ec TAX REVIEW 2024–5

Editorial

Will the Road to Carbon Neutrality Become Even More Bumpy Than Ever?

Han Kogels*

The first-ever global stocktake of what has been achieved and what still must be achieved since the 2015 Paris Agreement on climate change shows that we are not on track to meet the target of limiting global temperature increase in 2050 to 1.5°C above pre-industrial levels. Although the EU CBAM is still in its transitional stage and the proposal for a substantial revision of the EU ETD is the only file of the 'Fit for 55' package that has not yet been adopted, the EU is one of the better performers on the road to the net-zero CO2 emissions target for 2050. In 2023, COP28 has set a new ambitious target for greenhouse gas reductions by 2030. However, the geopolitical situation has dramatically changed by the wars in Ukraine and Gaza. The implications for the energy transition from fossil to renewable sources may make the already bumpy road to carbon neutrality even more bumpy than ever.

Keywords: energy tax, market-based instrument, emission trading scheme, carbon border adjustment mechanism, reduction policy, greenhouse gas, fossil fuel, renewable energy, climate

1 Introduction

At COP28[1] it became clear that the bumpy road to a 'net-zero CO2' world in 2050 has become even more bumpy than ever before (*see* section 2 of this editorial). Yet, the EU is one of the better performers on greenhouse gas reduction and is even striving at being 'the first climate-neutral continent' by 2050.[2] The market-based instruments that the EU may help to meet this ambitious target are the European Emission Trading Scheme (EU ETS), the Carbon Border Adjustment Mechanism (CBAM) and a modernized Energy Tax Directive (ETD).

In 2023, CO2 emissions under the EU ETS[3] showed a decrease of 15.5% compared to 2022 levels, bringing ETS emissions around 47% below 2005 levels and well on track to achieve its 2030 target CO2 emission reduction of 62%. According to the European Commission, this confirms the effectiveness and efficiency of EU's cap and trade system as 'the main policy instrument for the decarbonization of the European economy'.[4] For sectors falling under the CBAM, free emission allowances in the ETS, granted with the aim to avoid carbon leaking to non-EU countries, will be phased-out as of 2025, mirroring the phase-in of the CBAM.

The CBAM is 'EU's tool to put a fair price in the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries'.[5] The goods falling under the CBAM are iron and steel, aluminium, cement, electricity, fertilizers, and hydrogen. EU importers of these goods should register with the National Competent Authorities for CBAM,[6] declare the emissions embedded in their imports, buy 'CBAM certificates' at a price to be calculated in the weekly average auction price of EU ETS allowances (expressed in EUR/tonne of CO2 emitted),[7] and surrender the corresponding number of certificates each year. In its transitional phase (1 October 2023–31 January 2024) the EU importers concerned only have to report the greenhouse gases embedded in their imports without the need to buy and surrender certificate. In the Committee on Market Access of the WTO, there is still an ongoing debate on the

* Em. Prof. European Tax Law at the Erasmus School of Law of the Erasmus University Rotterdam. Email: kogels@xs4all.nl.

1 The 28th Conference of the Parties (the decision-making body of the United Nations Framework Convention in Climate Change UNFCCC) took place in Dubai, UAE, 30 Nov.–13 Dec. 2023.

2 *Source* European Commission, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en (accessed 24 Aug. 2024).

3 *See* European Commission, *EU Emissions Trading System*, https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en (accessed 24 Aug. 2024).

4 European Commission, *Record Reduction of 2023 ETS Emissions Due Largely to Boost in Renewable Energy* (Apr. 2024), *see* https://climate.ec.europa.eu/news-your-voice/news/record-reduction-2023-ets-emissions-due-largely-boost-renewable-energy-2024-04-03_en (accessed 24 Aug. 2024).

5 *See* European Commission, *Carbon Border Adjustment Mechanism*, https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en (accessed 24 Aug. 2024).

6 *See* The Provisional list of National Competent Authorities (as of 19 Mar. 2024), https://taxation-customs.ec.europa.eu/document/download/5595ce5b-9fd2-42f6-9908-ed6325338ffa_en?filename=20240220%20Updated%20provisional%20list%20of%20NCAs%20for%20CBAM.pdf (accessed 24 Aug. 2024).

