

# **THE ROLE OF TRADE IN CLIMATE CHANGE ADAPTATION AND MITIGATION: AN ASSESSMENT OF VIETNAM'S SITUATION IN RENEWABLE ENERGY SECTOR**

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## **Abstract**

This paper aims at analyzing the role of trade to combat climate change and its impacts to foster climate change adaptation and mitigation. Taking an example of Vietnam as a country being heavily affected by climate change, the paper points out that while Vietnam has put lots of efforts to promulgate laws and regulations, several obstacles remain, especially in the renewable energy sector. Recommendations are derived to further foster the role of trade in climate change adaptation and mitigation in Vietnam.

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## **1. Trade and Climate Change: Unveiling Challenges, Shaping the Role of Trade**

Economic actions leave an environmental footprint, and trade activity is no exception.

*On the one hand*, trade exacerbates climate change through increasing volume of greenhouse gas (GHG) emissions which cause global warming. It is expected that about 20-30% of total CO<sub>2</sub> emissions, which account for most GHG emissions, are estimated to be associated with international trade. Of these, more than 75% of the emissions embedded in international trade come from just a few sectors, including energy and transport<sup>1</sup>. At the global level, the world economy faces a potential loss of \$7,900 billion by 2050 due to climate change, as factors like droughts, floods, and crop failures impede growth and pose threats to infrastructure. Given the ongoing rise in global temperatures, the GDP worldwide is anticipated to decline by 3% in 2050<sup>2</sup>.

*On the other hand*, climate change worsens the effectiveness of trade activities. At a glance, the influence of climate change on trade is significant, as it can alter the comparative advantage held by countries and induce a shift in the international trade landscape. This effect is particularly pronounced in nations where their comparative advantage is rooted in climatic or geophysical factors. Countries or regions heavily reliant on agriculture may face the risk of diminishing agricultural export output if future climate warming and more frequent extreme weather events lead to a decline in crop productivity<sup>3</sup>.

The impacts of climate change extend beyond impeding trade of goods but also trade in services, such as tourism and transportation services. In this regard, extreme weather can disrupt supply chains, damage transport infrastructure necessary for trade in goods<sup>4</sup>. The increased occurrence and severity, as well as the expanding geographical range, of sudden and extreme weather events resulting from climate change, coupled with gradual impacts such as rising sea levels, present significant threats to the transportation infrastructure which is essential for the efficient and dependable functioning of global trade routes. Maritime transportation is especially susceptible to climate-related hazards. The rise in sea levels poses a direct risk to port operations, while alterations in precipitation impact the functionality of crucial maritime hubs and passages. A notable example is the Panama Canal, responsible for approximately 6% of global maritime trade<sup>5</sup>, where the authority has had to impose restrictions on the largest ships due to decreasing water levels in nearby lakes. China's Yangtze River has also experienced shipping disruptions attributable to low rainfall and increased evaporation<sup>6</sup>.

Despite these interactions between trade and climate change, trade remains instrumental to facilitate the adaptation and mitigation of climate change adverse effects.

*First*, international trade plays a role in enhancing production efficiency, promoting resource conservation, and optimizing natural resource utilization<sup>7</sup>. The global nature of contemporary trade allows for the expansion of production scale by employing increasingly efficient methods. This results in the ability to produce more goods using the same unit of labor, resources, and technology. Consequently, this helps alleviate the environmental impact on the climate while simultaneously maintaining living standards. *Second*, trade promotes affordable access to advanced technology and can be a catalyst for technical innovation in a climate change

and environmentally friendly manner. Opening trade markets can drive advancements in energy efficiency through the exchange of technological expertise, leading to the production of goods and services with lower greenhouse gas emissions. This occurs through several means. For one, trade liberalization through eliminating or lowering barriers to trade in environmental products greatly enhances the accessibility and affordability of environmentally friendly goods, services, and technologies by expanding their reach to customers in new markets. This is particularly crucial for developing countries where access to such products is limited. Moreover, the increased income generated from trade can also create a demand for improved environmental quality within society, thereby diminishing the impact on climate change. For instance, heightened awareness of health protection may result in reduced use of plastic bags to avoid the release of microplastic particles harmful to health, subsequently reducing environmental waste.

