CPD Power and Energy Study
Towards Carbon Neutral Economy

Nationally Determined Contributions (NDC) for the Power Sector

Tracking Progress of NDC 2.0 and Proposed Redesigning of NDC 3.0

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Abstract

Bangladesh, as like most of the parties of the UNFCC, are now taking preparation to submit their nationally determined contributions (NDC). The Department of Environment (DoE) under the Ministry of Environment and Climate Change of Bangladesh is vested with the responsibility to draft the NDC. Emission reduction in the power sector is said to receive the most priority not only from the point of mitigation but also for the fact that it is more feasible to reduce the power sector emission. Against the indicator of key energy transition such as renewable energy integration to mitigate carbon emission, the target for renewable energy for 2030 is set to be 12.5 per cent according to the NDC 2021. Against the less ambitious target, the progress made in 2024 is not much of significant with the current share of renewable energy in 2024 is 3.57 per cent and in 2025 the share is 5 per cent (including off grid and on grid). It is expected that the NDC 3.0 will properly reflect the Information to facilitate Clarity, Transparency and Understanding (ICTU) guideline and ensure the quality and standard set by the UNDP. The study proposes four-step framework to redesign the power sector NDC 3.0 for Bangladesh. The study proposes that the Ministry of Environment and Climate Change in consultation with the Ministry of Power Energy and Mineral Resources (MoPEMR) should set an ambitious emission reduction target of CO_2 emission would be 76.9 m. ton, 91.2 m. ton and 103.3 m. ton respectively. The Bangladesh NDC 3.0 must qualify the UNDP quality assurance checklist for NDC 3.0. Moreover, the NDC 3.0 should be passed on four indicators of the checklist – (a) country ownership and inclusivity; (b) ambitious; (c) just transition and sustainable development; (d) clarity and transparency; and (e) feasibility.

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Acronyms

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
BAU	Business as Usual
BPDB	Bangladesh Power Development Board
BTR	Biennial Transparency Report
CO_2	Carbon Dioxide
DoE	Department of Environment
DPs	Development Partners
ETF	Enhanced Transparency Framework
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FDI	Foreign Direct Investment
GCF	Green Climate Fund
GDP	Gross Domestic Product
G-G	Government to Government
G-P	Government to People
GST1	First Global Stocktake
GHG	Green House Gases
HFCs	Hydro fluorocarbons
IDCOL	Infrastructure Development Company Limited
IEPMP	Integrated Energy and Power Master Plan
INDC	International Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Na¬ture
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau

MDBs	Multilateral Development Banks
MoEFCC	Ministry of Environment, Forest and Climate Change
MRV	Measurement, Reporting, and Verification
MPGs	Modalities, Procedures, and Guidelines
MW	Megawatt
M. ton	Metric Ton
NAP	National Action Plan
NDC	Nationally Determined Contributions
P-P	People to People
SHS	Solar Home System
SREDA	Sustainable and Renewable Energy Development Authority
T&D	Transmission and Distribution
UNDP	United Nations Development Programme
UNFCC	United Nations Framework Convention on Climate Change
WB	World Bank
WRI	World Resource Institute

1. INTRODUCTION AND OBJECTIVES OF THE STUDY

Bangladesh, as like most of the parties of the UNFCC, are now taking preparation to submit their nationally determined contributions (NDC) – a document which outline the plans of respective countries to commit reductions of carbon emissions within a target period - usually before the UN Climate Change Conference to be held in Brazil in November 2025. As of 31 March 2025, only 19 countries have submitted their Nationally Determined Contributions (NDCs). The Department of Environment (DoE), under the Ministry of Environment and Climate Change of Bangladesh, is vested with the responsibility to draft the NDC. According to the UNFCC, the parties need to set more ambitious targets for reduction of carbon emission in NDC to be submitted in 2025 (called NDC 3.0) compared to that was submitted in 2021/22 (called NDC 2.0). This demand for setting ambitious target for reduction of carbon emissions came after the meagre progress reported in the First Global Stocktake (GST1) in 2024. Hence, parties need to submit not only an updated NDC 2.0 but an ambitious NDC for the period of next 10 years (2035).

In Bangladesh, the power sector is one of the major emitters of Green House Gases (GHG). Out of 9 sectors reported under the NDC 2021, top five sub-sectors include power, transport, industry, households and brick kilns. Among those the share of power sub sector is the highest 20.98 million Ton CO2e or 12.41 per cent of the total emission. In the Business as Usual (BAU) scenario (2030), the second highest contribution of GHG emission is found for the power sector (23.24 per cent). As a result, the combined GHG reduction target has been set at 48.9 per cent for the power sector by 2030, which is the highest compared to any other sub-sector.

In case of revising the target for the power sector and to set an 'ambitious' one it is important first to set a 'realistic' target of electricity demand till 2035 and possible energy-mix to attain that electricity. Moreover, an assessment of the progress of the NDC 2.0 for the power sector till 2025 is equally important in order to appreciate the effectiveness of the existing mechanism of implementation, monitoring and evaluation of the emission related targets of the power sector. Tracking the progress against the targeted sectoral conditional and unconditional emission reduction targets of the power sector will help better designing the NDC 3.0 of Bangladesh. Hence, targeting for NDC 3.0 needs clarity regarding projection of electricity demand for 2030-2040, energy mix including fossil and different non-fossil sources and investment required to attain that fuel mix.

In this backdrop, the Centre for Policy Dialogue (CPD) has decided to take up this study with the following objectives:

a) To assess the benchmark of the carbon emission scenario and targets of the power sector in NDC;
b) To review and track progress against the power sector targets set in NDC 2021; and
c) To design and if needed redesign the targets, goals and methods of the power sector Net Zero Emission targets in the NDC 3.0.

2. ANALYTICAL FRAME OF THE STUDY

2.1 Assessment Tools for Tracking Progress of NDC 2.0

As the decade has passed by the signing of Paris Agreement, parties urgently need to track the progress made against the commitment made in the NDC. It is almost halfway since parties submitted their NDC 2.0 in 2021 with their specific commitments for reduction of carbon emission by 2030. Several assessment criteria are identified for tracking progress of the NDC 2.0.

Assessment based on 'Ambition Enhancement': Qiu et al. (2024) applied an assessment framework with four categories of 'ambition enhancement'.[1] Each category represents a different level or degree of ambition enhancement. *Category 1* refers to advancements in economy-wide commitments, including new targets, the enhancement of existing targets (such as GHG reductions or target years), or shifting an existing GHG target to specify an emissions level for a particular target year, which involves defining a base year or a static baseline scenario.[2] *Category 2* focuses on the scope of sectoral and GHG coverage within a country's NDC commitments and plans. A broader scope could signal greater ambition if it leads to additional emissions reductions from new sectors or GHGs not covered by current policies.[3] *Category 3* indicates the establishment or enhancement of sector-specific targets. Non-GHG targets, such as forest restoration or achieving a certain share of renewable energy, can provide further mitigation beyond the effects of existing GHG targets.[4] *Category 4* involves setting or enhancing policies and actions aimed at reducing GHG emissions.

Readiness for Implementing NDC: The UN ESCAP used a method to track the progress using four enabling factors/categories, which when analysed individually and together provide an objective basis to estimate the readiness of developing countries in the Asia Pacific region to implement their current NDCs and initiate more ambitious, far-reaching pledges in the next five years (2021-2025) for an accelerated implementation of the Paris Agreement. The four anchors are: (a) mainstreaming of climate change in public policy; (b) coordination mechanism; (c) allocation of financial resources; and (d) monitoring capacity.

Future Structure of Decarbonisation: Baird et al. (2021) aimed to present a brief assessment analysis of the NDCs providing insights into how a future 'decarbonised' region might look like. The assessment of the parties NDC could be based on five indicators – (a) GHG targets, (b) GHG coverage, (c) time frame, (d) conditionality elements and (e) targets by mitigation sectors.

[1] 'Ambition enhancement' is defined as commitments or plans that raise the country's contribution to emissions reduction or strengthen accountability and clarity on its strategy for overall emissions reduction as communicated through NDCs.

[2] For instance, an emissions intensity target tied to future GDP or population creates a dynamic baseline, introducing uncertainty in the exact amount of emissions reduction.

[3] Countries that include land use in their scope can strengthen mitigation by adding more land-use categories and activities to their accounting framework.

[4] For AMS, sectoral GHG targets often indicate how actions to achieve economy-wide targets will be distributed across different sectors. In cases where there are no economy-wide targets, sectoral GHG targets may represent the main form of ambition communicated.