7 If EU importers can prove that a carbon price has already been paid during the production of the imported good, the corresponding amount can be deducted.

question whether the EU CBAM is compatible with the WTO rules. China, India and Russia in particular are questioning the compatibility.[8]

In July 2021, as part of the 'Fit for 55' package,[9] the European Commission tabled a new proposal for revision of the ETD, 2003/96/EC.[10] The proposal falls under the special legislative procedure, requiring unanimous support in the Council, followed consultation of the European Parliament. The main, climate policy related, revisions concerned changing the current volume-based system (e.g., EUR per 1000 litre or per 1000 kg) into a system based on energy content in Gigajoule (EUR per GJ), new minimum rates for four categories of fuel (EUR 10.75/GJ for traditional fossil fuels, EUR 7.17/GJ for natural gas and LPG, EUR 5.38/GJ for sustainable but not advanced biofuel, and EUR 0.15 for electricity, advanced biofuels, bioliquids, biogases and renewable hydrogen. Although two advisory committees (the European Economic and Social Committee and the European Committee of the Regions) and some of the stakeholders welcomed the modernization of the ETD, most of them sounded critical comments on the details of the proposal. At the time of finalizing this editorial (24 August 2024), this proposal for a revision of the ETD is the only legislative file of the 'Fit for 55' package that has not yet been adopted.

2 Global stocktake at COP28

The main topic of COP28 was the first-ever 'global stocktake', including an inventory of what has been achieved since the Paris Agreement (2015) and what still need to be achieved as regards the emission reduction of greenhouse gas (including its main component CO2).[11] According to the Paris Agreement, the emission reduction is based on national action plans that can be distinguished in unconditional and conditional Nationally Determined Contributions (NDCs). The stocktake shows that the present NDCs are not sufficient to achieve the target of the Paris Agreement. According to the Emissions Gap Report 2023,[12] if the present unconditional NDCs are fully implemented, the world would be on track for limiting the rise of global temperature to 2.9°C above pre-industrial (1890) level. Full implementation of the conditional NDCs would lower this to 2.5°C. This means that current and promised climate actions are inadequate to achieve the aim of keeping the overarching aim for 2050, i.e., a global warming rise of maximum 1.5°C. Hence, the continued delay in stringent emission reduction requires 'unprecedented annual emission cuts form now to 2030'.[13] In its closing UN Climate Press release, COP28 stated: 'The stocktake recognizes the science that indicates global greenhouse gas emissions need to be cut by 43% in 2030, compared to 2019 levels, to limit global warming to 1.5°C'.[14] In 2025, the present NDCs need to be updated for the coming period of five years and in view of the new targets for 2030, the commitments must be much stronger than the present ones.

Before going into that new targets for 2030, we consider the development of the emissions of greenhouse gas (GHG) including its main component CO2[15] since 2022.

3 Development of greenhouse gas and CO2 emissions

Table 1 shows the development of the anthropogenic GHG emissions in billion tonnes CO2-equivalent between 2000 and 2022, worldwide as well as for China, USA, India and (the region) EU-27, the four biggest GHG and CO2 emitters (hereafter together referred to as the 'Top-4').

Table 1. Greenhouse gas emissions in billion tonnes/year

year	2000	2022	growth in %
World	40.8	53.9	+ 32%
China	5.3	13.9	+ 163%
USA	7.0	6.0	- 14%
India	2.0	4.1	+103%
EU-27	4.3	3.3	- 22%
Rest of the world	22.9	26.5	+ 19%

[8] *See* World Trade Organization (WTO), *Statements in the Formal Meeting of the Committee on Market Access of 16-17 October 2023*, https://tradeconcerns.wto.org/en/stcs/details?imsId=69&domainId=CMA# (accessed 24 Aug. 2024).

[9] For a summary of the proposal, *see* Han Kogels, *Good Intensions and a Call for Higher Speed on the Bumpy Road to Carbon Neutrality*, 1(2) EC Tax Rev. 2. a.f. (2022), https://kluwerlawonline.com/JournalArticle/EC+Tax+Review/31.1/ECTA2022001, doi:10.54648/ECTA2022001 (accessed 24 Aug. 2024).

[10] In 2011, the European Commission had proposed to revise and align the ETD with EU's strengthened climate ambitions, but in 2020 the European Parliament called on the Commission to table a redesigned ETD.

[11] *See* https://unfccc.int/topics/global-stocktake/about-the-global-stocktake/why-the-global-stocktake-is-important-for-climate-action-this-decade and https://unfccc.int/cop28/5-key-takeaways (both accessed 24 Aug. 2024). The stocktake will be repeated every five years. As regards the status of adaptation measures, aimed at making vulnerable developing countries more resilient to the effects of climate change, the conclusion in the Adaptation Gap Report 2023 (*see* https://www.unep.org/resources/adaptation-gap-report-2023 (accessed 24 Aug. 2024)) concludes that the measures are underprepared and seriously underfinanced. As the focus of this editorial is on emission reduction, adaptation is left out of scope.