Acknowledging such linkages between trade and climate change and that trade could play a central role in efforts to combat climate change, countries have designed their trade law and policy to advance climate action towards mitigation and adaptation to climate change adverse effects. Below analysis demonstrates the status of climate change related law and policy in Vietnam to identify the role of trade in a particular sector, i.e., renewable energy, thereby providing some recommendations to foster such role towards climate change mitigation and adaptation.

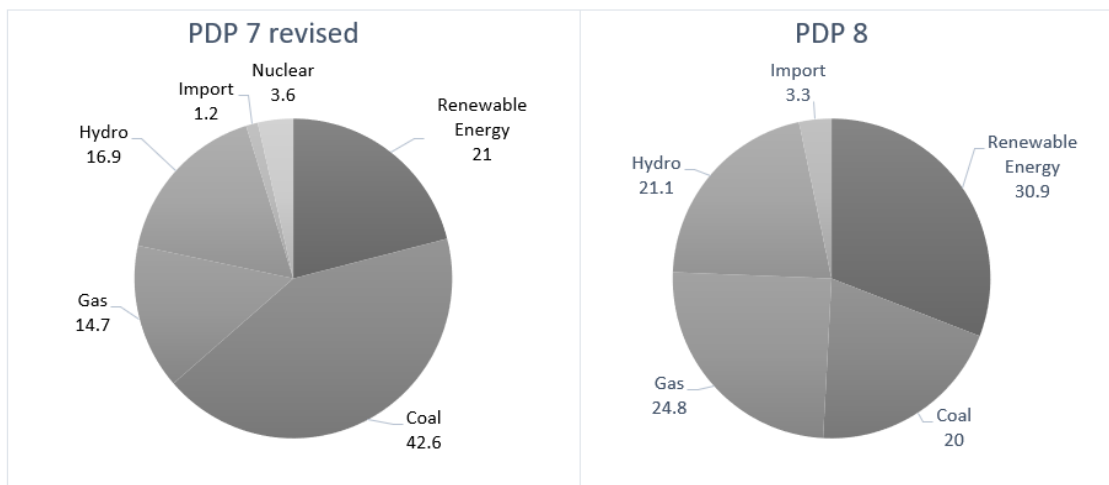
## **2. Vietnam's Climate Change Related Regulations in Renewable Energy Sector: A Combined Role of Trade and Investment**

Vietnam ranks among the top five countries globally most susceptible to the impacts of climate change<sup>8</sup>. Despite being a relatively minor contributor to GHG emissions, Vietnam has experienced a fivefold increase in emissions over the past two decades<sup>9</sup>. This surge is predominantly attributed to substantial growth in electricity demand. More than half of the country's emissions emanate from the energy sector, with agriculture, industrial processes, and waste contributing to the remainder. To limit the impacts of climate change, Vietnam plans to exploit environmentally friendly energy sources such as renewable energy, most notably through different versions of the Power Development Plan.

### ***2.1. The Power Development Plan VIII and investment incentives***

The Power Development Plan VIII (PDP8), the most recent version, is the planning for the development of power sources which strives to establish a comprehensive energy industry ecosystem rooted in renewable and new energy sources.

