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ABBREVIATIONS & ACRONYMES	MEANING
ADB	Asian Development Bank
BBS	Bureau of Statistics of Bangladesh
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
CAP	Bangladesh Country Action Plan for Clean Cook Stoves
ccGAP	Bangladesh Climate Change and Gender Action Plan
CEDAW	Convention on the Elimination of all Forms of Discrimination against Women
CVA	Climate Vulnerabilities Assessment
EUD	Delegation of the European Union to the People's Republic of Bangladesh
FFH	Female Headed Households
GBV	Gender Based Violence
GOB	Government of Bangladesh
GET	Green Energy Transition
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
IRENA	International Renewable Energy Agency
MoWCA	Ministry of Women and Children Affairs
MPEMR	Ministry of Power, Energy and Mineral Resources
NCWCD	National Council on Women's Development
NGO	Non Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
RE	Renewable Energy
SDG	Sustainable Development Goal
SIGI	Social Institutions and Gender Index
SHS	Solar home systems
SME	Small and medium-sized enterprises
SREDA	Sustainable and Renewable Energy Development Authority

ABBREVIATIONS & ACRONYMES	MEANING
UN	United Nations
USAID	United States Agency for International Development
VAW	Violence Against Women
WB	World Bank

EXECUTIVE SUMMARY

This report is analyzing gender differences and current women engagement in Green Energy transition in Bangladesh. Several studies have shown gender differences in energy production, energy use, access to energy, different preferences in terms of energy sources, and the need for equal participation of women in energy-related planning and decision-making.

Thus, this report synthesizes needs/ priorities for Bangladesh to design and operationalize an increased support of the engagement of women in the green energy transition process in Bangladesh.

The present report is structured as follows:

It starts with a brief description of the economic development of Bangladesh over the last decade, the energy sector and gender relations in the country. Chapter 3 contains an assessment of the degree of gender-sensitiveness of the main energy related laws and policies. This is followed by an assessment of main stakeholders in the energy sector in chapter 4. Chapter 5 focuses on decision-making at the household level and discuss if women and men have different preferences and who takes the decision with regard to the source of energy that a household uses. Chapter 6 provides an overview of women´s representation in the labour force and as entrepreneurs in the renewable energy sector while chapter 7 looks at women´s enrolment in relevant courses at university and in vocational training centers. Chapter 8 discusses main constraints that women face in the renewable energy sector which is followed by main conclusions and recommendations in chapter 9.

The information and data gathered for this study impressively show that in Bangladesh, as in many other countries, the renewable energy sector, which is currently still in its infancy but which, according to the explicit will of the government, will become much more important in the coming years, is male-dominated in all its facets (skills, employment, entrepreneurship, decision-making). Women face different barriers and constraints that hinder them to contribute to and benefit from the renewable energy sector to the same extent than men. Some positive developments, however, such as the increasing interest of young women in the sector, which is reflected in a higher rate of graduates from relevant courses, indicate that there will be enormous opportunities in terms of employment and income for women in the green energy sector in the coming years.

As consumers women can play an important role as change agent towards less polluting and more sustainable energy production and consumption.

The main recommendations are:

- Support improved data collection and analysis
- Address discriminatory socio-cultural norms
- Work with men for more equal gender relations and for women to benefit the energy sector resources and services.
- Address the intersectional inequalities that women of different social groups experience
- Support the reduction of women's time burden
- Support Gender Diversity Management
- Support female-led enterprises in the RE sector
- Dissemination of success stories
- Strengthen networks of professional women and establish database
- Organize a national (or regional) conference on gender-sensitive green energy transition
- Support capacity building
- Enhance skills of women as technicians for improved employment opportunities within the sector

1 INTRODUCTION

Bangladesh has made enormous progress in terms of economic and human development over the last decade which results in increasing demands for energy. However, energy is the largest contributor to global warming worldwide, and Bangladesh is among the countries that are most severely affected by climate change. The GoB has accorded high priority to the promotion of renewable energy as a means of addressing insufficient energy supply in the country and the countries contribution to GHG reduction. However, the current 8th Five Year Plans states that, much more emphasis needs to be put on renewable energy generation and use.

The Sustainable Development Goal (SDG 7) seeks to ensure access to affordable, reliable, sustainable, and modern energy for all by 2030. Advancements in renewable energy technologies, declining costs, and decentralised energy solutions are seen as important pathways for growth. These efforts include increasing access to energy devices and household systems such as improved cookstoves and fuels, solar lanterns, solar home systems and kits, mini-grids/utilities, and grid extensions.

Due to the work of the global gender and energy network ***Energia***[1] and other organisations and researchers, empirical data and a large number of case studies have documented the interlinkages between gender relations and energy issues. These studies clearly show **gender differences in energy production, energy use, access to energy, different preferences in terms of energy sources, and the need for equal participation of women in energy-related planning and decision-making.**

There is much empirical evidence that women's better access to clean energy results in improvements of girl´s and women's health, education and security, an improvement of their access to information, a reduction of women's and girl's time burden and new opportunities for employment and income generation.

The role of women is, thus, considered central to promote a transition to green energy, in large part because they are often the primary managers of household energy and the most heavily impacted by lack of clean energy access. Engaging

[1] www.energia.org

women at all levels of energy value chains is thought not only to have positive business outcomes, but also to economically empower women and support their families. Several reports emphasize that women's involvement in the clean energy industry will enable energy companies to produce products and services that are better targeted and more easily adopted by female customers, especially those in hard-to-reach locations, which, in turn, will increase women's access to energy.[2]

However, despite these insights many energy related policies remain gender blind[3] and energy is one of the sectors that are most unequal in terms of gender. More than 70% of the sector is occupied, decided and planned by men. According to statistics from IRENA, the current workforce in the energy sector as a whole comprises only 22% of women worldwide. In the renewable energy sector the percentage is a bit higher (32%), but women are still largely underrepresented. In addition, there is a difference in the quality of jobs that women occupy, compared to those that men hold, with men more represented in specialized positions and being better paid.[4]

Bangladesh is lagging to achieve its 10% of renewable energy target and has yet to mainstream gender equality, women's empowerment and intersectional inclusiveness in its renewable energy program and energy efficiency programmes. The participation of diverse groups of women in inclusive, sustainable, and green growth can propel the development of a genuinely equitable green economy business ecosystem. Currently, women are pioneering in green transformation by introducing many need-based innovations aiming at reducing CO_2 emissions.[5]

1.1 Policy and programme context

1.1.1 EU Gender Action Plan III

For the European Union, gender equality and women's empowerment (GEWE) is a core value, and a core objective of its external action, as expressed by the EU Gender Action Plan for EU external actions for the period 2021-2025 (GAP III), adopted in November 2020.

The EU GAP III defines the following six areas of engagement in external relations:

- Ensuring freedom from all forms of gender-based violence;
- Promoting sexual and reproductive health and rights;
- Promoting economic and social rights and empowering girls and women;
- Promoting equal participation and leadership;
- Integrating the women, peace and security agenda;
- Climate change and environment and Digitalisation.

The EU GAP III is built on three core principles, namely :

- Taking a gender-transformative approach. This entails examining, questioning, and changing rigid gender norms and power imbalances which disadvantage

[2] Shankar, A., Elam, A.B., & Glinski, A. (2020): Strengthening the Women's Entrepreneurship Ecosystem within the Energy Sector. *IDS Bulletin* Vol 51, No 1, February 2020, p. 28
[3] Maduekwea, M., Morris, E., Greene, J., Healey, V. (n.d.) Gender Equity and Mainstreaming in Renewable Energy Policies - Empowering Women in the Energy Value Chain in the Economic Community of West African States (ECOWAS)
[4] IRENA (2019): https://www.irena.org/publications/2019/Jan/Renewable-Energy-A-Gender-Perspective
[5] Gender Country Profile, 2021, p. 21

women and girls, in all their diversity, and generate discriminations at all ages, starting from early childhood, in societies. This means the EU promoting change in social attitudes, including by actively engaging men and boys and by putting a focus on young people as drivers of change."

- Addressing intersectionality (multiple forms of discrimination). GAP III recommends and approach to gender (in)equality that includes focus on the most disadvantaged women (for ex. indigenous peoples and persons belonging to racial/ethnic/religious minorities, forcibly displaced, migrant, economically and socially deprived women; persons living in rural and coastal areas). Going a step further, GAP III's conceptual framework highlights that specific challenges for girls, elderly women, women with disabilities, migrant women and other women and girls from socially disadvantaged groups should be considered. Recommendations are also made as to advancing the rights of LGBTIQ persons, as defined in the EU LGBTIQ equality strategy.6 The key rationale behind this GAP III recommendation is that "all intersecting dimensions are equally relevant."
- Following an approach based on human rights. This approach places the principles of non-discrimination and countering inequalities at the centre of all action. This includes helping every human being to exercise their human rights, participate in decisions concerning them and seek redress when their rights are violated.7

The GAP III requires that 85 % of new actions of development cooperation of the EU and EU member states need to be gender responsive, thus being classified with the OECD GG-marker 1 or 2.

In line with GAP III requirements, the EUD in Bangladesh will ensure that at least 85% of all new external actions have gender equality and women's and girls' empowerment as a significant objective (G1) and at least one has GEWE a principal objective (G2) by 2025.

1.1.2 Multi-Annual Indicative Programme 2021-2027

The EU supports the Bangladeshi Government in different areas that are outlined in the Multi-Annual Indicative Programme 2021-2027. Priority areas are (i) Human Capital Development; (ii) Green Inclusive Development and (iii) Inclusive Governance. The following box summarizes the priority areas of the MIP 2021-2027.

[6] EU LGBTIQ Equality Strategy 2020-2025
[7] Cf. GAPIII, "Tackling the root causes of gender inequality: three core principles, " p.4, copied from EU 2021

Box 1: The Multi-Annual Indicative Programme (MIP 2021-2027)

Programming

3 Priority Areas and 2 Team Europe Initiatives were tentatively identified:

Source : Gender Country Profile 2021, p. 10

The two major objectives of the MIP priority area *Green Inclusive Development* are a) Energy efficiency and affordable renewable energy for all; and b) Environmental protection & climate change mitigation and adaptation. Through this MIP area, the EUD is expected to contribute to GoB's efforts to develop a) 'policy framework for an inclusive green energy transition' while ensuring b) 'energy efficiency in selected value chains and industries.'[8]

To fulfil the requirements of the EU GAP III, the European Union Delegation (EUD) in Bangladesh (EUD) commissioned a Gender Country Profile (GCP), which was finalized in July 2021, with the overall purpose to provide an updated and comprehensive overview of the state of gender equality in the country with a focus on priority areas for EU development cooperation.

In addition, the results of the EU-GCP were used for the development of the Country Level Implementation Plan (CLIP) requested by the EU Action Plan for Gender Equality and Women Empowerment 2021-2025 (GAP III).

1.1.3 Country Level Implementation Plan

Based on the EU GAP III, the GCP and the MIP 2021-2027, a Country Level Implementation Plan (CLIP) for Bangladesh was developed, including the following selected thematic areas of engagement and objectives:

Thematic Area #1; overall thematic objective (Impact): Women and girls in all their diversity are free from all forms of gender-based violence in the public and private spheres, in the workplace and online.

Thematic Area #2; overall thematic objective (Impact): Women and girls in all their diversity access and fully enjoy their sexual and reproductive health rights.

Thematic Area #3; overall thematic objective (Impact): Women, men, girls and boys, in all their diversity, fully enjoy and exercise their equal economic, labour and social rights.

Thematic Area #4; overall thematic objective (Impact): Women, men, girls and boys, in all their diversity, participate equally in decision-making processes, in all spheres and at all levels of political and public life, including online, taking on

[8] Gender Country Profile, 2021, p. 20/21

leadership roles, to enjoy and exercise their human rights and seek redress if these rights are denied.

Thematic Area # 6; overall thematic objective (Impact): Women in all their diversity influence decision-making processes (policies and practices) on environmental conservation, climate change, green energy transition and digitalisation.

Part of the CLIP is the commissioning of in-depth gender studies of at least two of the MIPs key sub-themes, e.g., the energy sector (with special emphasis on energy efficiency and affordability), and decent work. The findings shall be used for improving GEWE and WR mainstreaming in the EUD's overall work including policy/political dialogue. This is in line with GAP III strategic objective 5.2. "conduct or update sector specific gender analysis for the priority areas under the programming cycle 2021-2027."[9]

1.1.4 Establishment of TEI GET

To better coordinate the support of the EUD and EU member states, two Team Europe Initiatives (TEI) on "Decent Work" and the "Green Energy Transition" (GET) were recently established in line with MIP 2021-2027 and CLIP priority areas.

The TEI GET defines the transformational potential of green energy transitions as follows:

- Decarbonize the energy system
- Reduce the environmental degradation
- Contribute to the climate change global response

The TEI-GET is based on 4 pillars to support Bangladesh in decarbonizing its energy system:

- Pillar 1: Backing of low carbon development by politics and society
- Pillar 2: An effective sustainable energy market
- Pillar 3: Grid infrastructure optimization and renewable energy integration
- Pillar 4: Energy efficiency (generation, distribution, consumption)

The creation of the two Team Europe Initiatives "Decent Work" and the "Green Energy Transition" opens a space for innovative approaches to GEWE and for mainstreaming GEWE issues in areas that are crucial for the country's gender equality agenda in line with international standards/initiatives (for ex. implementation of ILO's decent labour standards, climate change adaptation and mitigation commitments, the green energy transition and digital transformation). These two TEIs are of strategic importance to the EUD, since they can contribute to an enabling space for MS joint actions and active work around mainstreaming GEWE in two very challenging areas deserving policy attention and robust political support.

So far, the TEI GET has developed a **portfolio mapping table** compiling all relevant energy related projects by TEI GET members. While some of these actions include women as specific target beneficiaries (e.g. women entrepreneurship or targeted awareness campaigns), so far there is no structured TEI GET approach to a gender-energy nexus.

[9] Gender Country Profile, 2021, p. 47

1.2 Objectives and methodology of the study

It is against this background that the present study on Women Engagement in Green Energy Transition has been commissioned by the EUD in Bangladesh. Its main objective is to enable the EUD and all TEI GET members **to design and operationalise an increased support of the engagement of women in the green energy transition process in Bangladesh**.

The study team consisted of an international gender expert that served as the team leader and two national experts, namely a gender expert and an energy expert.

The study was drafted in three phases:

a) The inception phase started on January 18th, 2022 and ended with the submission of a comprehensive inception report that outlined relevant topics and questions to be addressed. The inception report was based on a desk review of existing research studies and data, the compilation of relevant policies, the mapping of relevant stakeholders and first interviews with bilateral donors and international organisations working in the area of green energy in Bangladesh.

b) Additional quantitative and qualitative data was collected during an **in-person field mission** in May 2022.

c) During the drafting period until mid-September 2022 the consultants followed up with several stakeholders to get additional data. However, access to information and data depended heavily on the commitment of the respective actors and proved difficult in some cases.

The present report is structured as follows:

It starts with a brief description of the economic development of Bangladesh over the last decade, the energy sector and gender relations in the country. Chapter 3 contains an assessment of the degree of gender-sensitiveness of the main energy related laws and policies. This is followed by an assessment of main stakeholders in the energy sector in chapter 4. Chapter 5 focuses on decision-making at the household level and discuss if women and men have different preferences and who takes the decision with regard to the source of energy that a household uses. Chapter 6 provides an overview of women´s representation in the labour force and as entrepreneurs in the renewable energy sector while chapter 7 looks at women´s enrolment in relevant courses at university and in vocational training centers. Chapter 8 discusses main constraints that women face in the renewable energy sector which is followed by main conclusions and recommendations in chapter 9.

2 BACKGROUND

2.1 Economic development of Bangladesh

Bangladesh has become one of Asia's most remarkable and unexpected success stories in recent years with an impressive track record of growth and poverty reduction. Poverty declined from 43.5 percent in 1991 to 14.3 percent in 2016, based on the international poverty line of $1.90 a day (using 2011 Purchasing Power Parity exchange rate). Moreover, human development outcomes improved along many dimensions and Bangladesh is now being classified as a country with medium human development achievements by UNDP.

According to the World Bank, Bangladesh has been among the fastest growing economies in the world over the past decade, supported by a demographic dividend, strong ready-made garment (RMG) exports, and stable macroeconomic conditions.[10]

In 2021, Bangladesh had a population of 163.05 million people, and a gross domestic product (GDP) of 317.8 billion US$.[11] The population growth rate is 1.09. With its GDP growing at 6% or more per year, the country has reached the World Bank lower-middle-income status since 2015.

While the share of the manufacturing sector in GDP increased slightly, the share of agriculture in total GDP decreased from 22.7% in 1999 to just 13.35% in 2019/20 (provisional). This has contributed to a decline in employment growth and to a slowdown in poverty reduction.[12] Nevertheless, the agricultural sector still constitutes a large share of GDP and employs almost half of the labour force[13], which is a challenge in the context of a rapidly growing labour force.

The services sector remains to be the dominant contributor to GDP and has emerged as the most dynamic sector of the economy. To reach the MIC status, Bangladesh needs to create decent job opportunities for the 2 million youth entering the job market every year.[14]

[10] https://www.worldbank.org/en/country/bangladesh/overview#1
[11] Global Gender Gap Report, 2021
[12] https://www.worldbank.org/en/country/bangladesh/overview#3
[13] ILO https://www.ilo.org/wcmsp5/groups/public/@asia/@ro-bangkok/@ilo-dhaka/documents/publication/wcms_697969.pdf
[14] Ministry of Women and Children Affairs, 2019, p. 8

Similar to other countries, Bangladesh was severely hit by the COVID-19 pandemic. The COVID-19 pandemic decelerated economic growth in 2020. The pace of poverty reduction slowed down, exports declined, inequality increased across several dimensions and the poverty rate in 2020 increased to 18.1 percent from 14.4 percent. Nevertheless, strong remittance inflows and a rebound in export markets has helped the economy to start recovering gradually.

According to the World Bank, to recover fully and achieve its growth ambitions of achieving upper-middle income status, Bangladesh must address the challenge of creating employment opportunities through a competitive business environment, increased human capital and skilled labour force, efficient infrastructure, and a policy environment that attracts private investments.

Other development priorities include diversifying exports beyond the RMG sector; deepening the financial sector; making urbanization more sustainable and strengthening public institutions. Addressing infrastructure gaps would accelerate growth and reduce spatial disparities in opportunities across regions and within cities. Addressing vulnerability to climate change and natural disasters will help Bangladesh to continue to build resilience to future shocks. **Pivoting towards green growth would support the sustainability of development outcomes for the next generation**.[15]

2.2 The energy sector

The energy sector is key to sustainable development and poverty reduction. With increasing industrial production in Bangladesh, the country's existing serious energy crisis is worsening. Supply bottlenecks lead to frequent power outages. The overburdened and outdated infrastructure in the energy sector is hampering economic development. The focus of the government is, thus, to ensure energy security for the country in the short and long term by developing power generation capacity and ensuring supply of primary fuel such as oil, gas, and coal.[16]

Currently, renewable energy sources have a very low share of the total generation (<3.5%)[17], although Bangladesh has considerable renewable energy resources in the form of solar photovoltaic energy, solar thermal energy, wind and biogas.

In particular, it is endowed with vast solar energy resources with an average solar insolation of about 4–6.5 kWh/ m2/day. Its wind resources are more moderate, and located in coastal areas. According to the Power System Master Plan, 2016, Bangladesh has a renewable energy potential of over 3,666 MW with an annual generation of 7,010 GWh. The country also has considerable biomass resources from agricultural residues.[18]

The following table shows the current capacity in different renewable energy resources (779,68 MW installed capacity in total):

Table 1 : Current capacity in different renewable energy sources

[15] https://www.worldbank.org/en/country/bangladesh/overview#1
[16] ADB, 2017, p. 58
[17] Total RE Power installed is 911.48 MW (http://www.renewableenergy.gov.bd/) Total installed power generation capacity is 25,730 MW (http://www.bpdb.gov.bd/site/page/e7f4aaea-7605-4588-a705-e615c574cb88/-)
[18] Nagpal, D., Lamichhane, N., Kafle, S., & Gyeltshen, M., 2022, p. 21

Techlology	*Off-grid (MW)*	*On-grid (MW)*	*Total (MW)*
Solar	347.43	198.25	545.69
Wind	2	0.9	2.9
Hydro	0	230	230
Biogas to Electricity	0.69	0	0.69
Biomass to Electricity	0.4	0	0.4
Total	**350.52**	**429.15**	**779.68**

Source: Website of SREDA

According to World Bank data, grid and off-grid access to electricity in Bangladesh reached 99.5% and the current installed generation capacity has increased to 25,235 MW including captive power and renewables.[19]

Electricity is available for 85% of the population, up from 20% in 2000 but **only 0.3% have access to renewable energy.**[20]

Due to acute shortage of energy, particularly electricity, and heavy reliance on imported raw material like fossil fuel, the **Government of Bangladesh (GoB) has accorded high priority to alternative energy sources**.

In addition, Bangladesh's geographical position renders it especially vulnerable to the adverse impacts of climate change[21]. The Global Climate Risk Index ranks Bangladesh as the world's seventh most affected country over the period 2000-2019 (Germanwatch 2021). According to the Report on the Nationally Determined Contributions 2021, **the energy sector contributes 96.1% to combined (conditional and unconditional) GHG reductions by 2030**.[22]

In terms of energy generation, the government had, thus, set a target of generating 5% of the total electricity supply from renewable energy (RE) resources by 2015 and 10% by 2020 (BPDB, 2008). However, as of 2019, the share of renewables was still less than 2%.[23]

In recent years, there has been a very sharp increase in demand for solar home systems (SHSs), creating opportunities for the promotion of green jobs in the renewable energy sector, particularly in rural areas. **Such green jobs can be promoted by training solar technicians and developing solar entrepreneurs in off-grid areas,** resulting in a win-win situation. The **installation and maintenance of SHSs not only creates employment opportunities for women, but also improves the living standards of poorer people in rural areas in general**.[24] Solar technology is convenient, proven, and well accepted in Bangladesh.

The use of renewable energy sources, especially for cooking, lighting, and productive activities can greatly improve women's lives.

[19] https://www.worldbank.org/en/country/bangladesh/overview#3
[20] International Energy Agency, https://www.iea.org/reports/sdg7-data-and-projections, accessed on February 7th, 2022
[21]https://blogs.worldbank.org/endpovertyinsouthasia/local-communities-combat-climate-change-bangladesh
[22] Ministry of Environment, Forest and Climate Change, 2021
[23] Nagpal, D., Lamichhane, N., Kafle, S., & Gyeltshen, M., 2022, p. 17
[24] ILO Website

Bangladesh has taken up several initiatives to enhance the best utilization of renewable energy. It has installed more than 6 million SHSs across the country benefiting more than 18 million people, i.e., 11% of the population. Around 66 MW is being produced through roof top solar panels installed in government and private buildings. 2,226 solar irrigation systems have been installed around the country. The GoB has extended a re-financing scheme to finance alternative energy generation projects like small scale solar and micro grids, to improve energy access in off-grid areas.

Currently, there are 5.8 million SHSs in Bangladesh that generate around 327.14 MW of electricity in the country's off-grid area Some 137,400 jobs have been created in Bangladesh's SHSs, representing about 80% of the total installed solar capacity, according to the latest figures released by the International Renewable Energy Agency (IRENA).[25]

According to the 2021 Flagship report on SDG 7 progress, an average of only 21% of the population had access to clean cooking technology between 2015 and 2019.[26]

Bangladesh Country Action Plan for Clean Cook stoves (CAP) targets to disseminate cook stoves to over 30 million households in Bangladesh toward achieving the goal of 100% clean cooking solutions by 2030. To achieve the goal of CAP, a project named "Household Energy Platform Program in Bangladesh" has been implemented from July 2016 to June 2021 to create awareness about improved cook stoves (ICS), ensure access to finance for entrepreneurs, create new business models, remove all barriers, introduce new technology, develop a testing lab, reduce greenhouse gas emission, capacity building and research on new cooking solutions.

As of December 2018, under IDCOL 1.65 million ICS have been disseminated to reduce the use of solid fuels, indoor air pollution (IAP) and GHG Emission. By January 2017 its initial target of disseminating 1 million ICS was achieved almost two years ahead of the project completion period. The Program then aimed to disseminate 5 million ICS by 2021. [27]

2.3 Gender equality in Bangladesh

Over the last decades, Bangladesh had made significant progress on gender equality in several areas, e.g., the education of girls, the increased power of women in decision making, both in the private and the public sphere, and higher labour force participation rates of women. These efforts have translated into improvements in children's health and longer education periods for women.[28] Bangladesh has, therefore, ranked top country among South Asian countries by performing the best in narrowing the gender gap. According to the Global Gender Gap Report 2020 of the World Economic Forum, the country closed 72.6% of its overall gender gap and obtained rank 50 out of 153 countries globally.[29]

[25] https://www.tbsnews.net/bangladesh/energy/renewable-energy-creates-137-lakh-jobs-bangladesh-139222
[26] International Bank for Reconstruction and Development / The World Bank, 2021, p. 60
[27] Ministry of Women and Children Affairs, 2019, p. 30
[28] World Economic Forum, 2018, p. 25
[29] UN Women, 2020, p. 9

However, progress has been slower in terms of equal access to property rights by women, equal access to business start-ups, affordable and quality public services, parental authority, and access to sanitary napkins. Moreover, although Bangladesh is among the few countries in South Asia that has increased female employment in the last decade, while also significantly cutting the wage gap between men and women, inequality gaps persist in labour markets. According to the Global Gender Gap Report 2021, the labour force participation rate of women is substantially lower for women than men in Bangladesh (38.5% compared to 84.2%). Women are also more affected by unemployment: 6.78% of the female labour force was reported unemployed in 2020 compared to 3.49% of the male labour force.

Gender gaps are particularly high regarding women's participation and representation in high-levels of decision making in challenging areas (financial, economic, trade, digitalisation, e-commerce, green markets, circular economy, climate-change).[30]

Women from ethnic and religious minorities face 'double' discrimination in different aspects of life. Disadvantaged groups of women and girls, especially Dalit women, women with disabilities, elderly women, Rohingya refugee women and women of ethnic and religious minorities, as well as lesbian, gay, bisexual, transgender and intersex (LGBTI) people all face additional discrimination based on multiple intersecting factors such as gender, health, indigenous identity, caste and socio-economic status.

Women with a disability face an additional complex discriminatory situation and social stigma as women and as a person with a handicap. Their access to education, treatment, employment, marital life and family support is lower compared to that of men. [31]

To enhance women's participation in diversified areas of workforce, the Government has opened opportunities for women in different fields and addressed the barriers faced by women. These include recruitment in non-traditional fields, support for career progression, creating skills and vocational training opportunities including in those considered as male domain. [32]

In its report, Voices to Choices: Bangladesh's Journey in Women's Economic Empowerment[33], the World Bank highlights that the country can become more prosperous more quickly if more women get work in higher-quality and higher-paid jobs.[34]

[30] European Union, 2021, p. 12
[31] Ministry of Women and Children Affairs, 2019, p. 9
[32] Ministry of Women and Children Affairs, 2019, p. 8
[33] https://openknowledge.worldbank.org/handle/10986/30881
[34] https://www.worldbank.org/en/news/press-release/2019/04/28/bangladesh-more-and-betters-jobs-for-women-needed-for-faster-growth

3 LEGAL AND POLICY FRAMEWORK

The GoB has repeatedly reiterated its commitment to achieve gender equality. It has signed and ratified a number of relevant international treaties related to gender equality and the protection of women's rights (e.g., CEDAW, Beijing Platform for Action), and approved the National Policy for Women's Development (2011), which is currently being reviewed.

The (renewable) energy sector is governed by several policies and actions plans that are to a large extent rather gender-blind than gender-sensitive/gender-transformative.

In the following, we briefly describe the main policies related to gender equality and the energy sector and examine to which extent they address the gender and energy nexus.

