POLICY BRIEF

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SANEM
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FROM BARRIER TO BRIDGE: REFORMING TAX INCIDENCE ON RENEWABLE ENERGY EQUIPMENT IN BANGLADESH

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1. Introduction

Bangladesh's growth trajectory is built on an increasingly fragile energy foundation. Over 90% of its electricity is generated from fossil fuels, and its reliance on imported primary energy has risen sharply from 47.7% in FY2020–21 to 62.5% in FY2024–25. This dependence has generated a fossil fuel subsidy burden of nearly US$3.22 billion annually, exposed the macroeconomy to volatile global price shocks, and channelled 96% of power-sector investment into gas, coal, and LNG infrastructure, leaving renewable energy chronically underfunded and structurally marginalised.

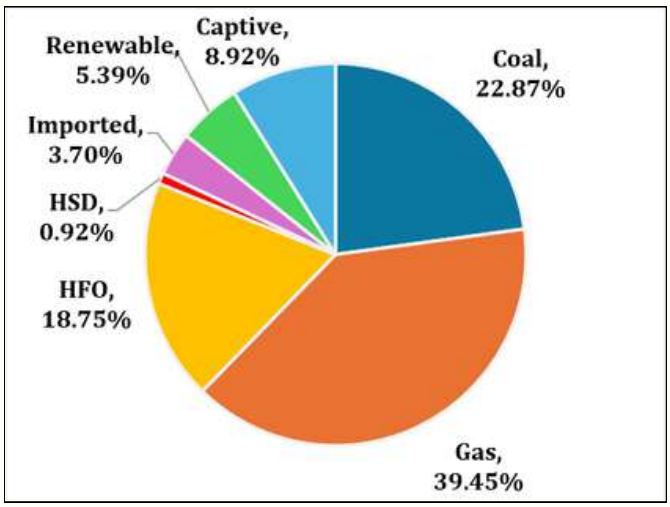
The government has acknowledged this vulnerability and set ambitious targets under the Renewable Energy Policy 2025: to source 20% of national electricity from renewables by 2030 and 30% by 2040, in line with the Paris Agreement and a trillion-dollar economy by 2034. However, the fiscal regime governing renewable energy equipment remains deeply contradictory and counterproductive. The Total Tax Incidence (TTI) on essential components like solar panels, inverters, batteries, and wind turbines ranges from 26% to 127%. In FY2025–26, 61% of the 74 renewable energy-related products identified in this study experienced tax increases rather than reductions. Bangladesh is, in effect, taxing its own energy transition.

This policy brief investigates whether reducing or eliminating the TTI on renewable energy equipment is economically justified, fiscally sustainable, and socially beneficial. Drawing on international comparative evidence, a partial equilibrium cost–benefit analysis, and an economy-wide Computable General Equilibrium (CGE) simulation, it demonstrates that the case for reform is not simply strong; it is, on the evidence, overwhelming.

2. Renewable Energy Landscape and the Tax Burden

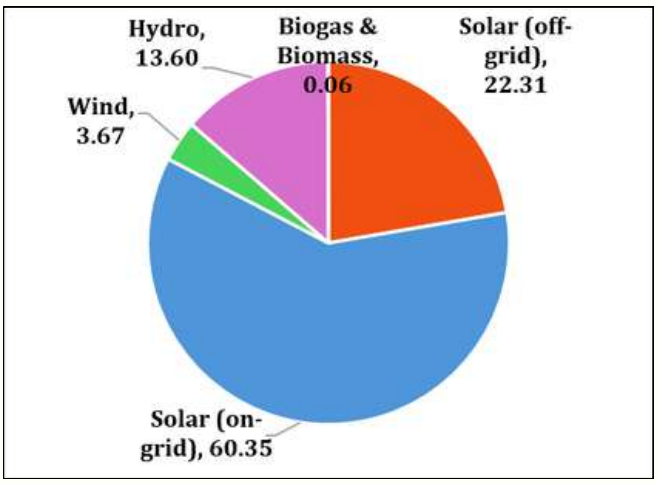
Renewable energy currently contributes approximately 1,691 MW, just 5.4% of Bangladesh's total installed capacity of 31,389 MW (Figure 1). Solar power dominates the renewable sector, accounting for 82% of renewable capacity, split between off-grid (22%) and on-grid (60%) installations (Figure 2). Wind contributes 4%, hydropower 14%, and biogas and biomass together less than 0.1%. Despite this modest base, the government's renewable energy targets are ambitious, and the gap between ambition and fiscal reality is stark.