Modalities, Procedures and Guidelines for Monitoring NDC Implementation: The Paris Agreement's Enhanced Transparency Framework (ETF) for action and support has adopted modalities, procedures, and guidelines (MPGs) which provides a foundation for monitoring and reporting related to the NDC implementation.[5] As the aim of the enhanced transparency framework is to provide a clear understanding of climate change action in the light of the objective of the Convention, including clarity and tracking of progress towards achieving Parties' individual NDCs, ETF can be used to track NDC implementation progress of the parties.

2.2 Framework for Redesigning the Power Sector NDC 3.0

According to the World Resource Institute (WRI), the existing NDCs of developed and developing nations are not nearly ambitious enough to limit global warming to below 1.5°C.[6] In April 2024, WRI experts identified a five-point plan for the next-generation NDCs, urging governments to 'go much further in their emissions cuts than their current NDCs'. WRI's five-point plan sets: (a) ambitious emissions-reduction targets aligned with the 1.5°C limit, (b) accelerating sectoral transformations, (c) building resilience across all systems, (d) catalysing multi-stakeholder action and investment, and (e) putting people at the centre of climate action. Keeping the sectoral requirement and WRI framework in mind, the study proposes four-step framework to redesign the power sector NDC 3.0 for Bangladesh. Figure 1 presents the components of the NDC 3.0 for the power sector.

Step 1: Setting 2035 and strengthen 2030 emissions-reduction targets aligned with 1.5-degrees C and net-zero emissions goals: Preventing increasingly dangerous impacts of climate change requires limiting global temperature rise to 1.5 degrees C above pre-industrial levels.[7] This is a collective goal supported by 194 vastly different countries, so it is hard to prescribe a single, objective 2030 and 2035 emissions target at the national level. Less ambiguous than the collective 1.5- degrees C goal are the net-zero emissions targets that 104 countries have now adopted. Those countries should ensure that their 2030 and 2035 targets put them on a realistic path to phasing out emissions entirely by their net-zero target date. Setting the power sector decarbonisation goals, targets and roadmap is crucial to achieve the overall net zero target of the parties as in most cases this is the highest emitting sector.

Step 2: Accelerate systemwide transformations by establishing ambitious, timebound sectoral targets: Limiting global temperature rise to 1.5 degrees C will also require scaling up renewable energy, doubling-down on innovation to decarbonise industry, incentivising green buildings, redesigning cities and shifting to zero- and low-carbon transport, conserving ecosystems and improving food systems to transform nearly every sector. To ensure such far-reaching changes, countries should set sector-specific targets that underpin their topline emissions-reduction goals, as well as jumpstart a process with ministries to integrate these targets into their strategic planning. Doing so can help guide domestic policymaking across the whole of government to phase out the fossil fuel power plants and emphasise the renewable energy-based power generation. The NDC 3.0 must include such targets and directives to massively scale down fossil fuels and speed up renewable energy.

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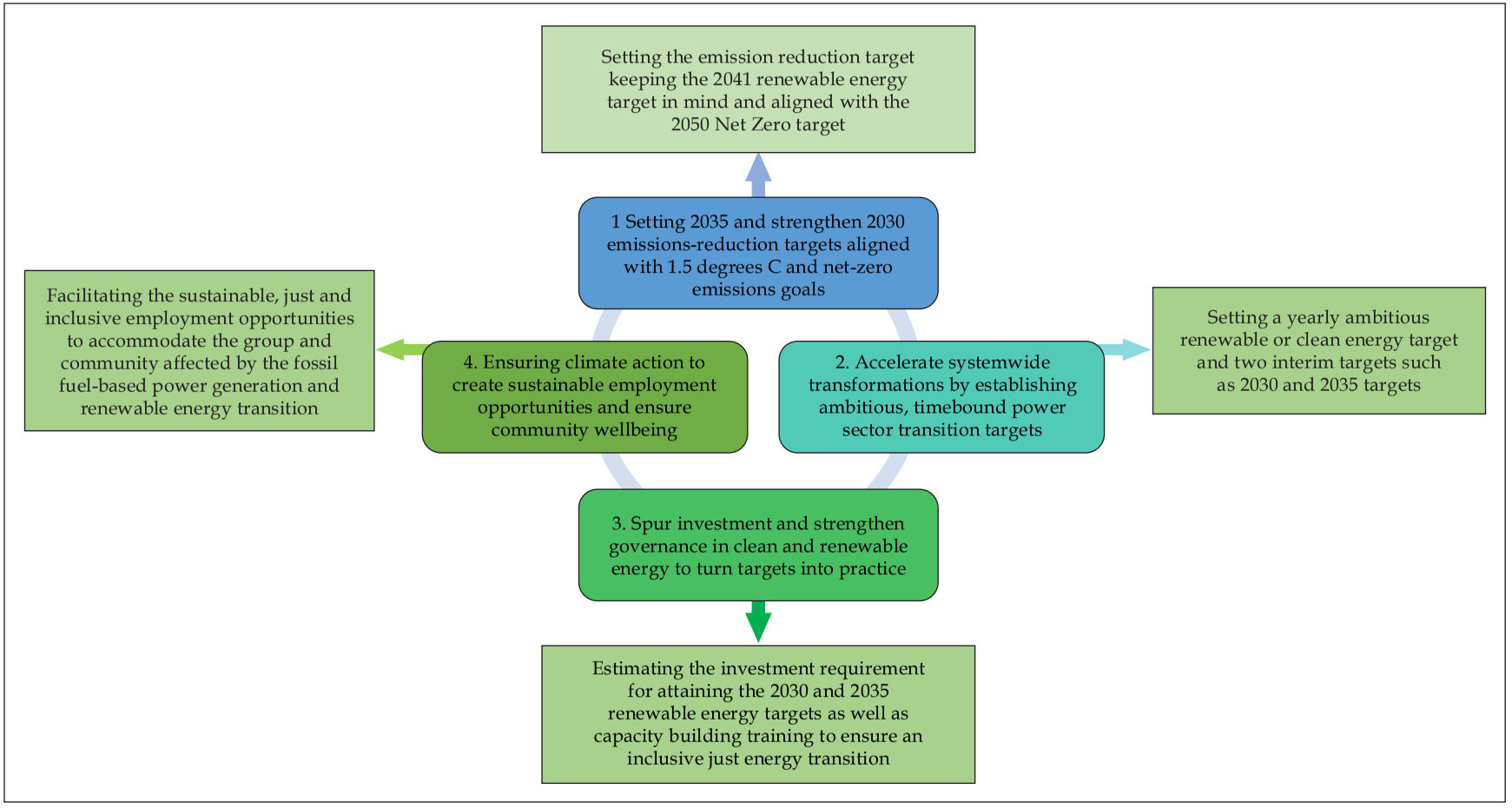
[5] A synthesis report by UNFCC synthesises information from 164 available NDCs, representing all 191 Parties to the Paris Agreement, including the 86 new or updated NDCs communicated by 113 Parties, recorded in the interim NDC registry as of 30 July 2021. The same indicators and scale of presence can be used as a benchmark to review the updated Bangladesh NDC 2021.

[6] In 2023, the Intergovernmental Panel on Climate Change's (IPCC) summary of five years of reports said that to keep within the 1.5°C limit, emissions need to be reduced by at least 43 per cent by 2030 compared to 2019 levels and at least 60 per cent by 2035. By 2035, the world needs to be on a radically different pathway to overcome the climate crisis.

[7] Limiting carbon emission means means cutting global greenhouse gas emissions by 43 per cent by 2030 and 60 per cent by 2035, relative to 2019.

Figure 1: Framework for Redesigning NDC 3.0 for the Power Sector



Source: Prepared by Authors based on WRI (2024).[8]

[8]World Resource Institute https://www.wri.org/insights/next-ndcs-5-point-plan

Step 3: Spur investment and strengthen governance in clean and renewable energy to turn targets into practice: It is critical that NDCs not only make commitments but also lay the groundwork for implementing them. This includes a vision for how government ministries, subnational governments, the private sector and civil society, as well as others, will work together to turn ambition into reality, including through policies, institutions and finance.

To start with, implementing NDCs will require a whole-of-government effort. The profile, legitimacy and associated international scrutiny of the NDC process can shift the political calculus, creating opportunities to strengthen climate governance accordingly. The process can also help facilitate consensus-building and integrate climate issues into mainstream planning, policy, finance, regulatory and legislative decisions. The NDC document itself can describe allocation of responsibility for implementation to certain ministries and note whether the country is establishing or strengthening national climate bodies that can drive forward integration and accountability. Leveraging these opportunities may prove critical to establishing the legal and institutional infrastructure necessary to implement ambitious goals. The NDC process is also an opportunity to engage subnational actors such as cities, states, regions and local communities. This can achieve several goals: ensuring alignment between local and national climate goals; strengthening subnational implementation via policies and budgets; and increasing countries' overall ambition.