[12] *See* UN environment programme, (hereafter: UNEP), https://www.unep.org/resources/emissions-gap-report-2023 (accessed 24 Aug. 2024).

[13] *See* UNEP, *Broken Record, Emission Gap Report 2023*, at 30, https://wedocs.unep.org/bitstream/handle/20.500.11822/43922/EGR2023.pdf?sequence=3&isAllowed=y (accessed 24 Aug. 2024).

[14] *See COP28 Agreement Signals 'Beginning of the End' of the Fossil Fuel Era,* UN Climate Press Release (13 Dec. 2023), https://unfccc.int/news/cop28-agreement-signals-beginning-of-the-end-of-the-fossil-fuel-era (accessed 24 Aug. 2024).

[15] Greenhouse gas emissions include CO2, methane and nitrous oxide from all sources, including land-use change. CO2 is about 70% of all greenhouse gas emissions. *Source* Our World in Data, https://ourworldindata.org/co2-and-greenhouse-gas-emissions (accessed 24 Aug. 2024).

In 2000, the Top-4 accounted for 46% of global GHG emissions, growing to 51% in 2022. Around 2004, China took over the position as biggest emitter from the USA and shows a steep increase since. Around the same time, the emissions in the USA started to decrease gradually. Around 2017, EU-27 took over the position of smallest emitter of the Top-4 from India that steadily speeded up its emissions around 2005.

Part of the volume of GHG emissions depends on the population. In 2022, the world population was eight billion of people. The Top four accounted for 45% of the world population. China and India together accounted for 35% of the world population.

Table 2 shows the GHG emissions per capita in tonnes, globally and in the Top-4, in 2000 and 2022.

Table 2. Greenhouse gas emissions per capita in tonnes

year	2000	2022	change in t.
World	6.6	6.8	+0.2
China	4.2	9.8	+5.6
USA	24.8	17.7	-7.1
India	1.9	2.9	+1.0
EU-27	10.1	7.5	-2.6

These development of GHG emissions per capita indicate a relation between the growth rate of GHG emissions and the growth rate of the population. A positive change of the emissions per capita shows that the growth rate of emissions is greater than the growth rate of the population. In the period 2000–2022 this was the case in China, India and globally. Whereas China's population is expected to have reached the top in 2023 and may decrease to a level of 1.3 billion around 2050, India's population is expected to grow further to 1.6 billion around 2050 and possibly reach the top after 2060.[16] In USA and EU-27, the GHG emissions decreased (*see* Table 1) while their population increased, which indicates a substantial reduction of GHG emission.

Reducing GHG emissions – notably reducing the emissions of CO2, its main component – requires an energy transition from fossil to new sustainable energy sources, such as wind, solar, hydro power, hydrogen and nuclear energy. This requires sufficient financial means to develop new ('green') technologies to achieve the reduction of GHG and CO2. The Environmental Kuznets curve, describing an empirically observed pattern that economic growth (increasing Gross National Income) is first associated with increasing and later with decreasing levels of pollution. An explanation could be that the environmentally friendly ('green') technologies can better be developed in rich countries than in poorer countries. [17] Table 3a and Table 3b show the change of GHG emissions, resp. the emissions of CO2 (the main component of GHG) between 2000 and 2022 in four groups of countries: high-income, upper-middle-income, lower-middle-income and low-income countries.[18]

Table 3a. Greenhouse gas emissions in billion tonnes

year	2000	2022	growth in %
World	40.8	53.9	+32.1%
High-income countries	17.0	15.4	- 9.4%
Upper-middle-income countries	15.7	26.3	+67.5%
Lower-middle-income countries	6.6	10.2	+54.5%
Low-income countries	1.4	2.0	+42.9%

Table 3b. CO2 emissions in billion tonnes

year	2000	2022	growth in %
World	25.5	37.2	+45.9%
High-income- countries	13.9	12.6	- 9.4%
Upper-middle-income countries	8.1	17.6	+117.3%
Lower-middle-income countries	2.6	5.7	+119.2%
Low-income countries	0.2	0.2	< 0.1%

In the high-income countries both GHG and CO2 emissions decreased by 9.4%.

In the upper-middle-income countries and the lower-middle-income countries, the GHG emissions increased by 67.5% resp. 54.5%. The CO2 emissions show staggering increases of 117.3% in the upper-middle-income countries and 119.2% in low-middle-income countries. The figures seem to be in line with the paradigm of the Environmental Kutznets Curve.