Figure 1: Electricity Generation Mix by Fuel Type in Bangladesh



Source: SREDA

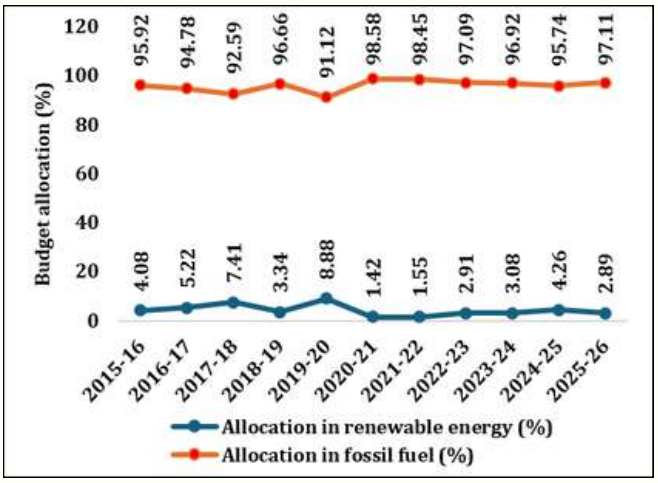
Figure 2: Share of Renewable Energy by Technology



Source: SREDA

In the proposed FY2025–26 budget, renewable energy received only 2.89% of the energy sector's Annual Development Program allocation, far below the level required for sustained deployment (Figure 3). Between 2018 and 2023, annual investment in renewable energy averaged just USD 238 million against an estimated requirement of USD 980 million. Meeting the 30% renewable energy target by 2040 would require an annual investment of approximately USD 1.46 billion. The current fiscal trajectory is nowhere near sufficient.

Figure 3: Trends in Energy Budget Allocation between Renewable and Fossil Fuels

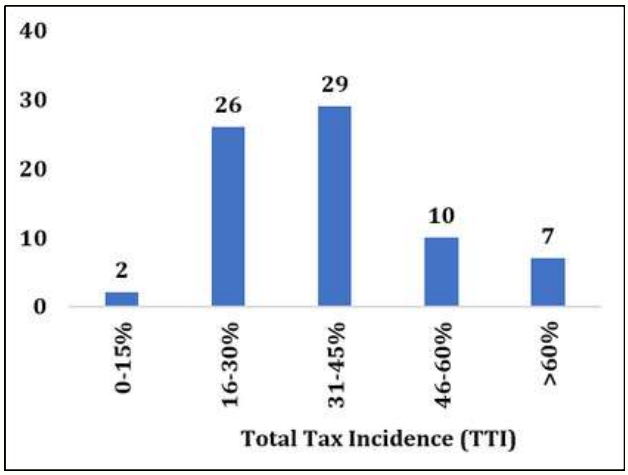


Source: Authors' Calculation Based on the Ministry of Finance (2025)

An analysis of Total Tax Incidence across 74 renewable energy-related products reveals a pattern that directly contradicts Bangladesh's clean energy goals. From FY2022–23 to FY2024–25, TTI across these products remained largely unchanged. The first major adjustments appeared in FY2025–26, but in the wrong direction: 61% of products experienced tax increases, only 31% saw reductions, and 8% remained unchanged (NBR, 2025).

Bangladesh's FY2025-26 tax structure imposes heavy Total Tax Incidence (TTI) on renewable energy components, with wind fan parts and solar LED units taxed as high as 127.43%, blade materials at 73.74%, batteries and solar appliances at 89.08%, and core components like modules, converters, and bearings ranging from 26.9% to 43%. These elevated rates significantly burden renewable energy developers, investors, and consumers.