3.1 Legal and Policy context related to gender equality

3.1.1 International Gender Commitments

Bangladesh is a signatory to the Beijing Declaration and Platform for Action (1995), the Universal Declaration of Human Rights, and other international human rights instruments, such as the Convention on the Rights of the Child, the Declaration on the Elimination of Violence against Women, the Declaration on the Right to Development, the International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families (2011), and Convention against Transnational Organized Crime (2011).[35]

In 1984, Bangladesh ratified the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) but with reservations on articles 2, 13(a), 16.1(c), and 16.1(f). As a justification, the government cited "conflict with Sharia law based on Holy Quran and Sunna." The conflict, however, was not specified

[35] ADB, 2017

and does not account for the fact that around 10 percent of the country is non-Muslim[36] to whom Sharia law does not even apply.[37]

Bangladesh is also a signatory to the United Nations Framework Convention on Climate Change, which recognises the importance of involving women and men equally in the treaty's processes and in the development and implementation of national climate policies that are gender responsive. The GoB has also endorsed the Sustainable Development Goals (SDGs), of which **Goal 5** is « **to achieve gender equality and empower all women and girls** » and **Goal 7** is to "**ensure access to affordable, reliable, sustainable and modern energy for all**."[38]

3.1.2 Constitution of Bangladesh

The Constitution of Bangladesh ensures human and fundamental rights of citizens including women. Article 27 of the Constitution states, "All citizens are equal before law and are entitled to equal protection of law." Article 28(1) states, "The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex or place of birth." Article 28(2) states, "Women shall have equal rights with men in all spheres of the State and of public life." Article 28(4) states, "Nothing in this article shall prevent the State from making special provision in favour of women or children or for the advancement of any backward section of citizens."[39]

Through the 14th Amendment of the Constitution in 2004, the provision of women's seats was increased to 45 seats in the parliament (in addition to the 300 general seats), and again to 50 through the 15th Amendment of the Constitution in 2011. The women are nominated in proportion to their seats by the parties present in parliament and are indirectly elected by the other members of Parliament. There are also provisions for direct elections to reserve seats for women (33% of the total seats) in the different tiers of local government.[40]

3.1.3 National legislation

Bangladesh has a pluralistic legal system with a uniform and non-religious legal system that applies to all, and religious personal laws established under the tenets of Muslim, Hindu and Christian communities that govern significant aspects of family life. These personal laws are officially recognized laws (Constitution of Bangladesh, Article 152) and are supplemented by authoritative decisions issued by the Supreme Court of Bangladesh and the High Court Division of the Supreme Court of Bangladesh.

Among the laws that have strengthened women's position are the following:

a) The Amendment to the Labour Act (2013), which increased the maternity leave to 6 months;

b) The Persons with Disabilities Rights and Protection Act (2013), which also provides for the rights of women with disabilities;

[36] Hindu women are not allowed to get divorced, and outdated inheritance laws remain in place, which deprive women from their right to property. UNDP Bangladesh (June 27, 2019): "Withdrawal of CEDAW reservations is necessary to ensure gender equality". URL: http://www.bd.undp.org/content/bangladesh/en/home/presscenter/pressreleases/2019/06/24/withdrawal-of-cedaw-reservations-is-necessary-to-ensure-gender-e.html, accessed July 23, 2019.
[37] https://www.thedailystar.net/star-weekend/news/cedaw-dead-end-bangladesh-1711840
[38] ADB, 2017, p. 66-68
[39] ADB, 2017, p. 9
[40] ADB, 2017, p. 9

c) The Prevention and Suppression of Human Trafficking Act (2012)

d) The Hindu Marriage Registration Act (2012), which provides for the legal recognition of Hindu marriages.[41]

However, many discriminatory laws and provisions remain in the national legislation, such as different definitions of a girl child and boy child in various acts, restrictive scope of marital rape in the criminal code, and the lack of jurisdiction of special tribunals for violence against women to hear cases of discrimination against women. Marital rape is not criminalized unless the victim is a child bride below the age of 13 years. Women are seldom able to find a remedy let alone file a lawsuit due to illiteracy, poverty, insufficient social infrastructure, and lack of awareness of their rights.

Personal status laws regulating marriage, divorce, inheritance, guardianship, and custodial rights within various religious groups continue to discriminate against women and girls, and there is yet to consider adopting a unified and secular family code. Currently, marriage, family and inheritance matters are governed by law as per the religious identity the person belongs to, lacking equal provisions for women as men in multiple religious based laws in the country including in Islam, Hinduism as well as Buddhism.

One of the most significant issues raised repeatedly by the CEDAW Committee is the need to repeal personal status laws that treat women and men differently in matters of marriage, divorce, inheritance, and child custody and adopt a uniform family code.[42]

In February 2017, the parliament adopted the **Child Marriage Restraint Act 2017**. Provisions include exceptions to the legal minimum age for the marriage of boys and girls if 'special circumstances' justify a marriage and are approved by a court.[43] The debate attracted the attention of national and international human rights organisations, and the provisions are still under controversial discussion. Considering that women and girls in Bangladesh are subjected to many forms of discrimination and violence, legalising child marriage could bar the way to progress regarding the recognition of women's and children's rights and self-determination. Dowry and dowry-related violence also continues to be a common practice to be imposed on and suffered by women.

A long-awaited **Anti-Discrimination Bill** has not yet been adopted.

Through the revision of the **Labour Act of 2006 in 2013 and formulation of Labour Rules in 2015**, the rights of workers were addressed, and initiatives taken to ensure a decent work environment. This included workers' right to trade unions, introduction of an insurance scheme, setting up of a central fund to improve the workers' living standards, and requiring 5% of annual profit to be deposited in employee welfare funds. However, Bangladeshi law still is not compliant with some International Labour Organization (ILO) standards, including Convention No. 87 on Freedom of Association and Convention No. 98 on the Right to Organize and Bargain Collectively. Although these abovementioned rights are not for women only, these provisions are of great importance to them because of the large number of women in industrial labor. The recent Labour Rules have also

[41] UN Committee on the Elimination of Discrimination Against Women (CEDAW), 2016]
[42] UN Women, 2020, p. 9
[43] UN Committee on the Elimination of Discrimination against Women (CEDAW), 2016

introduced detailed provisions such as on childcare and compensations. The National Industrial Health and Safety Council has drafted the Occupational Safety and Health Policy, which remains at the final stages of approval.[44]

The labour laws mandate sixteen weeks of paid maternity leave and benefits for the private sector, whereas in government service as per service rules, females are entitled to six months of paid maternity leave and benefits. The labour laws also mandate organisations to have free-of-cost childcare or day care facilities for children of their employee's up-to six years of age if they have forty or more female employees.

3.1.4 National gender policy

A **National Policy for Women's Development** was first formulated and approved in 1997. It was revised in 2011 with a few amendments. It provides for equal wage for work of equal value for women and men, increased participation of women in the labour market, equal opportunity at the workplace, security, and removal of disparities in employment. It emphasizes political empowerment and women's participation in decision-making processes. To achieve the latter, it provides for 33% women's representation within political parties, and recommends that political parties nominate more women in the elections. Furthermore, to increase women's representation in the Parliament, the policy supports increasing the number of women's seats to 33% and advocates for direct elections of women to these extended number of seats. This is particularly significant as presently the total number of female members of Parliament is only 69 out of the total 350 members of the Parliament (19.7% are women).[45]

The National Women Development Policy 2011 does not mention energy at all. It states that the essential issues for women's economic empowerment are to give full and equal opportunity to women in health, education (including lifelong education and technical education), training (including income-generating training), and information and technology, but **energy aspects are absent in most other gender-related public documents**. [46]

Following the approval of the National Policy for Women's Development was the approval of the **National Action Plan (NAP) for Women's Advancement** in 1998. In 2012, another action plan – the National Action Plan for Implementation of the National Women Development Policy - was approved, encompassing all the different aspects of women's life and various sectors.

The priority areas are: a. Women's Human Rights and Fundamental Rights; b. Development of Girl Children; c. Elimination of all kinds of Children Abuse ; d. Armed Conflicts and the State of Women; e. Education and Training; f. Sports and Culture; g. Participation in Economic Activities and economic empowerment; h. Elimination of Poverty of Women; i. Employment of Women; j. Gender Responsive Budget and Gender Disaggregated Database; k. Support Services ; l. Women and Technology; m. Food Security of Women; n. Women and Agriculture; o. Political Empowerment of Women; q. Administrative Empowerment of Women; r. Health and Nutrition; s. Housing and Shelter; t. Women and Environment; u. Women in Disasters; v. Women of Backward and Small Ethnic Groups; w. Program for

[44] ADB, 2017, p. 11
[45] ADB, 2017, p. 10
[46] ADB, 2017, p. 66-68

Disabled Women; x. Women and the Mass Media; and y. Other Vulnerable Women Groups.

Currently the Action Plan is being updated incorporating actions and targets until 2030 aligning with the targets of SDGs. Government is gradually increasing resources by implementing Gender Responsive Budgeting (see 3.1.5.) to ensure sufficient resources for the implementation of actions of the National Action Plan.[47]

The 2011 National Women's Development Policy (NWDP)[48] and its National Action Plan (2013) are an important policy framework. According to the NWDP, it is expected that women's labour force participation will be increased through closing the gap between male and female enrolments in tertiary education, especially in **Technical and Vocational Education and Training** (TVET), better access to training, improving childcare availability, ensuring safety of women's mobility and at the workplace, and increasing access to basic facilities at the workplace.[49]

3.1.5 Gender Responsive Planning and Budgeting

In 2003, the Ministry of Finance introduced the approach of Gender Responsive Planning and Budgeting. The first initiative was to establish a monitoring and reporting facility called the Recurrent, Capital, Gender, and Poverty (RCGP) model[50], through which all expenditure items are disaggregated to indicate what percentage of allocated funds contribute to poverty reduction and gender equity. The system allows government ministries to enter estimates in terms of percentages for recurrent, capital, gender, and poverty information. It, thus, provides a yearly trend analysis by ministry for recurrent, capital, gender, and poverty expenditures. The data is provided when the ministries fill in the required formats while responding to Budget Call Circular 1. The Ministry of Finance has been driving the Gender Responsive Budgeting agenda as part of the midterm budgeting framework process, which began in fiscal year (FY) 2006 with four ministries and now covers all the ministries. It requires all ministries to explicitly relate their budget proposals to the policy priorities of the government and the ministries' mandates.[51]

The Executive Committee of the National Economic Council issued a guideline in 2009 on Gender Responsive Planning and Review, a guide on how to address gender in development interventions.[52]

[47] Ministry of Women and Children Affairs, 2019, p. 58
[48] https://mowca.portal.gov.bd/sites/default/files/files/mowca.portal.gov.bd/policies/64238d39_0ecd_4a56_b00c_b834cc54f88d/National-Women-Policy-2011English.pdf
[49] EU GENDER ACTION PLAN III: 2021-2025 COUNTRY LEVEL IMPLEMENTATION PLAN FOR BANGLADESH, p. 2
[50] Each ministry has a gender budget report, which is showcased under the budget documents of the finance ministry. These reports have detailed sections on the ministry's relevant policies, ministry-specific national policy directives concerning women's advancement, and targets and indicators to achieve gender-equality goals. Besides simply identifying relevant policies and budget allocations as an accounting exercise, the reports also identify gender gaps in the ministry's activities and obstacles to achieve objectives.
[51] ADB, 2017, p. 13/14
[52] Mahal, n.y., p. 5

3.2 Gender equality goals in overall development strategies

3.2.1 Bangladesh Vision 2021

In 2007, the **Bangladesh Vision 2021** was elaborated with the perspective of the 50th anniversary of independence to be celebrated in 2021.

The objective of preparing Bangladesh Vision 2021 is to present a framework of a future Bangladesh that reflects the hopes and aspirations of the citizens of the country for an economically inclusive and politically accountable society. The Vision proposes a set of concrete measures to achieve eight identified goals by 2021, through implementation of several short and medium-term initiatives and interventions. These goals are:

- to become a participatory democracy;
- to have an efficient, accountable, transparent and decentralised system of governance;
- to become a poverty-free middle-income country;
- to have a nation of healthy citizens;
- to develop a skilled and creative human resource;
- to become a globally integrated regional economic and commercial hub;
- to be environmentally sustainable; and
- to be a more inclusive and equitable society.

These eight goals emerged from a one-year long activism of Bangladesh civil society throughout 2006, when 15 local level dialogues were held across the country, under the title of National Election 2007: Civil Society Initiative for Accountable Development. The Bangladesh Vision 2021 document was handed over to the leaders of major political parties at the Nagorik Forum organised in Dhaka on 9 December 2006, a time of critical political transition in the country.[53]

Ensuring gender equality in all parts of life (education, health, economic empowerment etc.) is part of goal 8 (inclusive and equitable society).

BOX 2: Ensuring gender equality

In order to correct the historic injustices which have denied women in Bangladesh the opportunity to realise their full potential and make a more effective contribution to national development, major changes will be introduced in national policies, allocative priorities and institutional arrangements relating to the role of women in society. In order to substantially reduce gender injustice by 2021 we will ensure significantly enhanced ownership and/or access for women to the means of production (land, capital, finance, equipment), as well as equality of access to opportunities for education and skill development. We will make provisions for ensuring full parity in educational and training opportunities, especially at the tertiary level where we will enable women to move beyond traditional occupational niches so that they can participate in the fast-growing areas of a knowledge-based economy. This will serve to end gender stereotyping and will improve prospects for women's upward mobility in the labour market.

[53] Centre for Policy Dialogue (CPD), 2007

To ensure that women are able to take advantage of the opportunities that are made available to them, it will also be important to counter the negative social attitudes and cultural practices that hinder their participation in the education system as well as in the labour market. This will involve educating both men and women to change their mind-sets regarding traditional gender roles and to recognise the importance of supporting and equipping women to more fully participate in the political and economic life of our society. In order to ensure unfettered opportunities for women to participate in public life, the increasing threats of violence to their person will have to be effectively eliminated. This will require legislation to guarantee the protection of women backed by adequate investment in instruments of law enforcement targeted to the specific needs of women/girls moving in public spaces and in their homes, and will also require policy, institutional and educational interventions to provide social as well as political protection needed to provide a sense of security to women across the country.

By 2021 we will ensure that women are fully equipped to protect their own rights and interests through equal representation and effective participation at all levels of governance from the Union Parishads to the Jatio Sangshad. To ensure progress towards this objective, immediate provision will be made to ensure for the direct election of women to reserved seats in the Jatio Sangshad (see Goal One for details).

Source: Vision 2021

The national planning documents, consecutive five-year plans, and poverty reduction strategy papers have integrated gender aspects in a progressive manner. Gender mainstreaming was adopted as an approach for all social and economic development sectors, starting from the Fourth Five Year Plan (1990–1995).[54]

3.2.2 8th Five Year Plan for the period 2021-2025

The 8th Five Year Plan (8FYP) for the period 2021-2025 focuses on increasing economic empowerment and better implementation of the National Women's Development Plan (NWDP).[55] The plan shows increased sensitivity by GoB to tackle the intersectional dimension of inequality and discrimination, at least at the level of producing intersectional data (third gender persons, persons with disability, urban/rural). The Eighth Five Year Plan (8FYP) proposes a set of policy measures related to GEWE in sectors of strategic importance to the Multiannual Indicative Programme for Bangladesh 2021-2027:

- Equal access to justice through measures such as improved access to free and quality legal aid, investment in the National Legal Aid Services Organisation's (NLASO) capacity so that it can effectively reach the poor and marginalized communities and improve their access to legal redress.
- Increasing women's labour force participation through closing the gap between male and female enrolments in tertiary education, especially in TVET, and better access to training programmes.
- Improving childcare availability, improving safety of women's movements and in the workplace, increasing access to basic facilities like toilet and sanitary napkins in the workplace.

[54] ADB, 2017, p. 9/10
[55] http://www.plancomm.gov.bd/sites/default/files/files/plancomm.portal.gov.bd/files/68e32f08_13b8_4192_ab9b_abd5a0a62a33/2021-02-03-17-04-ec95e78e452a813808a483b3b22e14a1.pdf

- The Plan emphasizes the need to implement a gender-inclusive climate change response framework and contains a number of performance indicators related to gender equality (linked to SDG 5 and 10). Gender-transformative climate action is mentioned as a key priority of Government, and power and energy is one of the priority sectors.

3.2.3 National Skills Development Policy

The National Skills Development Policy of 2011 recognized the low participation rate of women in skills development and the need to correct the gender imbalance in the formal training system. It proposed promoting women inclusion in non-traditional training courses and the recruitment of female administrators and instructors wherever possible.[56]

3.3 Gender-responsiveness of energy related policies

According to Agora, the Portal for Parliamentary Development, "mainstreaming gender in energy policies and programming is good social policy and would enhance the efficiency of energy policies. **Incorporating gender perspectives in energy projects, policy and planning is critical in ensuring the effectiveness not just of energy programmes and policies, but of all development activities that involve energy use**".[57]

In practice, however, women's contribution to energy planning, supply and policy making worldwide tends to be marginal. **Energy supply interventions are gender blind, which is compounded by the lack of gender-differentiated data on energy supply and demand**.[58] This is true of Bangladesh as well.

An assessment of the legal and policy framework in the Bangladeshi energy sector conducted by the Asian Development Bank in 2017 concluded that **energy policies are generally gender blind.**

The following table provides an overview of the different policies in the energy sector and their degree of gender-responsiveness examined in the ADB report:

Table 2 : Gender-responsiveness of energy sector policies of Bangladesh

Main policy or documents in the energy sector	*Directly addresses women's energy needs*
National Energy Policy 2014	Yes. The importance of provision for cooking energy is highlighted.
Power Pricing Framework 2004	No
Private Sector Power Generation Policy (revision 2004)	No
Policy Guidance on Power Purchase from Captive Power Plant 2007	No
Remote Area Power Supply Systems Fund 2007	Yes. It promotes investment to faciiliate electricity supply to households in remote areas.
Renewable Energy Policy 2008	Yes. The policy supports development of

[56] https://www.ilo.org/dhaka/Whatwedo/Publications/WCMS_655158/lang--en/index.htm
[57] AGORA (n/d): https://agora-parl.org/resources/aoe/climate-change-energy-and-gender
[58] Pueyo, A. (2020). Introduction: Gender and Energy Opportunities for All. *IDS Bulletin* Vol 51, No 1, February 2020

Main policy or documents in the energy sector	*Directly addresses women's energy needs*
	cooking fuels or technologies like biogas, improved cookstoves, solar electrification systems for households and community use, and other renewable energy technologies, which are to directly benefit women in their day-to-day activities.
Bangladesh Private Sector Infrastructure Guidelines (reivsion November 2008)	No
Small Power Plant Policy	No
Policy Guidelines for Enhancement of Private Participation in the Power Sector 2008	No
Power System Master Plan 2010	No
Action Plan for Energy Efficiency and Conservation 2013	Yes. All the sections take into consideration the impact of improved energy efficiency at the household level and the need for taking actions for raising awareness.
Solar Guide Book 2013	Yes. Women will benefit from the solar electrification, irrigation, and other technologies.
Country Action Plan for Clean Cookstoves, 2013	Yes. It attaches priority to reduced household air pollution, improved maternal and child health, women's economic empowerment through participation in cookstove-related entrepreneurship.
500 MW Solar Program, 2013	Yes. Solar electrification in unelectrified areas will enhance the quality of life of the population and reduce drudgery for women
National Policy for the Advancement of Women by the Ministry of Women and Children Affairs	No

Source: ADB, 2017, p. 68

The ADB assessment concludes that energy policies are generally gender-blind. Energy policies ignore differences in needs, access, and use between women and men. Most of them deal with large-scale power generation, and no gender concerns are addressed. Documents on energy planning and renewable energy development have some references to women as users of household energy but do not mention how women can benefit from access to these energy technologies or how they can be involved in the sector. There is also no recognition in the policies that women's needs and use of energy are different from those of men because of their different reproductive and productive activities. The more formal sectors of gas (exploration, transmission, and distribution) and electricity (generation, transmission, and distribution) are still mainly treated as gender-neutral, i.e., not having any differential impacts on women and men. However, in recent years, increasing emphasis has been given to social considerations, which has resulted in inclusion of some gender aspects.[59]

For instance, household energy needs are recognized in some policies. Among the few policies that consider gender issues are the National Energy Policy

[59] ADB, 2017, p. 66-68

(2004) and Bangladesh Energy Planning Project (1982–1984), which included assessment of biomass for household cooking energy as an important demand for energy in the rural areas. Data on availability of biomass is now being updated to help in area-based planning for cooking fuel and other uses. The Bangladesh Country Action Plan on Clean Cookstoves is the only plan endorsed by the government that is fully dedicated to women's energy concerns, specifically addressing women's traditional gender role of cooking for the family. The action plan defines a road map to disseminate cookstoves to over 30 million households in Bangladesh by 2030 in the shortest possible time. It identifies barriers to the large-scale adoption of clean cookstoves and fuels, as well as potential intervention options and mechanisms for quickly and effectively taking action. In addition to attending to the traditional aspect of women's work, the action plan is also aimed at improving women's health, reducing their drudgery, and alleviating their time poverty. It also seeks to motivate women to use new technology and draw lessons that can be used to support gender mainstreaming in other energy projects and programmes.[60]

Policy targets have also been set for promoting renewable energy development that benefit women from 2015 to 2021. The goal set out in the Renewable Energy Policy (2008) is to generate 5% of electricity by 2015 and 10% by 2020 from renewable sources. Most of the new capacity will be provided by solar (1,676 MW or 54%) and wind (1,370 MW or 44%). There are also targets for biomass (47 MW), biogas (7 MW), and hydroelectricity (4 MW). Under the 500 MW Solar Programme 2012– 2016, the government has declared plans for promoting electricity generation based on solar energy. The significant experience in developing renewable energy projects is now being expanded in other off-grid technologies like solar mini-grids and solar irrigation pumps. Grid-connected technologies being planned for investment include utility-scale solar, wind, and waste-to-energy, which can provide scope for women's involvement both as users and service providers.[61]

Since the publication of the ADB assessment of the gender-responsiveness of the legal and policy framework in the energy sector, several new policies have been endorsed, that regulate the overall framework of the gender and energy nexus. The following table contains a brief assessment of these policies and plans from a gender perspective that has been conducted as part of the assignment:

Table 3 : Gender responsiveness of the latest policies of Bangladesh

Perspective Plan of Bangladesh 2021-2041	**Long term goal: skilled workforce of women and men** **Therefore, there is a need to encourage women's participation in vocational training** **Attention will be given to establishing rural-based training institutes in high-demand areas to facilitate the participation of women.** **Objective to raise women's employment rate from 33% to 45 % which will result in an increase of 1% more GDP according to a World Bank study** **Variables that influence female labour force participation : education, fertility rate, affirmative**

[60] ADB, 2017, p. 66-68
[61] ADB, 2017, p. 66-68

	action, other measures like maternity leave **Greater opportunities for women in business are needed** **Renewable energy is not mentioned as a sector amenable to women's employment (in contrast to garments, electronics etc.)**
Energy Efficiency and Conservation Master Plan up to 2030	No reference to women and/or gender equality
National Solar Energy Roadmap 2021-2041	No reference to women and/or gender equality
Mujib Climate Property Plan Decade 2030	No reference to women and/or gender equality
Power System Masterplan 2016	No reference to women and/or gender equality
Climate Change and Gender Action Plan (CCGAP) 2013	The action plan outlines the gendered impacts of climate policy that deserve more attention. It is based on four key pillars, namely : Food Security, Social Protection and Health; Comprehensive Disaster Management; Infrastructure; and Mitigation and Low Carbon Development. The Action plan contains a number of gender-responsive objectives under priority sector 4 (mitigation and low carbon development)[62] including : Ensure that gender considerations are addressed in the process of reviewing energy and technology policies. Develop gender responsive programs to reduce GHG emission at household (HH) while ensuring women's access to energy and power technologies.
National Action Plan for Clean Cooking in Bangladesh (2020-2030)	Mentions that women and children account for over 60% of all the premature deaths from household air pollution Emphasizes the need to involve women in decision-making and that behavioral change is the most critical aspect inhibiting shift to a new technology like ICS especially for rural women However, the implementation plan does not contain any specific activity targeting women
Bangladesh Delta Plan 2100	No reference to women and/or gender equality

The assessment of the more recent policies and plans show that most of them are still completely gender-blind. Only the Climate Change and Gender Action Plan (CCGAP) of 2013 and the National Action Plan for Clean Cooking in Bangladesh (2020-2030) focus (partly) on women as particularly affected by poor energy supply (deaths from household air pollution) and the consequences of climate change and to some extent as important **agents of change**.

[62] See Annex for more detailed information.

4 ASSESSMENT OF MAIN STAKEHOLDERS

The Sustainable and Renewable Energy Development Authority, responsible for the promotion of renewable energy and energy efficiency in 'Bangladesh compiled a list of 184 main stakeholders in the renewable energy sector.[63] Not all actors could be covered within the scope of this study. The experts selected the most relevant ones, thereby taking care to cover all stages of the value chain (production, distribution, and storage as well as research and innovation, skills provision and policy making) and the various sub-sectors (solar, biogas, wind and ICS) as far as possible.

Stakeholders are clustered according to different categories (governmental organizations, non-governmental organizations, private sector, universities/research institutes, donors, and international organizations etc.).

4.1 Governmental institutions

4.1.1 Ministry of Women and Children Affairs

The Ministry of Women and Children Affairs (MOWCA), as part of the National Women's Machinery, is mandated by the government to act as the focal point and catalyst for action on issues of women's equality and development. The ministry, especially its Department of Women's Affairs is responsible for mainstreaming gender in all other ministries and to promote a broader and more consistent response by all government agencies to the needs and priorities of women. In addition, the MOWCA administers safety net allowances, i.e. maternity allowances for poor women in rural areas and the lactating mothers' allowance for poor working women in urban areas.

It is a full ministry currently headed by the Prime Minister, who is a woman herself, and who is committed to pushing the GEWE agenda forward.

Within the framework of the Sustainable Development Goals and the Poverty Reduction Strategy paper of Bangladesh, the Department of Women's Affairs of

[63] https://solar.sreda.gov.bd/stakeholder/view/

the MOWCA undertakes various development activities and implements them at the local level. The key areas of work include human resource development and self-employment, poverty reduction and creation of employment opportunities, prevention of violence against women and children, institutional development and access to service delivery, and awareness raising and promoting gender equality.[64]

Overall, however, the ministry has a vaguely defined mandate, weak institutional structure and lacks the necessary human, technical and financial resources to effectively promote women's rights and gender equality.[65]

According to UN Women[66], MoWCA is committed to reduce women´s work burden and has drafted a National Programme on Unpaid Work in which renewable energy is one of the key areas.[67]

MoWCA is currently drafting a National Action Plan that should get endorsed in the coming weeks. Its implementation will be mandatory for all ministries.

So far, renewable energy and energy efficiency has not been a priority of the MoWCA and there is no established cooperation between MOWCA and Ministry of Energy. Staff of the ministry lacks knowledge in the field and there would be need to build local expertise.

Under MoWCA, Department of Women Affairs provides various supports for women empowerment. It provides various training events in the Womens Training & Development Accademy. However, currently there is no training related to green energy.

4.1.2 Jatiha Mahila Sangstha

The National Women's Association is a statutory organization under MoWCA formed by the Jatiya Mahila Sangstha Act, 1991. It works with women's organizations registered with the Department of Women Affairs to promote the implementation of national and international commitments that are part of its mandate. It seeks to increase awareness on women's rights and development, increase their skills, provide resources for socioeconomic development, increase skills of workforce, and attain socio-political rights. One of the key programs they run is Promotion of Women Entrepreneurs for Economic Empowerment at Grassroot Level. However, at present there is no linkage with green energy transition.

