



Carbon Taxation

The Eleventh IMF-Japan High-Level Tax Conference For Asian Countries

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Urgency of Near-Term Mitigation Action

Last window to keep alive 1.5-2°C is about to close

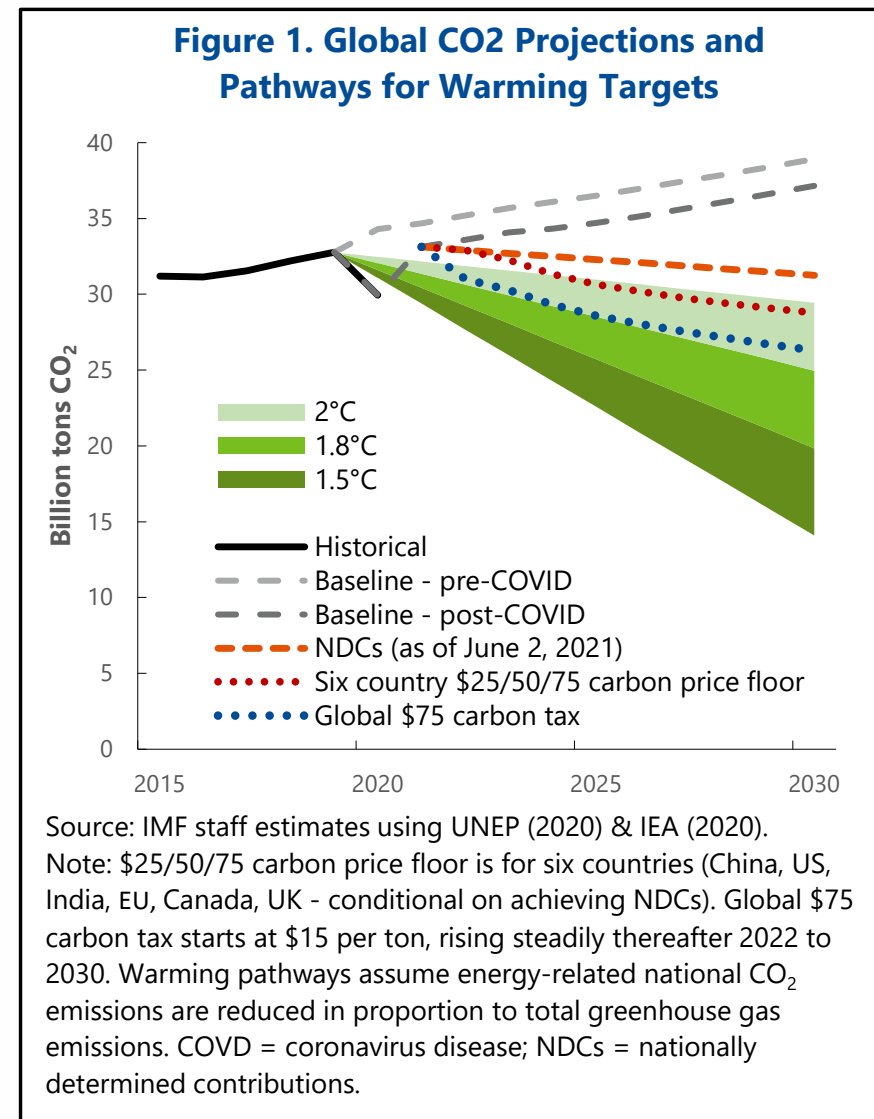
- Unless global emissions are cut 25-50% below 2019 levels by 2030

Paris Agreement is working...