**Table 1. PDP 7 revised vs. PDP 8 – Power source structure by percentage in 2030**



(Source: Vietnam's National Power Development Plan 2021 – 2030)

Analyzing PDP 8 and its previous version PDP 7 reveals a shift in the distribution of electricity sources. Notable adjustments include an increase in steam power utilization, the elimination of nuclear power, and, most significantly, changes in the exploitation of renewable energy and coal. The PDP 8 demonstrates a notable shift with an increased emphasis on renewable energy, reaching 30.9% (compared to 21% in PDP 7). Simultaneously, the use of coal for electricity generation experiences a significant reduction, plummeting to around 20% (compared to 42.6% in PDP 7). This highlights the ambitious focus of PDP 8 on advancing renewable energy sources and it is expected that Vietnam will need about \$134 billion in financing by 2030 for new power plants and grid infrastructure<sup>10</sup>.

Inspired by the PDP8, various investment incentive mechanisms have been implemented for renewable energy projects, with a particular emphasis on solar and wind power, recognized as having significant potential in Vietnam. Regarding Corporate Income Tax (CIT) benefits, companies venturing into renewable energy sector receive substantial support in the initial stages. This includes a tax exemption for the first four years, a subsequent 50% reduction in taxable income for nine years, and a favorable CIT rate of only 10% for a 15-year period from the establishment date. Moreover, the allocation of free land rent for the initial three years, or potentially an extended duration, signifies a reduction in financial burdens and an augmentation of investment capabilities for power projects. Vietnam stands out in the ASEAN region as the sole nation offering exemptions and reductions in land rental taxes for businesses involved in renewable energy production<sup>11</sup>.

Legal documents in the realm of renewable energy consistently emphasize the primacy of investment endeavors during the progression of renewable energy electricity development. Nevertheless, the significance accorded to trade mechanisms in this domain is often relatively limited, influenced by various factors. Exploring the intersection of trade and renewable energy reveals the extent to which trade dynamics could play a pivotal role in shaping the landscape of renewable energy in Vietnam.

## ***2.2. Trade in renewable energy sector***

At the global level, Vietnam became a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and joined the Kyoto Protocol in 1998. Vietnam also participated in the Paris Agreement in 2016, and joined two significant trade agreements, the CPTPP and EVFTA, featuring provisions facilitating the establishment of a low-emissions economy<sup>12</sup>. At the national level, there is presently no distinct "climate law" designed to systematically address climate change and its responses. It is noteworthy that regulations overseeing the development process of renewable power projects are not consolidated in a single law but are dispersed across various legal documents<sup>13</sup>. In 2014, the National Assembly introduced amendments to both the Electricity Law and the new Law on Environmental Protection enhancing the legal framework governing the exploration of energy resources and the advancement of projects related to renewable energy. In essence, Vietnam employs a conventional approach which involves integrating climate change considerations into sector-specific laws or specifying measures within these laws. This approach serves the dual purpose of achieving the laws' primary objectives and concurrently addressing climate change concerns<sup>14</sup>.

On the advantageous side, Vietnam provides some trade incentives in accordance with the regulations outlined in the Law on Export Tax and Import Tax No. 107/2016/QH13, as well as Decree No. 218/2013/ND-CP and Decree No. 46/2014/ND-CP. Of these, there are provisions for exempting import taxes on goods such as components, raw materials, supply materials, and semi-finished products that are not currently available in Vietnam. This initiative aims to alleviate production costs and enhance competitiveness thereby fostering trade in this sector. However, there are lots of obstacles that remain which may hinder the role of trade in climate change mitigation and adaptation in general and particularly in the renewable energy sector.

### ***2.2.1. Feed in Tariff***

To begin with, the existing electricity purchasing rates in Vietnam are unappealing, indicating that State acquires renewable energy at relatively low prices, resulting in weak demand stimulation efforts and a lack of acceptance among investors for commercialization activities. According to Global Petro Prices data, the global average household electricity price stands at 0.18 USD/kWh (equivalent to 4,260 VND), while Vietnam's electricity price is significantly lower at 0.08 USD/kWh (equivalent to 1,890 VND), ranking 45th lowest in the world as of the end of 2022. When compared to countries like Italy, which has the highest electricity prices globally, Vietnam's electricity costs are merely a tenth of theirs. Analysts argue that Vietnam's current electricity pricing mechanism does not accurately reflect the production and distribution costs in the competitive electricity generation market and the dynamics of supply and demand<sup>15</sup>. In this regard, a feed-in tariff (FIT) scheme is introduced to guarantee the purchase of energy and at more reasonable prices.