Figure 4: Distribution of Renewable Energy Products by Total Tax Incidence Level (TTI)



Source: NBR, 2025

The distribution of TTI across renewable energy products reveals a tax burden that is neither low nor uniform. The majority of products fall within the 31–45% range, with a significant cluster in the 16–30% band (Figure 4), meaning most essential renewable energy components face high import taxes that substantially raise their landed costs and erode competitiveness relative to conventional energy technologies.

3. Policy Framework: Progress and Persistent Gaps

The government has introduced a series of policy instruments to promote renewable energy development, most notably the Renewable Energy Policy 2025, uwhich sets the 20% and 30% targets and introduces a range of fiscal and institutional support mechanisms. Among the other key incentive instruments currently in effect are:

Table 1: Strategic Incentive Measures

Policy Name	Author & Date	Details
Customs Duty and VAT SRO-181	IRD, 2025	Reduced VAT (5%) on locally produced e-bikes, along with exemptions from VAT, advance tax, and supplementary duty on raw materials under specific conditions
Income Tax SRO-400	NBR, 2024	Income tax exemptions on electricity sales by renewable energy projects to the grid or bulk users: full exemption for 10 years, followed by partial exemptions over the next 7 years (first 5 years at 50% and the next 2 years at 25%)
VAT SRO-1752	IRD, 2024	Permanent imports of generation plants and temporary imports of erection materials, spare parts, and accessories for public and private projects are exempt from customs duty, VAT, and supplementary duty, with a minimum customs duty floor of 5%
Energy Efficiency and Conservation Master Plan up to 2030	MoPEMR, 2016	Investors are eligible for subsidies, preferential tax treatment through reductions or exemptions, and concessional loans to support the adoption of energy-efficient equipment and practices.

Source: Authors' Compilation from Various Policies

These instruments represent meaningful progress. However, they contain a critical structural weakness: they provide income tax relief for renewable energy producers while leaving the import tax burden on renewable energy equipment largely intact, and in many cases, increasing it. A developer may benefit from a 10-year income tax holiday; however, if the solar panels, inverters, and batteries required are subject to a tax rate of 26% to 127%, that holiday provides limited relief against the dominant cost barrier. Supply-side tax relief cannot substitute for reducing the upfront equipment cost that determines whether projects are financially viable in the first place.

4. International Evidence: What Works

The experiences of India, China, and Germany, representing market-driven, state-led, and institutionally anchored transition models, converge on a single, consistent lesson for Bangladesh.

Table 2: Summary of the Country Case Studies

Country Name	Summary of Case Study
India	In India, the combination of Investment Tax Credits, Generation-Based Incentives, Renewable Portfolio Obligations, and market-based reverse-bidding auctions dramatically reduced solar tariffs from over INR 17/kWh in 2010 to below INR 2/kWh by 2020. Critically, import duty exemptions on solar equipment in the early phase of deployment created the cost conditions for mass-market adoption before domestic manufacturing scaled up. The lesson for Bangladesh is that sequencing matters: removing import barriers first creates the market, and domestic manufacturing incentives follow.
China	In China, preferential VAT treatment (including up to 50% VAT refunds on solar projects), corporate income tax exemptions of three years' full exemption followed by three years' 50% reduction for wind and solar firms, and import duty refunds on key renewable components such as large wind turbines, combined to produce the world's largest renewable energy deployment at declining cost. China's experience confirms that VAT and customs duty relief, when applied systematically rather than selectively, generate manufacturing scale, cost reduction, and employment multipliers simultaneously.
Germany	In Germany, the integration of feed-in tariffs with tax relief measures, including VAT exemptions on self-generated renewable electricity, ecological tax reform that shifted the burden from labor to energy consumption, and the 100,000 Roofs Programme providing soft loans for PV installations, produced a renewable energy share of over 60% of electricity generation by 2024. Germany's lesson is institutional: fiscal incentives only deliver their full potential when they are stable, predictable, and embedded in a coherent long-term policy architecture.

Source: Authors' Compilation from Various Sources

Taken together, these three cases confirm that when fiscal policy is aligned with clean energy ambition rather than working against it, deployment accelerates, costs fall, and economic and environmental dividends follow. Bangladesh's current approach stands in direct contrast to this evidence.