Implementation of the new and more progressive NDCs will also depend on investment and finance. This signal is even stronger if NDC targets, policies and institutional measures are integrated into core national and sectoral plans. This can help to mobilise the finance and investment to carry out national commitments. But the NDCs' targets and measures, even if strengthened through integration into core national and sectoral planning, cannot stand alone if they are to succeed. They'll need to be buttressed by credible strategies to mobilise investment and financing. Such strategies would build on but go beyond the estimates some developing countries made in previous NDCs of the cost of their proposed actions. It can also delineate the actions countries could finance domestically and those which would be conditional on international finance. NDC investment strategies can also provide a rallying point that enables developing country governments to bring together public financing partners (e.g. Multilateral Development Banks, Development Finance institutions, climate funds, donors, philanthropists) and the private sector to coordinate how they will support countries' targets. Such coordination processes—which should be driven by a country's own objectives and internal alignment could enable the co-creation of project pipelines, structure investment programmes, and help identify policies that encourage greater investment.

Step 4: Ensuring climate action to create sustainable employment opportunities and ensure community wellbeing: Given the widespread ramifications of climate change and the many potential benefits of tackling it, the next generation NDC will need to draw clear linkages to a wide range of issues that are critical for peoples' lives—from employment to health to local economies and beyond. Doing so is essential to maximise the economic, development and social opportunities from well-planned climate policies, as well as for managing challenges like loss of livelihoods for workers in the fossil fuel industry or certain types of land use. Taking these issues into account is also critical for building public and political support for greater climate action.

The new NDC must be gender responsive and youth inclusive. There has consequently been an increase

in the number of NDCs addressing gender and youth in the second generation NDC compared to first generation NDCs. The United Nations Development Programme (UNDP) found that 45 per cent of second generation NDCs re¬viewed include gender-responsive targets.[9]

Whilst NDCs cannot provide fully granular policies across all issues, what they can do is outline clear plans for a transition, including working directly with communities, workers and other affected groups to develop strategies for an inclusive zero-carbon and resilient transition. These approaches could include employment creation and worker retraining, support for community development and economic diversification, social safety nets and more. The new NDCs can also provide quantitative goals on objectives such as access to high-quality green jobs, health improvements through pollutant reduction, and equitable access to renewable energy and sustainable transport.

The NDC process also offers countries the opportunity to engage the most vulnerable communities and Indigenous Peoples in developing national adaptation measures. Inclusive stakeholder participation helps ensure that investments in adaptation and climate-resilient development meet local needs. Finally, the new NDC can include providing specific information on financial costs and technical and capacity needs to respond to the most severe impacts of climate change, as well as national efforts related to disaster-risk reduction, humanitarian assistance, rehabilitation, migration and slow-onset events, such as loss of biodiversity and erosion of cultural heritage.

3. CRITICAL REVIEW OF THE NDC 2.0

3.1 Brief Structure of NDC 2.0 on Power and Energy Sector

In NDC 2.0, four sectors with 13 sub-sectors are targeted for emission reduction. Table 1 presents the targeted emission reduction under the power sector in three different scenarios: (a) unconditional contribution, (b) conditional contribution and (c) combined contribution. According to NDC 2.0, power sector's commitment by 2030 is to reduce 43.74 MtCO2e (48.9 per cent of total emission reduction target). These carbon emissions targets are to be achieved through different unconditional and conditional measures. Unconditional measures or contributions indicate activities which the government will implement without depending on external assistance. These unconditional contributions include three types of activities – (a) Implementation of renewable energy projects; (b) Enhanced efficiency existing power plants; and (c) Use of improved technology for power generation. These specific projects include- (i) Implementation of renewable energy projects of 911.8 MW; (ii) grid-connected Solar-581 MW, Wind-149 MW, Biomass-20 MW, Biogas-5 MW, New Hydro-100 MW, Solar Mini-grid-56.8 MW; (iii) installation of new Combined Cycle Gas based power plant (3208 MW); (iv) efficiency improvement of Existing Gas Turbine power plant (570 MW); and (v) installation of prepaid meter.

Conditional contributions, on the other hand, include activities which the government is committed to implement provided necessary technical and financial support from external sources are available.

[9]A recent study by the International Union for Conservation of Na¬ture (IUCN) found that of 89 updated or new NDCs reviewed, 69 (78 per cent) include at least one mention of gender. Whilst consultation increased, the question of what constitutes meaningful engagement in the process remains largely unanswered.

Similar to the unconditional ones, three types of activities are identified - (a) Implementation of renewable energy projects; (b) Enhanced efficiency existing power plants; and (c) Use of improved technology for power generation Power. Specific projects include – (i) implementation of 4114.3 MW worth of renewable energy projects which include grid-connected Solar (2,277 MW), Wind (597 MW), Biomass (50 MW), Biogas (5 MW), New Hydro (1,000 MW), Solar Mini-grid (56.8 MW) and Waste to Electricity (128.5 MW). Other projects include implementation of coal power plant using Ultra super critical technology (12,147 MW; installation of new Combined Cycle Gas based power plant (5,613 MW); efficiency improvement of Existing Gas Turbine power plant (570 MW); installation of prepaid meter; and bring down total T&D loss to a single digit by 2030.

Table 1: Power Sector in the NDC 2.0

	GHG Emission Scenario (BAU 2030)		Unconditional			Conditional			Combined	
	MtCO2e	In %	MtCO2e	Reduction of MtCO2e	In %	MtCO2e	Reduction of MtCO2e	In %	Reduction of MtCO2e	In %
Power	95.14	23.24	87.13	8.01	29.06	51.4	35.73	57.72	43,74	48.9
Total Emission	409.41		381.85			319.94				
Total reduction				27.56	6.73		61.9	15.12	89.47	21,85

Source: NDC 2.0.

3.2 Assessing the Targets of NDC 2.0

Scope and coverage: General description of the NDC targets includes economy-wide absolute targets of emission reduction by 2030 in the respective sectors. In terms of the selected gases of the emission reduction CO_2, CH_4, N_2O, and hydro fluorocarbons (HFCs) were included. Bangladesh has expanded the coverage of NDC by including more sectors than in INDC.[10] The number of selected sectors apparently seems okay; however, the target of power and energy sector seems less ambitious.[11] Small-scale renewables are included, such as solar home systems or use of solar to power irrigation. Emphasis on energy efficiency measures are also mentioned as a tool for managing demand for electricity but are not explicitly covered by the action plan. So, there are several ways and scopes of making the NDC more specific, comprehensive and target oriented.

Time frames and/or periods of implementation: To deliver the overall targets, the NDC anticipated that the power sector would contribute GHG emissions reductions of 5 per cent below 'business-as-usual' by 2030, or by 18 per cent below 'business-as-usual' by 2030 under unconditional terms, conditional on support from developed countries. Time frame and/or period for implementation starts from 1 January 2021 to 31 December 2030. The document only targets the emission reduction by 2030

[10]The scope of the action plan of power, industry and transport is electricity generation (including fossil fuels, renewables and others such as nuclear) and electricity transmission and distribution.

[11]There are debates among the academia whether the targets set forth for the power sector is ambitious or not.

and mentions the possible revision to be done in 2025. However, the NDC action plan covers the period from 2016 to 2019 and from 2020 to 2025 and describes what needs to be done over this timeframe, by whom and by when, to deliver the required GHG emissions reductions in the power sector. The timeframe and period of the NDC seems okay; however, inclusion of yearly targets would have helped achieve the final 2030 emission reduction target.

Assumptions and methodological approaches, including for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals: The assumptions and methodology regarding the reference indicators, baseline(s) and/or reference levels, including, where applicable, sector-, category- or activity-specific reference levels, are constructed, including, for example, key parameters, assumptions, definitions, methodologies, data sources and models used are not very much up to the point. In fact, according to the NDC 2021 Bangladesh has not used any other assumptions or methodological approaches. NDC also quotes that Bangladesh will also apply specific assumptions and methodologies, when appropriate, when assessing progress made under the policies and measures related to the implementation of its NDC in its National Communications and Biennial Update Reports. The upcoming Biennial Report is likely to report to what extent the specific assumptions are used for setting/estimating targets.