- 195 parties signed and 60 have submitted zero emission pledges for mid century

...but at present is insufficient

- Current pledges for 2030 would achieve only 2/3 of needed reduction for 2°C
- No mechanism for ensuring pledges achieved



Carbon Pricing

Central role in mitigation policy

- Across-the-board incentives, cost-effective, price signal for investment, raises revenue, domestic environmental co-benefits, administratively straightforward

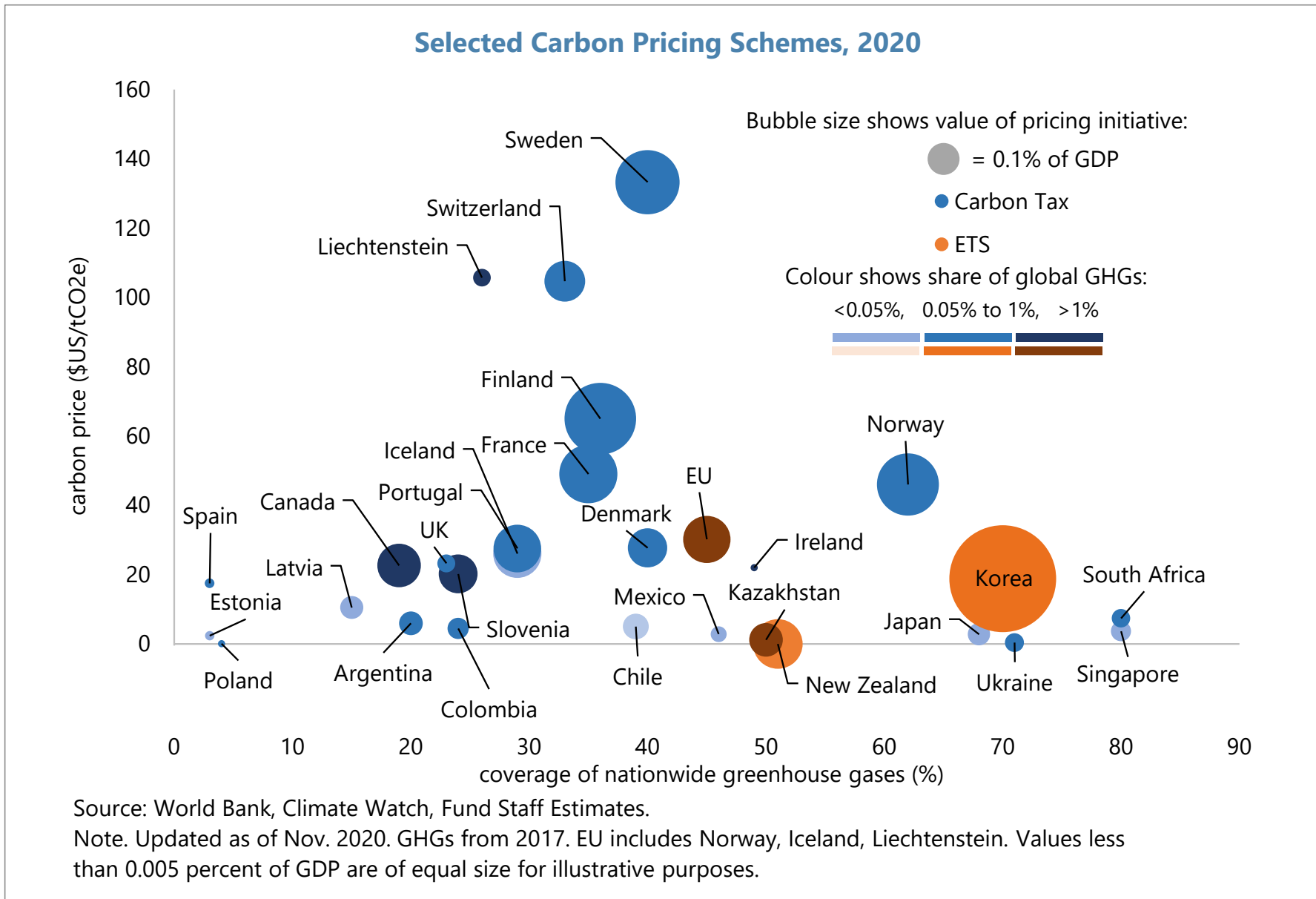
Basic design details are critical

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

Carbon taxes on the carbon content of fuels are a natural carbon pricing instrument