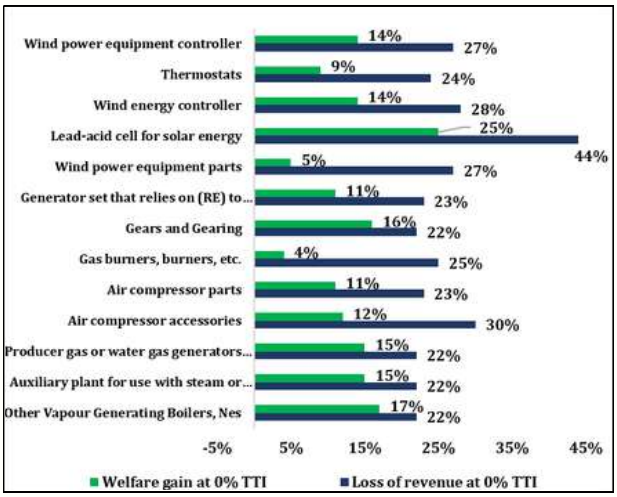
5. Economic Implications of Tax Reductions on Renewable Energy Components: A Cost–Benefit Analysis from a Partial Equilibrium Perspective

Based on HS classifications from the existing literature, 13 renewable energy products were selected for analysis. The import data for 2023 were drawn from UN Comtrade. Total Tax Incidence was applied to import values, and two policy scenarios were simulated: a 5% reduction in TTI and a full exemption (0%). Price changes were combined with import demand elasticities to estimate changes in import demand, adjusted revenue outcomes, and welfare gains from increased renewable energy adoption.

Reducing TTI to 0% results in gross revenue losses ranging from 22% to 44% across the 13 products (Figure 5). The largest decline is observed for lead-acid cells used in solar energy (44%), reflecting their high initial TTI of 58.6%. Air compressor accessories and wind power equipment parts also face notable declines of up to 30% and 27%, respectively. Reducing TTI to 5% moderates these losses to a range of 16% to 38% (Figure 6). These are real fiscal costs that must be acknowledged honestly.

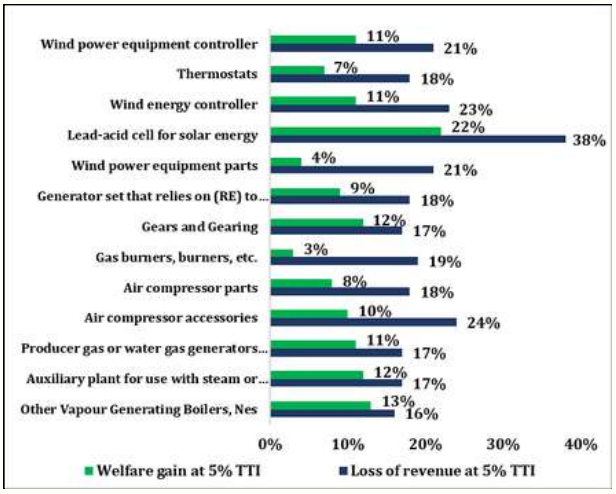
However, the gross revenue loss substantially overstates the true economic burden. Demand elasticity significantly moderates the net cost. Products with higher elasticity generate larger welfare gains, offsetting a considerable share of the revenue loss (Figure 7). The net loss pattern carries a clear strategic implication: tax reductions deliver the highest welfare return per unit of fiscal cost for high-elasticity products. Policymakers should prioritise TTI reductions for these products first, maximizing renewable energy adoption and welfare gains while minimizing net revenue loss. For lower-elasticity products, tax reductions should be complemented by direct subsidies, production incentives, and financing