Mitigation co-benefits resulting from adaptation action and/or economic diversification plans: The mitigation scenario analysis and assessment of achievable but ambitious unconditional and conditional GHG mitigation measures by 2030 for the NDC update have been prepared following IPCC guidelines and stakeholder consultation. In the unconditional part of NDC, only those mitigation measures were considered which would be implemented based on current local-level capacity and financed through internal resources. Contingent upon international funding and technological support, the conditional emission reduction will be implemented. The following sections present the updated unconditional and conditional contributions. The targeted GHG emission reduction for unconditional contributions will be implemented through a set of mitigation actions - such as implementation of renewable energy projects, enhanced efficiency of existing power plants and use of improved technology for power generation, etc.

Fairness and ambition in the light of national circumstances: The NDC 2021 represents an enhanced ambition for mitigation with a substantial increase from the INDC 2016. The actions needed to deliver on these commitments will require international support in the form of finance, technology transfer and capacity building. Bangladesh also committed to provide a relevant contribution regarding national financial resources, staff time and robust integration of development and mitigation activities. In selecting the actions set out above, Bangladesh has prioritised those which fit with the growth priorities set out in our national development plans. In addition, Bangladesh has captured the synergies between mitigation and adaptation. The INDC suggested measures have already been taken forward by the country's own resources. However, the NDC 2021 lacks fairness as it fails to mention some of the key issues related to employment, gender and marginal group and youth.

Implementation and monitoring mechanism of NDC 2021: Whilst submitting the previous NDC, Bangladesh has already prepared an NDC implementation roadmap and action plan for transport, power and industry sector. It suggests governance arrangements for the NDC-NAP implementation framework. Bangladesh is working to put a workable Measurement, Reporting, and Verification (MRV)

system to maintain transparency and verification of its mitigation efforts and outcomes. This action plan describes how Bangladesh intends to deliver the GHG emissions reductions in the power sector, to support the overall targets described above. The NDC implementation action plan covers the period from 2016 to 2019 and from 2020 to 2025 and describes what needs to be done over this timeframe, by whom and by when, to deliver the required GHG emissions reductions in the power sector. It is envisaged that the action plan will be a 'living' document and will be regularly updated.

Recognising that adaptation is the key priority for Bangladesh, the action plan prioritises actions that will deliver both GHG emissions reductions and strengthened climate resilience. As well as setting out what needs to be done, the plan also looks at the resource needs to implement it, how the activities will be measured and evaluated and how the work will be managed and coordinated. Delivering the plan includes solar, wind, biogas, re-powering or retrofitting gas power plants and lastly clean coal technologies. In addition to that, the action plan includes several actions that will be important in other sectors to help facilitate carbon reductions from the power sector.[12]

The lack of monitoring mechanism has slowed down the implementation of the NDC. Neither the NDC 2021, nor the action plan has chalked out any specific monitoring mechanism for regulating the implementation of the GHG emission reduction plan.

3.3 Tracking Progress of Power Sector Targets of the NDC 2.0

It is vital to track the progress of the indicators of NDC 2.0 before starting the designing the targets of different power sector indicators of NDC 3.0. Biennial report will delineate the tracking progress of NDC. The countries are expected to submit their biennial transparency report (BTR) every two years. The Department of Environment (DoE) has already prepared the first BTR in June 2023. The DoE is also preparing the second BTR to submit to UNFCC along with NDC tracking report. As the second report is yet to be published, there are some indicators lacking latest values and data such as the net GHG emission and removals in power sector and rate of energy efficiency, carbon neutrality. The data available for these indicators is as old as 2019.

Against the indicator of key energy transition such as renewable energy integration to mitigate carbon emission, the target for renewable energy for 2030 is set to be 12.5 per cent according to NDC 2021. Against that target, the progress made in 2024 is not much of significant. The share of renewable energy in 2024 is 3.57 per cent and in 2025 the share is 5 per cent (including off grid and on grid). However, the progress has been slow. With only five years remaining to achieve the target, the pace should have been much faster than the existing pace.

[12]Such as efficient use of electricity and primary energy uses in industry, raising awareness of efficient use of electricity, for businesses and the public. Introduction of different incentive schemes to promote industrial Energy Efficiency measures. Energy efficient and zero carbon homes, introduction of a market-based incentive scheme to promote renewable energy generation mainly by the private sector, rationalisation of import tax and all applicable duties to promote energy efficient appliances and imported energy efficient building materials. Having a dedicated action plan for the successful implementation of the NDC puts Bangladesh in a higher position, however, it is also important to regularly update and improve the implementation strategy to make it more relevant and up to date.

Table 2: Current situation of the selected indicators

Issues	2021	2024	NDC Target 2030
Share of renewable energy generation and usage	1.01%	3.57%	12.5% (5026 MW including both conditional and unconditional contribution by 2030)
Share of fossil fuel in primary energy consumption	98.99%	96.43%	Not mentioned
Net GHG emissions and removals in power sector		N/A	48.9%
Rate of energy efficiency, carbon neutrality		N/A	10%

Source: Authors' calculation based on BPDB and SREDA data.

The progress against the selected indicators is not so impressive (Table 2). The change in the renewable energy share was 1.01 per cent in 2021 compared to 2019 and 3.57 per cent in 2024 from 2021. The share of renewable energy has increased; on the other hand, the share of fossil fuel has decreased from 98.9 per cent to 96.4 per cent. Even in this case, the rate of fossil fuel phasing out is insufficient to meet the target of GHG emissions. Interestingly, there is no updated data available on the per cent reduction of GHG intensity, energy efficiency, carbon neutrality, GHG emissions and removals from electricity generation. The latest data available for these indicators are as latest as 2019.

According to the BTR submitted in June 2023, there are several renewable energy projects that have been initiated to mitigate carbon emission through the implementation of measures such as renewable energy development, energy efficiency, and waste management. Bangladesh has been increasing number of mitigation projects, including the Bangladesh Solar Home System (SHS), Solar Parks, Solar Mini-grid, Solar Irrigation Pumps, and Roof-top-solar Systems. The Bangladesh SHS programme, initiated in 2003, has been successful in reducing greenhouse gas emissions and providing electricity access to rural communities. Bangladesh's off-grid solar power programme is the largest globally, serving as a prime example for expanding access to clean and affordable electricity. Through this programme, 20 million people in Bangladesh have been able to access electricity by harnessing the power of solar energy. By implementing these projects, a total of 11 Mt of carbon emission can be reduced.

According to the DoE, the progress against the targeted indicators is significant, as the ambition was moderate, even low in some cases, so significant progress has been made. However, this study finds the progress rather to be slow. Given the less ambitious target setting in the NDC a speedier progress against the targets could have been achieved.

3.4 Reporting the National Circumstances and Institutional Arrangements

3.4.1 Alignment with the National Policies, Plans and Actions

There is lack of coherence in the national plans, policies and acts. Moazzem and Hridoy (2023) concluded that when compared to the other relevant energy-related acts, plans and policies of the country, the revised draft has many deviations though for most of them, the lack is in the prior policy rather than

in the revised draft. As the NDC was submitted in 2021, there are few significant policies that were undertaken after the NDC submission. Mujib Climate Prosperity Plan 2023, Renewable Energy Policy 2025 and lastly, the Integrated Energy and Power Master Plan 2023. These policies are dedicated to the renewable energy targets and expansion in Bangladesh.

Table 3: Reflection and Alignment between national policies and NDC

NDC and Other Policies	Renewable Energy Target	Fossil fuel phaseout target	net GHG emissions and removals	rate of energy efficiency, carbon neutrality
Nationally Determined Contributions 2021	5026 MW (including both conditional and unconditional contribution) by 2030	Not mentioned	43.74 MtCO2e (48.9 %)	10%
Integrated Energy and Power Master Plan (2023)	40% by 2041	Phase out of rental and quick rental power plants	Not mentioned	Reduce energy intensity (national primary energy consumption per unit of GDP) by 20% from 2013 levels in 2030
Climate Prosperity Plan (2023)	30% by 2030 40% by 2041	Not mentioned	Not mentioned	20% by 2030
Draft Renewable Energy Policy 2022	40% by 2041	Not mentioned	No fixed goal	Not mentioned

Source: Prepared by authors based on different official documents.