- Price certainty, revenues to the government, build off fuel tax collection
- Trading systems similar benefits if they include price floors, allowance auctions
 - Often confined to power/industry, not always practical (e.g., limited capacity)

Growing Momentum for Carbon Pricing



- 2021 developments
 - ▶ Carbon pricing in China and Germany
 - ▶ Canada price will rise to CAN\$170 by 2030
 - ▶ EU emissions price rises above €40/tonne
- Japan: \$3 carbon tax, considering trading

Impact of Carbon Taxes on Energy Prices

Impact of per ton \$50 Carbon Tax on Energy Prices, 2030

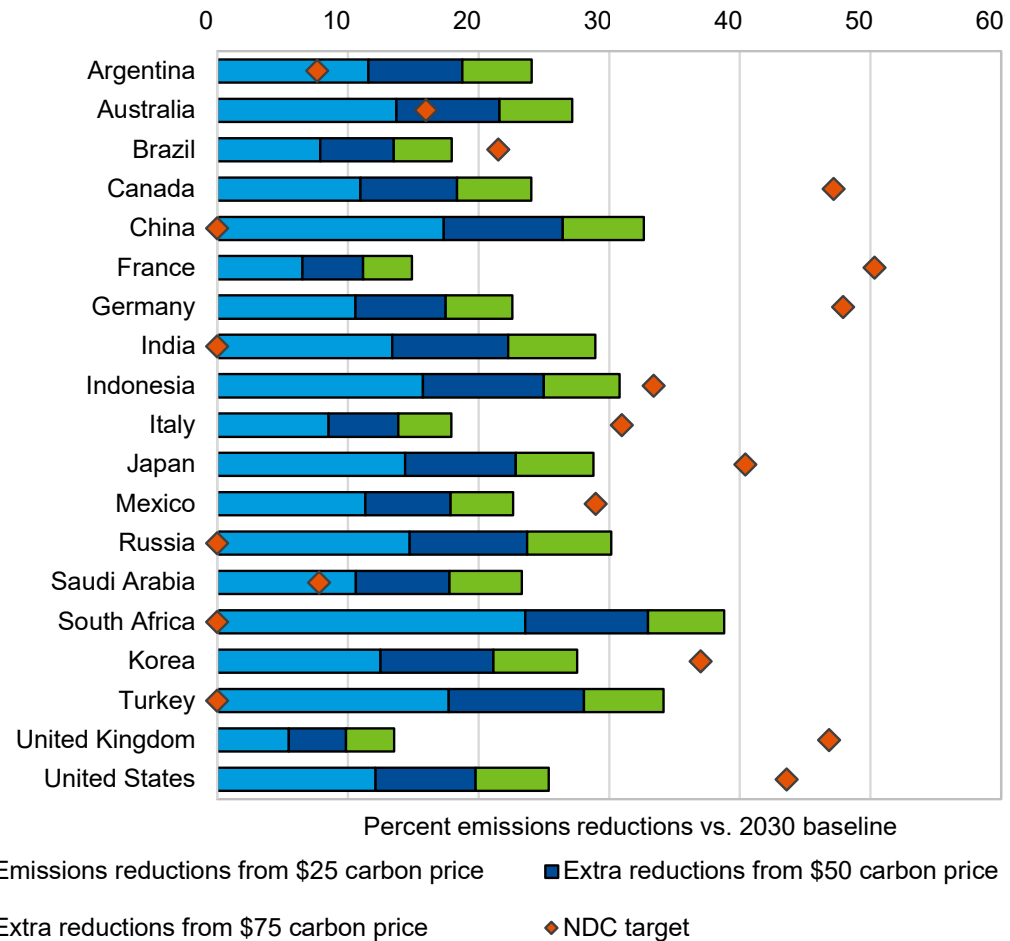
Country	Coal		Natural gas		Electricity		Gasoline	
	Baseline Price, \$/GJ	Price Increase	Baseline Price, \$/GJ	Price Increase	Baseline Price, \$/kWh	Price Increase	Baseline Price, \$/liter	Price Increase
