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The role of trade in a development-led global energy transition

Note by the secretariat

Summary

Achieving the global energy transition, from the use of fossil fuels to the use of renewable sources, is more urgent than ever, to ensure the supply of clean, affordable and reliable energy. Ensuring the required increase in renewable energy generation capacity depends on the expansion of renewable energy markets in developing countries, where some clean energy sources such as green hydrogen have already become cost competitive. Trade policy at the national, regional and international levels can help accelerate the energy transition and contribute to improving market access conditions, harmonizing regulations, phasing out inefficient fossil fuel subsidies and ensuring the distribution of environmental goods and services, to boost domestic production capacity in developing countries.

Introduction

1. The Secretary-General of the United Nations, in his note on international trade and development transmitted to the seventy-seventh session of the General Assembly, outlined current trends in energy markets and considered the supportive role that trade could play in the global energy transition, away from fossil fuels and towards renewable sources of energy, as well as in facilitating the geographical diversification of the production of energy from renewable sources and related goods and services, highlighting potential market opportunities for developing countries in these areas.[1] Such a transition is necessary to achieve sustainable development in the face of the ongoing climate crisis.

2. The United Nations Global Crisis Response Group on Food, Energy and Finance, in its third briefing, emphasized the importance of accelerating the global energy transition to overcome the energy crisis. Highlighting possible policy options for the short, medium and long terms, the Response Group noted the need for, inter alia, increased transfers of technology and finance, needed to boost capacity in developing countries to supply energy from renewable sources and related products to domestic and international markets.[2]

3. UNCTAD, as the focal point within the United Nations system for the integrated treatment of trade and development, is well positioned for in-depth discussions of the possible architecture of trade policy at the national, regional and multilateral levels, to better contribute to the achievement of an economically sustainable energy transition in developing countries. In line with the analysis and policy recommendations in the above-mentioned note and briefing, the present note, with a view to supporting discussions at the thirteenth session of the Trade and Development Commission, provides additional information and analysis with regard to the global energy transition imperative; the competitive advantage of developing countries in trade in energy from renewable sources; and trade and development policy in support of the energy transition.

I. The global energy transition imperative

4. In its contribution to the sixth assessment report of the Intergovernmental Panel on Climate Change, Working Group I noted that "global warming of 1.5°C and 2°C will be exceeded during the twenty-first century unless deep reductions in carbon dioxide and other greenhouse gas emissions occur in the coming decades".[3] In particular, global carbon dioxide emissions must peak before 2025, be reduced by at least 43 per cent by 2030 and fall to net zero by the early 2050s, alongside deep reductions in other greenhouse gases, to meet the target in the Paris Agreement under the United Nations Framework Convention on Climate Change of not exceeding a global rise of 1.5°C above pre-industrial temperatures.[4] The Conference of the Parties to the United Nations Framework Convention on Climate Change, at its twenty-sixth session, emphasized the urgent need for Parties to increase their efforts to collectively reduce emissions through accelerated action and implementation of domestic mitigation measures in accordance with the Paris Agreement and recognized that limiting global warming to 1.5°C required rapid, deep and sustained reductions in global greenhouse gas emissions, including reducing global carbon dioxide emissions by 45 per cent by 2030 relative to the 2010 level and to net zero around mid-century, as well as deep reductions in other greenhouse gases.[5]

[1] A/77/207.

[2] United Nations, Global Crisis Response Group on Food, Energy and Finance, 2022, Global impact of war in Ukraine: Energy crisis, available at https://unctad.org/webflyer/global-impact-war-ukraine-energy-crisis.
Note: All websites referred to in footnotes were accessed in September 2022.

[3] See https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/.

[4] See https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/.

[5] FCCC/PA/CMA/2021/10/Add.1.