Figure 5: Economic Effects of 0% TTI on Key Energy-Related Products



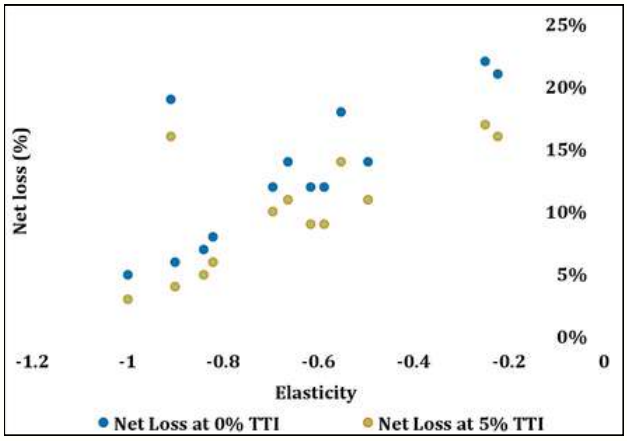
Source: Authors' calculations based on National Board of Revenue Data

Figure 6: Economic effects of 5% TTI on key energy-related products



Source: Authors' calculations based on National Board of Revenue Data

Figure 7: Impact of TTI on Net Loss by Product Elasticity



Source: Authors' calculations based on National Board of Revenue Data

support, rather than relying solely on tariff cuts.

Critically, these estimates capture only the direct fiscal and consumer welfare effects within individual product markets. They cannot account for macroeconomic spillovers, sectoral productivity gains, household income improvements, employment multiplier effects, or the long-run fiscal savings from reduced fossil-fuel subsidy expenditures. For a comprehensive assessment of these economy-wide effects, a general equilibrium framework is required.

6. Economic Implications of Tax Reductions on Renewable Energy Components: A Cost–Benefit Analysis from an Economy-Wide Perspective

The CGE model is calibrated with the 2022 Bangladesh Social Accounting Matrix, covering 86 production sectors, 13 factor categories, and 15 household groups differentiated by income quintile, geographic location (rural and urban), and farm versus nonfarm status. This structure enables simultaneous tracking of impacts across the the macroeconomy, all productive sectors, factor markets, and household welfare. A single policy scenario is simulated: a 100% reduction in TTI on all renewable energy components and the complete elimination of import tariffs, VAT, and supplementary duties.

The CGE results are unambiguously positive across every macroeconomic, sectoral, and household welfare dimension. The key findings are summarised in Table 3.

The simulation results show that GDP expands by 0.04% as lower energy input costs spread across 86 production sectors simultaneously, stimulating output, investment, and employment. Exports increase by 0.47% as reduced energy costs improve the competitiveness of Bangladesh's export-oriented industries, most notably the textiles and garments sector, which accounts for nearly two-thirds of total export earnings. The trade deficit narrows by 0.04 percentage points as export growth outpaces import growth. Consumer prices fall by 0.02%, moderating inflationary pressures and raising real purchasing power across the economy. The real exchange rate depreciates modestly by 0.12%, further supporting export competitiveness.

Real household income rises by 0.08% and real consumption by 0.02%, confirming that the macroeconomic gains translate directly into improved living standards. The welfare gains are driven through two channels: the factor income channel, which expands production and employment, raising labor and capital returns; and the price channel, which lowers consumer prices, raising real purchasing power without any direct government transfer. The distributional pattern is progressive. Rural farm households benefit most from lower agricultural energy input costs, which raise productivity and farm incomes. Rural nonfarm and urban poor households gain disproportionately from consumer price deflation, as they devote higher budget shares to energy-related goods. In a country where nearly 20% of the population remains below

Table 3: Results of CGE Simulation

Indicator	Base Value	Change (%)
GDP at Market Prices	BDT 42.31 billion	0.04
Exports	BDT 4.99 billion	0.47
Imports	BDT 8.04 billion	0.29
Consumer Price Index	100.00 (Index)	−0.02
Investment / GDP	32.01%	+0.01 pp
Trade Deficit / GDP	11.27%	−0.04 pp
Real Exchange Rate	100.00 (Index)	0.12
Government Spending (Nominal)	BDT 2.48 billion	−0.11
Import Taxes / GDP	0.61%	−0.09 pp
Households' Real Income	BDT 31.47 billion	0.08
Households' Real Consumption	BDT 28.11 billion	0.02

Source: Authors CGE Model Simulations based on the 2022 Bangladesh SAM
Note: 'pp' refers to percentage points

the poverty line, and rural households bear the greatest burden of energy cost shocks, these progressive welfare gains carry significant development value.