4 New ambitious COP28 targets for 2030

According to the outcome of COP28,[19] in 2030 global greenhouse gas emissions need to be cut with 43% compared to 2019 (the year before the Covid pandemic that led to a short dip in GHG emissions in 2020 and 2021) to fill the emission gap of twenty-three billion tonnes. In the new round of National Determined Contributions (2025), all countries (Parties of the Paris Agreements) should set 'ambitious, economy-wide emission targets, covering all greenhouse gases, sectors and categories'. Moreover, the Parties should take concrete actions to achieve a tripling of renewable energy capacity (such as solar and wind energy), a doubling of energy

[16] *Source* United Nations, *World Population Prospects 2022*, https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/PB153_fig1.png (accessed 24 Aug. 2024).

[17] *See* Willem Vermeend, Rick van der Ploeg & Jan Willem Timmer, *Taxes and the Economy – A Survey of the Impact of Taxes on Growth, Employment, Investment, Consumption and the Environment* 303 (Edward Elgar Publishing Ltd. 2008).

[18] Each year, the World Bank assigns the world's economies (countries) to four income groups of countries, based on the Gross National Income per capita, expressed in US dollars. In 2022, low-income is less than USD 1,085, lower-middle-income is between USD 1,086 and 4,255, upper-middle-income is between USD 4,256 and 13,205, and high-income is more than USD 13,205. *See* https://blogs.worldbank.org/en/opendata/new-world-bank-country-classifications-income-level-2022-2023 (accessed 24 Aug. 2024).

[19] COP28, *supra* n. 14.

efficiency improvements by 2030, a concrete phasing-down of the use of coal power, a phasing-out of inefficient fossil subsidies, and to take other measures driving the energy transition away from fossil fuels in energy systems, 'in a just, orderly and equitable manner, with developed countries continuing to take the lead'.

Table 4a shows the outcome of the new reduction target of 43% in 2030 if the Top-4 and the rest of the world succeed in meeting the new target.

Table 4a. New reduction target GHG emissions in billion tonnes

year	2019	2030	reduction
World	53.5	30.5	- 23.0
China	13.0	7.4	- 5.6
USA	6.2	3.5	- 2.7
India	3.8	2.2	- 1.6
EU-27	3.5	2.0	- 1.5
Rest of the world	27.0	15.5	- 11.6

Table 4b shows the outcome in the four income categories of countries if each of them succeed in meeting the new target.

Table 4b. New reduction target GHG emissions in billion tonnes

year	2019	2030	reduction
World	53.5	30.5	- 23.0
High -income- countries	16.0	9.1	-6.9
Upper-middle-income countries	25.5	14.5	-11.0
Lower-middle-income countries	10.1	5.8	-4.3
Low-income countries	1.9	1.1	-0.8

Considering that, in the past decennium, the upper-middle-income countries and the lower-middle-income countries have not been able to put an end to the increase of their GHG emissions, it should not be excluded that they cannot deliver their part of the global reduction target of GHG of 43%. Whether India, a lower-middle-income country with an ambition to achieve a strong economic growth, will be able to realize such a substantial reduction of GHG in 2030 is doubtful. Its present net-zero CO2 target is set for 2070 (instead of 2050), but its present NDC targets are (highly) insufficient to achieve that long-term target. The same goes for China, that has the ambition to become the economic leader of the world and has set the net-zero target in 2060, instead of 2050. Only if the high-income countries present generous NDCs in 2025 with effective new reduction policies, there is a chance that the global GHG emission reduction of 43% could be achieved in 2030. Moreover, though promising stronger new reduction policies in their NDCs may show the high ambitions of the Parties in the Paris Agreement to meet the target of net-zero CO2 emissions in 2050, we have learned that it often takes more political action and time than expected to translate these policies into concrete (legal) measures. And when such measures come into force, it takes time to assess whether they are sufficient and efficient to achieve the target. However, policymakers may benefit from the outcomes of a recent research project on the effectiveness of existing emission reduction policies.