A feed-in tariff represents an energy policy designed to promote the growth and widespread adoption of renewable power generation. Under this scheme, producers of energy derived from renewable sources, such as solar, wind, or water, receive compensation based on the production

costs for what they generate. This guaranteed purchase rate is typically provided on a long-term basis, varying from 5 to 20 years, with the most common duration being 15–20 years<sup>16</sup>. The FIT electricity price comprises of three fundamental components which remain crucial for the advancement of renewable energy sources: (i) an assurance of connectivity to the grid for renewable energy sources; (ii) a power purchase agreement extending over the long term; and (iii) an equitable electricity price designed to attract and benefit investors.

**Table 2: Vietnam’s FIT Rates for Solar and Wind Power Projects before Circular 19/2022/TT-BCT**

	Official plan	EVN’s plan	FIT price converted to VND	% change compared to FIT price
Ground solar power	1.184,9	1.188,0	1.680,0	-29,5%
Floating solar power	1.508,3	1.569,8	1.823,0	-17,3%
Onshore wind power	1.587,1	1.590,9	2.015,0	-21,2%
Offshore wind power	1.816,0	1.944,9	2.323,0	-21,8%

(Source: Mark Barnet, “Explained: Vietnam’s FiT Rates for Solar and Wind Power Projects”, Vietnam Briefing)

As shown in the table, the price for ground-mounted solar power is set at 1,184 VND/kWh, reflecting a 29.5% reduction compared to the FIT price. Similarly, onshore and offshore wind power prices are lowered by approximately 21%, standing at 1,587 VND/kWh and 1,816 VND/kWh, respectively. However, continually committing to purchasing renewable electricity at prices higher than the average for other power sources can impose financial strain on electricity purchasing entities and diminish the motivation for renewable electricity producers to enhance productivity. Recognizing this, the Ministry of Industry and Trade (MOIT) introduces Circular 15/2022/TT-BCT and Circular 19/2022/TT-BCT thereby shifts towards a cost-based pricing model, a strategy commonly employed in the European Union, which has proven successful in fostering the growth of renewable energy. However, Vietnam Electricity (EVN), the largest State-owned power enterprise, remains solely responsible for calculating the annual FITs based on the number of wind and solar projects, subject to approval from the Electricity Regulatory Authority of Vietnam (ERAV).

### *2.2.2. The Power Purchase Agreement*

All power plants must adopt a non-negotiable standardized agreement issued by the MOIT in the form of a power purchase agreement (PPA). The current PPA is an unalterable contract,

with its terms being subject to a binary decision of either acceptance or rejection, exhibiting the following characteristics: (i) there is no predefined termination payment for the power plant; (ii) it includes a provision enabling contract termination in the event of extended force majeure events lasting for more than one year, (iii) the PPA initially spans a standard 20-year period, with the possibility of extension through mutual agreement. It is important to note that the PPA's duration does not cover force majeure events or disputes, including situations where the power purchaser, like EVN, encounters challenges in meeting payment obligations.

For solar power, the PPA lacks specificity regarding the inclusion of a price escalation index and fails to address adjustments to FIT based on fluctuations in the VND/USD exchange rate for grid connection projects. Additionally, the responsibility of allocating power grid risks falls on the seller, disregarding essential factors such as distance from transmission lines, elevated installation costs, and location. The contract fails to consider political force majeure events and changes in the law. Notably, the PPA does not specify a foreign governing law or explicitly provide for international arbitration. Critical elements like the commercial operation date and liquidated damages are also absent.

