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Should Non-EU Countries Be Able to Join the EU Emissions Trading System?

Climate mitigation requires global action: it does not matter where on earth a tonne of carbon emissions is being saved. Reducing carbon emissions is often cheaper in less developed countries than in EU member states. Therefore, integrating them into the EU Emissions Trading System generates efficiency gains that present a triple win for both regions and the global climate while also addressing the development dilemma of climate mitigation.

Many advanced economies have set ambitious carbon emission reduction targets. At the same time, these countries often face increasing marginal costs, as low hanging fruits have already been picked. In contrast, many emerging and less developed countries are expected to grow strongly, causing significantly higher CO₂ emissions. The International Monetary Fund (IMF) estimates that CO₂ emissions of middle- and low-income countries will increase by 35%-45% by 2030, mostly driven by GDP growth in these regions (Chateau et al., 2022). Globally, projections show an increase in CO₂ emissions by 2030 of more than 20% vis-à-vis 2019.

Capturing gains from comparative advantages

Less developed countries often face lower marginal costs of reducing carbon emissions, attributed to the fact that the more developed a country is, the less carbon inten-

sive a unit of GDP produced is. In the calculations underlying Chateau et al. (2022), the IMF assumes lower GDP losses from carbon pricing in less developed countries than in advanced countries, although the effect varies depending on the economic structure.

The reasons for higher costs in advanced markets could be declining margins, in other words the easy gains of carbon reductions such as phasing out coal combustion have already been realised; lower efficiency of certain green technologies, e.g. fewer hours of sunlight in some advanced economies; and costs from stranded assets, as green technologies have to displace brown technologies, which is more expensive than greenfield investments.

Ricardo's theory of comparative advantage suggests that efficiency gains are larger when trading partners are more different. Today, however, carbon emission are barely tradeable internationally. Trade therefore promises significant efficiency gains. These gains could generate a three-sided win-win, for advanced as well as for less developed countries, and for the climate overall.

The development dilemma

From a global perspective, the differences in domestic policy priorities are mind-boggling: while EU policies try to squeeze out the last little bit of emission reductions through carbon pricing and subsidies for green technologies, growth in the less developed parts of the world frequently requires brown technologies, often because they are less capital intensive. This less climate-friendly infrastructure, which is rapidly scaling up in the high-growth environment of emerging countries, will remain in use for decades to come.

This throws effective development policy into a dilemma: the rise of less developed regions may thwart global climate mitigation efforts. For instance, China's emissions

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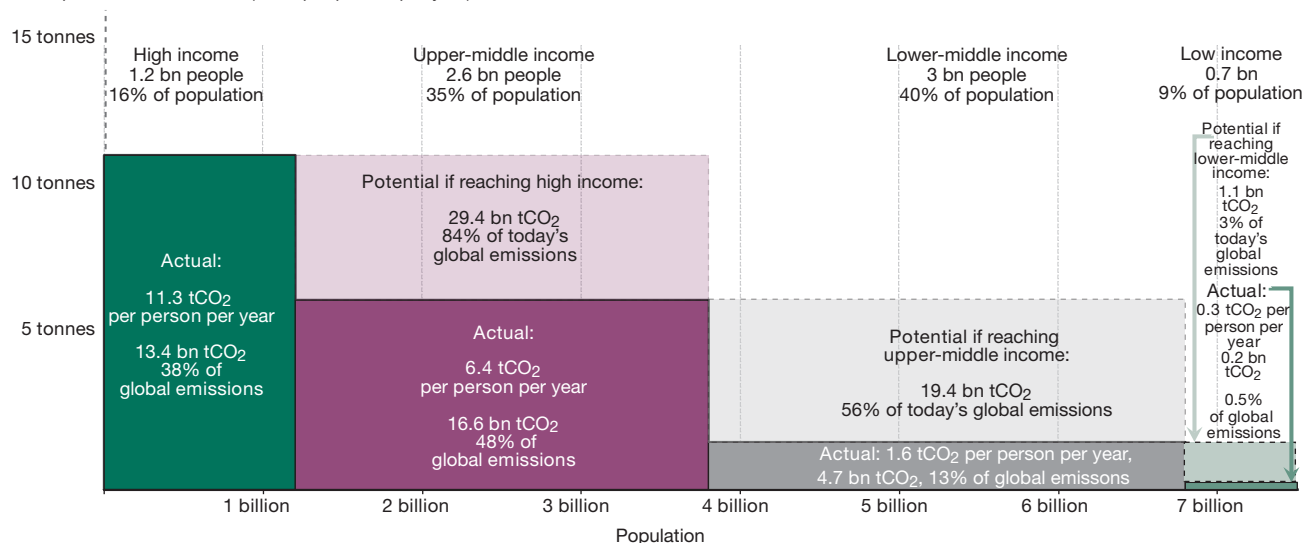
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Figure 1
CO₂ emissions, emission intensity and income level