Argentina	2.9	174%	3.0	101%	0.09	52%	0.81	17%
Australia	3.4	155%	7.2	41%	0.12	37%	0.90	14%
Brazil	4.0	130%	8.3	37%	0.10	7%	0.89	10%
Canada	2.2	232%	3.9	73%	0.09	10%	0.98	13%
China	5.0	99%	8.9	29%	0.07	46%	0.84	15%
France	5.5	95%	14.7	20%	0.13	3%	1.21	11%
Germany	5.7	91%	11.8	25%	0.17	12%	1.19	11%
India	3.9	125%	4.0	82%	0.12	33%	0.79	16%
Indonesia	3.3	153%	6.3	38%	0.11	71%	0.49	30%
Italy	5.1	104%	14.5	25%	0.12	23%	1.28	11%
Japan	3.6	133%	12.7	22%	0.12	38%	1.07	12%
Mexico	1.8	283%	3.7	74%	0.09	65%	0.92	15%
Russia	2.2	204%	3.4	79%	0.09	64%	0.65	20%
Saudi Arabia			4.2	63%	0.13	51%	0.36	34%
South Africa	1.3	352%	3.8	61%	0.05	72%	0.91	13%
Korea	4.6	103%	11.3	26%	0.08	59%	1.01	11%
Turkey	1.5	394%	7.6	40%	0.08	52%	0.98	13%
United Kingdom	7.0	74%	11.5	27%	0.17	7%	1.14	11%
United States	2.6	206%	4.5	68%	0.07	38%	0.78	17%
Simple Average	3.6	173%	7.7	49%	0.11	39%	0.91	15%