In the context of wind power purchase agreements (MPPA), a notable deficiency is the absence of an appropriate price index or provisions addressing inflation risks. The seller assumes the entire responsibility for establishing the power network, encompassing investment, construction, operation, and maintenance of connection equipment linking the plant to the transmission and distribution grids, transmission lines, and associated installation costs and locations. Importantly, the MPPA lacks clarity on the choice of foreign governing law and offers limited regulations on international arbitration. Dispute resolution methods recognized in the MPPA are limited to conciliation and negotiation, with arbitration following Circular 40/2010/TT-BCT governing dispute resolution procedures in the electricity market. Critical mechanisms for corrective measures, such as commissioning, unforeseen power outages, and damage calculations, are not adequately outlined in the MPPA. Furthermore, the MPPA does not include provisions permitting project assets to be mortgaged for securing lender loans, nor does it entail a separate PPA between EVN and lenders. The MPPA also lacks a provision for negotiations in the event of fundamental changes, such as alterations in law or taxes. The standardized contract format poses challenges for negotiations due to its fixed structure and vague content regarding crucial security provisions for lenders.

Another contract is DPPA (Direct Power Purchase Agreement). DPPA is a direct arrangement between the electricity producer and the purchaser, excluding intermediation by EVN's power companies. This bilateral contract allows both parties to mutually agree on the electricity's price and duration. As a result, businesses have the flexibility to navigate fluctuations in electricity prices, lower their energy costs, and improve their overall business reputation. The introduction of DPPA is favorable for both electricity consumers and generators. However, certain viewpoints argue that for DPPA to be genuinely workable, there must be a specific and transparent calculation of the compensation mechanism between the involved parties. This encompasses

various fees such as electricity production fees, transmission fees, distribution fees, and service fees. Simultaneously, the establishment of a comprehensive legal framework with clearly defined regulations and terms for addressing disputes is seen as crucial. Moreover, to participate in the DPPA mechanism, power generation units are mandated to enter into an additional PPA with EVN for grid connection. The challenge lies in the fact that the generation capacity is contingent on the transmission capacity of the grid, posing an additional hurdle for investors. In instances where the investor has harnessed part of the electricity output, but EVN only agrees to purchase a portion or half of it, the issue of what happens to the remaining electricity becomes a problem that requires solution.

### *2.2.3. The situation of grid congestion*

The rapid expansion of renewable energy in Vietnam during 2019-2020 has brought to light a significant challenge related to transmission grids. A detailed examination has categorized the primary challenges of grid congestion into three main types: infrastructure, investment, and climate resilience. A key issue stems from the insufficient infrastructure to facilitate the integration of renewable energy. As of 2020, Vietnam possessed 8,527 km of 500kV transmission lines and 18,477 km of 220kV lines. Despite substantial upgrades to transmission and distribution grids over the past decade, they continue to face considerable strain and necessitate substantial investment<sup>17</sup>.

A noteworthy concern is the uneven distribution of power production by technologies, with 95% of solar deployment concentrated in Southern provinces characterized by abundant solar irradiation but limited electricity demand and grid capacity. Conversely, the Northern region experiences rapid demand growth that surpasses the expansion of power capacity. The absence of a suitable grid system hinders the optimal utilization of renewable power in the Central and Southern regions, preventing it from meeting the escalating power demand in the North. Consequently, the swift development of variable renewable energy has resulted in challenges such as congestion and curtailment in South-Central Vietnam<sup>18</sup>. Additionally, the introduction of energy storage options has the potential to mitigate the variability in renewable energy generation and address grid congestion when it occurs. However, the current limitations in energy storage, coupled with restricted grid capacity, impose constraints on the prospective adoption of renewable energy in the future.

## **3. Recommendations to Foster the Role of Trade in Renewable Energy Sector**

While the significance of trade is crucial, it has not received adequate consideration and acknowledgment. Consequently, the subsequent section of the paper offers evaluations and suggestions to enhance the role of trade in promoting the development of renewable energy.