4.1.3 National Council for Women and Children Development

The National Council for Women and Children Development (NCWCD) is the central implementing organisation of the MOWCA. It is the most high-powered committee for women's development, headed by the Prime Minister. The council consists of 14 ministers, secretaries of 13 ministries, a member of the Planning Commission, 5 members of Parliament, and 10 prominent women, nominated by the government. The secretary of the MOWCA is the member secretary of NCWCD. Since it is chaired by the Prime Minister, it does not meet very often. It deals with women's empowerment as well as welfare and improvements in the

[64] ADB, 2017, p. 12
[65] Concluding Observations of the CEDAW Committee, 2017
[66] Oral communication
[67] Information provided by UN Women

living condition of women.[68] However, despite the high profile of the NCWCD, the CEDAW Committee is concerned that gender mainstreaming is not a priority of the Bangladeshi Government and that relevant institutions, such as the National Council for Women and Child Development, are not effectively promoting gender equality.[69]

4.1.4 Women in Development Focal Points

Since the Fourth Five Year Plan, all sectors and ministries are responsible for incorporating WID issues into their programmes. Each ministry selects an official at the rank of joint secretary to function as the WID focal point. This mechanism was established in 1990 to ensure that gender concerns are included in the policies, plans, and programmes of all line ministries. In 1997, the focal point position was upgraded to that of joint secretary or joint chief, and deputy secretaries or deputy chiefs were nominated as associate WID focal points.[70] The WID focal points, however, lack clear mandates, institutional set-up and resources to mainstream gender across all public institutions in Bangladesh.

4.1.5 Ministry of Power, Energy and Mineral Resources (MPEMR)

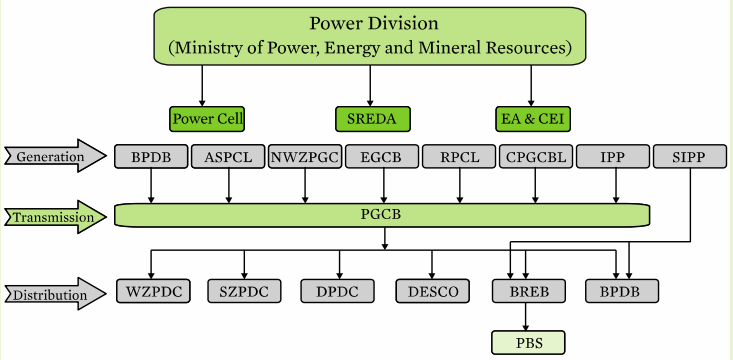
There are 14 government, autonomous, and semiautonomous organizations operating in power and energy sector, and all operate under the overall leadership of Ministry of Power, Energy and Mineral Resources (MPEMR). Out of those, seven are involved in electricity generation, one in transmission, and six in distribution. MPEMR and its related agencies are governed by 14 policy documents and 9 acts, starting from Electricity Act of 1910 to Bangladesh Rural Electrification Board Act 2015.[71]

The **Ministry of Power, Energy and Mineral Resources** (MPEMR) is at the top of the commanding chain. Fourteen autonomous and semiautonomous organizations and governments operate under its command to generate, transmit and distribute the energy. MPEMR and its related agencies are governed by 14 policy documents and 9 acts, starting from the 1910 Electricity Act to the **2015 Bangladesh Rural Electrification Board Act**[72].

The MPEMR has two Divisions headed by two secretaries ; Power Division and Energy and Mineral Resources Division. The Energy and Mineral Resources Division deals with the Import, Distribution, Exploration, Extraction, Pricing and other policy related details of the primary fuels. It has separate entities for Oil, Gas and Coal.

Power Division is responsible for all policies and matters relating to electricity generation, transmission and distribution from conventional and non-conventional energy sources including hydroelectricity

[68] ADB, 2017, p. 12
[69] Concluding Observations of the CEDAW Committee, 2017
[70] ADB, 2017, p. 12
[71] ADB, 2017, p. 58
[72] "BANGLADESH Gender Equality Diagnostic of Selected Sectors" Report, *Asian Development Bank,* 2017



APSCL = Ashuganj Power Station Company Ltd.; EA & CEI = Electric Advisor and Chief Electric Inspector; BPDB = Bangladesh Power Development Board; BREB = Bangladesh Rural Electrification Board; EGCB = Electricity Generation Company of Bangladesh Ltd.; DESCO = Dhaka Electric Supply Company Limited; DPDC = Dhaka Power Distribution Company Limited; IPP = Independent Power Producer; NWZPGC = North-West Power Generation Company Limited; PGCB = Power Grid Company of Bangladesh Ltd.; PBS = Polli Biddyut Samity (Rural electrification cooperatives under BREB); RPCL = Rural Power Company Limited; SREDA = Sustainable and Renewable Energy Development Authority; SIPP = Small Independent Power Producer; SZPDC = South Zone Power Distribution Company Limited; WZPDC = West Zone Power Distribution Company Limited.

Source: Government of Bangladesh, Ministry of Power, Energy and Mineral Resources (MPEMR). http://mpemr.gov.bd/about-us.

Figure 1 : Organ*i*gram of ***P***ower ***D***ivision[73]

4.1.6 Sustainable and Renewable Energy Development Authority (SREDA)

The government has established the Sustainable and Renewable Energy Development Authority (SREDA) to promote renewable energy and energy efficiency in 2014. SREDA is the sole authority responsible for the development of renewable energy. It promotes sustainable energy, working on renewable energy and energy efficiency toward building an energy-conscious nation to ensure energy security and to reduce carbon emission.

Key Functions of SREDA are as follows:

- Increase the share of renewable energy in the energy mix for reducing dependency on fossil fuel
- Take appropriate measures for energy saving
- Exploit possibility of any other form of new sustainable energy solutions
- Explore feasible financing for RE and EE project
- Build Capacity

Although SREDA does not have a strategy to address gender-based needs in the energy sector, gender elements may be integrated in the actual projects undertaken by its stakeholders. For example, in a project developed by ADB (Bangladesh Power System Enhancement and Efficiency Improvement Project), SREDA will be involved in capacity development for gender mainstreaming. It is overseeing the progress of the Bangladesh Country Action Plan for Clean

[73] ADB, 2017, p. 65

Cookstoves, a project being implemented in association with the Global Alliance for Clean Cookstoves. All renewable energy projects of GIZ are also undertaken with the active guidance of SREDA, and gender issues are integrated in their implementation.[74]

The following table shows the representation of women and men according to grade in SREDA:

Table 4 : Women Employment in SREDA

Grade	Women	Men	Total
Chair(wo)man (Grade 1)	1	0	1
Member (Grade 2-3)	1	2	3
Assistant Director grade 9	0	8	8
Program Assistant Grade 11 and Grade 14	2	6	8

Source: Information gathered during field visit

In the SREDA Board, 17% are women. SREDA does not have a specific gender policy or gender focal point. In the past, women were addressed as the primary beneficiaries in the campaigns and activities of SREDA's Household Energy Platform (HEP).[75] So far, staff of SREDA did not attend any gender training.

4.1.7 Power cell

Power Cell acts as its "Think Tank" and provides policy supports.

4.1.8 Bangladesh Energy Regulatory Commission (BERC)

The Bangladesh Energy Regulatory Commission (BERC) was created by the government in 2003 to regulate electricity, natural gas and petroleum. BERC's founding legislation empowered the regulator to set tariffs, Issue, cancel, amend and determine conditions of licenses, protect consumers, arbitrate disputes, and other key regulatory functions.

4.1.9 Bangladesh Power Development Board (BPDB)

Bangladesh Power Development Board (BPDB) is a statutory body created in May 1, 1972, by presidential Order No. 59 after bifurcation of erstwhile Bangladesh Water and Power Development Authority.

As part of reform and restructuring a number of Generation and Distribution companies have been created. The subsidiaries of BPDB in the generation side are:

[74] ADB, 2017, p. 65
[75] GIZ, 2021

- Ashuganj Power Station Company Ltd. (APSCL);
- Electricity Generation Company of Bangladesh (EGCB);
- North West Power Generation Company Ltd. (NWPGCL);
- West Zone Power Distribution Company Ltd. (WZPDCL).

The BPDB is responsible for a major portion of generation and distribution of electricity mainly in urban areas except Dhaka and West Zone of the country. The Board is under the Power Division of the Ministry of Power, Energy and Mineral Resources of the Government of Bangladesh.

BPDB constructs most of public sector power plants according to least cost plan, conduct procurement of private power (IPP), purchase power from generators (Public and Private) and sell to distributors.

4.1.10 Power Grid Company Of Bangladesh (PGCB)

Power Grid Company of Bangladesh (PGCB) is responsible for operation, maintenance and development of the transmission system of the country. The main function of PGCB is wheeling of energy from BPDB power station and other generation companies to Distribution entities utilizing transmission network. PGCB gets its energy wheeling charge from its clients (Distribution entities) at the rate fixed by BERC.

4.1.11 Dhaka Power Distribution Company Limited (DPDC)

Dhaka Power Distribution Company Limited (DPDC) is one of the largest power distribution companies in Bangladesh mostly distributing electricity in the southern part of Dhaka city (Dhaka South City Corporation). Among the more than 200 employed engineers, only 15 are women. During the field visit, DPDC expressed the need for support in two areas: a) technical training for female engineers that would allow them to access higher positions and to better raise their voice; b) the establishment of a child care facility for employees of DPDC which would enable especially women to better combine their professional work with family responsibilities.

4.1.12 Dhaka Electric Supply Company (DESCO)

Dhaka Electric Supply Company (DESCO) is one of the major power distribution companies in Bangladesh mostly distributing electricity in the northern part of Dhaka City (Dhaka North City Corporation).

4.1.13 Local Government Engineering Department (LGED)

LGED performs its functions through three sectors - Rural, Urban and Small-Scale Water Resources for creating local level infrastructural facilities thus contributing towards the goal of attaining economic growth. LGED as an agency also extends technical assistance to the Local Government Institutions (LGIs) while its project implementation leaves a positive impact in the overall progress of the country including the socio-economic development, employment generation and poverty alleviation. LGED has been a pioneer in promoting gender concerns in many of its projects and programmes such as providing streetlighting and developing growth centres, keeping gender considerations in mind. It has set targets for employment

of women, ensuring fair wages and sharing of profits from roadside plantations of LGED's Road maintenance projects.

4.1.14 Rural Development Academy (RDA) (RDA)

RDA's community-based biogas projects have been successful in including women in all stages of project implementation.[76]

Women's involvement in the Community Biogas Project of the Rural Development Academy (RDA) is a promising initiative. International development partners engaged in the energy sector of Bangladesh have also taken steps toward gender mainstreaming in their programmes and projects.[77]

4.1.15 Bangladesh Rural Electrification Board (BREB)

The Bangladesh Rural Electrification Board (BREB) has conducted a gender analysis, and corresponding gender strategies have been formulated. Women technicians have been involved in renewable energy initiatives.[78]

4.1.16 Joyeeta Foundation

Joyeeta Foundation is a specialized institution mandated for empowering women economically. They are engaged in enhancing business conducive institutional capacity of grass root level women associations and women business friendly congenial atmosphere and ensuring other enabling support services. Developing skills and competencies of women necessitate engagement in diverse business initiatives. However, at present they do not provide any support linked to green energy transition.

4.1.17 Ministry of Labour and Employment

The Ministry of Labour and Emplyoment deals with labor laws, welfare of labors and employment. At present there is no direct linkage with green energy transition.

4.1.18 Bureau of Manpower, Employment and Training (BMET)

BMET is Bangladesh's public sector training provider. It has Technical Training Centres operating throughout Bangladesh. BMET is working to ensure the institutionalization of the training curriculum with ILO and its partners whilst scaling up SHS training throughout the country to meet the ever-increasing demand for solar technicians and entrepreneurs.

4.2 Private sector

4.2.1 Solshare

Solshare is an energy solution provider to the underserved rural population. Solshare has created the world's first peer-to-peer energy exchange network (SOLbazaar). They provide ICT based solutions, creating synergies between energy and transport to provide clean and affordable access to electricity and micro mobility services.

[76] ADB, 2017, p. 65
[77] ADB, 2017, p. 57
[78] ADB, 2017, p. 57

SOLshare came up with a way for people to turn their excess solar electricity into money with zero hassle. It also enables them to purchase more power on the go whenever they want as well as they get to invest in more power generation and trade it off for a handsome return with minimal risk. This led them to install the world's first cyber-physical peer-to-peer (P2P) solar sharing grids, and this of all places in remote areas of Bangladesh. SOLshare connect solar home systems, monetizing excess solar energy in real time with mobile money and empowering rural communities to earn a direct income from the sun.

Solshare was founded by three German men, meanwhile the company has 6 directors. 40% of all employees are women, and according to one of the founding members women do a better job than men. However, on average women earn a lower salary than men due to the fact that they more often work in assembly where salaries are lower.

4.2.2 Grameen Shakti

Grameen Shakti is a social enterprise which is the largest service provider of rural-based renewable energy that promotes solar home systems to low-income rural households in the world[79]. It covers 60% of the SHS market, producing 14 MW of solar power, covering all 64 districts and provides electricity to 650,000 rural households. Given its successful business model and technical know-how, and with current demand for 20,000 SHS per month, Grameen Shakti has expressed a need for increased training of personnel. Approximately 50% of the students that pass through the Green Jobs in Asia training are absorbed into the labour market by Grameen Shakti.

4.2.3 Solaric

Solaric is a group of renewable energy development companies with its parent company in Singapore and subsidiary in Bangladesh to implement large-scale industrial rooftop solar projects based on both CapEx and OpEx models.

4.2.4 Jules Power Limited

Joules Power Limited (JPL) is a privately owned energy company operating in the power sector in Bangladesh. Currently its portfolio consists of Bangladesh's largest solar IPP, Technaf Solartech Energy Limited (TSEL); a 20 MW national grid-tied solar PV plant commissioned in September 2018.

4.2.5 Bangladesh Solar and Renewable energy Association

Bangladesh Solar and Renewable Energy Association (BSREA) is the largest association of business houses and NGOs working for promoting the clean energy industry in Bangladesh. It is a non-profit organization established in 2011. Currently, it has 42 active members and 15 executive members. BSREA's main partner is Ministry of Power, Energy and Mineral Resources. BSREA also collaborates with other ministries such as Ministry of Finance and Ministry of Commerce. Among various institutions in the renewable energy sector, BSREA is actively involved with the Bangladesh Bank (Central bank of Bangladesh), Sustainable & Renewable Energy Development Authority (SREDA), Power cell,

[79] https://www.gshakti.org/

and the Infrastructure Development Company Limited (IDCOL). BSREA also actively collaborates with various development partners supporting the sector.

Among its members companies not a single one is entirely led by a woman.[80]

4.2.6 Bangladesh Women Chambers of Commerce and Industry

Bangladesh Women Chamber of Commerce and Industry (BWCCI) is a non-profit, non-political organization established in June 2001 with the aim to encourage and strengthen women's participation in the private sector as entrepreneurs through promoting a woman friendly business environment. BWCCI is the country's first women Chamber of Commerce, a trade body exclusively working on women's economic and social empowerment nationally. BWCCI now has more than 15.000 members across the country. Since its creation, BWCCI has established a pool of trainers who trained nearly 3.000 women in entrepreneurial skills (e.g. how to develop a business plan, how to access finance). BWCCI also established a mentoring system. In addition, BWCCI is advocating for a change of policies. One of their successes in influencing policies was to bring down interest rates for collateral free loans introduced by the Central Bank in 2012 from 17-18% to currently 9%.

4.2.7 Solar Tie Limited

Solar Tie Limited[81], is a women-led Solar Start-up company that aims to promote Solar Energy as a best suited renewable energy source across the country since 2017. Searching for a more viable and environment friendly alternative to business Solar Tie Limited decided to expand its operation with the Solar Plant EPC, Industrial Roof Top Solar Solution, RESCO Model, Solar Irrigation, Independent Solar Power Producer, Research and Consultancy, Trading of Solar Product and Energy Efficient product in Bangladesh. This allowed Solar Tie Limited to provide a complete solar solution for its B2B and B2C.

Solar Tie focuses on women´s needs both as employees and as beneficiaries and end users of its services specifically targeted at changing women's lives.

Areas of work are as follows:

- Industrial Roof Top Solar Solution
- Solar Irrigation System
- Carbon Offsetting Project
- Independent Solar Power Producer
- Residential Solar Solution
- On-grid and Off-grid Solar Solution •Design and Consultancy
- Local and International EPC
- Solar Product Trading

Solar Tie Ltd. had been partnered with Tenka Solar GmbH to implement its high range solar plant project in the country with most updated technology and experienced hands.

[80] Oral communication
[81] http://solartie.net

The Tenka Solar panels are produced according to the highest and up to date quality and production standards in the three plants owned by the Group of Companies that leads JY Capital, located, respectively, two in the Chinese province of Zhejiang (50 kilometers from Shanghai, with a surface of 35,000 square meters) and a recently installed in Korea for a total production capacity of about 1GWp.

4.3 Non-governmental organisations

4.3.1 Women's rights organizations

According to one publication of 2013, „there is a small but extremely active women's movement, largely urban based but with networks in the countryside, that has been extremely influential in protesting against violence against women and demanding fairer legislation."[82]

NGOs, women's organizations, and human rights organizations continue to play an active and important role in advocating for gender equality, women's empowerment and the protection of women's rights. Their programmes range from providing direct services to raising awareness, mobilizing support, community work, and policy advocacy. NGOs range from small village clubs to large NGOs, like the Building Resources Across Communities (BRAC). The various categories of civil society organizations are regulated by various government registration authorities such as the Ministry of Social Welfare, Department of Women Affairs, and their own boards.[83]

Work for civil society organizations has, however, become more difficult after the adoption of the Foreign Donation Act in 2016. The Foreign Donation Act has the potential of placing a strict control over civil society organizations, including women's organizations, especially their funding, which may undermine their free registration and operation. The CEDAW Committee expressed the concern "that the increasing criminalization of criticism of government may further restrict the activities of non-governmental organization working on human rights, including women's rights organizations."[84]

4.3.2 BRAC

BRAC, the largest NGO in the world works for transforming socio-cultural gender norms at the community level by advocating for gender equality and gender justice at all levels through gender mainstreaming. BRAC reached 1.845 million people through awareness efforts on violence against women, children and prevention of child marriage across 7 districts in 2018.[85]

4.3.3 Engage Men and Boys

A network of like-minded organizations named Campaign to work with boys and men is addressing violence involving boys and men aims to prevent all forms of violence against women and children. It was renamed as "Engage Men & Boys: Network for promoting gender justice" in 2011 and it is working to engage boys and

[82] N. Kabeer et al. 2013. *Paid Work, Women's Empowerment and Inclusive Growth: Transforming the Structures of Constraint*. UN Women. p. 63
[83] ADB, 2017, p. 12
[84] CEDAW Committee Concluding Observatons, 2016
[85] Ministry of Women and Children Affairs, 2019, p. 46

men against social injustice. The Network works as a catalyst to break the traditional beliefs, norms and values perpetuating VAWG and upholding gender justice. It works through establishing active linkages at the local, national and global levels to raise men's and boys' voices and action on gender-based violence/VAW. The other activities include advocacy and lobby for ensuring action to engage men and boys to address gender-based violence, research to develop a knowledge-base on men and masculinity; campaign to change structural and behavioural barriers to ensure gender justice and to establish alliances with feminist and other social justice movements to ensure gender justice. [86]

4.3.4 Gender Monitoring Network

Several civil society organizations participate in the Gender Monitoring Network facilitated by UN Women. The Gender Monitoring Network has access to information from the population at the local level. In June 2020, the Gender Monitoring Network issued a Call for Action representing the voices of women and other vulnerable groups who are most affected by the COVID 19 pandemic. Therein, the Gender Monitoring Network requested from policy makers to recognize women human rights and integrate an intersectional gender equality approach in the COVID 19 Response to ensure everyone has access to necessary information,support and resources.[87]

4.3.5 Other related NGOs

Some NGOs (e.g., Centre for Mass Education in Science) and private firms (e.g., Prokaushali Sangsad, a consultancy firm with a view to bring together a group of engineers, architects, planners, economists, and other professionals to offer services in developmental activities of Bangladesh) are active and have been innovative in involving women. [88]

4.3.6 Bangladesh Bondhu Foundation (BBF)

At present, about 10% of all staff of BBF are female. Female representation is higher in the head office than in field offices. BBF has a good gender balance in the offices in Dhaka but this can be further improved. In the field offices this is harder to realise, but there are opportunities especially in the category "stove doctors" ('Bondhu Chula Doctors') who work at village level and do not travel long distances. BBF's ICS maintenance programme 'Bondhu Chula Doctors' mainly targets women – 95% of its service providers are female. [89]

4.3.7 Kazi Shahid Foundation (KSF)

Kazi Shahid Foundation (KSF) has developed its Biogas Programme to address health hazards of women from biomass fuels in Panchagarh district. KSF uses a mixed approach, using both dung and waste food to produce cooking fuel for Biogas Plant. It is using a "no cash" microfinance repayment system and the cost of the Biogas Plant is reimbursed through the effluent slurry, as well as, excess cow dung or milk. This multi-pronged approach ensures access to fuel without hazard. A comprehensive training and support are provided to quickly deal with

[86] Ministry of Women and Children Affairs, 2019, p. 46/47
[87] https://asiapacific.unwomen.org/en/news-and-events/stories/2020/06/gender-monitoring-network-calls-the-government-of-bangladesh-action-for-a-gender-responsive-covid-19
[88] ADB, 2017, p. 65
[89] GIZ, 2021, p. 51

both simple and complex problems and finding innovative methods to use the bio-slurry as a regular income generating asset. [90]

4.3.8 UCEP Bangladesh

UCEP Bangladesh is a non-governmental organization which provides Second Chance Education to out-of-school children and Decent Work to youth & adults through Technical Vocational Education & Training (TVET) and Skills Development. It has a special focus on Social Inclusion, therefore gives priority to females, children & youth from poor and underprivileged families. UCEP Bangladesh works to bring more children and youth, who have dropped out of school, back to General and Technical Education, as well as to engage families and communities to provide support to their children's education, training and employment. UCEP Bangladesh aims to build partnerships with the government, employers, organizations and other stakeholders to foster the institutionalization and sustainability process of the efforts and promote the "Leave No One Behind" campaign by focusing on Social Inclusion.

UCEP Bangladesh plays a leading role, collaborating with stakeholders, in employment creation and enhancement of productivity through skilled human resources, enabling them to live with dignity and respect, adapting with the changing context. UCEP Bangladesh was established by Mr. Lindsay Allan Cheyne, a New Zealander in 1972 with the motto 'Help to Learn, Skills to Earn'.

At present, UCEP Bangladesh is governed by the UCEP Bangladesh Association, comprising of 43 voluntary members of whom 7 are elected to serve as the Board of Governors (BoG) for a two years' term. The present Board of Governors lead by a woman Chairperson, Ms. Parveen Mahmud FCA while 4 out of 7-members are also women. The management of UCEP Bangladesh is leading by the Executive Director (ED) and a Senior Management Team (SMT), supported by Regional Management Team (RMT).

Region-wise information (2020)

Table 5 : Region wise enrollment information from UCEP

Region Name	*Enrolment*	*Girls*	*Boys*	*PWDs*	*Ethnic*	*Graduate*
Chattogram	1689	570	1119	80	64	1595
Dhaka North	1492	337	1155	8	7	1274
Dhaka South	1164	435	729	23	13	1089
Gazipur	869	462	407	22	12	823
Khulna	1712	750	962	100	93	1068
Rajshahi	1073	446	627	30	100	866
Rangpur	970	395	575	42	29	769
Sylhet	687	241	446	23	42	516

[90] Ministry of Women and Children Affairs, 2019, p. 30

Table 6 : Regional self-employment status (2020) from UCEP

Region Name	Female	Male	PWDs	Total
Chattogram	83	44	12	139
Dhaka North	28	74	0	102
Dhaka South	30	41	4	75
Gazipur	2	17	0	19
Khulna	113	90	9	212
Rajshahi	26	32	1	59
Rangpur	93	57	0	150
Sylhet	90	7	0	97

COVID-19 has brought some dimensional change to the skills training, UCEP Bangladesh has developed alternative training modalities for continuing the skills training during lockdown through Informal Apprenticeship Training and Industry based Training. It took a combined effort of TVET and DEED team to successfully start the training, DEED team has communicated and convinced the formal and informal employers to conduct training under their mentorship. During lockdown, DEED team conducted potential employer survey to ensure the job placement of UCEP graduates and also provided second time job opportunity for jobless UCEP graduates as well as doubled its job counselling with psychological support for bringing them back to employment.

Social Inclusion is one of the major components of the UCEP Bangladesh programme which is working to ensure gender equality, disability inclusion, and protection and safeguard all stakeholders especially students, teachers, and staff. The special focus of this component is to include more females, person with a handicap, ethnic, and other minority groups in all programmes and ensure an accessible environment for the beneficiaries in all establishments of UCEP Bangladesh.

The Social Enterprise Development (SED) department was established in 2018 to assist UCEP Bangladesh to transform from a fully philanthropic into a self-sustainable organization, considering the critical need for the institution to reduce donor dependency and gradually grow towards sustainability. SED focuses on developing various commercial models and provides a business orientation to existing models so that necessary funds can be generated for investing in social programmes of UCEP Bangladesh. UCEP Bangladesh also started exploring the Micro-Enterprise Development (MED) Programme in the year 2020.

4.4 Academic institutions

Research and development in energy and power sectors is essential for sustainable development of the country.

4.4.1 Bangladesh Energy and Power Research Council (BEPRC)

The Government has established the Bangladesh Energy and Power Research Council (BEPRC) as responsible entity for the coordination, monitoring and evaluation of research work in these sectors.

Apart from that, several university departments, the Bangladesh University of Engineering and Technology (BUET) Energy Centre and the Dhaka University Energy Institute are involved in research related to Energy and Power in Bangladesh.

The research areas include power system planning, grid stability analysis, waster heat recovery, energy efficiency and renewable system design. Centre for Energy Research of United International University is involved in research related to the Solar Photovoltaic systems. These Universities are also involved in energy policy formulation and adaptation.[91]

4.4.2 Bangladesh University of Engineering and Technology (BUET) Energy Centre

The Institute of Energy and Sustainable Development (IESD) of Bangladesh University of Engineering and Technology (BUET) was established by a resolution of the 199th meeting of BUET Syndicate held on 4 November 1984. The IESD aims at promoting education and research, organizing seminars, symposia, training workshops, short courses and outreach programs, and publishing journal, monographs, and books on energy related interdisciplinary matters. These include among others identification of the conventional (e.g. gas, coal), non-conventional (e.g. biomass, biogas) and renewable (e.g. solar, wind, hydro) resources of energy in Bangladesh, and addressing the contemporary policy, socio-economic, environmental and engineering concerns in relation to efficient conversion of the identified resources into end-usable forms and efficient supply, utilization and conservation of energy.

Out of the 7,100 students around 20% are women. Women apply to a much lesser extent, however, the percentage of women is increasing and women are encourage to apply. On average they have better grades than male students.

Among the teachers, the majority are men.

BUET is being supported by GIZ, JICA, UNDP and USAID.

4.4.3 Dhaka University Institute of Energy

Institute of Energy conducts academic and research activities in the field of renewable energy as well as to develop skilled workforce for the emerging energy sector of Bangladesh.

From 2011-2012 session the institute is conducting MS in Renewable Energy Technology (MRET) course and from 2016-2017 Professional MS in Renewable Energy Technology (PMRET) course. The institute also offers M.Phil. and Ph.D. programs in Renewable Energy Technology for students and conducts several short courses/training programs for the power sector of Govt. officials.

The institute organizes national renewable energy expo and publishes energy magazine/journal to promote and share the technical knowledge among the relevant stakeholders.

According to the Director of the Institute, the number of female students is increasing. Out of 400 students that applied for the Master Programme on Renewable Energy, 50% were women and out of the 40 students that have been

[91] A Review of Energy Sector of Bangladesh, p. 618.

selected based on an open competition, 20 are women. The data provided by the Department (see below table) however show a slightly different picture. It reflects an increase of the share of women from 17 to 27% between 2019-20 and 2020-21, but this share is still far below 50%.