Per capita carbon emissions (tCO₂ per person per year)



Sources: Lenaerts et al. (2021); Our World in Data and authors' own calculations.

have more than quadrupled during its amazing growth sprint over the last three decades. Would all upper-middle (lower-middle) income countries achieve the level of income of high-income (upper-middle) countries at their prevailing CO₂ intensity, global CO₂ emissions would rise by 12.8 (14.7) billion tCO₂, all else equal (Figure 1). Both these numbers are in the range of the total emissions caused by high-income countries, offsetting their efforts to reach climate neutrality.

This dilemma will not go away easily. The G20 pledge for development banks to stop financing coal power projects is an attempt to avoid a repeat. However, coal remains the most affordable source of energy production in many countries, partly because it is a less capital-intensive technology. Less than 5% of global investment in energy transition goes to developing countries, which require about US \$1.5 trillion per year in energy transition investment until 2030 (see Bhattacharya et al., 2024).

Hence, the thought of utilising emissions trading as a mechanism for development finance is a new and elegant way to better align the two conflicting policy objectives of climate mitigation and sustainable development.

How it could work

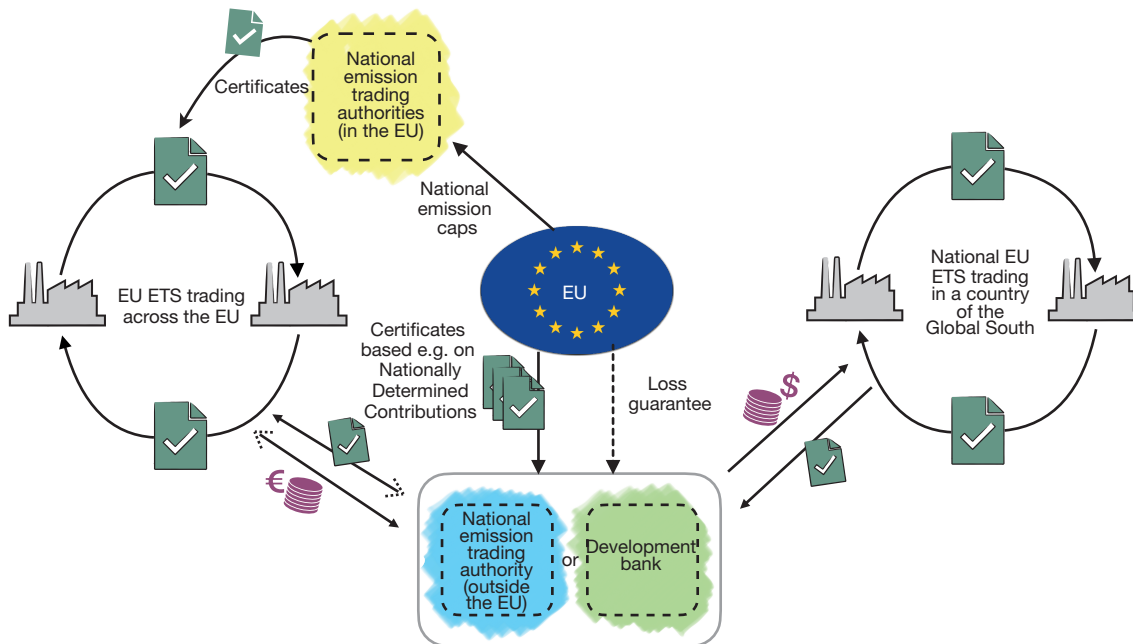
In the case of a country joining the EU Emissions Trading System (ETS) covering the energy and industrial sectors, the emitters in these sectors will have to acquire EU emis-