Source: IMF staff calculations.

Note: Baseline prices are retail prices estimated in Coady and others (2019) and include preexisting energy taxes. Baseline prices for coal and natural gas are based on regional reference prices. Baseline prices for electricity and gasoline are from cross-country databases. Impacts of carbon taxes on electricity prices depend on the emissions intensity of power generation. Carbon tax prices are per ton. GJ = gigajoule; kWh = kilowatt-hour

Prices Implicit in 2030 Mitigation Pledges Vary Considerably

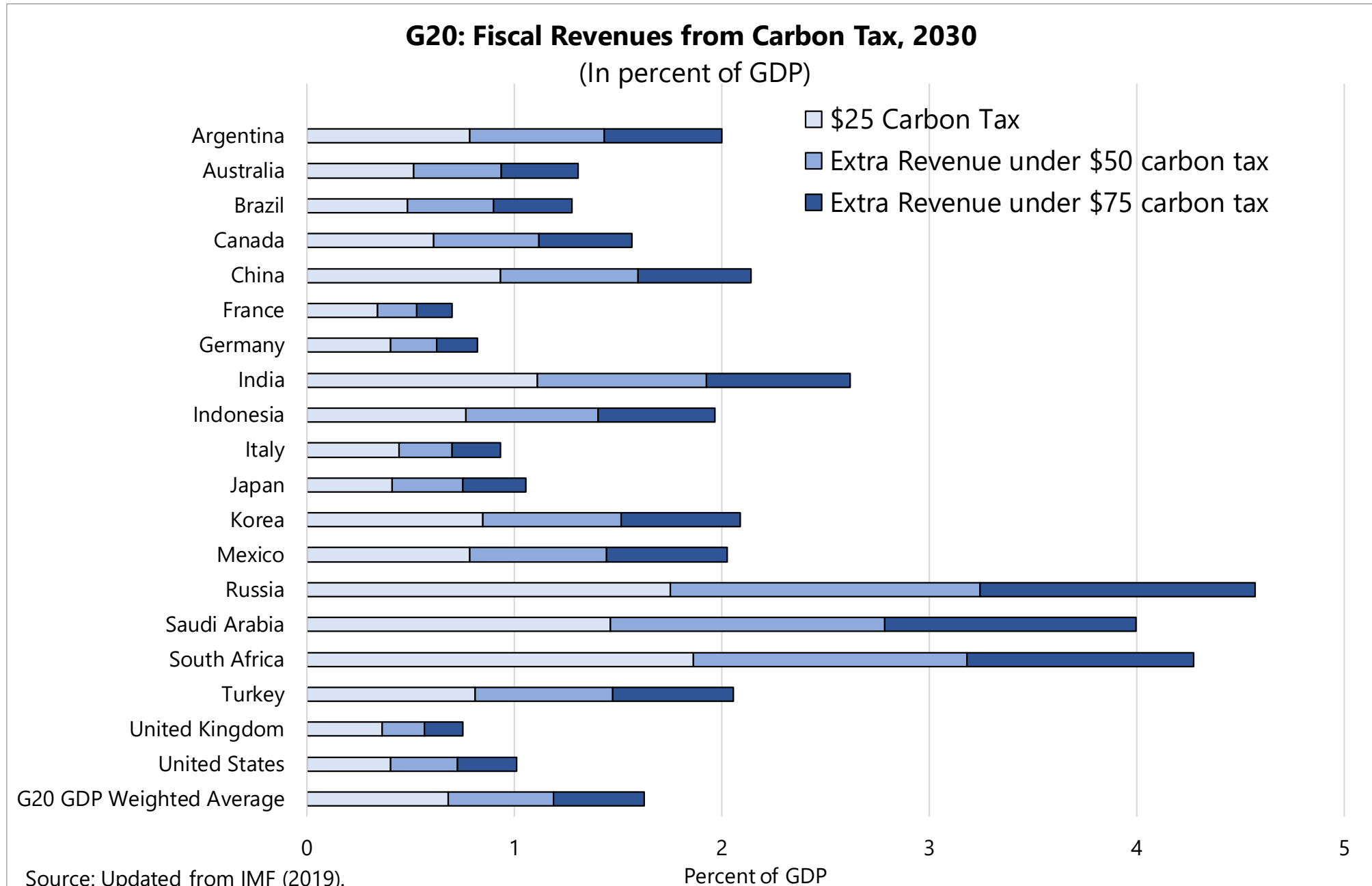
CO₂ Reductions for 2030 Pledges/ From Pricing