5. As at August 2022, 137 countries had made net zero pledges, that is, commitments to reducing national net carbon dioxide emissions to zero by a specified year between 2045 and 2070.[6] In addition to net zero pledges by national Governments, 116 regions, 239 cities and 739 companies had also made pledges.[7] Together, these pledges cover 83 per cent of global carbon dioxide emissions, 91 per cent of the global gross domestic product and 80 per cent of the global population. Despite the significant number of net zero pledges, most have, to date, not included details of the policies, plans, timetables and metrics required to drive the achievement of pledge targets and monitor progress.[8]

6. The energy sector, including energy production related to the sectors of industry, transport, buildings, electricity generation and oil and gas, should be the target of net zero pledges as, according to data for 2020 from Our World in Data, the sector accounts for over 73 per cent of greenhouse gas emissions and, of these gasses, carbon dioxide accounts for nearly 75 per cent of global warming effects. Reducing carbon dioxide emissions from the energy sector requires a radical and concurrent shift away from business-as-usual practices in all countries. Since 1992, the need for such a shift has been highlighted in United Nations Framework Convention on Climate Change processes and in reports by the Intergovernmental Panel on Climate Change.

7. In the past 30 years, limited progress has been made in transforming to a low-carbon world economy. Despite pledges, plans and efforts by Governments to redress the causes of climate change, carbon dioxide emissions from the energy sector have increased by 60 per cent since 1992. As a result, the adverse impacts of climate change are being felt in the form of heatwaves and storms of increased frequency and intensity, extended droughts and a rise in sea levels. Success in limiting future climate change effects depends on the ability to transform the way energy is produced and consumed. Evolving from the present high-carbon economy to a low-carbon economy by 2050 requires a global energy transition, away from fossil fuels and towards renewable sources of energy. Global net zero emission scenarios proposed by the Intergovernmental Panel on Climate Change, the International Energy Agency and the International Renewable Energy Agency emphasize the need to substantially increase the use of renewable and low-carbon energy sources in primary energy supply, including nuclear, biofuel, hydrogen and natural gas sources; to decarbonize industry, transport and buildings through the greater electrification of industrial processes, transport vehicles and building heating; and to immediately reduce coal and oil consumption and substantially enhance energy efficiency.[9] The scenarios also highlight the need to support the logistical transformation in developing countries, including by, inter alia, extending access to electricity to remote rural communities through off-grid renewable energy systems; supporting innovation and emerging technologies; using carbon capture and storage technologies as a transitional tool in countries currently dependent on coal, oil and gas; phasing out coal and fossil fuel subsidies; protecting workers and communities negatively affected by the energy transition; and ensuring that all countries and regions have an opportunity to participate in and realize the benefits of the global energy transition.

8. For such a transformation to be sustainable, it should make economic sense, particularly in developing countries. A targeted development policy covering trade and energy, and a supportive trade system, can help developing countries gain tangible development benefits, including in terms of commerce, income and employment, from a global energy transition.

[6] See https://zerotracker.net/.

[7] Ibid.

[8] See https://eciu.net/netzerotracker.

[9] See https://www.ipcc.ch/sr15/, https://www.iea.org/reports/net-zero-by-2050 and https://irena.org/publications/2022/Mar/World-Energy-Transitions-Outlook-2022/digitalreport.

II. The competitive advantage of developing countries in trade in energy from renewable sources

A. Size of renewables market

9. The market for renewable energy is expected to be significant and unprecedented in scale. Estimates by the International Energy Agency and the International Renewable Energy Agency indicate that global expenditures on the energy transition will amount to a level equivalent to 5 per cent of the global gross domestic product in 2019, which is double the current global expenditure on energy infrastructure. The net zero scenarios of the International Energy Agency and the International Renewable Energy Agency require renewable energy sources to account for 90 per cent of electricity generation by 2050; wind power and solar photovoltaic technologies alone need to supply 63 per cent of total electricity needs and other technologies, such as for hydroelectricity, bioenergy, geothermal energy, concentrated solar power and ocean energy, should supply 27 per cent. This requires an annual increase of wind power and solar power generation capacity by 630 GW in 2020–2050. At current prices, averaging $1.30 per kW of capacity, the combined annual global market for solar panels and wind turbines will be $820 billion over the next 30 years.[10] The renewable energy sources of wind power and solar power have become the cheapest sources of electricity in recent years and, along with other clean energy sources (e.g. hydroelectricity, bioenergy and nuclear), a total of 38 per cent of the world's electricity generation in 2021 was free of carbon dioxide emissions.[11]