sion certificates for their emissions (i.e. unilateral linking; see Burtraw et al., 2013). The cap on EU ETS certificates would be adjusted in line with the expansion of the EU ETS, as has been done when countries access the EU, such as Croatia in 2013. The expansion to the cap in the EU ETS does not mean that the emission cap is being relaxed – it means that more emissions are covered by a trading system that is the most efficient and effective way to achieve lower emissions.

The certificates would be put into circulation via a central counterpart in the country that has joined the EU ETS, for instance a local development bank or an institution similar to national emission trading institutions in the EU, such as the German Emissions Trading Authority (DEHSt). This institution would allocate the certificates to the emitters and receive a trade monopoly. Figure 2 illustrates the setup.

The increase in the cap could be calibrated in different ways. A generous way would be to increase the cap along a business-as-usual (BAU) scenario under baseline economic growth, which in emerging and less developed countries is typically higher than in the EU. If the allocated amount in the respective country is based on the BAU, no scarcity exists and the certificates would have zero value in local trading. Again, all else equal, even if this BAU scenario is less ambitious than the EU's goal for reducing emissions, it does not mean that there would be more emissions globally. It just means that emission reductions

Figure 2
How would joining the EU Emissions Trading System work?



Source: Authors' own illustration.

take place where it is most efficient within an enlarged region.

Under the Nationally Determined Contributions (NDC) of the Paris Agreement, countries have set out their own ambitions to reduce carbon emissions (unconditional scenario) and a second, more ambitious goal assuming financing from advanced economies (conditional scenario). It would be reasonable to increase the cap along the unconditional scenario. This means the following two things.

First, certificates are scarce and have a positive price. Since the unconditional scenario has lower emissions than the BAU scenario, there will be fewer certificates than needed without any climate ambition, hence the certificate price in the local market will be above zero. Since the local emission trading institutions receive the certificates for free, they could sell or auction them and receive a price for them. This revenue could be redistributed, for example, to shield poor consumers from the impact of carbon pricing in the energy sector. Since electricity is typically subsidised, mechanisms for the redistribution usually exist. Given the local market is disconnected from the EU ETS, the carbon price in the non-EU country can be different from the EU ETS. Different mechanisms, such as a price cap, could be used to prevent unduly high carbon prices. A loss guarantee by the EU could insure the country against a situation in which it fails its NDC target,

e.g. if growth is unexpectedly higher, and would have to purchase additional certificates on the EU ETS market.

Second, the EU ETS price rewards any carbon savings. If the country achieves higher carbon reductions and therefore does not use the corresponding amount of EU ETS certificates, the country could sell them in the EU ETS. As the ETS price reflects the marginal price of saving a tonne of carbon emission, the carbon saving is achieved at a lower price – an efficiency gain from trade. While the proceeds from this are a financial transfer from the EU to the respective country, it still leaves the EU better off, too. The carbon trading institution could retain part of this efficiency gain, e.g. by applying a levy on any sale of certificates from local entities to the EU ETS. Just like the EU Modernisation Fund today receives a fixed share of proceeds from EU ETS allowances auctioned, the revenue from auctioning certificates or their trading with the EU ETS would accrue with a designated development finance institution.