Table 7 : Enrollment data of MS in Renewable energy in Dhaka University

	MS. In Reneable Energy Technology							
	Number of students			Total Exminee	Total pass	Pass rate		
Academic year	Male	Female	Total					Female%
2011-12	28	2	30	16	13	81%		6,7%
2012-13	36	4	40	31	31	100%		10,0%
2013-14	35	5	40	16	13	81%		12,5%
2014-15	35	5	40	32	28	88%		12,5%
2015-16	33	7	40	34	28	82%		17,5%
2016-17	31	9	40	35	33	94%		22,5%
2017-18	34	6	40	33	28	85%		15,0%
2018-19	35	5	40	35	32	91%		12,5%
Total	267	43	310	232				13,9%
2019-20	33	7	40					17,5%
2020-21	29	11	40					27,5%
	329	61	390					15,6%
	Professional MS. In Reneable Energy Technology							
	Number of students			Total Exminee	Total pass	Pass rate		
Academic year	Male	Female	Total					
2016-17	40	5	45	38	35	92%		11%
2017-18	37	8	45	39	36	92%		18%
2018-19	39	8	47	45	39	87%		17%
Total	116	21	137	122				15%
2019-20	37	10	47					21%
	153	31	184					17%

Source: Data provided by Dhaka University

Women seem to have better results as they are more responsible. The Institute does not have child care facilities, but if need be students can bring their children with them.[92]

4.5 Financial institutions

4.5.1 Infrastructure Development Company Limited (IDCOL)

Infrastructure Development Company Limited (IDCOL), which has been working since 2003 for the financing of renewable energy projects using concessionary funds of the World Bank, ADB, KfW, Japan International Cooperation Agency, Department for International Development of the United Kingdom, Islamic Development Bank, and many other development partners. It is working with the help of 57 partner organizations such as Grameen Shakti.[93]

4.5.2 Bangladesh Infrastructure Finance Fund Limited (BIFFL)

Bangladesh Infrastructure Finance Fund Limited (BIFFL) is the biggest Non-Banking Financial Institution in Bangladesh owned by Government addressing the

[92] Oral communication
[93] ADB, 2017, p. 65

importance of infrastructure development with a view to promote an attractive environment for sustainable private investment.

The key program of BIFFL related to women in Energy is the EEREWEF LOAN scheme. The EUR 50 million project funded by the Agence Française de Développement (AFD) aims to support the Government of Bangladesh's objective to reduce energy intensity by 20% within 2030. It is also aimed at bringing about equitable growth through support to women entrepreneurs.

4.5.3 Bangladesh Bank (BB)

Bangladesh Bank, the central bank and apex regulatory body for the country's monetary and financial system, was established in Dhaka as a body corporate vide the Bangladesh Bank Order, 1972 (P.O. No. 127 of 1972) with effect from 16th December, 1971.

In addition to its core functions of a typical monetary and financial sector regulator, BB also promotes

- Women entrepreneurship development
- Sustainable Finance in 54 identified areas/products
- Provide credit Guarantee scheme for cottage and small and medium enterprises

4.5.4 Local Banks/FIs

Local Banks provides loan to MFIs, social and green energy entrepreneurs and women entrepreneurs. Leading Banks/FIs in Sustainable Finance are BRAC Bank, Mutual Trust Bank, Uttara Bank, Lankabangla Finance, IDLC etc.

4.6 International networks

At the international level, the issue of women in the energy sector has gained increasing attention in recent years. Platforms such as ENERGIA, the Global Women's Network for the Energy Transition (GWNET), Women in Energy, Climate and Sustainability (WECS) and the Women & Energy Network aim to connect women in leadership positions, establish mentoring systems and strengthen the exchange between women in general. There is also the international Women in Green Hydrogen (WIGH) network, a GIZ-supported initiative aimed at promoting women's participation in the sector. The networks are briefly described below:

4.6.1 ENERGIA

ENERGIA is one of the most well-known international networks on gender and sustainable energy. It was founded in 1996 by a group of women involved in gender and energy work in developing countries. It aims to promote the involvement of women in the development, delivery and use of modern energy in order to enhance the sustainability and adoption rates of these services, and to, thus, improve the outcomes of energy projects and the livelihoods of communities.

The vision of ENERGIA is that "(w)omen and men have equal and equitable access to and control over sustainable energy services as an essential human right to development."

ENERGIA contributes to scaling up the delivery of energy products and services through the strengthening of women-led energy enterprises. It also advocates for gender mainstreaming in energy policy and practice and creates the evidence base for incorporating a gender lens through research. ENERGIA has also developed training modules and tools for the energy sector and is involved in several ongoing programmes, such as the Women's Economic Empowerment Programme which aims to empower women along the whole energy value chain. In Bangladesh, ENERGIA is represented by Prakaushali Sangsad Limited an women led Engineering Consulting firm.

4.6.2 Global Women's Network for the Energy Transition

The Global Women's Network for the Energy Transition (GWNET)[94] is a global network that aims to empower women working in sustainable energy at various levels of leadership in the public and private sectors in all parts of the world. GWNET is an international non-profit organization founded in 2017 under Austrian law.

GWNET aims to advance the global energy transition by empowering women in the energy sector through interdisciplinary networking, advocacy, training, and mentoring. GWNET aims to address the current gender imbalance in the energy sector and promote gender-sensitive policies around the energy transition in all parts of the world.

GWNET empowers women in energy through interdisciplinary networking, advocacy, training, coaching and mentoring, and services related to projects and financing. Since 2018, GWNET organizes a mentorship program to help young energy professionals around the world develop their careers towards leadership positions.

As part of the network's activities, GWNET recently launched the Women in Energy Expert Platform during the Berlin Energy Transition Dialogue on 10th April 2019. The GWNET Women in Energy Expert Platform "connects and empowers women working in sustainable energy in developing, emerging and industrialised countries with the aim to encourage greater visibility, networking opportunities and professional connections between women". GWNET is also working with SEforALL on developing a program that will support and mentor women working on energy access projects in SEforALL high-impact countries. [95]

4.6.3 Women in Energy, Climate and Sustainability

Women in Energy, Climate and Sustainability (WECS) is a public foundation established to promote gender equality to enable the transition to a carbon neutral economy in Europe and globally. WECS aims to promote gender diversity and women's empowerment in the fields of energy, climate and sustainability.

4.6.4 Women & Energy Network

The German Women & Energy Network (wom.e.n) is an independent network and communication platform of women for women working in the energy industry.

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[94] https://www.gfse.at/index.php?id=40&tx_ttnews%5Btt_news%5D=234&cHash=d42e431c441cc672234b95d27587cc39

[95] GWNET (n/d): https://www.globalwomennet.org/about-gwnet/activities/

The network is a registered association with over 60 women working in different functions and at different hierarchical levels as well as in different companies and organizational units. The spectrum of represented professions ranges from technician and lawyer to businesswoman and PR manager to student and board member. Members work at municipal utilities, government agencies, consulting firms, energy companies, associations, universities and many other institutions.

Members can exchange experiences, knowledge and ideas in the network, support each other and offer collegial advice. Through interdisciplinary networking, (new) business ideas are to be developed like in a think tank. The aim is to promote an open, trusting exchange, as well as to organize personal and professional contacts, mutual support in establishing oneself in the industry, specialist lectures, lectures on personal development, and regular meetings.

4.6.5 Sustainable Energy for All

The Sustainable Energy for All (SE4ALL) initiative brings together governments, businesses, and civil society organizations to, among other things, double the share of renewable energy in the global energy mix by 2030. Its accountability framework requires actors to take gender into account. This is a positive example of an international initiative that promotes attention to gender issues in renewable energy project planning.

4.6.6 International Renewable Energy Agency (IRENA)

IRENA is the leading intergovernmental agency for the energy transition, supporting countries in their transition to a future sustainable energy provision.

With 161 members (160 countries and the European Union), IRENA promotes the widespread deployment and sustainable use of all forms of renewable energy in pursuit of sustainable development, energy access, energy security, and low-carbon economic growth and prosperity.

IRENA promotes the implementation of renewable energy strategies and provides countries with tools to develop the strategies needed to enable the transition to renewable energy. It provides an assessment of resources, financial management, policy and regulatory frameworks, and energy sector capacity.

IRENA has published several reports on women's role in renewable energy.

4.6.7 Women in Green Hydrogen

The Women in Green Hydrogen network[96] is an international platform for women working and researching in the field of green hydrogen. It was founded on the initiative of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and with financial support from the German Federal Ministry for the Environment.

The vision of the network is to increase the visibility of women working in the field of green hydrogen and to give them a stronger voice.

Specific goals of the network are:

- Increase the visibility of women (at conferences, on boards, etc.)

[96] https://women-in-green-hydrogen.net

- Increase networking among women in the hydrogen sector (through own network events and side events at conferences)
- Strengthen female experts (in career planning, through mentors)

A total of about 2,000 women are currently organized in the network, which makes itself known via its website, LinkedIn and Twitter. Currently, the network is still very European-focused, but it aims to increase membership of female experts from the Global South. There are plans to establish regional groups of the network in South America and Africa.

The first international networking event was held digitally with over 130 women participants in December 2020. By using break-out rooms, participants were able to network in small groups and discuss current issues related to the hydrogen market.

Due to the realization that currently only 20% of all speakers at green hydrogen conferences are women, the Green Hydrogen Expert Database was developed as a crowd-sourcing database of experts working in the field of green hydrogen. Currently, the database, which went online in November 2021, contains 530 profiles of female experts. As a service, the database is particularly aimed at media professionals and those responsible for organizing events, who are striving to reflect diversity and find potential female experts and speakers for their events. The goal is to promote equality and diversity in conferences, panel discussions, expert talks, media appearances, advisory committees, and boards of directors, making the world of green hydrogen more inclusive and innovative.

The network has established partnerships in which each partner commits to providing at least 30% women on each panel at future events. These partnerships provide opportunities to increase the percentage of women at events while providing greater visibility and networking opportunities for the women of the network.

Since 2021, Women in Green Hydrogen is offering a hydrogen sector-specific global mentoring program for women in lower/middle leadership positions. In the first run, 50 mentor-mentee pairs participated in the program. The program is designed as an online program, but a physical meeting at appropriate occasions such as events, networking meetings, or the like can complement the mentor-mentee relationship. Mentor-mentee pairs share their experiences in the hydrogen industry and mentors provide career development tips. WiGH provides a starter kit for the mentor-mentee program. The program concludes with an interactive, web-based exit interview.

4.7 Regional and national networks

4.7.1 WePower

WePOWER is a voluntary women's professional network in Energy and Power Sector in South Asia that supports women's participation in energy projects and institutions and promotes normative change regarding women in Science, Technology, Engineering, and Mathematics (STEM) education. The network was officially launched in 2019 and is being supported by the Asian Development Bank, the World Bank and the Australian Aid. In total, WePower has 29 partners (as of 2022). The WePower Award is granted to partners that have made exceptional

contributions in supporting workforce participation of women in the South Asian energy sector.

In 2021, the Partner of the Year Award was granted to the Water and Power Development Authority in Pakistan, the Highest Students Outreach Award was granted to Tata Power in India and the Highest Retention Award to Karachi Electric.[97]

The National Chapters of WePOWER are key to institutionalizing the network at the national level, fostering exchange of ideas, facilitating lateral learning, opening communications, and encouraging collaborative partnerships among national, institutional and strategic partners.

4.7.2 Gender and Energy Network Bangladesh

The Gender and Energy Network Bangladesh is an informal network of professionals and organizations engaged in promoting gender awareness and gender mainstreaming activities in the energy sector since 2004. It is a voluntary organization and has conducted several studies, training programmes, and awareness programmes under small grant funds from ENERGIA. These were targeted to energy sector agencies and others, including BREB and PBS, Bangladesh Power Development Board (BPDB), LGED, Department of Public Health Engineering, and energy professionals. Services of organizations like the Gender and Energy Network Bangladesh can be used to promote gender programmes at the grassroots levels.[98]

4.7.3 National chapter of ENERGIA

ENERGIA has a Bangladesh office and Ms. Asma Huque, Managing Director of Prokaushali Sangsad Ltd (PSL), became member of ENERGIA since 2002 and has started work as Coordinator of ENERGIA in Bangladesh. EUD Study team organised a meeting with ENERGIA team and had a meeting with Asma Huque while Ms. Hasna also joined from USA via Zoom. ENERGIA also have linked with *Grameen Shakti,* but there is no reportable progress because there is no financial support for it.

Unless any regular funding is available no one will be interested to join only for meetings. So, some funding is required to activate the network for energy and gender like ENERGIA which can help to address the gender friendly projects and policy issues in this sector.

4.8 Overview of programmes and projects of Development partners in Bangladesh

4.8.1 GIZ

The EUD will be working to promote gender equity and women empowerment (GEWE) in the green energy transition. At the macro level, the EUD will collaborate with international donors (i.e. World Bank via strategic partnership with the German Development Cooperation Agency (GIZ) and with the Government of Bangladesh

[97] For more information see: https://collaboration.worldbank.org/content/sites/collaboration-for-development/en/groups/the-wepowernetwork.html
[98] ADB, 2017, p. 71

(GoB) through the Sustainable and Renewable Development Authority (SREDA) to promote and implement clean cooking programs focused on women as the receivers of technology and also as producers of relevant knowledge. The goal is two-fold: i) to empower women as change agents to promote clean cooking solutions in their neighbourhoods and communities; and promote dissemination of clean cooking through them; and ii) to promote access to clean and affordable energy services by directly addressing the differential energy needs and concerns of women and men. All this GEWE mainstreaming work will be done within a broader strategy of advancing gender equality and intersectional inclusion in sustainable human development. High-level policy dialogues will be held with key Ministries, including the National Gender Machinery, i.e. the Ministry of Women and Children Affairs (MoWCA). GEWE issues in macro-level policy areas relating to green energy efficiency and affordability will be included in the forthcoming EUD Sectoral gender analysis of the energy sector.

4.8.2 AFD

AFD is providing a 50 million euro credit line to the Bangladesh Infrastructure Finance Fund to finance investments in energy efficiency, renewable energy generation and women's entrepreneurship.

The project aims to contribute to the transition of Bangladesh's economy towards a "greener" economy. More specifically, it aims to:

- increase the volume of investments in energy efficiency and renewable energy generation in Bangladesh;
- scale up this type of investment in the private sector in a wide range of sectors (SMEs in the industrial sector, cooperatives in rural areas, etc.);
- promote women's entrepreneurship.

The project involves a €50 million credit line which will be reallocated to the public non-banking financial institution BIFFL (Bangladesh Infrastructure Finance Fund Limited) to finance investments in the fields of energy efficiency (70 to 80 % of the credit line), renewable energy generation, mainly in rural areas (20 to 30% of the credit line) and women's entrepreneurship (to support the deployment of BIFFL's special program for this).

Alongside the implementation of the credit line, a €560,000 grant will be allocated to finance the technical assistance required for the effective implementation of the project.

4.8.3 Asian Development Bank

ADB supports Bangladesh to improve performance of the country's energy sector through technical, policy and capacity development support for investment projects in power and gas sectors. The ongoing project's of ADB in Bangladesh is the project number: 54108-001 named "Sustainable and Resilient Energy Sector Facility in Bangladesh". This technical assistance (TA) facility will support Government of Bangladesh during 2020-2022 to improve performance of the country's energy sector through technical, policy and capacity development support for investment projects in power and gas sectors. During this period, Asian Development Bank's (ADB) energy portfolio in Bangladesh is expected to increase by $1.7 billion, equivalent to the current ADB portfolio developed during 2015-2020.

The TA facility will combine the preparation of various projects in Bangladesh during 2020-2022. Such an approach is expected to result in a better-performing energy portfolio in Bangladesh than would be achieved through project-specific TA because of improved (i) response time by providing the country with consistent energy solutions; (ii) quality of outputs through efficient delivery systems; (iii) sector assessment and policy support; and (iv) knowledge sharing across sub-sectors. The TA facility is required to support preparation and implementation of these projects, as well as to provide policy advisory services and capacity development support. The TA facility's outputs will be: (i) improved planning, project design, and readiness; (ii) improved institutional capacity in project administration and energy sector service delivery; and (iii) improved knowledge management and sharing among sub-sectors. However, when considering from gender point of view, this project is formulated as an “Effective gender mainstreaming” (EGM) project as per ADB’s gender categories which stand in 2nd category while 1st category is “Gender Mainstreaming” (GM). The driver of changes will be i) Gender Equity and Mainstreaming, ii) Governance and capacity development, iii) Knowledge solutions, iv) Partnerships, v) Private sector development

4.8.4 World Bank

RERED II project is an active project supported by the World Bank providing USD 386 million finance for rural electrification and renewable energy deployment.

Rural Electrification and Renewable Energy Development II (RERED II) Project:

The development objective of the Second Rural Electrification and Renewable Energy development Project is to increase access to clean energy in rural areas through renewable energy and promote more efficient energy consumption. There are four components to the project. The first component of the project is access to electricity. This component will support the Solar Home Systems (SHS) and other renewable energy options for increasing access to electricity. The component will also include technical assistance support to Infrastructure Development Company Limited (IDCOL) for capacity building, inspection and monitoring, impact evaluation, training, and other related activities for ensuring effective implementation. The second component of the project is household energy. This component supports the efforts of various Non-Government Organizations (NGOs) in providing rural households with clean cooking solutions. The component will build on the success of Bangladeshi NGOs in the areas of community outreach in total sanitation programs. The third component of the project is energy efficient lighting. This component will support the distribution of 7.25 million Compact Fluorescent Lamps (CFLs) in predominantly rural areas where these energy efficient CFLs are not yet widely used. The fourth component of the project is sector technical assistance. This will support developing national guidelines for safe disposal/recycling of CFLs and capacity building for ensuring safe disposal of CFLs financed under the project.

4.8.5 UN Women

UN Women in Bangladesh supports the government to implement commitments to international normative standards on gender equality and women’s human rights. The new UN Sustainable Development Cooperation Framework (UNSDCF) for 2022-2026 was launched in 2021 and the corresponding UN Women Bangladesh

Strategy Note (2022-2026), defining UN Women's strategic engagement in Bangladesh, has also been finalized. The country strategy focuses on strengthening the national structures and mechanisms for gender mainstreaming in policies, plans and budgets; supporting efforts to prevent and eliminate violence against women; promoting women's access to decent and safe work; promoting policies and government investment in women's empowerment and resilience building in the context of climate change, humanitarian crisis as well as other threats to peace and security. UN Women works with a range of stakeholders in Bangladesh including the government, civil society and women's organisations, youth, UN agencies and donors, to promote gender equality and women's empowerment.

According to UN Women, there is a lack of engagement of women across the renewable energy sector. Even as more women become qualified to work in the renewable energy sector, social norms still prevent them from gaining employment. Time spent on unpaid care and domestic work has increased significantly since COVID-19, while overall sales of renewable energy products have decreased as communities save cash for essential needs.

UN Women in collaboration with International Union for Conservation of Nature (IUCN) and UN Environment Programme (UNEP), under the joint project EmPower: Women for Climate Resilient Societies, funded by the Swedish International Development Cooperation Agency, has completed a national assessment on the interlinkages of gender equality and climate change in Bangladesh. The assessment report contributes as "a tool" to raise awareness about benefits, advantages and need for gender-responsive climate action, analyzes gendered impacts of climate change and suggests ways to enhance and mainstream gender equality into climate-relevant sectoral policies. The report analyses the gendered impacts of climate change and raises awareness about the benefits and need for gender-responsive climate action.

The overall objectives of the assessment were:

i. to strengthen country-driven processes by presenting more evidence of the links between gender equality and climate change and analyzing gendered impacts in the key adaptation and mitigation sectors – Energy, Agriculture, Water Resource Management, and Forestry.
ii. to provide country-specific recommendations about how to enhance gender-responsive policy implementation and further bolster the integration of gender equality in climate-relevant policy areas.

Key Findings of the report is provided below[99]

Bangladesh has strong stand-alone policies in both climate change and gender equality. The Government of Bangladesh has made efforts to mainstream gender equality into climate actions through the BCCGAP 2013. Bangladesh has also adopted a unique approach to integrate the NDC and NAP under a joint governance structure, connecting with key national processes such as the Five-Year Plan and the implementation of the SDGs, and with strategic documents like

[99] https://asiapacific.unwomen.org/sites/default/files/2022-08/FINAL-Bangladesh-State-of-Gender-Equality-and-Climate-Change-Report_10-08-22.pdf

the BCCSAP. While these initiatives provide an enabling environment for NDC implementation, there remains a gap with regards to the interlinking of gender equality and climate change. Furthermore, there is little evidence of uptake of the BCCGAP 2013 by government agencies, donors, and NGOs. Some of the significant challenges include: limited capacity to mainstream gender into national and local policies, programmes and actions; lack of investment in gender-responsive actions; limited access of women's organizations; and low numbers of women in decision-making. The assessment found that policies, strategies and plans acknowledge and provide the scope to recognise gender roles in adaptation measures under the NDC. However, mitigation measures rarely have explicit references to gender equality especially in renewable energy. When it comes to critical sectors for climate change adaptation (agriculture, water resource management and forestry) measures do not accord adequate recognition or acknowledgement to gender equality. Moreover, the lack of gender responsive monitoring mechanisms, or of evaluation frameworks and indicators, hinder the assessment of gender-related outcomes. Further, implementation remains limited due to absence of resources, capacity and clear guidance for translating policy into action.

The energy sector continues to lag behind in gender-equality provisions. Energy policies do not integrate gender considerations in general. None of the energy sector policies have focused on the role of women in the consumption and management of energy. The absence of gender mainstreaming in the energy sector can be primarily attributed to a focus on economic performance and production, and to the technical and male-dominated nature of the energy sector. Energy projects are primarily focused on technology and feasibility. Little attention is paid to gender concerns, given the assumption that energy impacts men and women in similar ways. Rural women are disproportionately exposed to energy poverty and energy-related challenges. For example, indoor pollution is a severe problem for women and girls in Bangladesh. In addition, women and girls spend considerable time gathering fuel, cooking, and performing other household chores, resulting in time poverty, which is another dimension of gender inequality. Renewable energy sub-sectors offer benefits that can be leveraged to improve women's livelihoods, employment opportunities, and lives. However, they also present challenges that need to be addressed to ensure women and men benefit equitably.

4.8.6 IDCOL programme for renewable energy development

The **IDCOL programme for renewable energy development** has been successful with the implementation of solar home systems (SHSs) in the country, which resulted in expansion into other renewable energy and energy efficiency portfolio. Outputs of IDCOL projects are usually beneficial for women's empowerment because of the nature of the services provided by most of its project components, i.e., application of renewable energy technologies such as household electrification using solar panels and irrigation with solar water pumps. Currently, women technicians from NGOs are working in the field under IDCOL's SHS, improved cookstoves, and biogas programmes. A training programme for 27 women technicians was held by the private sector training institute of Prokaushali Sangsad.

4.8.7 Energy Sector Management Assistance Programme

The **Energy Sector Management Assistance Programme** funded the Ashden Award-winning project Opportunities for Women in Renewable Energy Technology Use in Bangladesh, which was implemented by Prokaushali Sangsad in 1999–2003. This was one of the first projects in Bangladesh addressing women in the energy sector.

4.8.8 USAID

4.8.8.1 Bangladesh Advancing Development and Growth through Energy (BADGE)

The USAID funded BADGE project is collaborating with the Government of Bangladesh and affiliated energy stakeholders to improve energy security and resilience in Bangladesh by improving access to affordable, reliable, and sustainable energy systems, and promoting transparent and efficient energy markets. Tetra Tech ES, Inc is the implementing partner for the BADGE project.

BADGE recently organized a workshop in Dhaka on Gender mainstreaming in the Bangladesh Energy sector to provide a forum for energy sector policymakers, utilities, experts, academicians, and other stakeholders to share insights, explore ways to build capacity to mainstream gender in the workplace, and incorporate gender perspectives into energy projects, policies, and planning.

4.8.8.2 Catalyzing Clean Energy in Bangladesh (CCEB)

Catalyzing Clean Energy in Bangladesh (CCEB), an ongoing project of USAID, has specific gender components embedded in all project tasks. Because of its project relationship with all the major organizations in the energy sector, CCEB can potentially influence other organizations to mainstream gender in their activities. CCEB has a gender strategy and action plan. A large component of the project supports promotion and commercialization of highly efficient mass- produced stoves all over the country, which directly reduces women's workload and exposure to indoor air pollution, women being generally responsible for cooking. It also promotes training and certification of women as certified energy auditors.[100]

In the 2000s, USAID and a **Renewable Energy project by Grameen Shakti**, the leading renewable energy company in the country, did a project to carry out a decentralized technology transfer to rural towns through building Grameen Technology Centers (GTC), recruit women engineers, and train hundreds of rural women from poor households. It was envisaged that these women would be integrated in and around these GTC to contribute to the Grameen Shakti target of installing 1 million Solar Housing Systems (SHS) by 2012. In two phases from 2006-2010, 35 Grameen Technology Centers (GTCs) were established and provided 15 days of training to a total of 2,797 rural women in the technical skills required to assemble components, install, and maintain the SHS. They also gained the capability of promoting the SHS to the public, to train users (often rural women based at home) in their use, and many gained business skills as well. This training took place across all seven of Bangladesh's administrative divisions in small rural towns with an added focus on GTCs in the cyclone vulnerable coastal areas.[101]

[100] ADB, 2017, p. 71

[101] Bangladesh Institute of Development Studies: "Integration of Women into Grameen Shakti's Clean Energy Program in Bangladesh". URL: https://bids.org.bd/page/researches/?rid=46, accessed October 1st, 2019.

The results of this project show, how difficult it remains to integrate women into technical jobs without stronger will and action force by state institutions: Despite this considerable training achievement, very few (3%) of the trainees were employed or engaged as entrepreneurs in the renewable energy sector.[102] Women generally have made stride in terms educational attainment, but their numbers are significantly low as far as studying technical subjects are concerned. Hence, it is hard to find qualified women to fill in the jobs related to energy and engineering.

4.8.9 Bangladesh Power System Enhancement and Efficiency Improvement Project

Bangladesh Power System Enhancement and Efficiency Improvement Project will strengthen the transmission and distribution network. It will improve access to reliable electricity targeting for 100% access to power by 2021 and improved power sector sustainability in Bangladesh by 2030. The project, especially, the component on rural electrification, will enhance reliable access to electricity and contribute to economic growth in rural areas. About 875,000 households will benefit from power distribution by 2020, with other impacts for women and children. **An attached grant will support to develop new energy-based businesses in rural areas, including those** led by women. Support for improved safety and awareness for the efficient use of electricity will target end-users, mostly women and address their specific concerns. The project will generate jobs for local communities during construction and operation of the physical infrastructure and adopt gender targets to promote women's equitable participation in project related employment opportunities. It will conduct a survey on women led energy-based livelihoods in project areas and provide training on energy-based livelihoods and business development services to new or recently electrified households. It will also include women in technical skills training (e.g., distribution grid, service line and household wiring maintenance and troubleshooting; energy auditing and energy management certification for BPL HHs; simple and routine electrical repairs).[103]

4.8.10 Household Energy Platform Program

The Household Energy Platform Program in Bangladesh undertakes capacity building and research on new cooking solutions for clean and efficient cooking aiming at women’s good health, as well as time and money saving. Women are engaged and trained in entrepreneurship related to manufacturing, marketing, distribution, and maintenance of ICS. IDCOL looks to install 5 million ICS by 2021.[104]

Marketing of Environment Friendly Cooking is joint programme of Department of Environment supported by Bangladesh Climate Change Trust Fund (BCCTF), Deutsche Gesellschaft International Zusammenarbe (GIZ) and Government of India. The programme has distributed around 1 million environment friendly cook stoves (Bondhu Chula) have been installed in 64 districts to protect women and child from indoor air pollution. MoEFCC, also developed entrepreneurship capacity

[102] Bangladesh Institute of Development Studies: “Integration of Women into Grameen Shakti's Clean Energy Program in Bangladesh”. URL: https://bids.org.bd/page/researches/?rid=46, accessed October 1st, 2019.
[103] Ministry of Women and Children Affairs, 2019, p. 25
[104] Ministry of Women and Children Affairs, 2019, p. 25

among 1,200 individuals to create and distribute such cook stoves and distributed around 220,000 cookers. [105]

Solar Gaon76, a social enterprise is working in Rangpur-Dinajpur districts, which helps the farmers install the solar pumps and maintain them. A combination of private grants, credit and equity provided by Solar Gaon and supported by IDCOL is bringing solar-powered technologies affordable to low-income farming communities. A majority of the more than 300 households in Shakarpur have been given access to solar based lighting systems through government schemes supported by IDCOL, which finances renewable energy infrastructure projects. The power generated by the solar pumps help farmers to irrigate their paddy fields and helps meeting other household needs like water purification, cold storage for mushrooms and to keep poultry farms. During night, solar lights powered by excess energy help women run literacy classes.[106]

BBS has recently initiated a new project supported by UN Women for 'Making Every Bangladeshi Women and Girls Count (MEBWGC)'. The aim of the project is to enhance the capacity of production, accessibility and use of gender statistics in Bangladesh. The objective of the Project is to address the urgent need to increase the availability of accurate data on gender equality and women's rights to inform policy and decision-making. It will enhance capacity and support to address the data gap by making quality, comparable, regular and accessible gender statistics available to monitor and report on the SDGs, BPfA and CEDAW and other national priorities. The Project will help process or reprocess surveys/censuses to compile gender statistics in consultation and collaboration with other government producers and users of gender data and statistics; civil society organizations, research and academic institutions.[107]

4.8.11 Bangladesh Bank

Bangladesh Bank, the central Bank of Bangladesh, in addition to its conventional activities regarding controlling the money market and regulate the financial market also leading the way towards sustainable financing in the country.