10. With regard to trade in energy from renewable sources, based on data from the United Nations Comtrade database, given the trade volume in 2000 as 100, in 2021, the trade volume of such energy reached 270, compared with 240 for natural gas and 170 for petroleum. However, the trade volume of coal, which has the highest level of carbon dioxide emissions per unit of electricity generated, has continued to increase at a greater rate, and reached 300. The value of trade in renewable energy systems and components covering machines and mechanical appliances was $90 billion in 2000 and $270 billion in 2010 and continued to increase, reaching $370 billion in 2021. In 2000–2021, the share of developing countries in such trade almost doubled, from 23 to 45 per cent. With regard to trade in materials, the demand for the mineral products needed for renewable energy production, such as lithium, platinum and various rare earth metals, will continue to rise, generating greater incentives to invest in countries that are endowed with these materials, such as Brazil and South Africa (manganese), Chile (lithium) and the Democratic Republic of the Congo (cobalt). However, most developing country suppliers of these minerals, particularly the least developed countries, generate little value addition in the production of the components required for the generation of energy from renewable sources, even in intermediary stages of value chains. For example, over 96 per cent of lithium-ion batteries (Harmonized System code 850760) exported in 2021, a market of $61.3 billion, were supplied by four economies, namely, China (including Hong Kong, China, and Macao, China), at 53.5 per cent; the European Union, at 34.5 per cent; Japan, at 5.5 per cent; and the United States of America, at 2.6 per cent.

[10] See https://www.iea.org/reports/net-zero-by-2050 and https://irena.org/publications/2022/Mar/World-Energy-Transitions-Outlook-2022/digitalreport.

[11] See A/77/207.

Note: The rapid growth of trade in energy from renewable sources and related systems and components, as well as in the materials needed for energy generation, are also highlighted in this document.

B. Example: Blue and green hydrogen production

11. The prospect of growth in the trade of renewable energy such as hydrogen presents a significant market opportunity for developing countries. Hydrogen is a zero-carbon fuel used in combustion engines or fuel cells to generate power. Grey hydrogen is generated from natural gas through a process called "steam reforming", which requires high temperatures and pressures and emits carbon dioxide; blue hydrogen refers to the use of carbon capture and storage, whereby 80–90 per cent of carbon dioxide emissions are removed from the hydrogen production process; and green hydrogen involves the use of electrolysis with energy from renewable sources, which involves zero carbon dioxide emissions but is relatively costly.[12] The net zero scenarios of the International Energy Agency and the International Renewable Energy Agency project that hydrogen will supply 10–15 per cent of total final energy consumption in 2050; approximately two thirds from green hydrogen and one third from blue hydrogen.[13]

12. Current research shows how carbon dioxide emissions that convert grey hydrogen to blue hydrogen may be reduced or eliminated and how the cost of the overall production of green hydrogen, currently $5.5 per kg of hydrogen in developed economies, could be reduced to levels comparable with the cost of producing grey hydrogen, currently $2 per kg of hydrogen; in contrast, the cost of producing green hydrogen in developing countries with greater solar power resources is currently below $3 per kg of hydrogen, making it already cost competitive compared with grey hydrogen.[14] Developing countries with natural gas reserves may explore the opportunity to produce and export blue hydrogen. For example, in 2021, 11 per cent of sustainably produced hydrogen projects were in Africa.[15]

III. Trade and development policy in support of the energy transition

13. Trade policy instruments that determine the market access conditions for renewable energy, the system and components of renewable energy production and the supply of renewable energy services, influence capacity in developing countries to capture market opportunities in renewable energy.