Compared to the current situation, this would massively improve incentives to invest in capital-intensive green technologies in non-EU countries. Given high capital costs in these countries, currently green technologies in the energy sector are not deployed even if the levelised cost of energy, a measure for the cost of a kilowatt-hour produced, is lower.

A global price for CO₂ emissions?

Is a global price for CO₂ emissions fair? No, it is not. And the proposal does not mean CO₂ prices will be equalised. The IMF's proposal for an international carbon price floor for key high-emitting countries proposes different price floors of US \$25, US \$50 and US \$75 per tonne CO₂ for low-income, middle-income and high-income countries respectively (Black et al., 2021). The rationale for this differentiation is fairness, not efficiency. The debate focuses on two price theories.

Pro uniform carbon price. A uniform carbon price would be more efficient from the perspective of global growth. According to the IMF's calculations, a uniform global carbon tax achieving the same carbon reduction as under differentiated prices would yield a higher global real GDP by about 0.3% in 2030 (Chateau et al., 2022). However, growth in low- and middle-income countries would suffer vis-à-vis the differentiated prices. These countries could be compensated, while the world remains better off.

Contra uniform carbon price. Many countries fear losing out through the free trade of CO₂ certificates. The IMF writes: "Given their lower per capita income, smaller contribution to historical emissions, and generally higher emissions intensity of production, lower price floor requirements for emerging market economies (EMEs) may be appropriate and needed to encourage their participation" (Parry et al., 2021).

To ensure price differentiation, the proposed mechanism – while trading the same EU ETS certificates – maintains two segregated markets. An institution with a sustainable development mandate – such as a development finance institution – would receive a monopoly for trading emissions certificates between the non-EU country and the EU market. Parallel to the levy that the emissions trading institutions would impose on certificate sales, the purchase of additional certificates could be discounted from the EU ETS price.

Overcoming reservations

Linking emission trading systems is not new and has often failed, for a myriad of reasons, more technical than political. The key difference of joining the EU ETS is that countries can adopt a well-established institutional setup, albeit a rather complicated one. The advantage is that issues such as double counting and fraud with carbon offsets can be better avoided. This will require capacity building and monitoring services provided by the EU. But overall, the well-designed institutions of the EU ETS would be offered as a global public good, just like in the past low-inflation reserve currencies. Hence, the institu-

tional setup of a foreign monetary policy was adopted by some countries. In times of geoeconomic fragmentation, the EU ETS adoption would form partnerships between the EU and other countries – and hence also has non-economic benefits.

Certainly, not many emerging or less developed countries are instantly ready to adopt a system like the EU ETS. The current efforts to help Ukraine develop an ETS under its association agreement with the EU demonstrate the difficulties. Yet, a large number of countries are currently working on developing their own ETS scheme (World Bank, 2023). The incentive of receiving generous allowances of EU ETS certificates, which can be thought of as a type of currency, could speed up implementation. Countries joining the EU ETS would gain from its credibility compared to local schemes. If sharing the EU's ambitions for reducing emissions, joining the EU ETS would obviate the need to negotiate any exception from the EU's Carbon Border Adjustment Mechanism (CBAM).

EU member states may be opposed to the expansion of the EU ETS as they fear a dilution of certificate prices. This is unlikely at the outset, since the additional free allowances are not large enough to distort the EU ETS. Establishing a different mechanism to allocate free allowances in the non-EU country could be seen as undermining the current, more stringent approach to reducing free allowances in the EU earlier. Ultimately, the political pledge of domestic climate neutrality resonates well with parts of the electorate who may oppose anything that puts this objective into question. For them, high carbon prices and falling emissions in the EU are a sign of virtue, regardless of the effect on global emissions. These arguments are all political. Economically, they are nonsensical. At times when the economic inefficiency of climate policies starts to dominate in the public debate and voters turn against climate policies, economic arguments are more likely to convince them than the moral pledge of local carbon neutrality at any price.