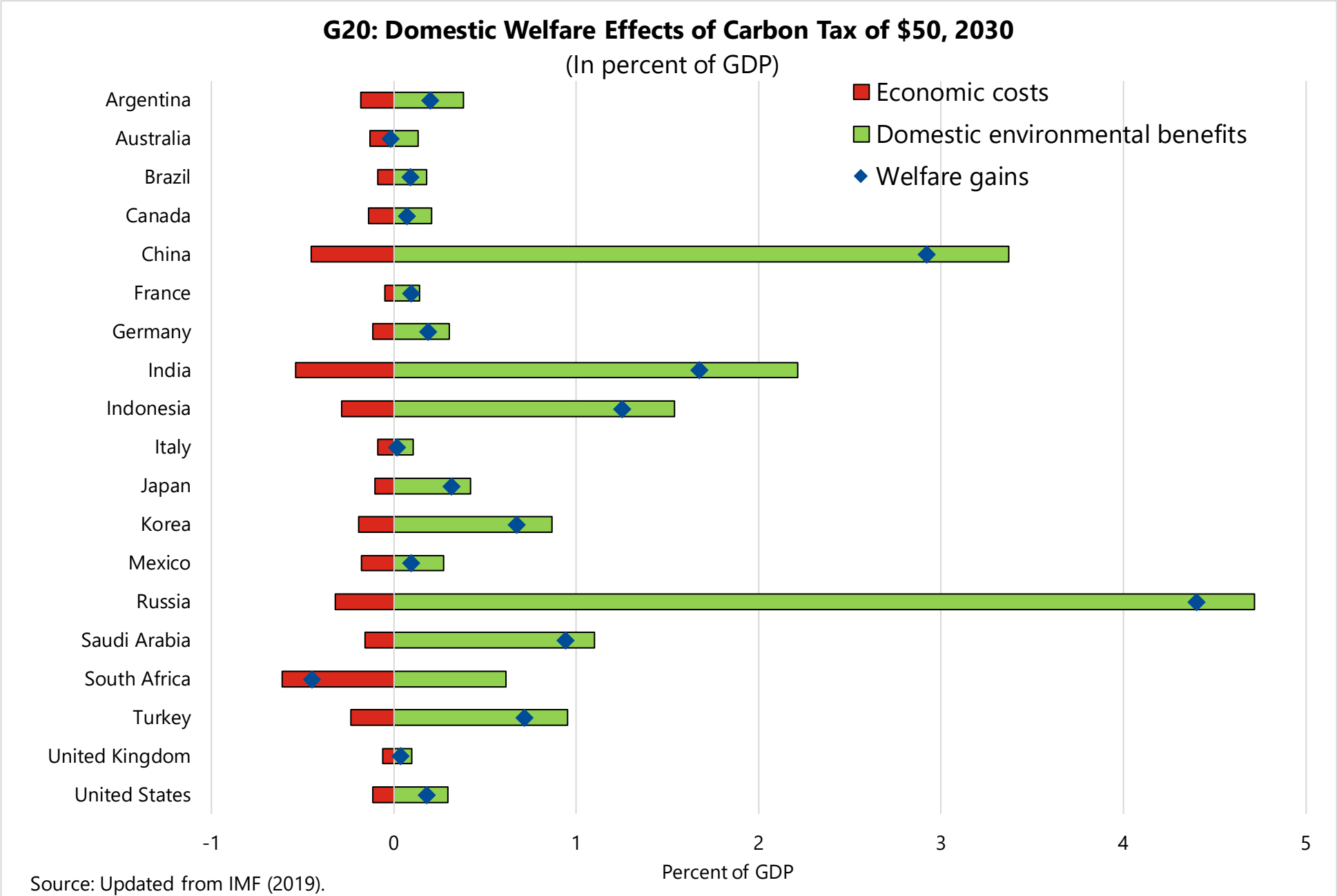
Source: IMF staff calculations.

Note: NDCs targets are from first-round or (if applicable) second-round Paris pledge. Estimates assume that CO₂ must fall in proportion to other GHGs to achieve the target (i.e. non-CO₂ GHGs must also fall in order for the target to be achieved). Where a country has a conditional NDC the target is defined as the average between the conditional and unconditional target. NDCs as of 6 May 2021.