There is a lack of reflection of the renewable energy and energy efficiency targets set in the NDC and different national plans and policies. The national plans and policies coherently have determined the target of 40 per cent of renewable energy by 2041. However, the NDC 2021 targets a comparatively lower ambitious target of 5,026 MW of renewable energy projects by 2030. The same trend can be found in case of energy efficiency. The NDC targets a more moderate rate of 10 per cent of energy efficiency by 2030, whereas the other plans and policies project double of that, 20 per cent of by 2030. One very weak point of all the plans policies including the NDC is, it ignores the necessity of fossil fuel phaseout for favouring the renewable energy transition. The NDC does not mention any timeline of fossil fuel phase out, hence, there is no reflection of that in the national policies as well. There is a clear mismatch among the NDC and other policies in terms of target setting for renewable energy, energy efficiency and fossil fuel phaseout.

3.4.2 Institutional Arrangement and Coordination Among Different Public Agencies Towards Attaining the NDC 2.0 targets

The institutional arrangements for driving forward and coordinating NDC implementation are set out in the NDC Implementation Roadmap. The NDC implementation power sector action plan is supposed to be coordinated and led by the Sustainable and Renewable Energy Development Authority (SREDA) in the Ministry of Power, Energy and Mineral Resources.[13] In the context of NDC implementation, SREDA's

[13]SREDA operates under the Power Division of the Ministry of Power, Energy and Mineral Resources (MPEMR) as a coordination body for the development of the renewable energy in the country.

role is fourfold: (a) to chair the NDC Implementation Power Sector Working Group; (b) to coordinate the policy response for that sector; (c) to work with all power sector stakeholders as appropriate; (d) to track progress at the sector level; (e) to put in place data sharing agreement as necessary to collect data to support this tracking of progress; (f) to report to the NDC implementation technical committee on power sector NDC implementation issues and progress; and (g) to suggest ways and means to improve implementation.

SREDA, being an implementing agency, has implemented utility scale and distributed solar systems to mitigate emission. It has also taken projects and initiatives to increase energy efficiency in the energy sector. However, such initiatives are insufficient to ensure proper NDC implementation and being the Chair of the NDC Implementation Power Sector Working Group, it needs more proactive stance.

There is a lack of coordination among the public agenting in ensuring NDC related activities. Not much of a significant collaboration has been noticed between the DoE, who is overall in-charge of the NDC implementation, and SREDA. SREDA did not arrange any consultation meetings with the different stakeholders. The NDC Implementation Power Sector Working Group. Its main role is to discuss sector-related issues, including discussions on mitigation measures and tracking progress.

The Power Division is to be responsible for coordinating stakeholder engagement within the Ministry on the power sector issues such as running open consultations on policy proposals, organising NDC implementation workshops for the power sector and responding to specific queries regarding NDC implementation in the power sector, liaise with the MoEFCC in relation to wider NDC implementation stakeholder engagement and contributing from a power sector perspective to wider stakeholder engagement exercises.

4. PROPOSED REDESIGNING OF THE POWER SECTOR TARGETS FOR NDC 3.0

4.1 Setting Carbon Emission-reduction Targets for 2035 and Strengthening the Existing Target of 2030
As per the NDC 3.0 guideline which is reflected in the analytical framework of the study, Bangladesh needs to set an emission reduction target for the power sector which should be 'ambitious'. To set the target of emission reduction for the next decades, a reliable estimate of electricity demand is an essential pre-requisite. Besides, a realistic projection of energy-mix for power generation will be equally important. the projection of electricity demand made in the IEPMP 2023 for 2041 is faulty (Moazzem and Quaiyyum, 2024) because of its weak methodological foundation, especially failure to consider lower electricity demand during covid and post-covid period. Hence, Bangladesh needs a revision of the electricity demand for 2030, 2035 and 2040. CPD has made a projection based on the proper methodological tool and found that electricity demand would be significantly lower compared to what is being projected in the IEPMP. According to the estimates, the projected demand for electricity for 2030, 2035 and 2040 would be 22,702 MW, 26,722 MW and 29,761 MW respectively. Taking that into account that the remaining power to be generated by fossil fuel, a predicted reduction of CO2 emission would be 76.9 m. ton, 91.2 m. ton and 103.3 m. ton respectively (Table 4). The unconditional targets are 19.24 m. ton, 22.81 m. ton and 25.83 m. ton respectively for 2030, 2035, 2041. Whereas the conditional targets are 57.72 m. ton, 68.43 m. ton and 77.5 m. ton respectively for 2030, 2035 and 2041.

Table 4: Proposed Targets of NDC 3.0: Electricity Demand and Carbon Emission

Issues	2030	2035	2041
Forecasted electricity demand (MW)	22,702	26,722	29,761
CO2 emission reduction target for the power sector (m ton CO2/MWH)	76.96 (Unconditional 19.24, conditional 57.72)	91.24 (Unconditional 22.81, conditional 68.43)	103.34 (Unconditional 25.83, conditional 77.5)
Expected share of renewable electricity (%)	20	24.5	30
Expected electricity demand from renewables in MW (estimated)	4540	6438	8928
Required renewable capacity in MW (plant factor 0.25)	18,162 (Unconditional 4,540 MW, conditional 13,622 MW)	25,751 (Unconditional 6,438 MW, conditional 19,313 MW)	35,713 (Unconditional 8,928 MW, conditional 26,785 MW)

Source: Authors' calculation.

According to the Renewable Energy Policy 2025, renewable energy will cover about 20 per cent of electricity demand by 2030 and 30 per cent of electricity demand by 2040. Taking the estimates of Moazzem and Quaiyyum (2024) and Moazzem et al. (2025), the required renewable energy-based power generation capacity would require increasing up to 18,162 MW for 2030 and 35,712 MW by 2040. CPD proposed an interim target for 2035 considering 24.5 per cent of total electricity demand to be met by 25,751 MW worth of generation capacity. Table 5 presents the estimates.

Table 5: Required Renewable Energy-based Power Generation Capacity for 2030, 2035 and 2040

Year	Total projected demand (on grid and off grid)	Expected share of renewable electricity (%)	Expected electricity demand from renewables in MW (estimated)	Required renewable capacity (plant factor 0.25)
2030	22,702	20	4,540	18,162
2035	26,277	24.5	6,438	25,751
2040	29,761	30	8,928	35,713

Source: Moazzem et al. (2025).

The remaining share of electricity demand for the period of 2030 and 2040 will be met by fossil-fuel-based power generation. A phased-out approach for fossil-fuel based power plants will be applied by the MoPEMR in order to make a balance in the share of electricity supply using fossil and non-fossils including renewable energy sources. Moazzem et al. (2025) estimated that the fossil fuel generation capacity for 2030, 2035 and 2040 would be 29,773 MW, 32,523 MW and 34,152 MW respectively. Table 6 presents the projected electricity generation capacity for 2030, 2035 and 2040 respectively.

Table 6: Required Fossil Fuel capacity to meet Demand

Year	Total projected demand (on grid and off grid)	Expected share of fossil fuel-based electricity (%)	Expected electricity demand from fossil fuel-based electricity in MW (estimated)	Required fossil fuel-based electricity capacity (plant factor 0.61)
2030	22,702	80	18,162	29,773
2035	26,277	75.5	19,839	32,523
2040	29,761	70	20,832	34,152

Source: Moazzem et al. (2025).

It is expected that the new NDC will improve its methodological rigor and framework for more accurate estimation of the key statistical indicators. It will set more ambitious target for reduction of CO_2, and other GHG emissions as well as undertake ambitious measures such as renewable energy targets, and energy efficiency targets. There must be an interim target for 2035 for all the indicators such as reduction of GHG emission, renewable energy, grid upgradation and energy efficiency.

4.2 Accelerate Systemwide Transformations by Establishing Ambitious, Timebound Sectoral Targets

Moazzem et al. (2025) estimated a distribution of energy-mix among different renewable energy sources which include solar, wind, hydro, biogas, biomass, off-grid and imported renewable energy. Table 7 presents different sources of renewable energy for power generation. According to the estimates major share of renewable energy would be sourced from different types of solar-based power generation- 34 per cent by 2030 and 46.6 per cent by 2035. Both utility scale and distributed scale of solar energy would be the possible option for meeting the required target. Wind **power** would be second important source for power generation (**24.8 per cent by 2030**). Other important sources include hydropower, biomass and biogas. A part of requirements needs to be met by imported electricity generated from hydropower from regional market. Enhancing energy efficiency at industrial and household levels needs to have a special focus in the future NDC as well.