In a large empirical research project, Dr A. Stechemesser and eleven other researchers evaluated 1500 climate polices implemented between 2002 and 2022 across forty-one (developed and developing) countries from six continents, together accounting for 81% of global GHG emissions.[20] Focusing on the need to reduce the emission gap as soon as possible, the research group aimed to identify large emission reductions and subsequently attribute them to potential policy interventions, derived from the climate policy database of the OECD.[21] This technique made it possible to find a interference on the (differential) effectiveness of single policies and various policy mixes of regulatory and market-based policies. They identified sixty-three most successful policy interventions with total emission reductions between 0.6 billion and 1.8 billion metric tonnes CO2. The research team found several situations in which a combination of two or more policy instruments shows more effective than the single use of a policy instrument, as they have complementary effects and generate positive synergy. Examples of successful 'policy mixes' are combinations of regulatory measures, such as emission standards and CO2 emission labels, and market-based policies, such as s subsidies (including tax incentives), carbon taxes and emission trading schemes like the EU ETS. The research team found that that successful policy mixes vary across sectors. Not surprisingly, market-based policies (notably energy taxes and ETSs) show to be very effective for the industry sectors and the electricity sectors in developed countries.[22] The research team emphasizes that the effectiveness of the policies vary with economic development of the countries. No effective successful pricing policies with large emission reductions in the electricity sector were found in the developing economies.

5 GEOPOLITICAL IMPACTS

The timeframe for countries to implement existing emission reducing policies and to make and implement additional policies that could effectively result in achieving in 2030 the new target of a reduction of global GHG emissions by 43% compared to 2019 levels is extremely

[20] *See* Annika Stechemesser et al., *Climate Policies that Achieved Major Emission Reductions: Global Evidence from Two Decades*, Science (2024), https://www.science.org/doi/10.1126/science.adl6547 (accessed 24 Aug. 2024).

[21] This was done by applying applying a machine learning-based extension of the standard difference-in-difference (DID) approach to evaluate the policies. To avoid misunderstanding, 'machine learning' and 'artificial intelligence' (AI) are different notions. Machine learning is teaching a machine (computer) to perform a specific task and provide accurate results by identifying patterns, whereas AI is software that make the computer think as a human being.

[22] The research team noted that its analysis for developing countries is based on a small set of estimates given the limited number of policies detected, particularly in the electricity sector.

small. Moreover, the outcome of this legislating process and the possible effects of these policies on the real reduction of GHG emissions, are also influenced by the geopolitical situation in which we have ended up.

With the fall of the Berlin wall in 1989, the long 'cold war' between 'The West' and the Soviet Union came to an end. It was the start of a peace economy with open markets, free trade, multilateral economic cooperation, that facilitated the growth to 'the global economy'. Also, we became more aware of the environmental problems that came with economic growth. The Earth Summit in Rio de Janeiro in 1992, pointed at the global climate problems, caused by economic growth of the developed and emerging countries. It adopted the 'polluters pay' principle in which environmental costs should be internalized in the price of polluting products, without distorting international trade and investment.[23] This led to the 'Kyoto Protocol',[24] the first multilateral instrument to reduce carbon emissions, and eventually to the Paris Agreement in 2015.[25]

In February 2022, however, the peace economy was startled by the Russian invasion in Ukraine, followed by a war that is going on without a view of the outcome. Sanctions against Russia led to a significant decrease of gas and petroleum oils from Russia and a volatile price pattern on the global market for these products. While the war in Ukraine goes on, secure supply of oil and gas remains a key aspect in a situation of geopolitical tensions which may well lead to a (long) period of market tensions and price volatility.[26] In October 2023, the war broke out between Israel and Hamas in the Gaza-strip. Up to now (24 August 2024) there has been no significant impact on the global energy markets. However, the recent fear for an extension of the Gaza war to Lebanon and (in the worst-case scenario) also to Iran shows an escalating geopolitical tension in the Middle East which could trigger a reaction from OPEC and increasing crude oil prices.[27]

In a world where a peace economy is turning into a war economy, the political focus of countries on achieving an ambitious world-wide reduction of greenhouse gas emissions may change into a focus on national independency, security and defence. If that happens, the bumpy road to carbon neutrality will become even more bumpy than ever.

[23] *See* UNFCCC (1992), https://unfccc.int/resource/docs/convkp/conveng.pdf (accessed 24 Aug. 2024).

[24] *See Kyoto Protocol to UNFCCC (1997)*, https://unfccc.int./resource/docs/convkp/kpeng.pdf (accessed 24 Aug. 2024).

[25] *See* UNFCCC (2015), https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf (accessed 24 Aug. 2024).

[26] *Source* IEA Gas Market Report (2023), https://www.iea.org/reports/gas-market-report-q1-2024 (accessed 24 Aug. 2024).

[27] *Source* Oil Price (2024), *Escalating Tensions in the Middle East Keep Oil Markets on Edge*, https://oilprice.com/Energy/Energy-General/Escalating-Tensions-in-the-Middle-East-Keep-Oil-Markets-on-Edge.html (accessed 24 Aug. 2024).