero-Accelerating-a-Global-Just-Transition-in-This-Decade-525242>

Carbon Taxes or Emissions Trading Systems?

Instrument Choice and Design

Ian Parry, Simon Black, and Karlygash Zhunussova

IMF STAFF CLIMATE NOTE 2022/006

Ian Parry, Simon Black, and Karlygash Zhunussova. 2022. "Carbon Taxes or Emissions Trading Systems? Instrument Choice and Design," IMF Staff Climate Notes, No 2022/006.
<https://www.imf.org/en/Publications/staff-climate-notes/Issues/2022/07/14/Carbon-Taxes-or-Emissions-Trading-Systems-Instrument-Choice-and-Design-519101>.



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Getting on Track to Net Zero
Accelerating a Global Just Transition in This Decade

Simon Black, Jean Chateau, Florence Jaumotte, Ian Parry, Gregor Schwerhoff, Sneha Thube, and Karlygash Zhunussova

IMF STAFF CLIMATE NOTE 2022/010



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Proposal for an International Carbon Price Floor among Large Emitters

Ian Parry, Simon Black, and James Roaf

IMF STAFF CLIMATE NOTES 2021/001

Ian Parry, Simon Black, and James Roaf. 2021. "Proposal for an International Carbon Price Floor among Large Emitters," IMF Staff Climate Notes, no. 2021/001.
<https://www.imf.org/en/Publications/staff-climate-notes/Issues/2021/06/15/Proposal-for-an-International-Carbon-Price-Floor-Among-Large-Emitters-460468>.

Ian Parry, Christophe Waerzeggers, Cory Hillier, James Roaf, Florian Misch, Martin Kaufman, and Kyung Kwak. 2021. "Carbon Pricing: What Role for Border Carbon Adjustments?," IMF Staff Climate Note 2021/004, International Monetary Fund, Washington, DC., .
<https://www.imf.org/en/Publications/staff-climate-notes/Issues/2021/09/24/Carbon-Pricing-What-Role-for-Border-Carbon-Adjustments-464805>.



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Carbon Pricing
What Role for Border Carbon Adjustments?

Ian Parry, Peter Dohlman, Cory Hillier, Martin Kaufman, Kyung Kwak, Florian Misch, James Roaf, and Christophe Waerzeggers

IMF STAFF CLIMATE NOTE 2021/004