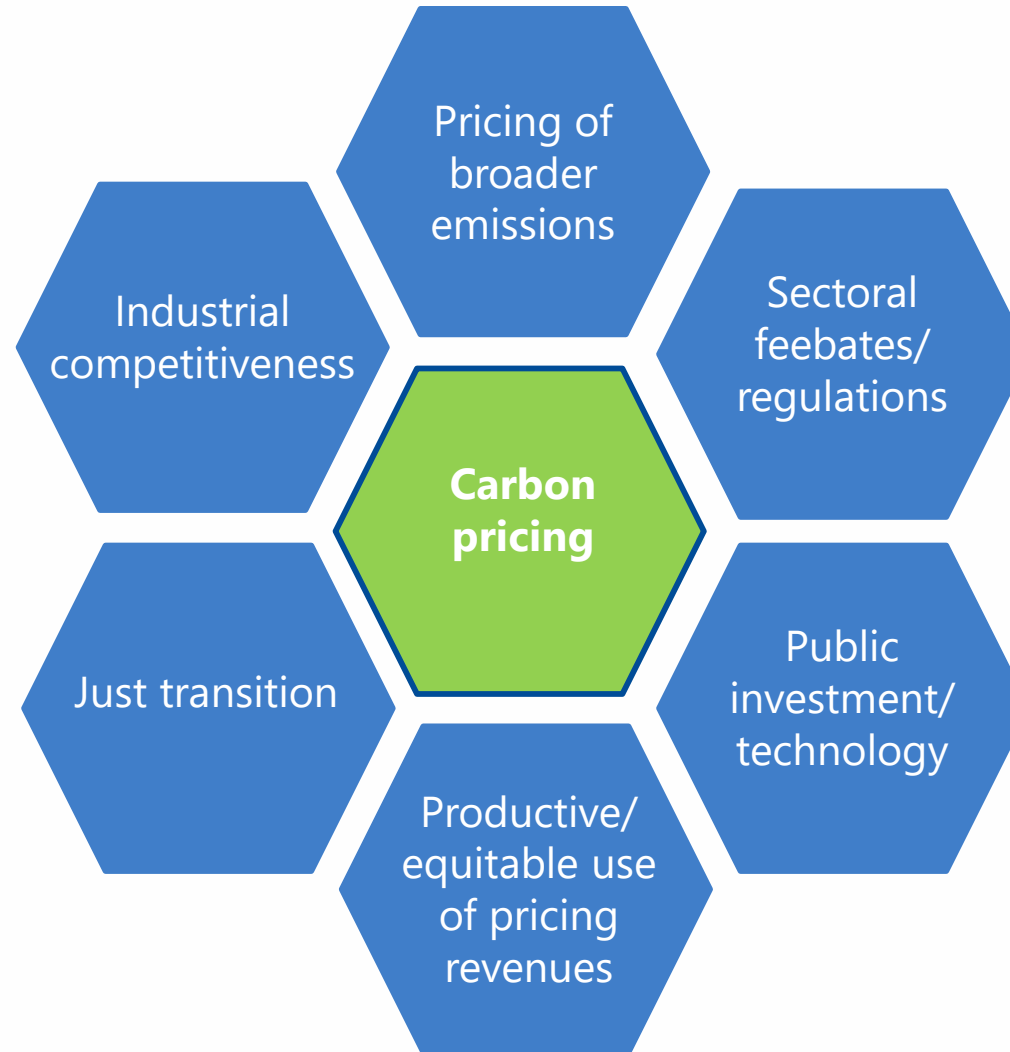
Carbon Pricing has Significant Fiscal Benefits



Carbon Pricing Can Be in Countries' Own Interests



Supporting Policies Needed to Enhance Effectiveness and Acceptability of Mitigation Strategy