Bangladesh Bank has been incorporating "Sustainability" into core banking practice through green banking, corporate social responsibility and financial inclusion. Bangladesh Bank has been proactively guiding the Banks and NBFIs for diverse sustainable banking initiative since 2011. Bangladesh Bank issued Guidelines for Environment Risk Management in 2011, a Green Banking Policy Guideline in 2013. A minimum target of direct green finance has been set at 5% of the total loan portfolio from

4.8.11.1 Sustainable Finance Department

A major factor influencing the availability of domestic finance for sustainable energy projects is the formulation of the Green Banking Policy by the Bangladesh Bank (the central bank of Bangladesh) in 2011. This policy requires, among others, banks to prepare and implement their own green banking policies, which over time should increase in their sectoral coverage and scope. Banks need to report on their implementation of this requirement. To support the implementation of the Green

[105] Ministry of Women and Children Affairs, 2019, p. 69
[106] Ministry of Women and Children Affairs, 2019, p. 69
[107] Ministry of Women and Children Affairs, 2019, p. 81

Banking Policy, Bangladesh Bank has established a BDT 2000 million revolving fund facility for sustainable finance in the following broad categories:

- Renewable energy;
- Energy efficiency;
- Green brick making;
- Green Infrastructure;
- Waste Management;
- Recycling and Reuse;
- Safety and security of factory.

At present 54 clean energy product and 1 work safety related finance product are eligible for Bangladesh Bank refinancing scheme. Financial institutions who signed contracts with Bangladesh Bank can utilize the refinancing facility at reduced interest rates.

4.8.11.2 Credit Guarantee Scheme department

In a bid to support the cottage, micro, and small enterprises (CMSEs) mired in financial difficulty caused by Covid-19, Bangladesh Bank approved a credit guarantee scheme (CGS) worth Tk 200 billion on July 23, 2020

The scheme titled ‘Financial Inclusion Credit Guarantee Scheme’ would be encouraging for banks and FIs to disburse loans to the landless farmers, low-income people, school banking accountholders and small-scale traders and women CSME entrepreneurs.

The marginal people can take a loan of Tk 25,000 to Tk 500,000 in a single name while Tk 2.0 million can be borrowed as a 5-member group under the new credit guarantee scheme, reports UNB.

Subsequently, the CGS Unit of BB issued related circulars (BB's SMESPD Circular No 03) defining the scope and detailing other aspects of the scheme such as, the eligibility criteria for scheduled banks and financial institutions (FIs) as well as for enterprises, application procedure, fee structure, responsibilities of the scheduled banks and FIs, claim settlement, etc. Following the implementation of the scheme, CMSEs which fail to meet the collateral requirements of the banks or other FIs, can be provided with the support from the CGS.

The CGS in Bangladesh, modelled as a Hybrid Portfolio Partial Credit Guarantee Scheme covering 80% of the loan of the portfolio guaranteed

A special quota for women has been kept under the scheme. At least 10% of the portfolio has to be provided to women borrower.

Bangladesh Bank has established a new department to oversee the activities under the current and upcoming credit guarantee scheme.

4.8.11.3 Women Entrepreneurship Development Program

Under the SME and special programmes department Bangladesh Bank runs a Program conducting women entrepreneurship development activities, providing financial facilities on easy terms & conditions with a view to increasing women's participation in the mainstream economy.

4.9 Stakeholder map and interactions

To understand the interaction between different stakeholder a hexagonal be-hive model was used. The hexagon as a symbol often stands for harmony and balance between male and female energy. At the core of the hive, 3 most prominent engagement of women in green energy transition were positioned which are women end users, women employees and women entrepreneurs. Stakeholders with close interactions are put together side by side.

Starting with the most prominent women engagement in energy which is women end users, their access to energy (solar, ICS and biogas) is mostly facilitated by NGOs or private sector energy services companies. These service providers are supported by blended finance (grant + concessional loan) from National Financial institutions such IDCOL and BIFFL. These national finance institutions are supported by multilateral or bilateral development financial institutions such as KFW, AFD, WB etc. and Government programs (TR-Kabikha). In some cases, they also get access to finance from MFIs (purchase of cows to have feedstock for biogas production). MFIs funding sources are typically from end users (70%), PKSF (10%) and local Banks (20%).

The second type of engagement of women are women employees. Women are employed in Private Energy Service companies, NGO field staff and in relevant Government ministries like SREDA, PDB, DPDC, PWD etc. Women employment in the energy sector requires STEM education backgrounds which are provided by educational institues such as Bangladesh University of Engineering and Technology (BUET) and Institute of Energy, Dhaka University. Training institutes may also play important role by providing professional training.

The third type of women engagement is Women entrepreneurship in green energy. Women entrepreneurship needs close support from local Banks. Bangladesh Bank has a special program for women entrepreneurship development and specific fund under green energy refinancing scheme. Business association and networks like BSREA, We power, Energia provides support to women entrepreneurs and women professionals in the renewable energy sector.

The fourth type of engagement of women which is “women in supply chain” are not prominent in developing countries like Bangladesh. However, they can be also considered as women entrepreneurship. The sides of the hexagon show the existing interaction between stakeholders.

The diagram below provides connectivity between different stakeholders relevant to women engagement in green energy.

Figure 2: Stakeholder mapping of women engagement in green energy transition

5 ACCESS TO ENERGY AND PREFERENCES OF END USERS

5.1 Access to energy

The demand of energy is ever increasing with the increasing world population. Commercial energy consumption comes mostly from **natural gas** (around 66%), followed by oil, hydropower, and coal. Non-commercial energy sources, such as wood fuel, and crop residues, are estimated to account for over half of the country's energy consumption. At present, over 99% of the energy demand is being fulfilled by fossil fuel energy resources in Bangladesh. But all of these conventional energy sources are very limited and harmful to our environment. The government and different NGOs are working hard for harnessing renewable energy in last few decades. Presently electricity is the most useful form of energy. It plays a significant role in developing the socioeconomic status and the standard of living of a country. In Bangladesh only 96.2 % of the total population[108] has access to it.

However, to reduce dependency on fossil fuel and to reduce GHG emission from power sector to fulfil the NDC commitment, Bangladesh need to look for alternative energy resources which can meet our unprecedented energy needs. The renewable energy resources have the potential to fulfil many criteria of this demand.

"Energy has an equity dimension that influence women's work at household level". The following are general observations from all sites:

- It is observed that more lighting for poor families would allow children to study at night.
- Lighting also provides opportunities for extended working hours and thus improved income generation, specifically for rural women. A poor women can operate a sewing machine if there is light at night which gives her the opportunity to earn additional money for the family, because she had to be very busy for domestic works in daytime.

[108] World Bank Indicators, Data Bank

- Poor families use Improved Cook Stove (ICS) to reduce fuel cost but in some cases, they are interested if there is subsidy or free of cost.
- Many wealthier households use mixtures of modern and traditional fuels, that help them reduce the working time as well as family expenditures. If women have chance to make decisions, they always try to combine biomass and LPG Gas Cylinder.
- Energy plays a major role in meeting women's practical and reproductive needs (such as cooking, food processing and water carrying), but it can also be seen as a component necessary to meet their productive and strategic needs (lighting to enable evening study, street lighting for safety in attending community programs, power for women's enterprise development).
- The role of energy in the sustainability of women's enterprises is also important although it depends on types of enterprises that women are traditionally involved in are energy intensive and rely on biomass fuels. Women have to buy fuelwood to run enterprises such as food processing.
- Focus on women's livelihoods and employment is needed as men are already involved in energy projects, women should be involved equitably.

With the steady economic growth, 96.2% of the total population in Bangladesh have access to electricity with 351 million clients.[109] 81.28% of the people in the rural areas have access to electricity, including off-grid renewable electricity. The government has prioritized its vision regarding electrification of all the households in the country by 2021, with 10% of that electricity coming from renewable sources. In 2018 fiscal year, the per capita electricity generation (on grid) was 382 kWh and the per capita consumption was 336 kWh.

For household cooking, the demand for energy is attributed to different sources, namely biomass, natural gas, liquefied petroleum gas, oil and electricity. About 73.8% of fuel source for cooking in 2018 are met by usage of biomass fuel such as straw/leaf (28.6%), husk/bran (4.0%) and jute stick/wood/bamboo (41.2%)[110]. This is a reduction on dependency on biomass fuel reported in the previous Country Action Plan for clean cooking in Bangladesh (90%)[111] by 16.2%. The usage of fuel in urban and rural areas and division-wise breakdown as well as data from 2012-2018 is presented below.

Table 8: Source of Fuel for Cooking in Rural and Urban Areas and Different Divisions of Bangladesh in 2018

Source of Fuel (%)	*Residence*		*Divisions*								
	Total	Rural	Urban	Barisal	Chattogram	Dhaka	Khulna	Rajshahi	Rangpur	Sylhet	Mymensingh
Straw/Leaf	28.6	43	11.3	22.5	27.4	25.8	24.8	48.2	31.1	13	34.7
Husk	4	4.6	3.3	2.7	4.3	2.5	5.2	4.9	5	2.4	5.7
Jute Stick/Wood/Bamboo	41.2	45.6	36.1	55.1	39	25	53.3	29.3	48.5	46.3	52.3

[109] http://www.powercell.gov.bd/site/page/d730f98d-8912-47a2-8a35-382c4935eddc (accessed on 11 November 2019)
[110] Bangladesh Bureau of Statistics (2018) Bangladesh Sample Vital Statistics 2018
[111] Fuel for Life: Household Energy and Health, WHO, 2006

Source of Fuel (%)	Residence		Divisions								
Kerosene	0.3	0.2	0.4	0.2	0.2	0.5	0.2	0.3	0.3	0.3	0.1
Electricity	1.1	0.1	2.1	0.5	0.6	0.7	0.9	1.2	3.4	0.4	0.2
Gas	24.3	5.8	46.5	18.7	28.2	45	14.4	15.4	11.6	36.4	6.8
Others	0.5	0.7	0.3	0.2	0.2	0.5	1.2	0.7	0	1.2	0
Total	100	100	100	99.9	99.9	100	100	100	99.9	100	99.8

Source: Bangladesh Bureau of Statistics (2018) Bangladesh Sample Vital Statistics 2018, copied from SREDA 2020

Table 9: Time-series data of fuel usage for cooking from 2012-2018

Source of Fuel (%)	2012	2013	2014	2015	2016	2017	2018
Straw/Leaf	40.2	36.3	36.3	30.7	31.1	30.2	28.6
Husk	4	2.8	3.7	3	3.8	3.5	4
Jute stick/Wood/Bamboo	42.4	44.4	42.8	44.2	42.5	41.3	41.2
Kerosene	0.3	0.3	0.2	0.4	0.4	0.3	0.3
Electricity	0.6	0.9	0.7	1.1	1	1	1
Gas	10.4	13.9	15.1	19.7	20.5	23.1	24.3
Others	1.9	1.3	1.1	0.9	0.8	0.6	0.5

Source: Bangladesh Bureau of Statistics (2018) Bangladesh Sample Vital Statistics 2018, copied from SREDA, 2020

- The household sector is the largest consumer of energy overall (55% in 2017), largely comprising the use of primary biofuels for cooking
- The domestic sector was the largest electricity consumer (57%) in 2019
- SHSs have expanded significantly in Bangladesh. As of October 2020, nearly 4.2 million SHSs had been deployed in the country under the IDCOL programme of the Infrastructure Development Company Limited, providing access to electricity to around 12% of the population (IDCOL n. d.). 112 SHSs are mainly used for lighting purposes in Bangladesh.
- Household expenditure on fuels for cooking and lighting as a share of household incomes are higher in rural areas than the national average. The average monthly expenditure on cooking fuel and lighting in rural areas is USD 11.11, compared to USD 11.67 in urban areas and USD 11.26 nationally, and accounting for 5%–6% of monthly expenditure. 113

5.2 Summary of findings during field visit

As part of the current study, some primary data was collected during a field trip to Jessore that took place between 5th of June 2022 and 07th of June 2022. The field trip was organize with spport from IDCOL and it´s POs. The following sites were visited:

[112] Nagpal, D., Lamichhane, N., Kafle, S., & Gyeltshen, M., 2022, p. 20
[113] Nagpal, D., Lamichhane, N., Kafle, S., & Gyeltshen, M., 2022, p. 21

- 2 Biogas plants at Monirampur Upazila of Jashore district, 10 ICS home at Mujibpara/Chanchra, Sadar Upazila of Jashore district
- 5-Solar home system at Vekutiya/Arabpur, Sadar Upazila of Jashore district
- 1-Women lead NGO; ***Kheya*** who are working for Retained heat cooker (Magic Chula/ Cooker), at Chayagharia, Satkhira district.

Findings as per each product:

The first sites were two biogas plants at two households and have taken intensive interview of the Household members: one male at first household and one female at second household.

Benefits of Biogas Plants (Summary of both interviews):

- Cooking facility without smoke
- No Carbon emission
- No hassle for managing firewood and no tears for smoke or wet firewood
- Steady & easy to control the fire
- Can do other work along with cooking foods
- Tasty Food (more time and attention can be given for cooking)
- Needs less time for cooking than before while used firewood/ Reduced half time than before
- Cooker is friendly for cleaning
- No cost now so reduced family expenditure (Previous cost was for Gas Cylinder/firewood)
- Used cow dung at biogas plants can be reused as compost fertilizer for cultivation
- Less time needed for managing biogas plant
- Increased women's involvement in family decisions
- No tension while need to cook extra food for guests, now always having gas
- If any family has cows only then they can have biogas plant, so it is not for poor family unless there is a financial support system for the poor family. Grant or micro-credit/loan with minimum interest need to be provided to the poor families to buy cows; and the biogas plant should be free for them.

Improved Cook Stoves (ICS), IDCOL model

The Team visited Mujibpara where a total of 100 ICS had been distributed and the team intensively visited ten households and the team had discussion with each of the household member. The Team also had large group discussion and received community feedback as well as findings of ICS users and providers. The local NGO ARS is partner of IDCOL to provide the ICS at the community levels.

Benefit of users of ICS:

- These poor community are living in the government's provided free houses for homeless people. They want to reduce their fuel cost and save time for cooking so that they can spend more time for livelihood work.
- They like it as there is no smoke during cooking

- Needs less firewood due to metal protection inside the cooker
- ARS (IDCOL PO) provides it @BDT500.00 for each with subsidy from IDCOL

The IDCOL model is a tier 3 model which is a big improvement from previous model “Bondhu Chula” which made of concrete only. The IDCOL model, in addition to the concrete base also includes inner limning with metallic sheets, an insolation of rock wool inside and a grate for ash removal. Tier 3 model provides much higher efficiency and thus more reduction in fuel wood consumption and more savings in fuel cost.

Solar Panels at Household level

This service is provided by IDCOL through the local partner NGO named Srijony. We have visited five Solar Panels in the Vekutiya village of Sadar Upazila of Jashore. We have been at five households in the evening and in one place there was no electricity at that moment due to load shading. That had helped us to see the capacity of Solar Panel and real lights of each bulb. Out of five households, 4 have 50-watt Panel and one household has 75-watt Panel on their roof top. Every 50-watt panel could provide lights through 4-bulbs and 75-watt panel owner could use 6 bulbs which seemed good for their 4-members family. The following are findings as per their opinions:

- This Solar panel is a great support during load shading and bad weather
- It helps student to study smoothly without any interruption
- No bill no cost that reduced family expenditure
- No tension for Cooking if there is no electricity in the evening as they have solar light in the kitchen
- No worry for feeding children or elderly during load shading
- In most cases decision has been taken jointly by discussion with male & female members of the household.
- The solar panels are given at a free off cost by the Government under the TR-Kabikha 2016-17 project implemented by IDCOL. The local governments selected the recipients based on the application. Based on the family needs either 75 kW or 50 Kw system was installed by Partner organizations (NGOs). The installation, maintenance and monitoring are done by the POs and their activities are funded by IDCOL.

Kheya (Samaj Unnayan Sangstha) and Retention Heat Cooker

The Team has visited a GIZ funded woman headed NGO named *Kheya*, and its’ production staff, cutting staff and sales staff. They also visited their factory and the products. They also organized a demonstration of cooking by using LPG gas cylinder and their magic-bag (retention heat cooker). We were witness of the cooking show and noticed that:

- The cooking time reduced by one third of using only LPG gas Cylinder; for example, the rice boiled for 9-minutes then put into the magic-bag while another pot was kept in the gas-cooker. The one in gas cooker took 29-minutes to complete the cooking while magic-bag cooked another pot of rice without any fuel.

- As a result, the fuel cost reduced by more than half as well as helped to cook other items within the same cost.
- When rice pot kept into the magic-bag, she can do other work without and risk.
- Even can go to children's school to drop off or pick them up; then serve them hot food from the magic-bag.

Kheya is registered as an NGO and Social Institution with a aim to support the under privileged women.

GIZ supported Kheya to do research on Retention heat cooker in 2017. After successful pilot. GIZ provided around 50,000 euro for purchasing some equipment, raw material store house and working capital for RHC production. Kheya invested in 11 sewing machine and make a production center in their own premises and trained 35 under privileged women to manufacture retention heat cooker. Also, they trained women for sales and marketing of the product. Till date they have sold 200,000 RHCs but mostly bought by development programs. At present their sales volume is very low and we found only 11 women present at work.

The reason for sales volume is that they seriously lack of working capital to purchase raw material for RHCs. Also marketing and training requires finance. Unlike IDCOL cookstoves no subsidy is provided where as the cost of a RHC is almost same as a IDCOL cookstove. Which 700 taka per RHC. In this regard RHC cannot cook by itself it needs any kind of cookstove at place but it drastically reduces cooking energy and time which is very much evident.

The socio-economic situation of the project area is adversely affecting the female workers. There is literally no work other than field work in the Agri sector. Despite the hardship some women earned around 40 euro per month to continue their study on their own without family supports and many women are divorced and left alone along with their kids by their husband. Such poor women can earn their livelihood from a monthly income of 40 euro from this project. But the situation is worse now since the factory is struggling with working capital.

The technology is proven and if a large-scale production with sufficient working capital is arrange with an 100,000 Euro more than 100 female workers can earn a steady income from the factory.

In summary this an perfect example of women engagement in Green Energy Transition. A project invested by a women entrepreneur, a product prepared by under privileged women, a product sold by the women and used by the women. The end beneficiaries are also the women.

Pictures of Kheya Production and Cooking demonstration:

Figure 3 : Kheya employees making the RHC and demonstration of cooking rice

5.3 Preferences and decision-making at household level

A survey of 630 households in Bangladesh reported that women are typically the primary cooks and spend on average 80 minutes a day on cooking alone. Combined with the collection of biomass, the time spent by women each day on cooking-related activities can be over 5 hours, 40 minutes.

Another survey found that on average female students get to study 37 minutes less per day than their male counterparts, and access 17 minutes less per day of leisure time. However, decision-making regarding energy choices and its purchase is found to rest predominantly with the men, requiring policies to enable fuel switching to empower women and/or involve them strongly (IISD, 2020; Practical Action, 2017). [114]

According to SREDA, even though women do most of the cooking in households, and women empowerment is on the rise, but often times, men are the ones making purchasing decisions in general, e.g. cooking fuel and cookstoves, as they are the household heads in the family. In other words, the awareness on the benefits of clean cooking should be infiltrated among the whole family, not just women to ensure a sustainable change. Clean cooking programs focused on women as the

[114] Nagpal, D., Lamichhane, N., Kafle, S., & Gyeltshen, M., 2022, p. 22

receiver of technology. Women can also be viewed as change agents to promote clean cooking solutions among the neighbors and peers that would likely to increase diffusion.[115]

During field visits it was observed that women and men both are involved in decision making process but not in the same level or same aspects. For example: to install a biogas plant, the decision has been taken mostly in consultation of the female members of the households. Female members of the households mainly benefit from the smoke free cooking and family can reduce the cost of fuel rather having compost fertilizer from the waste of cow dung. Improved cookstove or Bandhu Chula is brought to the household level by the vendor so women directly have access to buy and take decision as it cost minimum amount which they could manage. Here is also same benefit by the women folk and the family having good cooking environment and reduced cost of fuel rather have savings as it takes less fuel than traditional cook stove.

- Purchase decision for biogas plant is taken mostly in consultation of the family. Women benefit from the clean cooking while the total family benefits from cost savings in fertilizer and fuel wood purchase.
- Purchase decision for improved cookstove is taken mostly women. Women benefit from the clean cooking while the total family benefits from cost savings in fuel wood purchase.
- Purchase decision for SHS is taken mostly by Men sometime in consultation with women. However, Women and children benefit from the lighting while the total family benefits from cost savings in electricity bill.

[115] SREDA (2020) : National Action Plan for Clean Cooking 2020-2030, p. 3

6 EMPLOYMENT IN THE RENEWABLE ENERGY SECTOR

As mentioned earlier, the energy sector is one of the most male dominated sectors worldwide. According to the International Renewable Energy Agency (IRENA), overall, the energy sector as a whole employs only 22% of women. **Renewable energy opportunities have shown more inclusion and a better gender balance than fossil fuels.**

With 32% of women, the proportion of women is higher in the renewable energy sector compared to fossil fuel jobs. In addition, there is a difference in the quality of opportunities that women occupy, compared to those that men hold, which are more represented in more specialized positions and are better paid.[116]

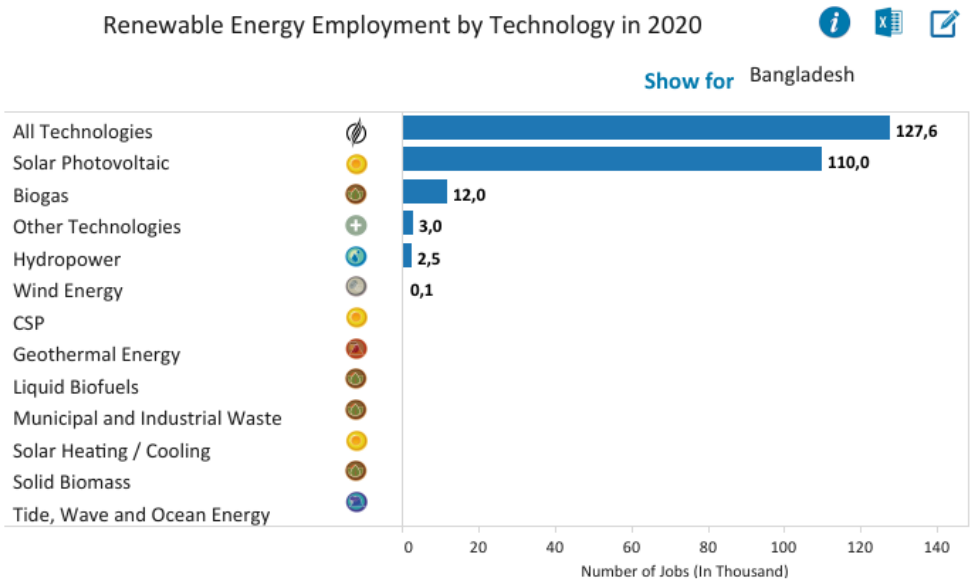
The renewable energy sector has a huge employment potential in future: IRENA estimates that worldwide the number of jobs in the renewable energy sector could increase from 10.3 million in 2017 to nearly 29 million in 2050. Thus, the **ongoing global energy transition offers the chance to create new jobs and reshape all aspects of how energy is produced and distributed.**

IRENA's latest annual review of renewable energy and jobs confirms a long-term growth trend and strong policy action essential to ensure continued employment expansion in the Covid-19 era.

In contrast to fossil fuels, renewable energy also offers new opportunities for small and medium-sized companies, e.g. in the field of installation and maintenance of small solar systems, from which female entrepreneurs could benefit.

In Bangladesh, around 127,000 persons are employed in the renewable energy sector of which the highest proportion (110,000) is employed in the solar photovoltaic sector, followed by 12.000 in biogas as is shown in the following figure:

[116] IRENA, 2019



Source IRENA jobs database. Figures provided are the result of a comprehensive review of primary information sources by national entities such as ministries and statistical agencies, and secondary data sources such as regional and global studies.This is an ongoing effort to update and refine available knowledge. Totals may not add up due to rounding.'Other Technologies' include jobs which are not technology specific.

Figure 4: Renewable energy employment by technology in 2020

Source: IRENA, 2020[117]

This puts Bangladesh in fifth place among 161 countries in renewable energy jobs. As a comparison: China accounts for 2.2 million jobs, half of the global employment, followed by Japan, the United States, and India. [118]

According to data from IRENA, most employment in the sector in Bangladesh occurred in sales, installation, and maintenance. Some 10,000 people are also employed in module assembly.[119]

Unfortunately, sex-disaggregated data on employment and entrepreneurship in the (renewable) energy sector in Bangladesh as a whole, and different energy sub-sectors in particular does not seem to exist. Nor could the consultants identify sex-disaggregated data on wage rates in the energy sector.

However, some data were provided by GIZ. The following table contains a breakdown of GoB Power and Energy agency/utility employment data from the published information on their website:

[117] https://www.irena.org/Statistics/View-Data-by-Topic/Benefits/Renewable-Energy-Employment-by-Country, accessed on February 19th, 2022

[118] https://www.tbsnews.net/bangladesh/energy/renewable-energy-creates-137-lakh-jobs-bangladesh-139222

[119] https://www.tbsnews.net/bangladesh/energy/renewable-energy-creates-137-lakh-jobs-bangladesh-139222

Table 10 : Women employment in Government institute of Bangladesh under Ministry of Energy power and mineral resources

Organisation	*Employees*		*Remarks*
	Male	Female	
SREDA	16	2	Both women are board members
Power Division	34	8	Not possible to discern whether any are engineers from designation, which are according to secretarial structure
BPDB	99	4	Engineers
BERC	27	3	Not possible to discern whether any are engineers from designation, which are according to secretarial structure
PGCB	222	8	Tech-staff, Non-tech staff are not listed in website
WZPDCL	24	4	Tech-staff (Planning and Development, ICT, Training Engineers), no female staff in non-tech positions
BREB (Head quarter) BREB countrywide	66 30,000	0 5000	Appx. 4 % in tech positions (tech & non-tech)
BPMI (Bangladesh Power Management Institute)	14	1	http://bpmi.gov.bd/

Source: GIZ, e-mail of 20.2.2022

In addition, some data could be obtained from member companies of the Bangladesh Solar and Renewable Energy Association (BSREA). 14 out of 42 active member companies replied to a survey questionnaire and provided information about the representation of women and men among shareholders, senior management and employment. The following table shows that women were the majority shareholders in only one of the companies. The majority of all companies (9 of 14) are completely male owned. In 8 companies, senior management consists entirely of men. In the other 6 companies women are largely underrepresented in senior management positions. The situation is slightly more positive when it comes to employment. 27% of all employees in the 14 companies are women. However, from the data it is not clear, if female staff is employed as technical experts or rather as administrative staff.