An example: What if Morocco were to join the EU ETS?

Morocco is highly committed to climate mitigation, having pledged to reduce its greenhouse gas emissions by 18% by 2030 compared to a BAU scenario. Conditional on additional international support, it could reduce emissions by 45% by 2030 (European Environment Agency, 2023). In 2022, the EU and Morocco launched a Green Partnership on energy, climate and the environment (European Commission, 2022). In line with the partnership commitments, the EU has pledged €50 million for the greening of Morocco's economy and energy sector as part of the EU coop-

Table 1

Morocco's energy and industry sector emissions and Emissions Trading System certificates

	Energy sector	Industry sector	Both sectors
Emissions (in MtCO₂eq)			
2022 Actual	30	7.5	37.5
2030 Business-as-usual scenario	50	18	68
2030 Under unconditional targets	41	15	56
2030 Under conditional and unconditional targets	27	10	37
	Energy sector	Industry sector	Both sectors
Value of ETS certificates at €50/MtCO₂eq (in bn euros)			
2030 Business-as-usual scenario	2.5	0.9	3.4
2030 Under unconditional targets	2.1	0.8	2.9
2030 Under conditional and unconditional targets	1.4	0.5	1.9

Sources: Climate Action Tracker, Policy Center for the New South, Moroccan Ministry of Energy Transition and Sustainable Development, authors' own calculations.

eration programme in 2023, which has an overall volume of €624 million (European Commission, 2023). Morocco is rated Ba1 by Moody's and investors face considerable strains in funding green investment.

In 2022, Morocco emitted a total of 66.7 million tonnes of CO₂, with the energy and industry sectors contributing 45% and 11% respectively (Table 1). In a BAU scenario, the emissions in these sectors are to rise by more than 60% in the energy sector and more than double in the industry sector. These emissions compare to the current EU-wide cap set for 2021 (including the UK) of 1,571 million allowances to emit a tonne of CO₂ or equivalent which is reduced by 2.2% per year. Hence, Morocco's 2022 emissions in the energy and industrial sectors correspond to about 2% of the EU's ETS allowance. At 37.5 MtCO₂eq these two sectors in Morocco emit just slightly more than the free allowances allocated to the EU's three most polluting steel mills,¹ and slightly more than the EU's entire production of bulk chemicals.²

Assuming the emissions price of €50 per MtCO₂eq in today's prices, the value of certificates needed by Morocco's energy and industry sectors under the unconditional scenario are currently valued at €2.9 billion per year.

1 ThyssenKrupp Hüttenwerk in Duisburg, 14.8 MtCO₂eq; Tata Steel Ijmuiden, 10.2 MtCO₂eq; ArcelorMittal Atlantique et Lorraine Dunkerque, 9.6 MtCO₂eq; all as of 2022 (European Commission, 2021).

2 33.2 MtCO₂eq (European Environment Agency, 2024).

Hence, the proceeds from selling EU ETS certificates if Morocco manages to reduce emissions under the conditional scenario equals €2.9 - €1.9 = €0.9 billion per year in 2030. A 50% levy would mean that the emitters who deploy green instead of brown technology would receive proceeds of about half a billion euros per year, with the rest accruing to the emissions trading institution for development purposes. However, it is hard to say what the marginal price of carbon reductions under these targets will be. In any case, these amounts are likely much more significant than the support provided by the EU under existing agreements.

The proceeds from EU ETS certificates would be a game changer for investments in green technologies. Today, such investments are hampered by green technologies, such as solar plants, being relatively more capital intensive, while proceeds from the local sale of electricity often remain below the cost of production. The savings in CO₂ emissions from renewable energy vis-à-vis brown technologies would free ETS certificates with a value of around €0.04 per kWh at an ETS certificate price of €50 per MtCO₂eq.