Table 7: Scaled Renewable Energy Source Contribution: CPD Estimates

Renewable energy source	Technology	2030 MW	2035 MW	2041 MW
Solar	Solar Park	4742.1	6843.9	10299.9
	Rooftop Solar Except NEM	417.37	2057.00	3095.72
	Net Metering Rooftop Solar	472.79	800.51	1204.79
	Solar Irrigation	290.51	492.09	740.69
	Solar Mini grid	32.36	54.73	82.62
	Solar Microgrid	0.00	0.00	0.00
	Solar Nanogrid	0.00	0.00	0.00
	Solar Charging Station	1.53	2.66	3.87
	Solar Street Light	95.41	161.52	243.02
	Solar powered Telecom BTS	44.88	76.00	114.57
	Solar Drinking Water System	0.46	0.89	1.29

(Table 7 contd.)

(Table 7 contd.)

Renewable energy source	Technology	2030 MW	2035 MW	2041 MW
Total Solar		6332.43	12023.9	17229.2
All Wind Projects		4520.2	9508.8	13625.1
All Hydro Projects		1504.9	2489.5	3567.1
All Biogas projects		4.5	7.4	10.4
All Biomass projects		42.9	44.6	46.4
Off-Grid renewable energy		554	554	554
Import Required		5243.2	1162.9	720.9
Total		**18202**	**25791**	**35753**

Source: Moazzem et al. (2025).

4.3 Spur Investment in Renewable Energy-based Power Generation

Achieving ambitious NDC 3.0 will require huge investment in generation, transmission and distribution of variable electricity of different types of renewable energy sources. An unconditional contribution by the government of Bangladesh and the local private sector would marginally meet the required need of investment. Bangladesh can set the target of attaining 20 per cent-25 per cent of the required financing from domestic sources including public expenditure and private) sources, rest of the 75 per cent- 80 per cent needs to be from overseas investment (FDI), G-G, G-P, P-P partnerships.

To ensure the required need for resources, NDC 3.0 should strongly approach for conditional contribution from different external sources. Moazzem et al. (2025) estimated that a total amount of USD 18 billion will be required for creating generation capacity of 16,655 MW of electricity by 2030. The amount would be another USD 13 billion for creating generation capacity of 12,832 MW by 2035 and another USD 11billion for 11,124 MW by 2041.

There is a need for financing diversification from national and international sources. In the case of attracting national investment sources, private sector investment should be the major priority as private sector power generation contributes to 50 per cent of the total power generation. A study by Khan et al. (2023) reveals that Bangladesh's private sector dominates the renewable energy sector, with 59 per cent of then planned projects under its ownership and 62 per cent of total investment coming from private sources.

In this connection overseas investment (FDI), G-G, G-P, P-P partnerships will be required to generate resources for ensuring renewable energy investment. Multilateral Development Banks (MDBs), bilateral financial institutions, and the state-owned Infrastructure Development Company Limited (IDCOL) could serve as the main sources of debt financing for large-scale renewable energy projects in Bangladesh. Key lenders such as the European Union (EU), World Bank (WB), Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB), and bilateral agencies such as Japan International Cooperation Agency (JICA) and Germany's Kreditanstalt für Wiederaufbau (KfW) could be targeted for necessary resources for implementing the NDC 3.0. The MDBs could play a major role in supporting the country's clean energy transition through climate finance initiatives, offering funding both directly and via financial intermediaries. It is important to note that Bangladesh cannot utilise the available committed

amount for energy financing by the development partners – about 39 per cent of the committed support from the development partners (DPs) for the power sector is still to be disbursed.

There are over 30 different global climate funds available with a total potential available resource of USD 32 billion where Bangladesh can apply. Moazzem et al. (2024) identified that these sources offer different types of financial instruments targeting different kinds of demand for investment in generation, transmission and distribution of renewable energy. These include co-financing, technical assistance, loan, concessional loan, equity, carbon finance, forward purchase, guarantee, mezzanine financing, loan guarantee and structured financing, etc. Table 8 presents a list of selected climate funds eligible for Bangladesh.

Table 8: Different Climate Funds Available for Bangladesh

Name of the fund	Type of fund	About
Green Climate Fund (GCF)	Multilateral	The fund established under the UNFCCC to support climate mitigation and adaptation projects in developing countries.
Global Environment Facility (GEF)	Multilateral	The fund provides grants to developing countries for projects that benefit the global environment, including climate change mitigation and adaptation.
Climate Investment Funds (CIFs)	Multilateral	The fund supports climate resilience and low-carbon development in developing countries through concessional financing.
Adaptation Fund	Multilateral	The fund provides funding for concrete adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol.
Clean Technology Fund (CTF)	Multilateral	It supports the demonstration, deployment, and transfer of low-carbon technologies in developing countries.
The World Bank's International Development Association (IDA)	Multilateral	The fund provides concessional loans and grants to the world's poorest countries to support development projects, including those related to climate change.
The World Bank's Energy Sector Management Assistance Program (ESMAP)	Multilateral	The fund provides technical assistance and knowledge sharing to help countries transition to sustainable energy solutions.
Renewable Energy Performance Platform (REPP)	Multilateral	It facilitates private investment in renewable energy projects in developing countries.
The United Nations Development Programme (UNDP) Climate Change Adaptation Fund	Multilateral	Supports adaptation projects in vulnerable communities, focusing on building resilience to climate change impacts.
The European Union's Climate Finance Instruments	Multilateral	The fund provides financial support to developing countries for climate change mitigation and adaptation projects.
The Global Energy Efficiency and Renewable Energy Fund (GEEREF)	Multilateral	GEEREF invests in specialist renewable energy and energy efficiency private equity funds in emerging markets.
The Asia-Pacific Climate Finance Fund (APCF)	Multilateral	The fund supports the development and implementation of innovative, scalable, and commercially viable financial risk management products that increase investments in climate change mitigation, adaptation, and disaster risk management in ADB's DMCs.

(Table 8 contd.)

(Table 8 contd.)

Name of the fund	Type of fund	About
The Nordic Development Fund (NDF) Climate and Energy Fund	Multilateral	The Nordic Development Fund provides financing and expertise for climate change mitigation and adaptation projects in developing countries.
The Japan International Cooperation Agency (JICA) Climate Change Mitigation Fund	Multilateral	JICA provides financial and technical assistance to developing countries to support various projects related to climate change mitigation, adaptation, and resilience building.
The German Federal Ministry for Economic Cooperation and Development (BMZ) Climate Finance Program	Bilateral	BMZ's Climate Finance Program aims to support developing countries in their efforts to mitigate and adapt to climate change.
The Climate Resilience and Adaptation Finance and Technology Transfer Facility for South Asia (CRAFT)	Regional	This facility aims to support climate resilience and adaptation efforts in South Asian countries.

Source: Moazzem et al. (2024).

4.4 Ensuring Climate Action to Create Sustainable Employment Opportunities and Ensuring Community Wellbeing

NDC 3.0 should include a new perspective of gender and youth. Specific indicators which need to be track is generation of new employment for youths and women under the new initiatives to be committed. It is found that energy transition in Bangladesh will help positively contribute to employment generation.[14] CPD study shows that the renewable energy sector could generate about 9,300–28,626 new employment, mainly through on-grid-based electricity generation (Moazzem & Hridoy, 2023). The estimates showed that the changing structure of employment in fossil fuel-based power generation would have either adverse or positive impact. However, a substantial part of the new employment in the renewable energy-based power plants and associated services could be absorbed by reemploying the occupants of the fossil fuel-based power plants. The new NDC should consider setting a new benchmark for male and female representation in the employment generation from renewable energy.

The NDC should also consider the affected and vulnerable communities as there have been multiple cases found where the process of energy transition was not sustainable. The land used and acquired sometimes result in displacing vulnerable community or indigenous people. NDC should mention specific policy interventions to address such displacements.

[14]One major drawback of the fossil fuel-based power generation is the limited scope of women inclusion in the workforce. World Bank Bangladesh has run a baseline study (2020) on determining women representation in Power sector of Bangladesh. There is only 6 per cent female representation in the work force of which 304 women are working in technical positions and 5,006 women are working as technical staff. Representation of women in the power sector is very low at 9.5 per cent of total staff in the six public utilities. According to the same study, overall, only 304 out of 5,006 engineering staff (6 per cent) are women, and most of them work at the Bangladesh Power Development Board (BPDB). Almost 80 per cent of them are in assistant (34 per cent) or sub assistant (46 per cent) positions. In total, 45 women work as executive/senior engineers, and 35 of them are in the BPDB. Women are not well represented in higher decision-making positions, either. Of the 44 officers in the Power Division of the Ministry, 7 are women (16 per cent). However, most of the officers have a non-technical background. The share of female Board members and officials working in the 13 power sector organisations is 6 per cent (16/276 officials).