On the cost side, import taxes as a share of GDP decline by 0.09 percentage points, and nominal government spending contracts by 0.11%. These are real fiscal costs. However, they are partially offset by higher import volumes driven by lower equipment prices, broader economic expansion that widens the income and consumption tax base, and reduced pressure on fossil-fuel subsidy expenditures. The net fiscal burden is considerably smaller than the gross revenue loss, and shrinks further over time as the renewable energy transition reduces the country's structural fossil fuel import dependence.

The cost–benefit verdict is clear and consistent across both analytical frameworks. The direct fiscal burden, a 0.09 percentage point decline in import taxes as a share of GDP, and a 0.11% contraction in nominal government spending is real but modest, partially self-financing through higher import volumes and broader economic activity, and must be weighed against a far costlier alternative: subsidising fossil fuel imports at US$3.22 billion annually while taxing the clean energy equipment needed to reduce that dependence. The benefits of GDP growth of 0.04%, export expansion of 0.47%, consumer price deflation of 0.02%, and real household income gains of 0.08% are multi-dimensional, durable, and self-reinforcing. The static CGE results conservatively understate the long-run returns as compounding savings from reduced fossil fuel subsidy expenditure will dwarf the tariff revenue foregone in the near term. The conclusion is unambiguous: the economy-wide benefits of TTI elimination substantially outweigh the short-term fiscal costs; this reform more than pays for itself.

7. Policy Recommendations

The following recommendations are organised into three tiers, each grounded in distinct strands of the study's evidence-based international comparative experience, product-level elasticity analysis, and economy-wide CGE simulation. Moving from immediate fiscal corrections to structural and macroeconomic reform, these recommendations are intended to be read as a sequenced, mutually reinforcing agenda rather than a menu of isolated options.

Tier 1: Align the Fiscal Regime with Renewable Energy Targets

- Implement a Unified TTI Reduction Strategy. Immediately reverse the FY2025–26 tax increases on renewable energy components and adopt a unified TTI-reduction roadmap across all technology categories: solar, wind, and biomass. A clear, time-bound schedule of reductions, moving to 0% TTI within three years, will provide the investment certainty that developers and importers require.

- Finance the Transition Through Rationalisation of Fossil Fuel Subsidies. The short-term revenue cost of TTI elimination, estimated at 0.09 percentage points of import tax/GDP, should be financed through a phased rationalisation of the US$3.22 billion annual fossil-fuel subsidy burden. Redirecting even a modest share of this expenditure toward support for the renewable energy transition generates a fiscal double dividend: lower subsidy costs and higher revenues from an expanded economy.

- Develop a Sovereign Green Bond Market. Establish a regulatory framework for sovereign and corporate green bond issuance to channel long-term institutional capital into renewable energy infrastructure, with proceeds partially supporting the National Energy Transition Fund recommended below.

- Establish a National Energy Transition Fund. Capitalise a dedicated fund through subsidy savings, green bond proceeds, and international climate finance, including the Green Climate Fund and ADB climate financing windows, to finance grid modernization, battery storage, domestic RE manufacturing, and just transition support for fossil fuel-dependent communities.

Tier 2: Differentiated Tax Reform Based on Elasticity Evidence

- **Prioritise High-Elasticity Products First.** Begin TTI reductions with the most price-responsive products: lead-acid solar cells, vapour-generating boilers, gears and gearing for wind turbines, and auxiliary steam plant equipment. For these products, welfare gains of 15–25% substantially offset the revenue loss, reducing net fiscal costs to 5–8%. This delivers the highest renewable energy uptake per unit of fiscal cost.

- **Phase in Reductions for Moderate-Elasticity Products.** For renewable generator sets, wind energy controllers, and air compressor accessories, reduce TTI to 5% immediately with a clear roadmap to full elimination within three years. This preserves a modest revenue base while delivering meaningful demand stimulation.

- **Complement Low-Elasticity Product Reforms with Direct Incentives.** For products with low demand elasticity, such as gas burners, and parts for wind power equipment, combine modest TTI reductions with direct subsidies, production-linked incentives, and subsidised financing to maximize adoption while minimizing net revenue losses.