A. Market access conditions for renewable energy products

14. Market access conditions with regard to renewable energy products and fossil fuels, or "brown" energy products, are significantly different in almost all countries.

15. First, with regard to non-tariff measures, brown energy products appear to be more intensively regulated than green energy products. This does not necessarily imply that trade is more restricted with regard to the former; it is more likely that the latter are innovative products and countries have not yet developed regulations for them. Of the 104 economies covered in the UNCTAD Trade Analysis Information System database, only 76, particularly the least developed countries, implement non-tariff measures for renewable energy products. Another possible reason for fewer applications of non-tariff measures for renewable energy products is that the market size is still limited. Data from the UNCTAD Non-Tariff Measures database shows that the more traded a product, the more highly it is regulated through non-tariff measures. If trade in renewable energy products increases, the use of non-tariff measures for such products might also increase. It is therefore important, when designing a new technical regulation (e.g. a safety standard), to control the cost of compliance, as it can impose higher trade costs.

[12] See https://www.weforum.org/agenda/2021/07/clean-energy-green-hydrogen/.

[13] See https://www.iea.org/reports/net-zero-by-2050 and https://irena.org/publications/2022/Mar/World-Energy-Transitions-Outlook-2022/digitalreport.

[14] See https://ieefa.org/resources/green-hydrogen-fuelling-indias-ambition-energy-independence.

[15] A/77/207.

16. Second, with regard to tariffs, imports of green energy products generally face a higher market access barrier than brown energy products in all economic groupings. The aggregated figures, as shown in the table, are only indicative of market access conditions, which vary significantly between countries within the same group, reflecting country-specific needs and constraints in trade in energy. Developed economies could raise tariffs on brown energy products, by an average of 2.5 percentage points, with a view to using the increased customs revenue to help pay for the energy transition. This is due to the gap between the average applied tariff rate and the World Trade Organization-bound tariff rate.

Average global import tariffs on energy products
(Percentage)

	Developed economies	*Developing economies*	*Least developed countries*
Renewable energy products	1.05	4.55	6.04
Fossil fuels	0.63	2.08	3.18

Source: UNCTAD Trade Analysis Information System database.

Notes: Simple average of effectively applied tariffs based on most recently available tariff data (2019–2021). Renewable energy products consist of 32 products under the Harmonized System at the six-digit level. Fossil fuels include coal (Harmonized System code 2701), petroleum oil and products (2709 and 2710) and petroleum gas and other gaseous hydrocarbons (2711).

B. Short-term policy responses to the energy crisis

17. Raising tariffs on fossil fuels would not be a practical option for Governments, at least in the short term, given the energy crisis triggered by the war in Ukraine. On the contrary, major economies have sharply increased support for the production and consumption of coal, oil and natural gas; in 2021, in 51 countries, overall Government support for fossil fuels reached $697.2 billion, almost double the amount in 2020, and overall fuel subsidies, in particular consumption subsidies, were expected to increase further in 2022.[16] Subsidies encourage the greater production and consumption of fossil fuels and may divert trade and investment away from renewable energy projects and towards fossil fuel projects. Before the war, the urgent need to redress fossil fuel subsidies had been recognized. At the twenty-sixth session of the Conference of the Parties, 197 countries agreed to accelerate efforts to phase out inefficient fossil fuel subsidies. In December 2021, 45 members of the World Trade Organization issued a ministerial statement on fossil fuel subsidies, seeking, inter alia, the rationalization and phase out of inefficient fossil fuel subsidies along a clear timeline, with reform needing to "take fully into account the specific needs and conditions of developing countries and minimize the possible adverse impacts on their development in a manner that protects the poor and the affected communities".[17]

18. Noting that the impacts of the energy crisis differed across countries, the United Nations Global Crisis Response Group on Food, Energy and Finance suggested that high-income countries should choose policies oriented towards mitigating the crisis rather than short-term protection that might worsen it, such as providing blanket subsidies for fuel or electricity.[18] Dealing with the energy crisis is fundamental in order for developing countries to break the vicious cycle of the increasing cost of living and rising levels of poverty and social discontent. In this regard, the Response Group suggested that developing countries needed sustainable responses that prioritized vulnerable households, communities and populations, and that policy measures to best prioritize those in need might require the management of supply and demand, for example, the use of solar photovoltaics rather than

[16] See https://www.oecd.org/newsroom/support-for-fossil-fuels-almost-doubled-in-2021-slowing-progress-toward-international-climate-goals-according-to-new-analysis-from-oecd-and-iea.htm.