Table 11: Representation of women and men in BSREA member companies

	Shareholding			Senior Managment			Employment		
Organization name	Men	women	Total	Men	women	Total	Men	women	Total
Data Enterprises Limited	66%	33,0%	100,0%	3	2	5	6	4	10
Bright Green Energy Foundation	72%	28,0%	100,0%	12	**2**	14	38	3	41
SolShare	100%	0,0%	100,0%	9	3	12	18	15	33
Rahimaafrooz Solar	100%	0,0%	100,0%	5	1	6	120	80	200
Rural Service Foundation	100%	0,0%	100,0%	5	0	5	25	13	38
Energypac Electronics	100%	0,0%	100,0%	5	0	5	178	72	250
Engreen Enegineering Ltd.	100%	0,0%	100,0%	2	0	2	3	0	0
Filament Engineering Ltd	100%	0,0%	100,0%	4	0	4	40	3	0
Solar Electro Bangladesh limited	100%	0,0%	100,0%	6	0	6	32	7	39
Sherpa Power Ltd.	33%	66,0%	100,0%	4	0	4	16	5	21
Super Stra Renewable Energy	100%	0,0%	100,0%	8	0	8	52	12	74
Intregreted Development Foundation	100%	0,0%	100,0%	7	0	7	126	33	159
G tech Solution limited	80%	20,0%	100,0%	4	1	5	23	4	27
Solar EPC Development Co.	66%	33,0%	100,0%	6	2	8	12	5	17

Source: Survey conducted by BSREA in May/June 2022

Although the Prime Minister herself leads this Ministry of Power, Energy and Mineral Resources, while there is also a Minister of State[120], the majority of the senior administration in the ministry, and the relevant departments consists of men.

There is, thus, a lack of women at management levels who can voice suggestions for improvement and concerns in all aspects of energy-related matters and bring in a gender perspective to decision-making and in energy policies. The shortage of women at senior levels implies that there is a dearth of role models for younger women.

The following case study highlights opportunities and constraints that women face in the renewable energy sector.

BOX 3 : Case Study : Solshare

Case Study: SOLshare[121]

Farzana Akter Isha (Ms.) is working at SOLshare as Production Supervisor for about five years now. Young & spontaneous Isha completed a one-year of rigorous technical training on electronics trade from UCEP, then she joined SOLshare a renowned solar assembling company, in 2017. Isha also currently obtains a diploma in Electrical Engineering at MIST (Mirpur Institute of Science & Technology). Isha received an award of achievement from SOLshare for completion of five years working with SOLshare. She herself provides support to her family livelihood, her education cost and other family maintenance expenditure. She loves to work for women empowerment and equal opportunity for education and vocational training for the underprivileged children from vulnerable families. Her story was published in several newspapers, online portals, UNICEFBD twitter and Facebook of SOLshare. She made speeches in several events of UCEP and other women entrepreneurship groups. She also does voluntary work to help for employment of trained girls and other UCEP skilled workers by using her contacts. Afterwards she joined in SOLshare in 2017 when she had to supervise 17 production staff as a Production Supervisor. It was a challenging job, leading a team as a young professional while she had to be careful about production as well as quality

120 Nasrul Hamid is the state minister for the Ministry of Power, Energy, and Mineral Resources of Bangladesh.

121 Based on an interview conducted on May 18th, 2022

work from the staff while some of them were older than her. She wanted to continue her study so she got admitted in MIST for a 4-years diploma course which will be end by few months from now. She is a brave girl; for example, she was the only staff of SOLshare who worked during lockdown in pandemic time to keep the system active so that people using Solar panel and related gazettes of SOLshare product. At that period, she had to stay overnight in the guest house of SOLshare office premises in Baridhara while her rented house was in Mirpur. After few days, she went to her house to meet her mother, but neighbors did not allow her to enter the house; for two reasons, firstly for COVD-19 situation and secondly for her absent of previous nights blaming her as bad-girl. After a few hours fight with neighbors her family had to move from that house at midnight while finding a new house was very difficult. Her family was always supportive and appreciated her for her non-traditional work. But her journey was not so easy in the beginning stage. She had to do lots of struggle in her teenage but with her strong will power and dedication helped her to overcome those.

Overall, **women's role as entrepreneurs** is strikingly low in all sectors in Bangladesh: According to the Global Gender Gap Report 2021, only 12.7% of all firms have a female majority ownership and only 4.8% of all firms have a woman as a top manager.[122]

In the formal sector, women as entrepreneurs are represented even less: only 1.7% of enterprises in the formal sector are owned by women, which is among the lowest rates of women's enterprise ownership in the world. Although the rate of female entrepreneurship has been growing, women-led businesses continue to be small and concentrated in specific sectors. [123]

The reasons for the low representation of women as entrepreneurs are manifold: Women often lack collaterals and can, therefore, not access credits. They have less access to information, technology and markets. In addition, they often lack entrepreneurial skills such as accounting, marketing, financial and human resource management.

No nationwide data is available about female ownership of companies working in the (renewable) energy sector.

The following box contains a case study of a female entrepreneur in the renewable energy sector who was supported by GIZ.

[122] Global Gender Gap Report 2021
[123] https://www.worldbank.org/en/news/press-release/2019/04/28/bangladesh-more-and-betters-jobs-for-women-needed-for-faster-growth

BOX 4 : Case Study : Retention Heat Cookers production by Kheya

The journey of a female entrepreneur

When Josna Ara was a child, she probably never imagined that one day she would become a successful entrepreneur. A woman from a simple rural background, she was married off at a very early age even before completing secondary school. Today she is the founder and Executive Director of Kheya Samaj Unnayan Shangstha (a non-government organisation) based in Satkhira. Her organisation provides services in area of capacity building, micro financing, renewable energy, handicraft production etc. with especial emphasis on poor, vulnerable and distressed children, mothers, adult women, adolescent girls and persons with disability.

A determined woman, Josna completed her school examinations after marriage. With a motivation to do something independently, she enrolled herself in a three-month training course under Jubo Unnayan Shangstha (Youth Development Organisation, a Government organization). In the year 1998 Josna Ara, with a few other local women established an NGO named Kheya with a loaned capital of thirty thousand taka (around 320 Euro). She had a vision to create employment for the poor divorced and widow women in the locality. Bolstered by the support of her family, she started to run the NGO with three sewing machines, making clothes for females and children. From this humble beginning, today Josna Ara runs several small projects under different stakeholders such as Ministry of Women and Children Affairs and many International & National NGOs. Her son and daughter-in-law are now also deeply involved in the activities of Kheya. Today she has not only achieved financial independence, she is also creating opportunities for deprived women and men in her community.

Source: GIZ REEP programme

https://gender-works.giz.de/competitions2020/bangladesh-the-journey-of-josna-ara/

What comes out of this example is the need for training and networking and the support of family members, including husbands and sons to become a successful entrepreneur in the renewable energy sector.

7 ENERGY RELATED SKILLS

7.1 Women in STEM

An important pre-condition for more women being employed in the renewable energy sector either as employees or as entrepreneurs is necessary qualification. Women's low representation in the energy sector is partly due to the fact that women comprise less than 30% of the world's researchers and only 35% of Science, Technology, Engineering, and Mathematics (STEM) students.

As in many other countries, in Bangladesh are under-represented in technical training relevant in the energy sector. Women's attainment in STEM topics is 8.24% compared to 12.39% for men.[124]

Women's participation in **technical and vocational education and training (TVET)** in Bangladesh is strikingly low, ranging from 9 per cent to 13 per cent in public institutions and 33 percent in private institutions, averaging to around 24 percent.[125] Women's limited presence in technical and vocational training is one of the many factors that influence their employment patterns.[126]

The following table provides an overview of women's representation in selected institutes providing technical training:

Table 12 : Overview of women's representation in Technical studies

Type of institution	*Management*	*No of Institution*	*No of Teachers*			*No of Students*		
			Total	*Female*	*% of Female*	*Total*	*Female*	*% of Female*
Polytechnic Institute	Public	52	2720	425	15.63	136570	20986	15.37
	Private	387	9378	1788	19.07	120525	22194	18.41
	Total	439	12098	2213	18.29	257095	43180	16.80
Technical School & College	Public	73	1968	205	10.42	70726	8200	11.59
	Private	152	2602	905	34.78	43500	14624	33.62
	Total	225	4570	1110	24.29	114226	22824	19.98

[124] Global Gender Gap Report 2021
[125] ILO, n.y.
[126] ADB, 2017, p. 3

Type of institution	Management	No of Institution	No of Teachers			No of Students		
			Total	Female	% of Female	Total	Female	% of Female
Technical Training Centre	Public	68	1792	288	16.07	26292	7955	30.26
	Private	98	325	78	24.00	13426	5655	42.12
	Total	166	2117	366	17.29	39718	13610	34.27
Total (Technical Education)	Public	678	10665	1745	16.36	340020	64284	18.91
	Private	7083	44277	9524	21.51	824860	251776	30.52
	Total	7761	54942	11269	20.51	1164880	316060	27.13

Source: Bangladesh Education Statistics 2021 (Table 7.6 of Chapter 7)

The table reveals the substantive underrepresentation of women both as teachers and students in technical training institutes.

7.2 Masters in renewable energy

The Institute of Energy, Dhaka University has started its Masters in Renewable Energy Technology Program since 2011. The number of seats has been fixed at 40 students in each calendar year. Till 2021 a total of 390 students has been enrolled to the Program out of which only 61 were female students. The total female percentage among enrolled students is 15.6%. The average pass rate of the program is 88%. No gender disaggregated pass rate was available.

The chart below provides Academic year-wise enrolment of male and female students. It shows that percentage of female students are rising sharply in recent years.

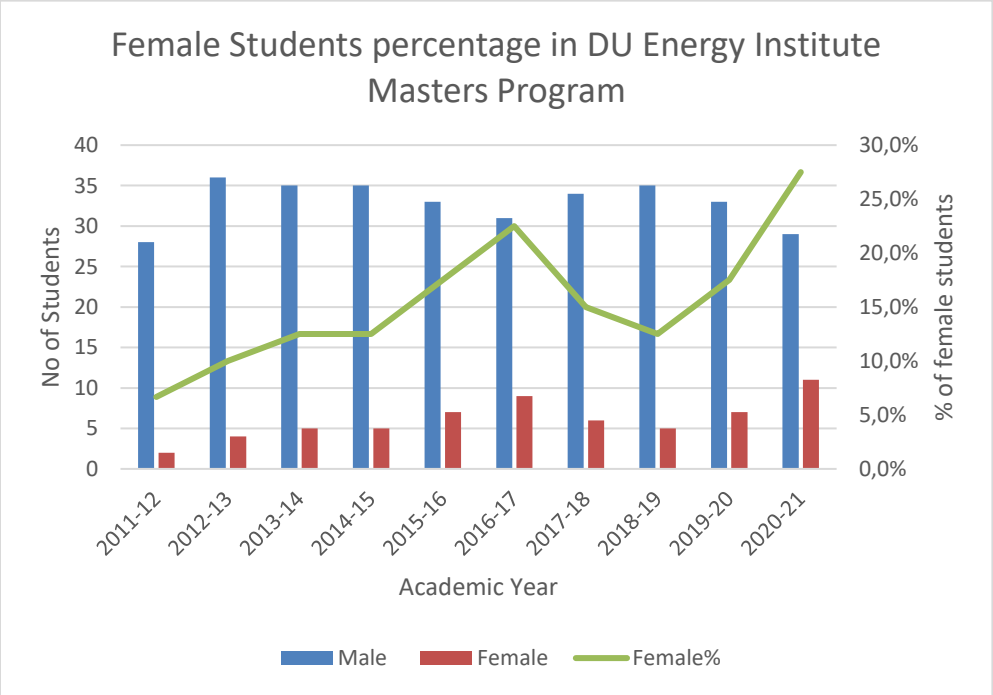


Figure 5 : Female Students percentage in DU Energy Institute Master's Program

The Institute of Energy has started a Master Degree Program for Professionals (who are working in the field of Energy and Environment) since 2016. 184 students

in total have been enrolled to the Program out of which only 31 are female students. The total female percentage among enrolled students is 17%. The average pass rate of the program is 90%. No gender disaggregated pass rate was available.

The chart below provides Academic year-wise enrolment of male and female students in Professional Masters Program. It shows that percentage of female students has been rising gradually in recent years.

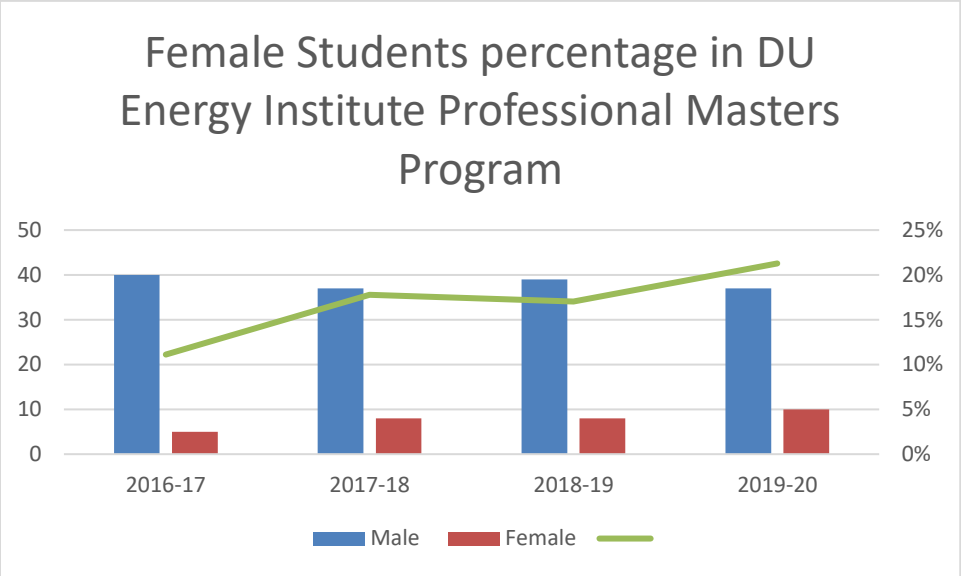


Figure 6 : Female Students percentage in DU Energy Institute Professional Master's Program

8 CONSTRAINTS FACED BY WOMEN

Women in the renewable energy sector face different constraints and barriers than men in terms of decision making as end users, employment opportunities, working conditions, career development and entrepreneurship.

8.1 Constraints faced by women employees in green energy sector

As employee's women have difficulties in getting promotions due to their inability to work after office hours, not having provision for weekly holidays at field level offices, inadequate transport, difficulties in renting accommodation, nonexistence of public toilets, sexual harassment, short maternity leave, and public attitudes toward working women who are looked down upon as being from low-income families.[127]

In line with the already mentioned assessment conducted by ADB[128] the **following key challenges in the energy sector in Bangladesh from a gender perspective were identified**:

- While there is a **high demand for technical people in the energy sector**, the **number of women in these jobs is limited**, and the sector has been traditionally male dominated. Several persons from the private sector interviewed for the present study emphasized that they would like to employ more qualified women as they are performing better than men but it would be difficult to find suitable candidates and to retain them.
- Education in science and technology is generally not promoted for women and girls, and the environment for technical work is not conducive to women. In Bangladesh, **women participate in the workforce generally in areas that are deemed an extension of their gender roles**. This results in less interest of families in sending girls to technical schools, and in limited opportunities for further training for those women already in the sector.

[127] ADB, p. 2017, p. 70
[128] ADB, 2017

- Women students have limited choice of study in the technical subjects. Even if they have chosen a technical subject, they are often unwilling to start a career with field visits due to social and family barriers. Mainly after marriage they are depended on the decision of their in law family and mostly not allowed to continue a professional job where challenges have to be taken. A positive trend is the increasing number of women enrolled in the Master Programme on Renewable Energy which is however, limited to Dhaka and a very small overall number of students.
- The challenges of a male-dominated sector are further compounded by the usual limitations faced by women working outside the home regarding a safe and secure working environment. Particularly in rural and peri-urban areas, the idea of women taking on traditionally male roles often leads to a dismissive or even degrading treatment of women in the technical workforce. This may be one of the reasons why several female engineers that were interviewed as part of this study decided to leave the private sector and to work in international or bilateral development organisations instead.
- Women in Bangladesh are also constrained by family responsibilities within the home, which must be attended to even with a full-time career in a demanding sector. The Bangladesh Bureau of Statistics conducted a pilot time use survey in 2012 which revealed that women spend far more time on care work compared with men (5.6 hours for women and only 1.5 hours for men), even when women are employed. As such, absence of alternative support systems such as child care facilities is a major constraint on women's external activities.
- Women´s family responsibilities also impact on their mobility and the possibility to do field trips which is a constraint in some position for career development (and sometimes even recruitment).
- Mobility of women is also restricted by discriminatory socio-cultural norms and values. Based on the Social Institution and Gender Index (SIGI) calculated by the OECD, **Bangladesh** is ranked as 114 out of 120 countries, and classified as having a **very high degree of discrimination** against women.
- Discrimination is especially high in the family (83%) and in terms of restricted access to productive and financial resources (52%).[129]
- Male family members often do not support their wifes or sisters to travel outside urban areas. This was exemplified by a female engineer working in DPDC who said in public that her family had strongly supported her career, but when spoken face-to-face confessed that her husband does not allow her to travel alone outside Dhaka for business purpose which had a negative impact on her career chances in the company.
- Women risk to encounter Gender based violence (GBV) and Sexual exploitation, abuse and harassment (SEAH) at the workplace while they need to work for long hours due to technical requirements in the renewable energy sector.
- Another key challenge for women working outside the home is the lack of access to private and suitable sanitary services. The professional female staff members face a lack of a women friendly workplace environment and a lack of gender-sensitive facilities, not due to unavailable funds but for management negligence or lack of understanding of their women´s differenet needs.

[129] OECD (2019), Social Institutions and Gender (indicator). doi: 10.1787/7b6cfcf0-en

- The regional consultations conducted by ADB revealed that the government officials in energy-related field offices are not aware of how their ideas and information for new initiatives and projects, including those elements that relate to gender issues, could be forwarded to agencies like ADB or the government.
- There is a lack of women at senior levels who can voice suggestions for improvement and concerns in all aspects of energy-related matters and bring in a gender perspective to decision-making and policy development. The shortage of women at senior levels also implies that there is a dearth of role models for younger women. Encouraging strong female role models for girls and women, both in technical education and in the workplace, is also critical to overcoming the challenge of limited participation.

8.2 Constraints faced by women end users of green energy

- The majority of the population lives in rural areas. Overall, the society is based on patriarchal norms which means that many Bangladeshi women have a subordinate status within the household vis à vis men and senior women. Often women are the last to eat the already limited quantities of food available to the family because they are expected to defer to their husbands, children and mothers-in-law even when pregnant.[130] Gender roles, however, vary across religious and ethnics groups, socio-economic status, and between urban and rural areas. For example, in landless, small and marginalized farm households, gender norms are often more flexible.[131] Over 90% of the country's population is Muslim, and the roles and rules for women and men stipulated in Islam play an important role for most of the Muslim population. Traditional restrictive gender stereotypes and attitudes reinforce the notion that women's primary role is to take care of children and housework. Girls are often regarded as a financial burden, especially to rural families, because of immense dowry that has to be paid to the family of the future husband to marry them off, which is one reason why Bangladesh has the highest share of early marriages of all Asian countries.[132]
- Due to the subordinate status in the family, women most often do not take part in the decision making process of household energy use specifically for solar home system installation, use of biogas for cooking etc.

8.3 Constraints faced by women entrepreneurs in Green Energy

Female entrepreneurs face a number of additional constraints. In addition to the financial barriers faced by green energy project developers in general, women led companies face some distinctive barriers which are as follows[133]:

- Although there is no such rule imposed by Bangladesh Bank, local Banks often ask women entrepreneurs to provide a Guarantee from a Male family members.

[130] Britt, 2010
[131] Naved, 2011
[132] Human Rights Watch, 2019.
[133] https://www.prothomalo.com/bangladesh

- Women entrepreneurs struggle seriously to obtain required documentation for financing such as TIN, Trade License, Bank Account and statements Land or other collateral papers, Rent Deed etc.
- Overall, women-led CMSMEs depend more on informal sector loans and own sources of fund for investment[134] the interest rate of which very high.

Restrictive social norms and inheritance laws[135] reduce opportunities for women to claim the ownership of land and other resources, the lack of which is a major constraint to access finance, particularly in rural areas. Men hold most of the decision-making power in households, as well as the control of the money.[136] A lack of mobility often leads to a dependency of women on their husbands or other male members of their families in all areas of life.

- Although Bangladesh Bank has excellent facilities and programs for women, some constraints were found which is hindering the implementation of the programs
  - Sustainable Finance facilities do not have a gender specific window
  - Credit Guarantee Scheme has a gender specific window but do not have a specific focus on green energy and deals with any sector.
  - Lack of awareness amongst the women entrepreneurs in rural and peri urban areas regarding the facilities already provided by Bangladesh Bank
  - Relationship Managers of different branches of the participatory and the bankers are not fully aware of procedures and requirements for extending loans to women entrepreneurs and sometime often are reluctant to extend additional supports
  - Lack of funds to support to properly educate Bankers in peri urban and rural branches of participatory financial institutes about the facilities for women entrepreneurs

Lack of funds to support women entrepreneurs with documentation and loan processing to avail the finance.

[134] BRAC Study on Women CSME Entreprenuers

[135] In Bangladesh, inheritance is governed by a person's religion, which has left much of the inheritance process of women unequal and discriminatory. In Bangladesh, under Islamic law, the wife inherits a fixed share of one-eighth of the deceased husband's property if he leaves children, whereas the husband receives one fourth of his deceased wife's property. If he does not leave any children, then the wife inherits a quarter of the husband's estate. A daughter, who is an only child, inherits half the estate of her late father or mother. If there is more than one daughter and no son, then the daughters jointly inherit two-thirds of the estate. However, if there is a son, then the daughter's share will be equal to half of the son's share. In all cases, men inherit more than the women do. Among Hindus in Bangladesh, a large number of women are also excluded from inheritance. According to Hindu law, not all daughters of a man are equally eligible to inherit. Unmarried daughters and married daughters with sons can inherit, while childless widowed daughters or daughters having no son are excluded. (Source: https://www.yourcommonwealth.org/uncategorized/bangladesh-women-and-the-equal-distribution-of-inherited-property/

[136] Wolf; Dipali, 2014

9 CONCLUSIONS AND RECOMMENDATIONS

The information and data gathered for this study impressively show that in Bangladesh, as in many other countries, the renewable energy sector, which is currently still in its infancy but which, according to the explicit will of the government, will become much more important in the coming years, is male-dominated in all its facets (skills, employment, entrepreneurship, decision-making). Women face different barriers and constraints that hinder them to contribute to and benefit from the renewable energy sector to the same extent than men. Some positive developments, however, such as the increasing interest of young women in the sector, which is reflected in a higher rate of graduates from relevant courses, indicate that there will be enormous opportunities in terms of emplyoment and income for women in the green energy sector in the coming years.

As consumers women can play an important role as change agent towards less polluting and more sustainable energy production and consumption.

The following sections summarize recommendations in which areas and how TEI GET members can help strengthen the role of women in the Green Energy Transition as consumers, producers and decision-makers.

9.1 Support improved data collection and analysis

For good gender-sensitive policies and projects, the availability of reliable sex-disaggregated data is key. Field research for this study has confirmed what was reported elsewhere: Data gaps in many fields exist, e.g. in terms of employment and entrepreneurship in the sector, and regarding qualitative aspects of energy use, including electricity consumption by divisions/districts and regarding access to electricity disaggregated by gender and by non-households such as local enterprises.

UN Women is supporting the Government of Bangladesh in improving sex-disaggregated data collection and analysis. TEI GET members should closely coordinate with the UN system and complement support with regard to the renewable energy sector.

9.2 Address discriminatory socio-cultural norms

Discriminatory social and gender norms and patriarchal attitudes[137] are a significant barrier to women´s equal involvement in the green energy transition at all levels (end users, training, employment, entrepreneurship, decision-making, policy making).

The restrictions caused by prevalent gender and social norms have traditionally perpetuated women's economic dependency on men, their mobility restrictions and access to markets, their assumed inability to operate and manage technology and energy and vulnerabilities to GBV which constrain women's independence and any decision-making regarding use of equipment and energy appliances.

To tackle these constraining norms should be a cross-cutting topic in all kind of support. Useful activities could be the dissemination of success stories of women who could serve as role models through leaflets, films, social media, public events etc.

9.3 Work with men for more equal gender relations and for women to benefit from the energy sector resources and services

Working with men to enable them to support women's access to different energy sources, use of appliances, establishing and running energy-based enterprises and managing unpaid care work together to enable focus on enterprises is important.

A cooperation with the Engage Men & Boys: Network for promoting gender justice should be explored in this regard to ensure that approaches are adapted to the local context.

To avoid any unintended negative impact, men should be involved in all kind of activities targeted at women, especially at community level.

Sustained dialogue with men and family decision-makers and reflections by women themselves regarding these aspects should be supported.

Good experience has been made in other countries to train couples from rural communities as installers of small solar homes systems., e.g. at the Barefoot College.

[137] UN Committee on the Elimination of Discrimination Against Women (CEDAW) 2016

BOX 5 : **BAREFOOT COLLEGE**

The Barefoot College is an India based community-based grassroots organization working to make marginalized communities sustainable and self-sufficient since 1972.

The Barefoot College connects rural communities to solar, water, education, professions. It aims to increase economic mobility by making vocational and educational opportunities accessible to women and girls from the most marginalized communities around the world.

Barefoot College operates in over 2000 villages in 93 countries. The geographic focus is on the Least Developed Countries.

Barefoot College has worked on solar rural electrification since 1984 with the aim of bringing clean electricity to households using solar electricity. The Barefoot College is training women worldwide as solar engineers, entrepreneurs and educators. These women return to their villages to bring light and learning to their communities and drive rural resurgence and economic resilience. According to its website, 1,708 rural women from 96 countries have been trained as Barefoot Solar Engineers, widely known as 'Solar Mamas'.1 IN the Barefoot College they have learnt how to install home lighting systems in their villages and how to make solar lanterns, solar lamps, parabolic cookers and solar water heaters.

9.4 Address the intersectional inequalities that women of different social groups experience

Women from disadvantaged caste/ethnic groups, women with disabilities, older women, women from remote areas and income poor households experience multiple barriers and may not be able to access energy resources and opportunities unless their specific issues are recognized and addressed. Due to a lack of data and time constraints intersectional discrimination could not be analyzed in detail as part of this study. However, intersectionality should be regarded as a cross-cutting theme in all actions supported by TEI-GET members.

Discussion with specific interest groups are required to identify their issues and possible solutions. Policies need to be revised to respond to such intersectional inequalities, and programmes require to have activities backed by budget to ensure that issues like caste or language or location or income-based discrimination do not constrain the access of disadvantaged groups women to different opportunities

9.5 Support the reduction of women´s time burden

Closely interlinked with the persistence of discriminatory and patriarchal socio-cultural norms are women´s and men´s different time use patterns. The time use survey of 2012 has revealed that women have the main responsibility for unpaid work in the so-called “care economy” (comprising care work for family and community members and unpaid household services such as cleaning, cooking, ironing, shopping etc.). A new time use survey is in the process of being finalized and will soon provide more recent data. Women´s time burden in the care-

economy limits their possibility to engage in training, employment and entrepreneurship in the renewable energy sector, and may also limit their participation in all kinds of support measures by TEI-GET members which has to be considered when choosing time and place of activities.