- **Institutionalise a Biennial TTI Review Mechanism.** Establish a joint NBR-SREDA technical working group to review TTI rates on all renewable energy products every two years, with published findings informing each national budget cycle. This replaces ad hoc, contradictory annual adjustments with a transparent, evidence-based review process.

- **Ensure Direct Pass-Through of Tax Benefits to End Users.** Operationalise the Power Division's mandate under the Renewable Energy Policy 2025 to develop a direct pass-through mechanism, ensuring that import cost reductions translate into lower prices for households, smallholder farmers, and small businesses, not just importers and distributors.

Tier 3: Structural and Macroeconomic Reform

- **Position TTI Elimination as Macroeconomic Policy.** The CGE evidence of GDP +0.04%, exports +0.47%, trade deficit -0.04 pp, CPI −0.02% confirms that TTI elimination is a macroeconomic growth and stabilization policy, not merely an energy-sector measure. The Ministry of Finance and Bangladesh Bank should incorporate these co-benefits into medium-term fiscal and monetary planning frameworks and communicate the reform accordingly.

- **Leverage Exchange Rate Dynamics for Export Competitiveness.** The 0.12% real exchange rate depreciation induced by the reform improves export competitiveness across the economy. Coordinate exchange rate and monetary policy to sustain this competitiveness effect, particularly for the textiles and garments sector.

- **Protect Rural and Low-Income Household Welfare.** Complement TTI reform with targeted welfare measures, subsidised solar home systems for off-grid rural households, solar-powered irrigation support for smallholder farmers, and energy literacy programmes to ensure the progressive welfare gains identified in the CGE model are fully realized and equitably distributed.

- **Align the ADP with Renewable Energy Targets.** Mandate a minimum renewable energy share of 10% of the energy sector's Annual Development Program, rising progressively to 20% by FY2030, and link TTI adjustments directly to annual renewable energy deployment milestones. Fiscal policy and energy policy must speak with one voice.

- **Strengthen Institutional Coordination.** Establish a formal inter-ministerial coordination mechanism involving NBR, MoPEMR, the Ministry of Finance, Bangladesh Bank, and SREDA to ensure policy consistency and investor confidence. The contradictory signals sent by rising TTIs alongside ambitious renewable energy targets must be resolved at the institutional level, not left to individual budget cycles.

8. Conclusion

Bangladesh cannot afford to maintain a tax regime that penalises the very technologies it needs most to secure its economic future. The evidence presented in this policy brief, drawn from international comparative experience, product-level elasticity analysis, and economy-wide CGE simulation, is consistent and compelling across all three analytical lenses.

The fiscal contradiction is real and urgent: 61% of renewable energy products faced tax increases in FY2025–26, even as the government has committed to sourcing 20% of electricity from renewables by 2030. The partial equilibrium analysis confirms that demand elasticity substantially moderates the net fiscal cost of TTI reduction, to as low as 5% for high-elasticity products. The CGE model demonstrates that at the economy-wide level, a 100% TTI reduction generates GDP growth, export expansion, consumer price deflation, improved trade balance, and progressive household welfare gains with a direct fiscal cost that is modest, manageable, and substantially offset by broader economic returns and long-run fossil fuel subsidy savings.

The reform agenda outlined in this brief is not radical. It is fiscally responsible, evidence-grounded, and directly aligned with commitments the government has already made. What is required is the institutional will to align Bangladesh's tax regime with its clean energy ambitions and to recognize that every year of delay is a year of foregone growth, preventable inflation, avoidable subsidy expenditure, and compounding vulnerability to global fossil fuel price shocks. The transition to renewable energy is not merely an environmental choice. It is Bangladesh's most important economic policy decision of the coming decade.

This policy brief has been prepared based on the report titled "Reduction of Tax Incidence on Renewable Energy Equipment: Potential Implications for Bangladesh." The full report is available at: https://sanemnet.org/reduction-of-tax-incidence-on-renewable-energy-equipment-potential-implications-for-bangladesh/

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