[17] WT/MIN(21)/9/Rev.1.

[18] United Nations, Global Crisis Response Group on Food, Energy and Finance, 2022.

diesel power to reduce fuel expenditure and, ultimately, the cost of agricultural production.[19]

C. Trade policy for the energy transition in the medium and long terms

19. To facilitate the sustainable energy transition in developing countries, trade policy should contribute to reducing bottlenecks in renewable energy supply, such as with regard to the lack of access to materials and mechanical appliances needed for renewable energy generation and regulatory burdens with regard to physical installations related to production.[20]

1. Trade policy at the national level

20. At the national level, the choice of trade policy depends on whether priority is given to facilitating the domestic generation of energy from renewable sources or to promoting the domestic production of the physical components required for renewable energy production. Both are critical in the sustainable energy transition. To speed up the shift among domestic industries to renewable energy sources, the policy sequence could start with the liberalization of the imports of materials and appliances related to renewable energy through the reduction of tariffs and/or simplification of the technical standards applied to such imports. However, the current bottleneck in access to necessary materials and mechanical appliances clearly suggests the need for developing countries to unlock domestic capacity to manufacture such products. This, in turn, can contribute to diversifying renewable energy product value chains beyond the supply chains currently concentrated in a small number of economies. In this regard, one study showed that "around three quarters of the world's production capacity for battery cells, around 70 per cent of cathode capacity and 85 per cent of anode capacity, as well as more than half of the global raw material processing of lithium, cobalt and graphite," are located in a single country.[21]

2. Trade policy at the regional level

21. Trade liberalization at the regional level through regional trade agreements is an effective option for enhancing the region-wide production of renewable energy and associated products and services. Beyond tariff elimination, regional trade agreements can also help enhance regulatory harmonization and cooperation concerning the production and supply of renewable energy within a region.

22. Of all regional trade agreements notified to the World Trade Organization, 97 per cent include at least one environmental provision.[22] Cooperation on environmental issues is the most common type of provision, and is found in 45 per cent of notified agreements. Some of the most recent agreements, such as those involving Canada, the United Kingdom of Great Britain and Northern Ireland, the United States and the European Union, have explicit provisions on climate change, addressing cooperation in climate change mitigation and adaptation measures (see box). If a robust regional production of renewable energy goods and services destined for regional markets can be achieved, the jobs, commerce. income and technical capacity development associated with the energy transition can be captured by developing countries on a regional basis, thereby paving the way for a development-led energy transition.

[19] Ibid.
[20] Ibid.
[21] See https://www.iea.org/reports/securing-clean-energy-technology-supply-chains.
[22] World Trade Organization, 2021, Trade and climate change, Information Brief No. 2, available at https://www.wto.org/english/tratop_e/envir_e/climate_intro_e.htm.

Addressing trade and climate change in regional trade agreements: Singapore and the European Union

Singapore and the European Union signed trade and investment protection agreements in 2018. The trade agreement entered into force in November 2019 and the investment protection agreement will enter into force after it has been ratified by all member States of the European Union.

Under chapter 12 on trade and sustainable development, the trade agreement has a dedicated section on trade and investment promoting sustainable development, which states that the Parties resolve to make continuing special efforts to facilitate and promote trade and investment in environmental goods and services, including through addressing related non-tariff barriers (article 12.11.1); shall pay special attention to facilitating the removal of obstacles to trade or investment concerning climate-friendly goods and services, such as sustainable renewable energy goods and related services and energy efficient products and services (article 12.11.2); share the goal of progressively reducing subsidies for fossil fuels and will actively promote the development of a sustainable and safe low-carbon economy (article 12.11.3).