4.5 Strengthening Governance in Clean and Renewable Energy to Turn Targets into Practice

As previously mentioned, the SREDA is assigned with the coordination and leading the NDC implementation plan as the chair of NDC implementation power sector working group. In the context of NDC implementation, SREDA has some specific laid out activities to be carried out. However, for the implementation of NDC 3.0, SREDA needs to play much of a bigger role in next one decade to be effective as the chair of the NDC implementation of power sector working group. Table 9 lays out the proposed role. SREDA needs more proactive role with additional authority and resources to implement NDC 3.0 properly. SREDA's active role needs to be reflected in the following areas: (a) chairing the NDC Implementation Power Sector Working Group; (b) coordinating the policy response for that sector, working with all power sector stakeholders as appropriate; (c) tracking progress at the sectoral level; (d) putting in place data sharing agreement as necessary to collect data to support this tracking of progress; (e) reporting to the NDC implementation technical committee on power sector NDC implementation issues and progress; (f) liaising with the NDC Implementation Coordination Team in the MoEFCC to agree analytical needs on NDC implementation; (g) suggesting ways and means to improve implementation, and (h) ensuring adequate capacity development for smooth NDC implementation.

Table 9: Proposed Role of SREDA for Implementing NDC 3.0

Role of SREDA according to NDC NAP	Proposed role of SREDA
Chair the NDC Implementation Power Sector Working Group	• SREDA needs to capacitate first to be chair of the NDC implementation power sector working group • SREDA should have a separate department to solely work on the implementation of the NDC
Coordinate the policy response for that sector, working with all power sector stakeholders as appropriate	• As the chair, SREDA should be the coordination focal point for all the private and public stakeholders including UNFCC • Regular reporting and consultation regarding the policy and operational responses for the power sector must be maintained by SREDA
Track progress at the sectoral level	• Tracking progress at the sectoral level
Putting in place data sharing agreement as necessary to collect data to support this tracking of progress	• SREDA should also be the main point for data collection of the power sector which will help tracking the progress
Reporting to the NDC implementation technical committee on power sector NDC implementation issues and progress	• Consulting with the NDC implementation technical committee to check the progress of power sector • Reporting to the NDC implementation technical committee
Liaising with the NDC Implementation Coordination Team in MoEFCC to agree analytical needs on NDC implementation	• Liaising with the NDC Implementation Coordination Team in MoEFCC to agree analytical needs on NDC implementation
Suggesting ways and means to improve implementation	• SREDA needs to find out the ways and means to improve the implementation of NDC targets and must implement those by itself
Ensuring adequate capacity development for smooth NDC implementation	• Ensuring adequate capacity development of SREDA for smooth NDC implementation

Source: Prepared by authors based on KIIs.

Other agencies responsible should take more expanded engagement and activities for proper implementation of the NDC. These agencies include Ministry of Environment, Forest and Climate Change (MoEFCC), including Department of Environment; Ministry of Finance, and in particular the

Economic Relations Division; Energy and Mineral Resources Division of the Ministry of Power, Energy and Mineral Resources; Bangladesh Power Development Board; Infrastructure Development Company Limited (IDCOL); Ministry of Industry and National Board of Revenue. Table 10 presents the specific actions that need to be taken by the agencies mentioned above.

Table 10: Proposed Activities of Relevant Government Authority

Government Authority	Proposed Activities
The MoEFCC, including the Department of Environment (DoE)	• Overseeing the overall and wider NDC implementation and for assistance in reducing carbon emission and increasing energy efficiency
The Ministry of Finance (MoF), and in particular the Economic Relations Division (ERD)	• Assisting in accessing climate financing and for general policy support
Energy and Mineral Resources Division of the Ministry of Power, Energy and Mineral Resources (MoPEMR)	• Guiding the overall sector towards the net zero targets • Monitoring the energy transition in power sector • Coordinating the public and private stakeholders including power producers and foreign missions
The Bangladesh Power Development Board (BPDB)	• Planning the power generation based on the emission target of 2030, 2035, 2041 • Providing data support through conducting baseline surveys
The Infrastructure Development Company Limited (IDCOL)	• Mobilise international funds, loans and grants for mitigation initiatives • Facilitate the government to successfully implement the national rooftop solar programme • For the link to the private sector and also for support in considering reduction of import barriers
Ministry of Industry (MoI)	• To provide data from industry particularly captive power
National Board of Revenue (NBR)	• To provide support in considering reduction of import barriers on renewable energy-based power generation related equipment

Source: Authors compilation based on KIIs.

As the power division is the representator of the power sector to present the NDC Implementation Power Sector Working Group on the NDC Implementation Coordination Committee, a much bigger role to be undertaken by the power division. The Power Division is to be also responsible for coordinating stakeholder engagement on the power sector issues demonstrated in the following table (Table 11).

Table 11: Proposed Activities of the Power Division

Role of Power Division according to NDC NAP	Activities undertaken
Running open consultations on policy proposals	• Organising open consultations on policy proposals by assisting power division to review and revise policies aligning with the net zero targets
Organising NDC implementation workshops for the power sector and responding to specific queries regarding NDC implementation in the power sector	• Regular monitoring of the NDC implementation in the power sector • Organising half yearly meetings to get an update regarding the implementation
Liaise with the MoEFCC in relation to wider NDC implementation stakeholder engagement	• Liaise with MoEFCC and international development partners and foreign missions in relation to wider NDC implementation stakeholder engagement

(Table 11 contd.)

(Table 11 contd.)

Role of Power Division according to NDC NAP	Activities undertaken
Contributing from a power sector perspective to wider stakeholder engagement exercises	• Regularly meet and consult with the private power producers, especially renewable energy-based power producers • Debrief the development partners and foreign missions to regularly update them and get feedback from them • Consultation and dialogue with the civil society organisations regarding the progress on NDC implementation

Source: Authors compilation based on KIIs.

The Department of Environment (DoE) needs to schedule consultation and data tracking activities more frequently to implement the NDC and track progress against the indicators. A monitoring committee or body should have been appointed to regularly check the activities carried out and progress made against the NDC target. NDC-NAP implementation framework and the Measurement, Reporting, and Verification (MRV) system need to be ready immediately.

4.6 Compliance with the Guideline for NDC 3.0 Reporting

It is expected that the NDC 3.0 will properly reflect the Information to facilitate Clarity, Transparency and Understanding (ICTU) guideline and ensure the quality and standard set by the UNDP. The seven issues highlighted in the ICTU guideline need to be properly filled in. CPD recommends that quantifiable information that will be provided in the NDC 3.0 document should be appropriate. The timeframe to be mentioned in NDC 3.0 should keep in mind the implementability issue. The scope and coverage of the NDC 3.0 should consider economy-wide approach as well as those should be sufficiently ambitious. The planning processes need to be properly designed with specific responsibility. Assumptions and methodological approaches must be sound and robust as per the guidelines. It is expected that no vagueness and unclear assumptions will be put in place whilst estimating the emission-related targets as well as projection of electricity demand. It is expected that NDC 3.0 is fair and ambitious -just transition related issues including issues related to employment, gender, marginalised groups are properly be reflected. The NDC is expected to contribute towards achieving the objective of the Paris Convention—regular monitoring and reporting and proper way of implementation with specific responsibilities.

The Bangladesh NDC 3.0 must qualify the UNDP quality assurance checklist for NDC 3.0. In other words, the NDC 3.0 should be passed on four indicators of the checklist – (a) country ownership and inclusivity; (b) ambitious; (c) just transition and sustainable development; (d) clarity and transparency; and (e) feasibility.

5. CONCLUSION AND RECOMMENDATIONS

The Ministry of Environment, in consultation with the relevant agencies of the power sector, should prepare NDC 3.0 for the power sector following the guideline of the ICTU. Taking the meagre progress under the NDC 1.0 and NDC 2.0, a bold and ambitious initiative is required from national and international agencies concerned. This study proposes ambitious carbon emission reduction targets

for the power sector for 2030 and 2035. The study proposed a re-estimation of the electricity demand for 2030, 2035 and 2040 and thereby identified an alternate energy-mix for the country for the next decades – a combination of phasing out of fossil fuel and a mix of renewable energy for meeting the electricity demand. The study has identified a possible requirement of investment of USD 18 billion to USD 42 billion between 2030 and 2040. Such a huge investment is not possible for Bangladesh to generate under its unconditional contribution for NDC 3.0. Hence, climate finance from external sources will be required, as part of 'conditional contribution' towards achieving the NDC 3.0 targets.