At the level of ministries and private enterprises sensitization and awareness raising will be needed in this regard. The provision of a child care facility was a concrete request during one of the meetings held for the study. Besides, flexible working hours and the possibility for teleworking may also facilitate the balance between family obligations and professional work for women.

9.6 Support Gender Diversity Management

In addition to a lack of child care facilities, the general working conditions are often discriminatory against women (lack of separate sanitary facilities, lack of career development, discriminatory attitudes of employers and colleagues etc.). Gender Diversity Management promotes non-discriminatory recruitment, retention and career development processes. TEI-GET members could support the introduction of Gender Diversity Management in main private companies in the renewable energy sector and develop a dashboard that allows comparison between the different companies and progress over time.

9.7 Support female-led enterprises in the RE sector

The renewable energy sector provides huge opportunities for female entrepreneurs. While access to finance for enterprises in the renewable energy sector is difficult for both sexes, women face additional and more severe constraints. TEI-GET members could support female entrepreneurs in accessing necessary loans and overcoming administrative barriers. Close cooperation should be sought with ENERGIA that has developed and implemented the Empowered Entrepreneur Training Handbook (see Annex 4 for more details) with proven success. The Bangladesh Women Chamber of Commerce and Industry (BWCCI) has built a pool of trainers and could be a good partner. The Bangladesh Solar and Renewable Energy Association (BSREA) as the largest association of companies and NGOs working for promoting the clean energy industry in Bangladesh has expressed interest in supporting female-led businesses in the sector, e.g. through coaching and mentoring. It is recommended that existing projects of TEI-GET members that already support BSREA in other aspects explore whether they could add activities in this regard.

9.8 Dissemination of success stories

To encourage women to choose training in the renewable energy sector, search employment or establish an enterprise, it would be helpful to disseminate the stories of successful women that could serve as role models (see chapter 6 for some examples). This can be done through invitations to public events, flyers, short films, interviews in the media, etc. Social media should also be used to address young women in particular.

9.9 Strengthen networks of professional women and establish database

Professional networks such as WePower or ENERGIA help to empower women working in the renewable energy sector. They have developed interesting approaches and tools, but need continuous support to function. TEI-GET member should closely cooperate and coordinate with ADB and WB and explore how they could contribute to the strengthening of existing networks. It is also recommended to establish a database with female experts in the renewable energy sector (see Women in Green Hydrogen Database as an example). Such a database would facilitate media professionals and those responsible for organizing events to find female experts and speakers. The goal should be to promote equality and diversity in conferences, panel discussions, expert talks, media appearances, advisory committees, and boards of directors, and to, thus, increase women´s participation in the public discourse and decision-making related to green energy transition in Bangladesh where women can be important change agents.

9.10 Organize a national (or regional) conference on gender-sensitive green energy transition

In light of the need to speed up the process of green energy transition to fulfil the national climate change related targets and the huge potential women can play as change agents and champions in the sector, TEI-GET members should explore the possibilities to organize a national or regional conference on gender-sensitive/gender-transformative green energy transition. All main stakeholders involved in the sector should be invited and the output should be a concrete action plan.

9.11 Support capacity building

Interviews during the field visit have revealed that many important actors lack awareness, knowledge and skills about the gender/renewable energy nexus in terms of what are the impacts of renewable energy provision on gender relations, how could women be better involved as important change agent to the betterment of the whole country, and how would a gender-sensitive energy policy need to look like. TEI-GET members should support capacity building of major stakeholders, including SREDA, the Ministry of Power, Energy and Mineral Resources, and the Ministry of Women and Children Affairs.

9.12 Enhance skills of women as technicians for improved employment opportunities within the sector

Women need to be technically qualified for the job opportunities within the sector. The rising number of women enrolled in the Master on Renewable Energy and their good performance is encouraging. However, many more qualified women will be needed in future. TEI-GET members should support the encouragement of young women to choose a career in the renewable energy sector through the organization of girls´ days, internships, career counselling etc.

TEI-GET members should also support the enhancement of capacity and skills of women already trained as engineers, technicians, meter

readers, repairing mechanics, training for maintenance and installment of energy related activities.

Technical skill development should be complemented with leadership and business skills to better prepare women to qualify for management positions and to open up their opportunities to establish their own company.

9.13 Support drafting of gender-transformative policies

The assessment of the main renewable energy related policies and strategies from a gender perspective (see chapter 2) has revealed that most of them are gender-blind. TEI-GET members should support the Government of Bangladesh to formulate gender-transformative renewable energy policies that are built on reliable sex-disaggregated data and adequately consider women´s different needs, priorities and constraints as energy consumers, students, employees and entrepreneurs.

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ANNEXES

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Annexe 2. Household characterics of interviewed persons during field trip

Annexe 3. Proposed measures

Annexe 4. Mapping of good practice exemples from the region

Annexe 5. Relevant activities of action plan of Bangladesh climate change and gender action plan

Annexe 6. Theory of change

Annexe 7. Value chain analysis

Annexe 8. Set of gender-sensitive indicators

Annexe 9. Concept notes for proposed measures

ANNEXE 1. LIST OF TEI-GET MEMBERS

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ANNEXE 2. HOUSEHOLD CHARACTERICS OF INTERVIEWED PERSONS DURING FIELD TRIP

Sl#	PO	Customer name	Village	Union	Upazilla	District
Solar Home System (SHS)						
1	Srizony	MS. Jasmin Akter	Vakutia	Arabpur	Jashore Sadar	Jashore
2	Srizony	Md. Nuruzzaman	Vakutia	Arabpur	Jashore Sadar	Jashore
3	Srizony	Mr. Uzzal	Vakutia	Arabpur	Jashore Sadar	Jashore
4	Srizony	Dulal Kumar Sarkar	Vakutia	Arabpur	Jashore Sadar	Jashore
5	Srizony	Md. Firoz Ali	Vakutia	Arabpur	Jashore Sadar	Jashore
Improved Cook Stove (ICS)						
1	ARS-BD	Md.Sala Uddin	Chanchra Mojib Para	Chanchra	Jashore Sadar	Jashore
2	ARS-BD	Abdul Ajit Biswas	Chanchra Mojib Para	Chanchra	Jashore Sadar	Jashore
3	ARS-BD	Jahanara Begum	Chanchra Mojib Para	Chanchra	Jashore Sadar	Jashore
4	ARS-BD	Md.Milon Hossain	Chanchra Mojib Para	Chanchra	Jashore Sadar	Jashore
5	ARS-BD	Shorif	Chanchra Mojib Para	Chanchra	Jashore Sadar	Jashore
Biogas						
1	Success Renewable Energy Ltd. (SREL)	ABDUL MANNAN	Taherpur	Manirampur Paurashava	Monirampur	Jashore
2		REZAUL KORIM	Lebo sathi	Kashimnagar	Monirampur	Jashore
3		ABDUR RAHIM	Taher pur	Manirampur Paurashava	Monirampur	Jashore

ANNEXE 3. PROPOSED MEASURES

Policy Development

Sl. no	*Type of measures*	*Subcomponents*	*Relevant Stakeholder*	*Role*
1.	Policy improvement conducive to a more gender focused or gender transformative sustainable power system	Gender Diversity management plan for government agencies.	Power Division, BPDB, DPDC, DESCO, SREDA, BREB, Power Cell, PWD, LGED	With the support from EUD/TEI-GET members develop a gender diversity management plan, build the necessary infrastructure, and train officers on gender diversity management and regular monitor for improvement. Establish a network between government agencies on gender diversity management in the energy sector.
		Gender Diversity management plan the private sector.	Bangladesh Solar and Renewable Energy Association and their member companies	With support from EUD/ TEI-GET members prepare a gender diversity management plan for private sector energy companies Coordinate and arrange trainings for shareholders and key senior management officials on gender diversity management.
		Policy improvement	SREDA	Provide technical advice how to formulate gender-sensitive/gender transformative renewable energy policies including a results-oriented M&E system

Awareness Raising

Sl. no	*Type of measures*	*Subcomponents*	*Relevant Stakeholder*	*Role*
1.	Women as change agent to achieve household energy efficiency and access to sustainable energy	Train high school, Female Madrasha and college girls on i) climate change and impact of renewable energy and energy efficiency. ii) Save household energy consumption through behaviour change ii) Study STEM subjects and build career in Green Energy Sector	High Schools, Female Madrsha and colleges. School, Female Madrsha and college girls	With the support from EUD/TEI-GET members develop a training curriculum and support in arranging awareness programs in their respective premises. Become the change agent and advocate for energy efficiency and access to renewable energy in households
		Awareness raising amongst the rural end users	Rural women end users NGOs	Participate in awareness raising campaign and advocate for SHS, ICS and biogas in household cooking. Conduct awareness raising campaigns with rural women's
2	Awareness raising campaign for women entrepreneurs	Increased access to information on existing financing windows for women entrepreneurs.	Bangladesh Bank Banks/FIs Bangladesh Women Chambers of commerce and Industries. Bangladesh Small and Cottage Industries Corporation, SME Foundation, Bangladesh Small and Cottage Industries Cooperative Joyeeta Foundation BIFFL	Women entrepreneurship development program, credit guarantee scheme program and sustainable finance department of Bangladesh Bank, arrange stakeholder consultation with Banks/FIs for increased participation of women in the existing program and development of an awareness campaign Banks/FIs organize regional workshops for increased awareness on different financial products for women entrepreneurs. Local officers of banks and women entrepreneurs may participate in the awareness campaigns Ensure participation of women entrepreneurs in the awareness campaign Supplementary organization to support participation of women entrepreneurs in the awareness programme Awareness campaign and explore marketing facility BIFFL is implementing EEREWEF LOAN scheme which is a EUR 50 million

Sl. no	Type of measures	Subcomponents	Relevant Stakeholder	Role
				project funded by the Agence Française de Développement (AFD) and aimed at bringing about equitable growth through support to women entrepreneurs. Awareness raising campaign can be undertaken to build pipeline of women led projects in green energy.
3.	Increased participation of Women in STEM studies	Baseline study of Women in STEM studies	STEM Universities (DU, BUET, KUET, RUET, CUET, IUT, BRAC, AIUB, NSU etc.) Vocational training Institutes	Support to conduct the survey on number of female students by subject and year in their respective institutions
		Awareness raising program on female students in STEM subjects to build career in green energy	STEM Universities (DU, BUET, KUET, RUET, CUET, IUT, BRAC, AIUB, NSU etc.) Vocational training Institutes	Facilitate awareness campaign in their respective institutions.

Capacity Building

Sl. no	Type of measures	Subcomponents	Relevant Stakeholder	Role
1.	Capacity Building of women students in STEM studies	Study Tours	STEM Universities BSREA Members	Provide support for arranging study tours Through BSREA, members may allow their facility accessible for study tours in solar power plants, rooftop solar sites, mini grid or peer-to-peer solar projects
		Case Studies	STEM University Teachers BSREA Members Industry Experts	Case Studies may be developed as a part of the curriculum to enable the students analyse the critical business cases and in depth understanding of the RE business.
		Internship	BSREA	BSREA will collect information of job requirement and post Vacancy announcement in the University Notice Board and facilitate Internship and Job Placement Program in collaboration with respective university
		Career counselling for female STEM students and job Placement		
2	Capacity building of women entrepreneurs	Mentorship	BSREA BWCCI Joyeeta Foundation	Women led SMEs and startups willing to start a RE business or grow existing business may be introduced to a Mentor under

Sl. no	Type of measures	Subcomponents	Relevant Stakeholder	Role
			Startup Accelerator	the Mentorship program for capacity building. Startup accelerator supports the startups in terms of capacity building and fund raising in time bound cohorts. They could be a good source of women led green energy projects which can be further supported for capacity building
		Training on Business management, successful RE business models, fund raising process (training on Business plan, financial model, Investment pitch etc.)	BSREA PFAN Network Bangladesh	BSREA members can help new women led companies on business management in different aspects. PFAN Network, a global program, provides support in investment readiness and fund raising for climate-neutral and clean energy projects.
		Institutional Support	BSREA BWCCI	Support women entrepreneurs to obtain required documentation for financing such as TIN, Trade License, Bank statements, Rent Deed etc.
3	Capacity Building of female professionals in the Green Energy sector	Support Women employees in Government Agencies in Leadership development Job specific training Digitization of utility business and loss reduction	Government Agencies employing women from STEM subjects (Power Division, BPDB, DPDC, DESCO, SREDA, BREB, Power Cell, PWD, LGED)	Facilitating the capacity building program in respective institutions
		Support Private Sector female professionals in Career counselling Professional development training	Women network of professionals in the Energy Sector (Energia, We power etc.)	Facilitating the capacity building program for the network members

Women Entrepreneurship Development

Sl. no	Type of measures	Subcomponents	Relevant Stakeholder	Role
1.	Promotion of female entrepreneurship and startups on RE/EE investments	Additional funding by TEI members (Result based Grant from EUD and/or concessional Loan from TEI members) to the Bangladesh Bank Refinancing Scheme for Green	Sustainable Finance Department of Bangladesh Bank	Arrange stakeholder meetings with PFIs to create awareness of the fund and encourage the banks to build pipeline and encourage women led green energy enterprises to develop investment projects and to apply for funds

		projects specifically earmarked for Women led Green Projects		
		Grant finance by EUD to the Bangladesh Bank Credit Guarantee Scheme to cover a portion of first loss incurred by PFIs from women led green energy projects.	Credit Guarantee Scheme Unit of Bangladesh Bank	Arrange stakeholder meetings with PFIs to create awareness of the additional risk coverage and encourage the banks to build pipeline encourage women led green energy enterprises to develop investment projects and to apply for funds
		Establish an online platform for women led green energy startups to raise finance	Start Up Accelerators Venture Capital and Private Equity Association of Bangladesh	Assists with project pipeline building Association for local Venture Capital and Private Equity investment companies.

ANNEXE 4. MAPPING OF GOOD PRACTICE EXEMPLES FROM THE REGION

Women´s Economic Empowerment programme of Energia

The Women's Economic Empowerment (WEE) programme operated by ENERGIA, is designed to expand the reach of women's energy enterprises in the renewable energy sector in selected countries. In this programme, the social capital of women energy entrepreneurs is supported through **business development associates that provide mentoring and technical advice as well as access to larger business networks and resources** (Dutta 2019). Solar Sister, one of the WEE partners and a female-led organisation, takes the concept to building social capital further, through its 'sisterhood' meetings. These monthly meetings, which are designed to strengthen local ties, help build interpersonal relationships, as well as provide technical advice to last-mile energy entrepreneurs (MIT-CITE 2018). Monthly mentoring meetings supported by easy-to-use software to track sales performance have been crucial to the WEE programme's success (Dutta 2019).

Another women-led organisation, Frontier Markets, which works with over 5,000 entrepreneurs (50 per cent women) who are trained in technology, marketing, and technical repair as well as selling clean energy solutions, is expanding its networks throughout India with the use of ICTs. Its teams are currently expanding a technology platform to serve rural consumers and simultaneously leverage a network of digital rural women entrepreneurs throughout India.[138]

Shankar *et al.* (2015) compared sales performance of newly trained male and female cookstove entrepreneurs testing a personal agency-based empowerment training curriculum as compared with standard business skills training. The results

[138] Copied from Shakar et.al, p. 37

showed a **threefold increase in sales** and a **doubling of business retention over time** for energy entrepreneurs who underwent personal agency as compared with traditional business training, with the biggest influence seen on women entrepreneurs. **Notably, women participants outsold men in both intervention and control groups, owing in large part to their enhanced knowledge of cookstove use and their willingness to provide after-sales services**. The results of this study demonstrate that women can succeed very effectively as cookstove entrepreneurs in both urban and rural settings, with empowerment training serving to equip these entrepreneurs with a sense of personal agency, confidence, and social solidarity with their fellow women entrepreneurs. **The curriculum for this personal agency programme, the *Empowered Entrepreneur Training Handbook* (Smith and Shankar 2015) is available on an open access basis with support from the Clean Cooking Alliance (previously Global Alliance for Clean Cookstoves).** More recently, the Empowered Entrepreneur Training Program (EETP) was deployed through a trainer certification programme that **reached over 1,000 energy entrepreneurs via 67 trainers at more than 20 organisations** in Kenya, Tanzania, Uganda, Nigeria, India, **Bangladesh**, Nepal, and Indonesia. The post-training monitoring further increased sales volumes and numbers of high sellers among those trained. A return-on-investment study conducted under real-life conditions found a return of 115.9 per cent and a significant (10.6 per cent) increase in monthly sales after the training programme (Shankar, Spurzem and Smith 2017). The EETP curriculum has been well integrated throughout ENERGIA's WEE partner programmes, which include an integrated **support package with technical, business and personal empowerment, continued mentoring, and financial advice on business planning and capital access as well as supported networks and partnerships between various actors in the energy sector** (Dutta 2019). [139]

Women's Economic Empowerment (WEE) in Nepal started supporting entrepreneurs on productive uses of energy and realized that access to finance for the entrepreneurs was the biggest challenge. While women were in saving and credit groups, the procedural requirements for loans for energy businesses were different and seemed too complex to the women. The financial institutions were not confident to extend loans to rural women since they did not have the staff or resources to go into rural areas or the ability to monitor regularly. The project worked with the entrepreneurs' to strengthen their businesses to a level that the financial institutions would feel confident about lending to them. The micro-finance institutions were sensitized and assisted to design women- friendly loan products.[140]

[139] Shakar et.al, p. 39/40
[140] European Union Delegation Nepal, 2020, p. 54 with reference to ENERGIA. 2018. *Supporting Last-mile Women Energy Entrepreneurs: What Works and What Does Not.* The Hague.

Energising Development

The Energising Development (EnDev) programme is a multi-donor partnership, currently financed by six donor countries: the Netherlands, Germany, Norway, United Kingdom, Switzerland and Sweden. In addition to the German Federal Ministry for Economic Cooperation and Development (BMZ) funding organisations are the Directorate-General for International Cooperation at the Ministry of Foreign Affairs of the Netherlands (DGIS), the Norwegian Ministry of Foreign Affairs (MFA), the UK Department for International Development (DFID), the Swiss Agency for Development and Cooperation (SDC) and the Swedish International Development Cooperation Agency (SIDA).

Since 2005, EnDev has taken a leading role in promoting access to Sustainable Energy for All by providing access to modern energy services that meet the needs of the poor – reliable, affordable, socially acceptable and environmentally sound.

The mission statement of EnDev reads as follows:

„We promote sustainable access to modern energy services for households, small and medium enterprises, schools, health centres and community centres in developing countries as a means to inclusive social, economic and low carbon development, thereby contributing to the objectives of SE4All."

EnDev works in 25 countries in Africa, Asia and Latin America, including in Bangladesh, in close cooperation with government and other development partners.

EnDev supports the provision of

- **energy for household applications**: provision of modern energy for lighting and small electrical appliances (e.g. information and communication technologies),
- **energy for cooking**: provision of efficient and clean cooking, baking and space heating devices,
- **energy for social infrastructure** (schools, hospitals and community centres): provision of energy for the use of electrical as well as cooking and heating devices, and
- **energy for small and medium-sized enterprises, cooperatives and craftsmen**: provision of modern energy services for productive use, for income generation.[141]

Solutions promoted by EnDev within Bangladesh include solar systems from micro to medium-sized photovoltaic systems and solar thermal energy, connection to the national grid, small hydropower plants, biogas and energy-efficient cooking stoves. In addition to sustainable energy access and measurable impacts, EnDev focuses on results orientation and competitiveness, and promotes measures that are particularly efficient.

By December 2018, more than 21 million people in private households had been provided with access to electricity or improved cooking energy. With the assistance provided by EnDev, around 21,000 social institutions and 46,000 small and medium-sized enterprises also have sustainable access to energy-efficient,

[141] See: www.endev.info

sustainable and reliable power supply. The programme has trained more than 40,500 stove producers, craftspeople and traders.[142]

The **promotion of gender equality is an explicit objective of EnDev**.

A number of country-level EnDev projects have conducted gender analyses. In addition, a general impact analysis of the overall programme has also assessed the effects of EnDev activities on women/gender equality. It concludes that "providing access to modern energy services is (...) **important for establishing equal opportunities for women and can help them to escape poverty. Electricity is an important factor in overcoming gender-specific disadvantages.** It makes possible the use of innovative, time-saving electrical appliances, it opens up access to new sources of information, and it can help to create additional income."[143]

Since 2005, EnDev has been carrying out monitoring and impact studies in various country projects. Project achievements are therefore traceable and visible. They include **some important results that can contribute to gender equality and the protection of women´s rights**.

Among these achievements are:

- More time for productive and income-generating work,
- A better learning environment in educational institutions thanks to lighting and computers,
- Higher productivity as a result of a lower workload,
- Less indoor air pollution and less respiratory disease thanks to better cooking stoves for 6.4 million people, including three million women and children,
- Fewer accidents involving burns from kerosene lamps,
- Better medical care following electrification of health centres,
- Reduction in short-lived greenhouse gases and CO2 emissions,
- More than 11,000 new and long-term jobs.

In Bangladesh, EnDev is currently supporting BBF in developing a gender strategy and action plan to ensure further internalisation of gender equality in the institution. The data collection and analysis for the gender study has been delayed due to Covid19 pandemic. The future action plan will both cover the internal operation of BBF as well as the households to increase their benefits from the field program. BBF is collecting gender disaggregated data but according to GIZ this can be improved upon and used as a basis to adapt program activities.[144]

USAID Enhancing equality in energy for Southeast Asia

A $9.1 million regional program focused on enhancing opportunities for women and girls in Southeast Asia Energy Sector

[142] See: https://www.giz.de/en/worldwide/40417.html and www.endev.info
[143] GTZ, n.y., p.17
[144] GIZ, 2021, p. 51

The overall Goals are a) increased workplace diversity; b) promote inclusive workplace environment; and c) equitable promotion opportunities.

Focus countries are Indonesia, Laos, the Philipines, Thailand and Vietnam.

The project works with energy employers, universities and vocational schools, ministries and other government agencies, including energy sector regulators, and civil society organizations.

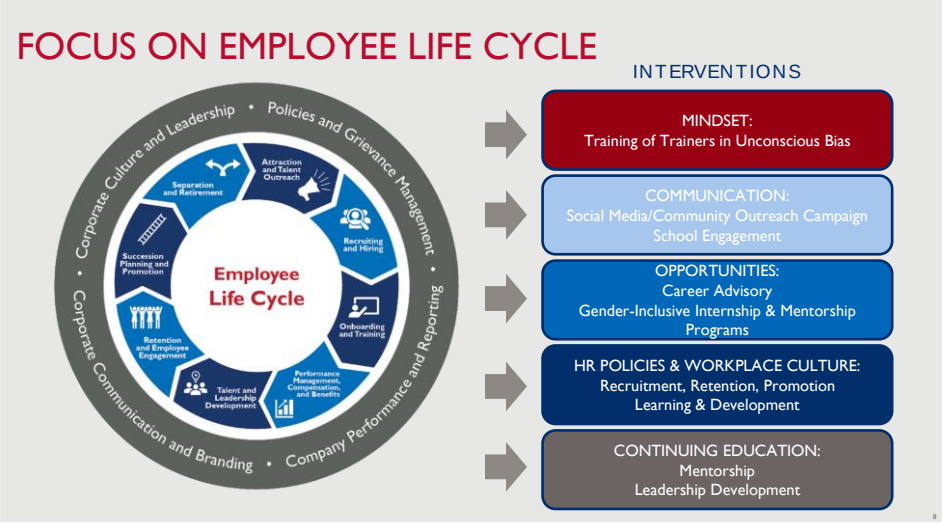
A baseline study revealed that women hold less than 25% of energy sector jobs in the focus countries.

The project identified the following key challenges for women and girls:

- Society
  - Cultural biases favor males to study STEM to be better breadwinners
  - Lack of female role models
- Education
  - Fewer female students who choose to study STEM as compared to social sciences (but the share of female students in STEM is growing)
  - Lack of information on educational and career opportunities in energy
  - Relatively high rate of drop- off among girls in STEM during the second and third year of undergraduate studies
- Energy workplaces
  - To fulfill multiple roles, many women in the energy sector, especially engineers, decide to leave their jobs to meet the needs of their families
  - Most heavy industries, and energy companies prefer men rather than women due to the nature of heavy labor jobs and strong technical skills requirements
  - Lack of policies and programs on gender equality in energy

The project aims to support ASEAN´s commitment to eliminate the gender gap in the energy sector. ASEAN recognizes that gender equality is an important element of energy transition and the limitation of women's participation in the energy sector must be eliminated.

The following figures summarize the interventions of the project together with its partners and the employee life cycle approach that the project adopted.



Source: Power Point Presentation

E4SEA is in the process of exploring regional partnerships with various entities e.g., ASEAN Centre for Energy (ACE), Friedrich Ebert Stiftung, New Energy Nexus, SEAMEO, South Asia WePOWER, and UNEP EmPower and aims to develop regional approaches to address STEM, gender and climate change (energy transition) as well as to harmonize gender policies related to energy transition in the ASEAN region.

These women who return in their villages and communities after the five months training at the Barefoot College can serve as role models for women´s empowerment and ambassadors for change to others. They have learnt by 'doing' and can 'teach by doing' too.