Older installations, such as the 160 MW NOORo I Concentrated Solar Power Project at the Ouarzazate Solar Complex south of Marrakesh commissioned in 2016, produce clean electricity at a levelised cost of energy of €0.26 per kWh (National Renewable Energy Laboratory, 2023). The new Noor Midelt I Solar Plant, while suffering from long setbacks, is expected to reach a levelised cost of energy of €0.07 per kWh during peak hours, one of the lowest globally. The project requires an investment of about \$2.3 billion, which is financed by the World Bank, the International Bank for Reconstruction and Development, the Clean Technology Fund with loans from the African Development Bank, the European Investment Bank, the French Development Agency and KfW (NS Energy, 2019). If the project could benefit from the sale of ETS certificates for the 700,000 tonnes of CO₂ saved per year, a significant revenue stream of €35 million at an ETS certificate price of €50 per MtCO₂eq would be added to the operation.

Summary

Climate mitigation requires a global approach. Thinking backwards, in the long run we will have a system of global emissions trading just as we have a system of convertible currencies today – something that sounded like a moonshot 75 years ago before the Bretton Woods Agreement in 1944. Emissions trading is not only economically efficient, it is also effective given it caps emissions. Trading produces larger efficiency gains when comparative advantages are larger, suggesting large efficiency gains

from emissions trading between the EU and non-EU economies. To harvest these gains, access to the EU ETS would avoid the obstacles and drawbacks of linking national schemes. In the end, both partners would benefit – and the global climate, too.

The free or discounted allocation of emission certificates, if channelled through appropriate institutions, would support development and make green investments in emerging and less developed countries profitable. In addition, countries joining the EU ETS under similar ambitions would be spared from the EU CBAM. The efficiency gains would in part be reflected in the certificate prices, moderating emission costs in the EU. Most importantly though, a larger share of global emissions would be captured by emission trading systems, the most efficient and effective way towards global net zero. Just like countries adopting a foreign currency, a well-designed institution, like the EU ETS, should become a global public good.

References

- Bhattacharya, A., Songwe V., & Stern, N. (2024), *Raising ambition and accelerating delivery of climate finance*. Third report of the Independent High-Level Expert Group on Climate Finance, London School of Economics and Political Science.
- Black, S., Parry, I. Roaf, J., & Zhunussova, K. (2021). Not Yet on Track to Net Zero: The Urgent Need for Greater Ambition and Policy Action to Achieve Paris Temperature Goals. *Staff Climate Note*, 2021/005 (October), International Monetary Fund.
- Burtraw, D., Palmer, K., Munnings, C., Weber, P., & Woerman, M. (2013). Linking by Degrees. *Resources for the Future Discussion Paper*.
- Kachi, A., Unger, C., Böhm, N., Stelmakh, K., Haug, C., & Frerk, M. (2015). *Linking Emissions Trading Systems: A Summary of Current Research*. ICAP.
- European Commission. (2023, March 2). *EU launches new cooperation programmes with Morocco* [Press release].
- European Commission. (2022, October 18). *The EU and Morocco launch the first Green Partnership on energy, climate and the environment ahead of COP27* [Press release].
- European Commission. (2021). *Commission Decision 2021/C 302/01*.
- European Environment Agency. (2023). *Climate Resilience for Energy Transition in Morocco*.
- European Environment Agency. (2023, September 11). *EU Emissions Trading System (ETS) data viewer*.
- Lenaerts, K., Tagliapietra, S., & Wolff, G.B. (2021). Can climate change be tackled without ditching economic growth? *Bruegel Working Paper*, 10/2021.
- National Renewable Energy Laboratory. (2023, October 25). *NOOR I CSP Project*.
- NS Energy. (2019, May 28). *Noor Midelt Solar Power Project, Morocco*.
- Parry, I., Black, S., & Roaf, J. (2021). Proposal for an International Carbon Price Floor among Large Emitters. *IMF Staff Climate Note*, 2021/001. International Monetary Fund
- World Bank. (2023). *State and Trends of Carbon Pricing 2023*.