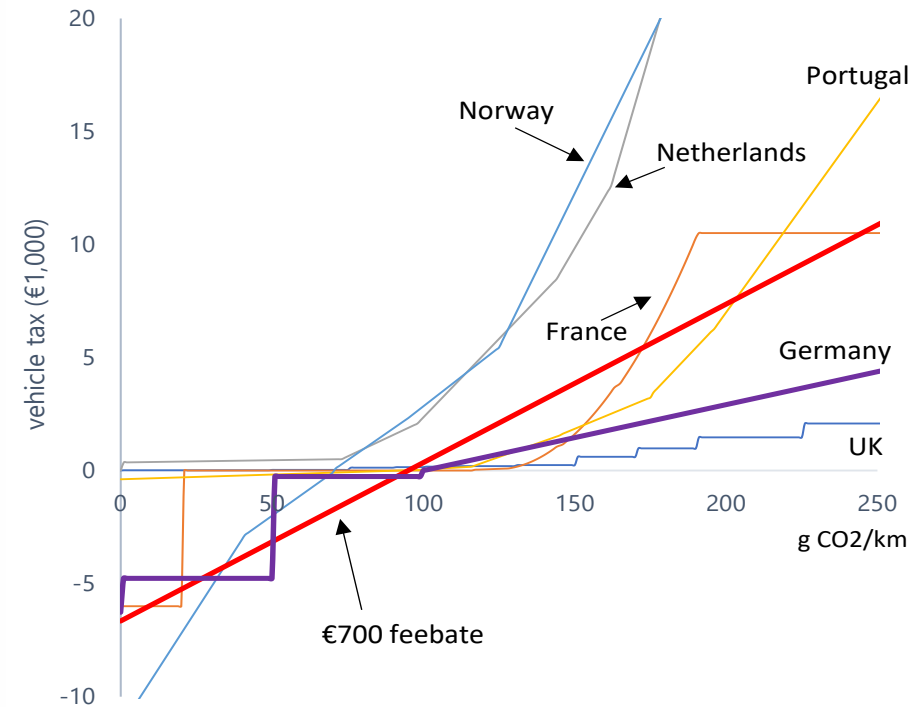
Reinforcing Sectoral Instruments

- Needed because of acceptability constraints on pricing
- Feebates (fiscal analog of regulations)
 - ▶ Revenue neutral sliding scale of fees/rebates for products/activities with $>/<$ average CO₂ rates
- Attractions
 - ▶ Promote all responses for reducing emissions intensity (though no demand response)
 - ▶ Cost effective (unlike emission regulations)
 - ▶ Avoid a fiscal cost (unlike subsidies)
 - ▶ No burden on average household/firm (unlike carbon pricing)
 - ▶ Compatible with regulations

Feebate for Transportation

- Feebate applied to vehicle sales would apply a fee
- $\{\text{CO}_2 \text{ price}\} \times \{\text{vehicle's CO}_2/\text{km} - \text{fleetwide average CO}_2/\text{km}\} \times \{\text{the average lifetime km driven per vehicle}\}$
- CO₂ price of €700 → similar system of taxes/subsidies as in some European countries
- Electric vehicle subsidies decline over time as fleetwide emission rate declines

CO₂-Based Components of Vehicle Taxes



Sources: ACEA (2018) and IMF staff calculations.

Note. Feebates assume on road fleet average emission rate of 115 g CO₂/km. Circulation taxes for Germany are expressed on a lifetime basis assuming a 13 year life and 7 percent discount rate.

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Further Applications of Sectoral Policies

Feebates

- Reduce industry emission rates, promote clean heating systems, efficient appliances
- Forestry
 - ▶ Landowners: fee = CO₂ price × (baseline carbon storage – current storage)
 - ▶ Cost effectively promotes enhanced management, afforestation, reduced deforestation

Pricing

- Extractives (methane leaks)
 - ▶ Tax fuel suppliers using default leakage rates, rebates for firms demonstrating lower rates
- Agriculture
 - ▶ Proxy emissions fee based on farm inputs—but compensation likely needed (e.g., keep revenues within sector)

International Carbon Price Floor (ICPF)

- Unilateral action is very difficult
 - ▶ Free rider, competitiveness concerns

- ICPF would focus on large emitters
 - ▶ E.g., China, India, US, EU (other G20 countries)

- Focus on minimum carbon price
 - ▶ Efficient and easily understood parameter
 - ▶ Simultaneous action addresses free rider/competitiveness concerns
 - ▶ Equity: differentiated price floors and/or simple transfer mechanism
 - ▶ Flexibility: allow alternative approaches yielding equivalent emissions outcomes

CO₂ Outcomes under Alternative ICPF Scenarios

Percent reduction in global CO₂ emissions below baseline, 2030

Minimum emissions reductions required for temperature goals¹:

2°C	20.8
1.8°C	32.8
1.5°C	46.6

China, US, India, EU, Canada, UK All G20 Countries

NDCs Only	10.8	14.0
NDCs+\$50 Floor	23.4	25.3
NDCs+Differentiated Floor \$75/50/25 ²	22.6	24.6

Source: NDCs from June 2, 2021; and IMF staff calculations.

Note: G20 - Group of Twenty; GHGs - greenhouse gases; NDC - nationally determined contributions.

¹ Assumes energy-related national CO₂ emissions need to reduce in proportion to total GHGs.

² Higher/middle/lower price for advanced/high income emerging market/low income emerging market economies.