*First*, MOIT should assess the annual deployment plan of power sources, ensuring a balance between capacity and electricity generation. It is crucial to ascertain the appropriate scale, both in terms of capacity and electricity output, for renewable energy sources such as wind and solar power. This assessment should consider optimal distribution across regions to achieve maximum efficiency, addressing issues like electricity shortages, minimizing reliance on oil-



burning power plants, reducing inter-regional electricity transmission, and preventing overloads on the power grid.

*Second*, it is crucial for authorities with competence to establish a transparent and well-directed FIT pricing mechanism. The current uniform application of FIT prices across the country has led to a concentration of development in areas with high economic potential, such as abundant solar radiation or high average wind speed. This has resulted in grid overloads in certain regions or investments in locations with low electricity demand, necessitating the long-distance transmission of electricity. Moreover, the fact that EVN remains solely responsible for calculating FIT price may conflict with its position as the currently largest buyer of renewable electricity who wants to minimize the cost of buying electricity. Consequently, the implementation of a transparent and appealing FIT pricing mechanism is essential to enhance future trade and investment attractiveness.

*Third*, it remains essential to enhance the clarity of provisions within the PPA to improve its bankability. In the existing PPA, there is no contractual obligation for the EVN to purchase the entire output generated by wind and solar power projects. EVN only incurs payment for the received electricity (obligation to receive and pay), without a stipulated minimum purchase requirement. Ambiguity surrounds the determination and composition of the cancellation amount in the event of PPA termination, and whether the EVN will provide sufficient compensation to cover outstanding debts and/or incurred investment costs. This uncertainty raises concerns about the level of security for investors engaging in such projects.

*Fourth*, addressing the issue of overloading the power transmission grid requires both short-term and long-term solutions. Currently, the concentration of renewable energy projects is primarily in the Central region, whereas the highest consumption areas are in the North and South. Implementing planning reforms is a viable strategy to optimize the deployment of new generation capacity, prevent congestion, and position generators closer to the load centers. This could involve initiatives like establishing Renewable Energy Zones and integrating comprehensive renewable energy planning for each region.

*Fifth*, acquiring the latest technologies to exploit renewable energy electricity should be promoted. As demand increases, exploiting electricity on land or offshore requires the application of scientific and technical advances with the goal of maximizing available output. However, for a developing country like Vietnam, developing our own technology can be difficult due to many different factors such as resources and investment capital. Therefore, the competent authorities need to be more active in promoting the commercialization of necessary equipment and technology in the renewable energy sector.

Finally, measures need to be in place to further improve competition in the electricity market. EVN currently holds a seemingly monopolistic position in the electricity market, and thus, any escalation in electricity prices by EVN would adversely affect both consumers and investors. Therefore, it is necessary to increase the competitiveness of investors, possibly through promoting

them to directly sell electricity to consumers through EVN's power transmission grids at reasonable prices.

#### 4. Conclusion and the way forward

The assessment of Vietnam's situation in the renewable energy sector highlights the obstacles that may hinder the pivotal role that trade could play in both climate change adaptation and mitigation efforts. Moving forward, it is imperative for Vietnam to prioritize the development of a robust regulatory framework that encourages investment, fosters innovation, and ensures the sustainability of renewable energy projects. The government should actively engage in international collaborations to benefit from knowledge exchange, technological advancements, and financial support. Moreover, enhancing the capacity and efficiency of the power transmission grid, along with clear provisions in PPA, will contribute to the effective integration of renewable energy into the national electricity grid. As Vietnam continues to navigate its path towards a greener and more sustainable energy future, a holistic approach that combines regulatory reforms, international cooperation, and infrastructure development remain essential. The commitments to these measures will not only strengthen the country's resilience to climate change but also greatly enhance Vietnam's position in the global transition towards a cleaner and more sustainable energy system.

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