Source: European Commission, 2022, Singapore and European Union free trade agreement and investment protection agreement, available at https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/singapore/eu-singapore-agreement_en.

D. Multiple paths for environment-related trade negotiations

23. To date, the international discourse has been centred on the reduction of tariffs on environmental goods that can lower the costs of domestic renewable energy production. Within the multilateral trading system, the negotiations on environmental tariff reductions launched at the fourth Ministerial Conference of the World Trade Organization did not reach an agreement as to what constitutes environmental goods, that is, the product definition and the customs classification, as well as tariff reduction modalities. A group of members of the World Trade Organization launched plurilateral negotiations, independent of the Doha Development Round of negotiations, towards achieving an environmental goods agreement, aimed at promoting trade in a few key environmental products, such as wind turbines and solar panels, that contribute to the production of renewable energy.[23] Currently, 18 economies are participating in these negotiations, aimed at eliminating tariffs on key environmental products.[24] The environmental goods agreement will be designed in such a manner that, when adopted, the agreed tariff elimination will be applied to imports from all members of the World Trade Organization and not only the signatories. Within the multilateral framework, in November 2020, 50 WTO members launched the Trade and Environmental Sustainability Structured Discussions initiative with a view to, inter alia, launching dedicated discussions on "how trade-related climate measures and policies can best contribute to climate and environmental goals and commitments while being consistent with World Trade Organization rules and principles" and exploring opportunities for "promoting and facilitating trade in environmental goods and services to meet environmental and climate goals, including through addressing supply chain, technical and regulatory elements".[25] Currently, 74 members of the World Trade Organization participate in the discussion group. The group reported on its progress to the twelfth Ministerial Conference, including the establishment of four informal working groups on environmental goods and services, trade-related climate measures, the circular economy and circularity and subsidies.[26] In July 2022, the group discussed preparations for a high-level event to be held in December, to take stock of the work of the groups to date, aimed at progressing

[23] See https://www.wto.org/english/tratop_e/envir_e/ega_e.htm.

[24] Australia; Canada; China; Hong Kong, China; Taiwan Province of China; Costa Rica; Iceland; Israel; Japan; Liechtenstein; New Zealand; Norway; Republic of Korea; Singapore; Switzerland; Türkiye; United States; European Union.

[25] WT/MIN(21)/6/Rev.2.

[26] See https://www.wto.org/english/news_e/news22_e/envir_13jun22_e.htm.

towards agreement on concrete actions to be presented to the thirteenth Ministerial Conference in 2023.[27]

IV. Issues for discussion

24. At its thirteenth session, the Trade and Development Commission may wish to discuss in depth the possible architecture of trade policy at the national, regional and multilateral levels, to better contribute to the achievement of an economically sustainable energy transition in developing countries; and ways for the international community to provide effective support, to help net energy-importing and fossil-fuel–exporting developing countries reduce dependence on fossil fuels.

25. In addition to the issues presented in this note, delegates at the thirteenth session may wish to consider the following questions:

(a) What are examples of national policies available to support the transition to the use of energy from renewable sources?

(b) Is trade policy an element of such policies? If not, why?

(c) What are some examples of national cost advantages and disadvantages in the production and trade of energy from renewable sources? In which renewable energy sector (such as wind power, solar power, hydroelectricity or others) might these examples be noted?

(d) What are some of the greatest obstacles at the national level in the production and trade of energy from renewable sources?

(e) Has the current energy crisis enhanced or reduced national-level market opportunities in renewable energy?

(f) With regard to regional trade agreements that address environmental cooperation in general and the production and trade of energy from renewable sources in particular, how effective have they been in enhancing national and regional energy transitions?

(g) What are some examples of national experiences with regard to access to the technology and finance required to achieve the energy transition?

[27] See https://www.wto.org/english/news_e/news22_e/tessd_20jul22_e.htm.