The study proposes that the Ministry of Environment and Climate Change (MoECC), in consultation with the Ministry of Power Energy and Mineral Resources (MoPEMR), should set an ambitious target for reduction of carbon emission for the power sector. In case of unconditional terms, the reduction targets for 2030, 2035 and 2040 should be 19.24 m ton CO_2/MWH, 22.81 m ton CO_2/MWH and 25.83 m ton CO_2/MWH respectively. On the other hand, the emission reduction targets under conditional terms should be set for 2030, 2035 and 2040 as follows: 57.72 m ton CO_2/MWH, 68.43 m ton CO_2/MWH and 77.5 m ton CO_2/MWH respectively. Achieving these will require substantial rise in electricity generation from renewable energy sources. In unconditional terms these targets for 2030, 2035 and 2040 would be 4,540 MW, 6,438 MW and 8,928 MW respectively, whilst in conditional terms these targets would be as follows: 13,622 MW, 19,313 MW and 26,785 MW respectively.

A proper implementation of NDC 3.0 needs proper coordination between different public and private agencies. Followings are some recommendations for the NDC 3.0.

5.1 Recommendations for the Department of Environment, Ministry of Environment, Forest and Climate Change

The DoE, under the Ministry of Environment, Forest and Climate Change, is expected to undertake the following initiatives:

1. A baseline assessment regarding the coordination and collaboration of different government authorities is vital as there is a visible dissimilarity among their perception.
2. Rather than playing small with less ambitious targets, the NDC 2025 should set more ambitious target for mitigation measures such as renewable energy targets, GHG emission and energy efficiency targets.
3. The new NDC must improve its methodological rigor and framework for more accurate estimation of the key statistical indicators.
4. The renewable energy target should be set at 30 per cent (35,753 MW) from renewable energy by 2040, if not 40 per cent.
5. There should be an interim target for 2035 for all the indicators such as renewable energy, energy efficiency, GHG emission reduction.
6. DoE needs to schedule consultation and data tracking activities more frequently to implement the NDC and track progress against the indicators.
7. Policy for providing necessary training to the female and youth must be a part of the NDC action plan. Along with the necessary finance and policy requirement for the affected vulnerable community in case of both the new renewable energy plants and phased out fossil fuel-based plants.

8. For keeping the temperature under 1.5 degree Celsius, some new indicators to be included with attainable and realistic targets, such as: phase out of fossil fuel-based power generation.
9. The NDC must lay out a target for gender and youth inclusion in the employment generation from energy transition.

5.2 Recommendations for the Sustainable and Renewable Energy Development Authority (SREDA)

It is expected that SREDA will undertake the following activities to implement the NDC 3.0:

1. SREDA needs more resources and most importantly authority to work as a chair of the working group of the NDC of power sector. More consultation meetings, feedback and even data collection initiatives to be facilitated by SREDA.
2. A monitoring mechanism to regularly check the activities carried out and progress made against the NDC target should be developed by SREDA.
3. SREDA needs to capacitate itself first to be chair of the NDC implementation power sector working group.
4. SREDA should have a separate department to solely work on the implementation of the NDC.
5. As the chair, SREDA should be the coordination focal point for all the private and public stakeholders including UNFCC.
6. Regular reporting and consultation regarding the policy and operational responses for the power sector must be maintained by SREDA.
7. SREDA should also be the main point for data collection of the power sector which will help tracking progress.
8. Along with reporting, consulting with the NDC implementation technical committee to check the progress of power sector is also crucial to check and balance the mitigation plans.
9. SREDA needs to find out the ways and means to improve the implementation of NDC targets and must implement those by itself.
10. A monitoring and evaluation framework to be established to track the NDC 3.0 implementation process from a holistic point of view.
11. SREDA needs to ensure adequate capacity development of itself for smooth NDC implementation. The DoE, with the assistance of UNFCC, can initiate capacity development and build training and workshop programmes to train SREDA personnels.

5.3 Recommendations for the Power Division and Bangladesh Power Development Board

Followings are the recommendations made for the BPDB for proper implementation of the NDC 3.0.

1. Power Division, with support from the DoE, should immediately conduct national survey to have an idea where the achievements against the emission targets stand.
2. The targets in the fresh NDC must align with the national policies, especially Renewable Energy Policy 2025, Integrated Energy and Power Master Plan 2023, Climate Prosperity Plan and others.
3. BPDB should plan the power generation for next 10 years based on the emission target of 2030, 2035 and 2041. Based on that planning, the BPDB along with Power Division must decide on the fuel mix and phase out or approve the fossil fuel or renewable energy-based power plants accordingly.

4. Power Division should organise open consultations on policy proposals by assisting the power cell to review and revise policies aligning with the net zero targets and BPDB should plan its upcoming power generation plan accordingly.
5. Power division with the help of SREDA should regularly monitor the NDC implementation in the power sector by organising half yearly meetings to get an update regarding the implementation.
6. Power Division and the BPDB should regularly meet and consult with the private power producers, especially renewable energy-based power producers. They should also debrief and update the development partners and foreign missions and get feedback from them. Regular consultation and dialogue with the civil society organisations regarding the progress on NDC implementation is required for successful implementation of the NDC 3.0.

5.4 Recommendations for the Infrastructure Development Company Limited (IDCOL)

Several recommendations are mentioned below for the IDCOL towards achieving the NDC goal through ensuring financing for NDC related activities.

1. The new NDC must include the financing and investment aspects with solid targets for renewable energy investments by 2030, 2035 and 2040.
2. IDCOL should also estimate how much of that financing is to be funded from public sources, private sources and from Foreign Direct Investment (FDI).
3. As IDCOL is actively involved with the Green Climate Fund (GCF) in Bangladesh, particularly in promoting energy efficiency and renewable energy projects, it should design some new and innovative framework which will help access the GCF fund directly for any climate change mitigation/adaptation project to be implemented in Bangladesh. The fund can be channeled to private/public sector entities or through private sector banks and financial institutions.

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Annexure

Annex Table 1: Proposition of NDC 3.0 for the Power Sector under the NDC template

Time frames and/or periods for implementation	
(a) Time frame and/or period for implementation, including start and end date	From 1 January 2026 - 31 December 2035
(b) Whether it is a single-year or multiyear target, as applicable	Multi-year target for 2030 and 2035
Scope and coverage	
(a) General description of the target	Sectoral absolute target for power sector
(b) Sectors, gases, categories and pools covered by the nationally determined contribution, including, as applicable, consistent with Intergovernmental Panel on Climate Change (IPCC) guidelines	N/A
(c) Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans, including description of specific projects, measures and initiatives of Parties' adaptation actions and/or economic diversification plans	Mitigation to be the main priority from the energy transition point of view in case of power sector.
Planning processes	
(a) Domestic institutional arrangements, public participation and engagement with local communities and indigenous peoples, in a gender-responsive manner:	The NDC 3.0 should be prepared following a structured process involving stakeholders from relevant ministries and agencies of power sector. The required data should be collected from the agencies on present condition and future plans and projects relevant to GHG emission reduction. Key stakeholders such as DoE, SREDA, Power Division must work together to ensure realistic target setting and baseline data collection. New responsibilities of relevant stakeholders have been chalked out.
Assumptions and methodological approaches, including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals	
(a) Assumptions, methodological and data approaches used for estimating emission targets	Renewable energy target of 20 per cent and 30 per cent will be achieved by 2030 and 2040.
(b) Assumptions and methodological approaches used for accounting for the implementation of policies and measures or strategies in the nationally determined contribution:	The targets have been set aligning with the national targets and goals of energy transition mentioned in Integrated Energy and Power Master Plan, Renewable Energy Policy.
How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances	
(a) How the Party considers that its nationally determined contribution is fair and ambitious in the light of its national circumstances	The power sector targets in the previous NDCs were not fair and ambitious enough. However, this proposed targets from power sector in NDC 3.0 is ambitious and fair as it will actually lead towards the net zero carbon emission goals along with facilitating the energy transition in Bangladesh.
(b) Fairness considerations, including reflecting on equity	Fair inclusion of youth and gender mainstreaming the cross-cutting aspect into the NDC 3.0.

Source: Authors' estimation.

Bangladesh is preparing its NDC 3.0 with the power sector as the main focus for emission cuts. Whilst the 2021 NDC set a 12.5% renewable energy target for 2030, progress remains slow—renewables account for just 3.57% in 2024 and are expected to reach 5% in 2025. A proposed four-step framework calls for more ambitious CO_2 reduction targets of 76.9m, 91.2m, and 103.3m tons, and urges that NDC 3.0 align with UNDP's quality standards of ownership, ambition, just transition, transparency, and feasibility.

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