ANNEXE 5. RELEVANT ACTIVITIES OF ACTION PLAN OF BANGLADESH CLIMATE CHANGE AND GENDER ACTION PLAN

Action Plan Table: Mitigation and Low Carbon Development

Objectives	Action Steps	Indicators of Success	Responsible
Ensure that gender considerations are address in the process of reviewing energy and technology policies.	Identified a group of gender experts to support the review of the energy and technology policies and incentives to promote efficient production, consumption, distribution and use of energy[176]. Incorporate women's participation, access and benefit in the energy policy.	Gender references incorporated in the energy and technologies policies.	**Lead:** Min of sci. and Tech., Ministry of Power, Energy and Mineral Resources, BCSIR **Other possible ministries/ departments:** ENERGIA (International Network on Gender and Sustainable Energy) UNWomen, Women NGOs, MoEF
Develop gender responsive programs to reduce GHG emission at household (HH) while ensuring women's access to energy and power technologies.	Stakeholder's workshop including women to identify the current status and gaps. Disseminate information on environment friendly and green technology regarding the positive impact of these technologies on the health of women. Train and create access of women to renewable alternative energy solutions (wind, solar). Introduce energy efficient low cost cooking technology. Expansion of bio-gas technology amongst women livestock enterprise owners Promote "Solar Bottle Bulb" for reducing day time energy consumption. Include energy consumption methodology in the national school curriculum. Organize energy fair at school, college and university with parents (women and men) with information, services. Soft credits/ loans for women to use green technology. Train women to develop as a resource pool (local service provider at the local level).	Women's groups' formed/ oriented and networking towards solutions. Reduction of traditional fuel[177]. Reduction of respiratory pulmonary related diseases. Increased usages of new alternative technologies, energy efficient cooking stove. Budget allocated for expanding solar power technology for women No. of women/livestock entrepreneurs practicing bio gas technology. No. of households using bottle bulb. No. of women producing and operating bottle bulb. Incorporation of "necessity of efficient energy use" at the course curriculum. Amount of curricula included related with gender and energy. No. of energy fair held at school, college and universities. No. of women accessing loans. Purchasing capacity of new technology by women. Number of women entrepreneurs -local service provider.	**Lead:** DoE, FD, Ministry of Power, Energy and Mineral Resources, MoEF **Other possible ministries/ departments:** MoWCA, Ministry of Information, MoHFW, Banks, Financial institutes, Local & International NGOs, Donors, Research organizations

Source: Bangladesh Climate Change and Gender Action Plan, p. 78

ANNEXE 6. THEORY OF CHANGE

Outcome : Increase women´s role in the green energy transition of Bangladesh			
Outputs			
Gender-sensitive energy policies	Increased employment opportunities	Encoruage women to establish enterprises in the renewable energy sector	Strengthen women´s decision making power at household level
Activities			
Sensitize policy makers with regard to the necessity of having more women at decision making level in the Ministry	Gender Diversity Management Training	Facilitate access of female enterpreneurs to finance	Conduct awareness raising campaigns at local level highlighting the benefits of clean energy sources
Build capacity of staff in the Ministry how to develop gender-sensitive energy policy	Organize leadership trainings for women employed in the sector	Support women´s business networks	
	Support Dhaka University to organize internships for female students in the Master of Renewable Energy	Establish mentoring approach	
	Organize girls day in renewable energy companies and to disseminate information about Renewable Energy Master	Disseminate experiences of sucessful female entrepreneurs who could serve as role models	
	Provide career counselling for girls at secondary school age	Faciliate exchange with international networks	

ANNEXE 7. VALUE CHAIN ANALYSIS

Figure 7: Biogas for household cooking value chain: women engagement and support needed

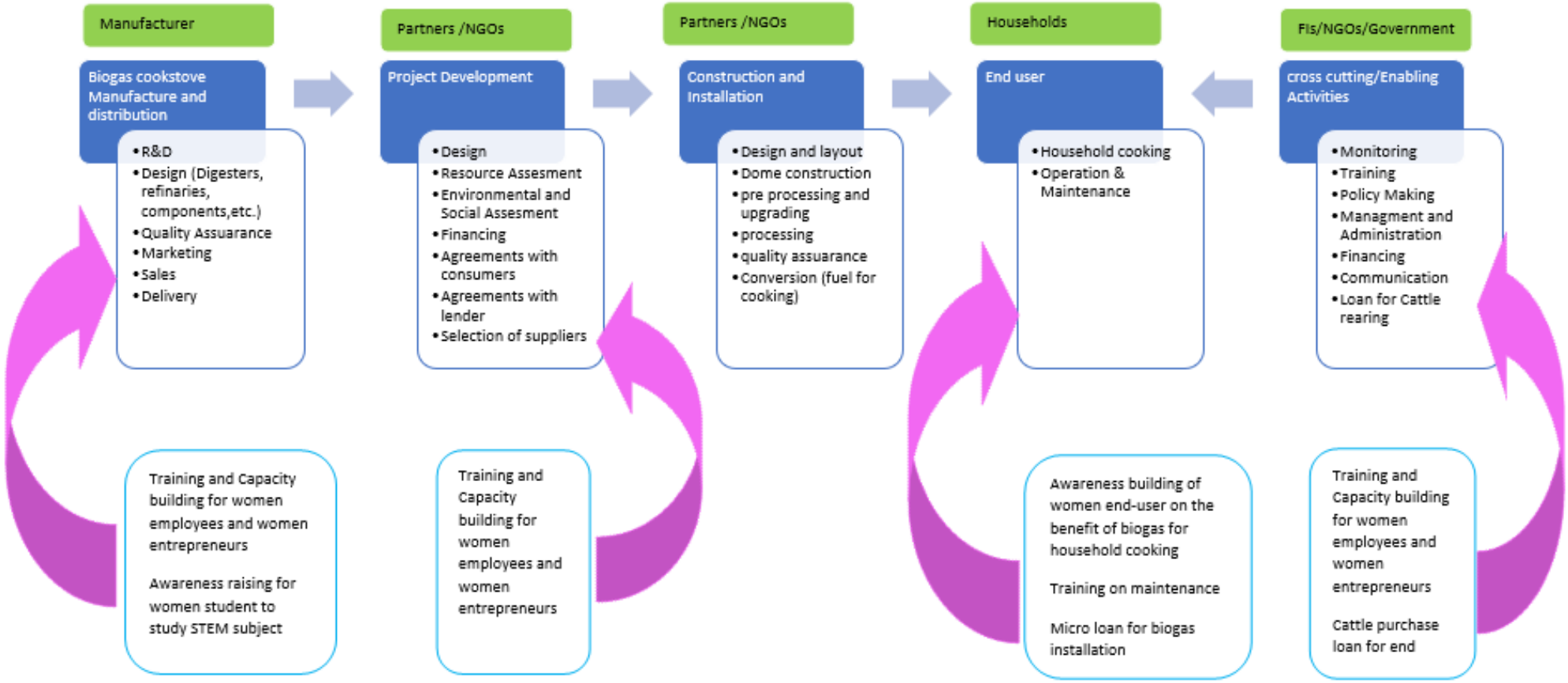


Figure 8: Biogas for household cooking value chain: multiple benefits

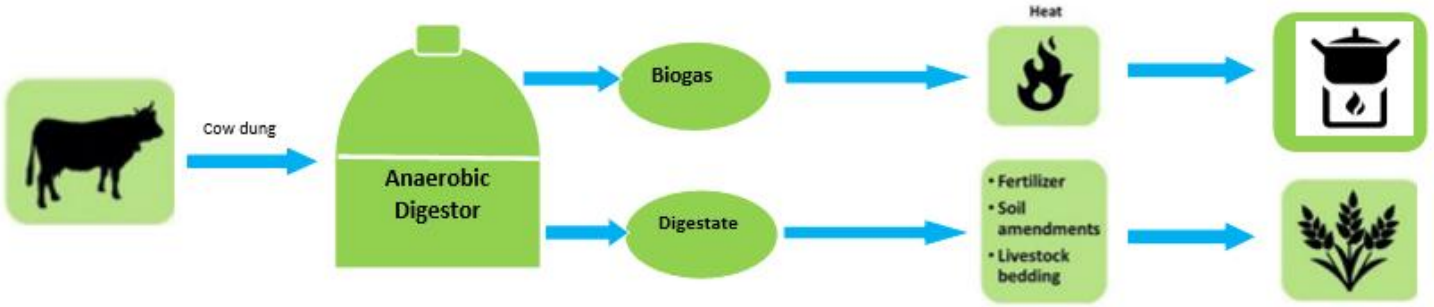


Figure 9: Improved cookstove for household cooking value chain: women engagement and support needed

Figure 10: Solar home system value chain: women engagement and support needed

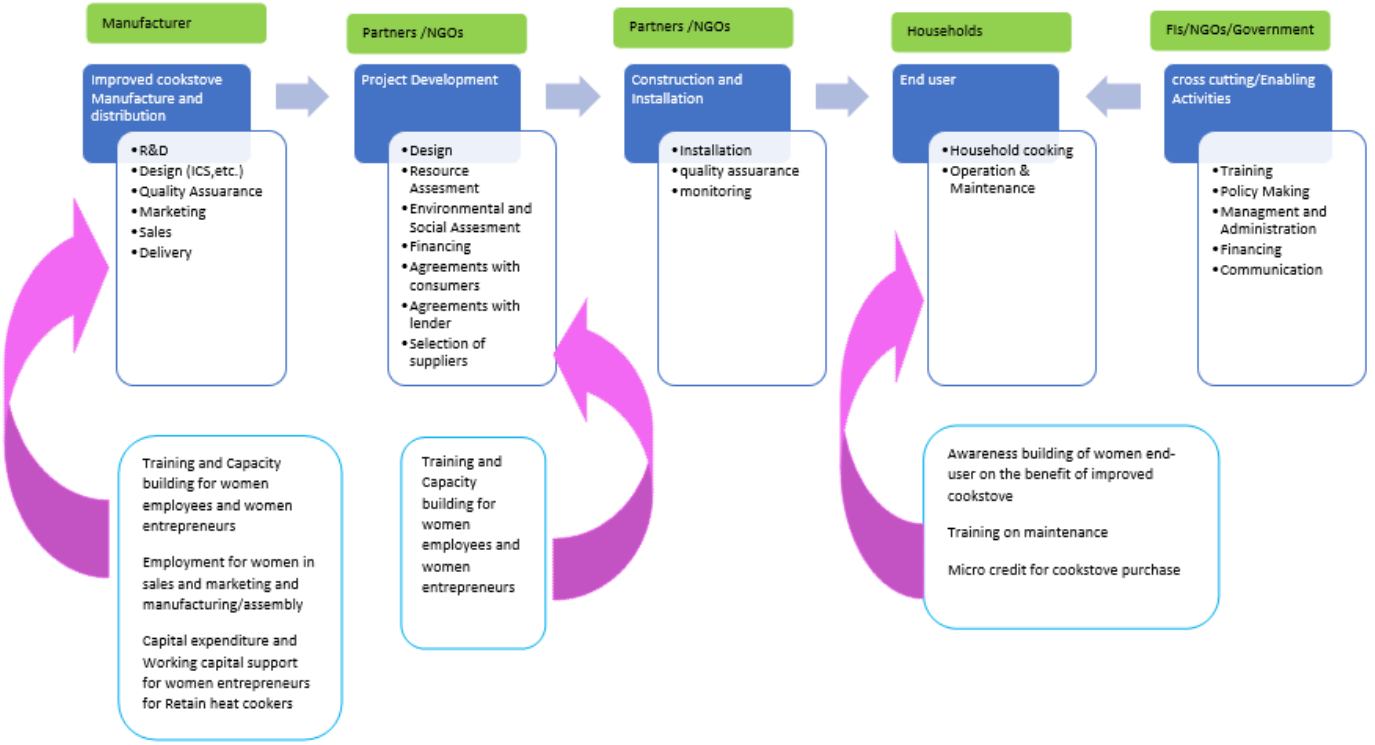
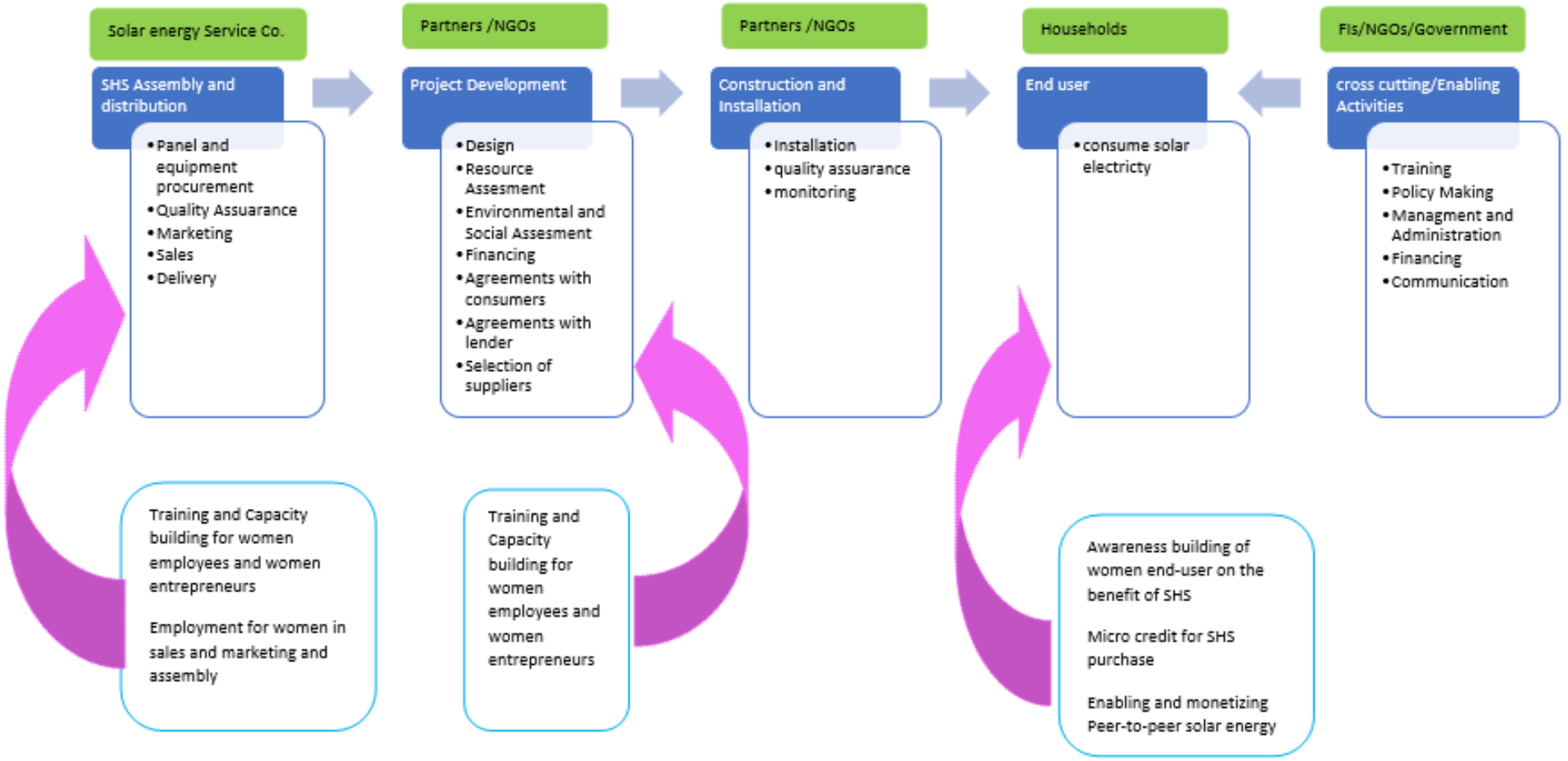


Figure 11: Solar home system value chain : women engagement and support needed



ANNEXE 8. SET OF GENDER-SENSITIVE INDICATORS

Indicators are needed to increase focus on sustainable development and assist decision-makers at all levels to adopt sound national sustainable development policies. Generally, gender indicators are designed to measure women's empowerment and progress toward gender equality between women and men, including women's and men's status, gender roles and relations in social, economic, cultural, and political life. The relationship between energy and gender is associated with consumption and decision-making on energy production.

A 'gender-responsive', 'gender-sensitive', or just 'gender' indicator measures gender-related changes over time. Gender indicators can refer to quantitative indicators based on sex disaggregated statistical data - which provides separate measures for men and women. If the energy industry does not prioritize gender diversity now, the renewable energy transition may extend and deepen, rather than reduce, gender inequality. It is time to explore how greater consideration of the role of gender and the value of diversity in energy could provide multiple social benefits, including promoting more sustainable practices, accelerating innovation, enhancing women's opportunities, and empowering communities to engage in energy-system change.

Gender-sensitive indicators allow for the measurement of changes in the relations between women and men in a certain policy area, programme or activity, as well as changes in the status or situation of women and men. SDG 5: Achieve gender equality and empower all women and girls.

For the more specific indicators, in energy sector we may refer to **SDG Goals related to Energy (Goal 7)**

- **SDG Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all.**
  - **Target 7.1**: By 2030, ensure universal access to affordable, reliable and modern energy services
    - **Indicator 7.1.1:** Proportion of population with access to electricity

      Indicator 7.1.2: Proportion of population with primary reliance on clean fuels and technology

- **Target 7.2**: By 2030, increase substantially the share of renewable energy in the global energy mix
  - **Indicator 7.2.1:** Renewable energy share in the total final energy consumption
- **Target 7.3 : By 2030, double the global rate of improvement in energy efficiency**
  - **Indicator 7.3.1: Energy intensity measured in termsof primary energy and GDP**
- **Target 7.a : By 2030, enhance international cooperation to facilitate access to clean energy research and technology, icluding renewable energy, energy efficiency and advance and cleaner fossill-fuel technology, and promote investment in energy infrastructure and clean energy technology.**
  - **Indicator 7.a.1:** International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems
- **Target 7.b : By 2030, expand infrastructure and upgrade technology for supplyig modern and sustainable energy srvices for all in developing countries, in particular least developed countries, small island developing Stated and landlocked developing countries, in accordance with their respective programmes of support**
  - **Indicator 7.b.1:** Installed renewable energy-generating capacity in developing countries (in watts per capita)

ANNEXE 9. CONCEPT NOTES FOR PROPOSED MEASURES

Concept Note 1: Gender Transformative Energy Policies

Problem identified

Majority of the energy policies in Bangladesh are generally gender blind i.e., ignore gender norms, roles and relations and ignores differences in opportunities and resource allocation for women and men. The policies are constructed based on the assumption that energy provision and consumption do not have different impacts on women and men and that both sexes have the same preferences and needs.

Analysis

An assessment of the legal and policy framework in the Bangladeshi energy sector conducted by the Asian Development Bank in 2017 concluded that **energy policies are generally gender blind.**

The following table provides an overview of the different policies in the energy sector and their degree of gender-responsiveness examined in the ADB report:

Table 1 : Gender-responsiveness of energy sector policies of Bangladesh

Main policy or documents in the energy sector	*Directly addresses women's energy needs*
National Energy Policy 2014	Yes. The importance of provision for cooking energy is highlighted.
Power Pricing Framework 2004	No
Private Sector Power Generation Policy (revision 2004)	No
Policy Guidance on Power Purchase from Captive Power Plant 2007	No
Remote Area Power Supply Systems Fund 2007	Yes. It promotes investment to facilitate electricity supply to households in remote areas.

Main policy or documents in the energy sector	*Directly addresses women's energy needs*
Renewable Energy Policy 2008	Yes. The policy supports development of cooking fuels or technologies like biogas, improved cookstoves, solar electrification systems for households and community use, and other renewable energy technologies, which are to directly benefit women in their day-to-day activities.
Bangladesh Private Sector Infrastructure Guidelines (revision November 2008)	No
Small Power Plant Policy	No
Policy Guidelines for Enhancement of Private Participation in the Power Sector 2008	No
Power System Master Plan 2010	No
Action Plan for Energy Efficiency and Conservation 2013	Yes. All the sections take into consideration the impact of improved energy efficiency at the household level and the need for taking actions for raising awareness. However, No reference to women and/or gender equality.
Solar Guide Book 2013	Yes. Women will benefit from the solar electrification, irrigation, and other technologies.
Country Action Plan for Clean Cookstoves, 2013	Yes. It attaches priority to reduced household air pollution, improved maternal and child health, women's economic empowerment through participation in cookstove-related entrepreneurship.
500 MW Solar Program, 2013	Yes. Solar electrification in unelectrified areas will enhance the quality of life of the population and reduce drudgery for women
Mujib Climate Property Plan Decade 2030	No reference to women and/or gender equality

The assessment of the more recent policies and plans show that most of them are still completely gender-blind. Only the Climate Change and Gender Action Plan (CCGAP) of 2013 and the National Action Plan for Clean Cooking in Bangladesh (2020-2030) focus (partly) on women as particularly affected by poor energy supply (deaths from household air pollution) and the consequences of climate change and to some extent as important **agents of change**.

According to WHO Gender Responsive Assessment Scale: criteria for assessing programmes and policies[145], different level of gender responsive ness is provided below.

Table 2 : Gender Responsive Assessment Scale

Level	*Criteria*
1. Gender-unequal	Perpetuates gender inequality by reinforcing unbalanced norms, roles and relations Privileges men over women (or vice versa)

[145] https://www.ncbi.nlm.nih.gov/books/NBK559709/table/ch2.t1/

Level	Criteria
	Often leads to one sex enjoying more rights or opportunities than the other
2. Gender-blind	Ignores gender norms, roles and relations Very often reinforces gender-based discrimination Ignores differences in opportunities and resource allocation for women and men Often constructed based on the principle of being "fair" by treating everyone the same
3.Gender-sensitive	Considers gender norms, roles and relations Does not address inequality generated by unequal norms, roles or relations Indicates gender awareness, although often no remedial action is developed
4. Gender-specific	Considers gender norms, roles and relations for women and men and how they affect access to and control over resources Considers women's and men's specific needs Intentionally targets and benefits a specific group of women or men to achieve certain policy or programme goals or meet certain needs Makes it easier for women and men to fulfil duties that are ascribed to them based on their gender roles
5.Gender-transformative	Considers gender norms, roles and relations for women and men and that these affect access to and control over resources Considers women's and men's specific needs Addresses the causes of gender-based health inequities Includes ways to transform harmful gender norms, roles and relations Objective is often to promote gender equality Includes strategies to foster progressive changes in power relationships between women and men

Substantial support need to be provided to make revision of the energy policies to upgrade to gender transformative energy policies from current gender-blind level.

General objective

To revise the energy policies to make them gender transformative

Specific objectives

- Energy policies consider gender norms, roles and relations for women and men and that these affect access to and control over resources
- Energy policies consider women's and men's specific needs and priorities
- Includes ways to transform harmful gender norms, roles and relations
- Energy policies promote gender equality
- Energy policies include strategies to foster progressive changes in power relationships between women and men

Suggested budget by EU: 1 million Euro

Interventions Recommended

Component 1: Revision of Key Energy policies to make them gender transformative

- Selection of key policies for revision in light of gender equity in the renewable energy sector
- Stakeholder consultation with relevant government policies
- Review, analysis and inclusion of gender transformative approaches in the selected energy sector policies
- National validation and adoption of revised gender transformative energy policies

Component 2: Preparation of gender diversity management plan

- Stakeholder consultation with relevant government agencies
- Preparation of gender diversity management plan for both public and private sectors
- Training and capacity building support to government staff on Gender diversity management plan and its effective implementation

Outputs

- 4 key national policies have adopted gender transformative approach
- At least 10 government agencies have adopted gender diversity management plan
- At least 20 private sector green energy companies have adopted gender diversity management plan

Potential benefits

- Increased admission of women in STEM studies
- Increased skills and capacity of women graduates for technical jobs in RE industries
- Increased leadership skills development and job specific technical for women employee in government agencies facilitating promotion in higher ranks
- Increased number of employment of women in green energy companies
- Increased technical capacity of women employees in green energy companies

Duration: 3 years

Potential partners: Power Division

Potential funding modality of the project: Grant (Technical Assistance)

Risks/lessons learned

- Key risk and challenges to be faced are perceived conception of the principle of being “fair” by treating men and women the same way by the majority of the men co-workers. Due to differences in opportunities and resource allocation for women and men, women need specific facilities i.e., more than equal treatment.
- The program needs buy in from senior officials of Government agencies.
- Stakeholder consultation needs to be carefully designed and implemented to ensure acceptance of the program by relevant key stakeholders especially male co-workers.

Concept Note 2: Increase women employment in green energy sector

Problem identified

Women employment in renewable energy sector in Bangladesh is only 27% of total employment. However, due to lack of sex-disaggregated data it is not known how many of them are actually in technical positions. Government agencies under power division only employs up to 4% women in technical positions and very low representation of women in senior positions. Although there are policies for women employment in government agencies but there is lack of qualified women candidates to fill the positions. Women representation in STEM studies are also less than 30%.

Analysis

The energy sector is one of the most male dominated sectors worldwide. According to the International Renewable Energy Agency (IRENA), overall, the energy sector as a whole employ only 22% of women. **Renewable energy opportunities have shown more inclusion and a better gender balance than fossil fuels.**

The renewable energy sector has a huge employment potential in future: IRENA estimates that worldwide the number of jobs in the renewable energy sector could increase from 10.3 million in 2017 to nearly 29 million in 2050. Thus, the **ongoing global energy transition offers the chance to create new jobs and reshape all aspects of how energy is produced and distributed.**

In contrast to fossil fuels, renewable energy also offers new opportunities for small and medium-sized companies, e.g. in the field of installation and maintenance of small solar systems, from which female entrepreneurs could benefit.

In Bangladesh, around 127,000 persons are employed in the renewable energy sector of which the highest proportion (110,000) is employed in the solar photovoltaic sector, followed by 12.000 in biogas as is shown in the following figure:

This puts Bangladesh in fifth place among 161 countries in renewable energy jobs. As a comparison: China accounts for 2.2 million jobs, half of the global employment, followed by Japan, the United States, and India. [146]

According to data from IRENA, most employment in the sector in Bangladesh occurred in sales, installation, and maintenance. Some 10,000 people are also employed in module assembly.[147]

Unfortunately, sex-disaggregated data on employment and entrepreneurship in the (renewable) energy sector in Bangladesh as a whole, and different energy sub-sectors in particular does not seem to exist. Nor could the consultants identify sex-disaggregated data on wage rates in the energy sector. Some women network of professionals in green energy are working. Support can be given to them to prepare a sex disaggregated database of women technical staff in different public and private green energy companies. They also need support to prepare and maintain a database of women professionals in green energy

[146] https://www.tbsnews.net/bangladesh/energy/renewable-energy-creates-137-lakh-jobs-bangladesh-139222

[147] https://www.tbsnews.net/bangladesh/energy/renewable-energy-creates-137-lakh-jobs-bangladesh-139222

According to GIZ data, around 4% women is employed in technical positions and up to 10% of total employment are women in different institutions under Power division, Ministry of Power Energy and Mineral resources.

According to the survey conducted by the study team on Bangladesh Solar and Renewable Energy Association (BSREA) members (14 out of 42 active members responded) women employment is around 27% of the total employment. However, from the data it is not clear, if female staff is employed as technical experts or rather as administrative staff. The majority of the senior administration in the ministry, and the relevant departments consists of men.

There is, thus, a lack of women at management levels who can voice suggestions for improvement and concerns in all aspects of energy-related matters and bring in a gender perspective to decision-making and in energy policies. The shortage of women at senior levels implies that there is a dearth of role models for younger women. Women employees of public companies may receive training in leadership development and job specific training under the proposed project that may help them to be promoted to hire positions.

An important pre-condition for more women being employed in the renewable energy sector either as employees is necessary qualification. Women's low representation in the energy sector is partly due to the fact that women comprise less than 30% of the world's researchers and only 35% of Science, Technology, Engineering, and Mathematics (STEM) students.

As in many other countries, in Bangladesh are under-represented in technical training relevant in the energy sector. Women's attainment in STEM topics is 8.24% compared to 12.39% for men.[148]

Women's participation in **technical and vocational education and training (TVET)** in Bangladesh is strikingly low, ranging from 9 per cent to 13 per cent in public institutions and 33 percent in private institutions, averaging to around 24 percent.[149] Women's limited presence in technical and vocational training is one of the many factors that influence their employment patterns.[150]

To overcome the situation and increase the number of women employment in the green energy sector primary focus needs to be given for the women in STEM studies. In Bangladesh there are 4 major public universities providing engineering education besides 3-4 private universities. Notably, BUET, KUET, CUET, RUET in the public sector and Ahsanullah Engineering University, BRAC University, North South University and AIUB in the private sectors. Dhaka university Energy Institute is providing Masters in Renewable energy courses since 2011 and women students is currently 25%. To encourage more women enrolment in Master's program and as well as choosing RE as a career path, career counselling workshops and study tours can be arranged for women students studying undergraduate level in engineering courses (focusing on electrical, mechanical and chemical engineering) bachelor. Scholarships for women students enrolled in Masters in RE program can be provided. Study tours and training and certification workshops for women students enrolled in Masters in RE program can be provided.

[148] Global Gender Gap Report 2021
[149] ILO, n.y.
[150] ADB, 2017, p. 3

BSREA (the only association of Re companies in Bangladesh) members informed that they want to hire more women but they do not find qualified women candidates. Whereas job placement for increased number of female students is becoming an issue as mention by DU Energy institute teachers. An internship placement program can be developed with the collaboration between Academia and Industry through BSREA.

BSREA can collect information of job requirement and post Vacancy announcement in the Notice Boards of selected universities and facilitate Internship placement of selected candidates into interested companies. The program can bear the 3-6 months Internship payment cost (partial or full) for each of the selected women candidates. The companies will also be benefitted with additional staff at no/low cost while the women graduates may benefit from real life experience and on the job training and mentorship.

General objective

To increase women employment in green energy sector

Specific objectives

- To increase women enrolment in STEM studies
- To increase women graduates in STEM studies
- To increase technical capacity of women graduates in STEM studies
- To achieve academia – industry collaboration in women employment in green energy sector
- To improve the sex disaggregated data of women employment in the green energy sector
- To provide career counselling and mentorship programs for women employed in the renewable energy sector

Suggested budget by EU: 2 million Euro

Interventions Recommended

Component 1: funding support for women in STEM studies

- Scholarships for women studying masters in renewable energy
- Supporting Study tour in RE sites for women in STEM studies
- Internship placement of women graduates in RE companies
- Capacity Building of women students in STEM studies (Training and certification on RE technology)
- Career counselling for female STEM students and job Placement

Component 2: Capacity Building of female professionals in the Green Energy sector

- Support Women employees in Government Agencies in Leadership development and Job specific training
- Support Private Sector female professionals in Career counselling, Professional development training

Component 3: Capacity Building of Women network of professionals in the Energy Sector

- Facilitating the capacity building program for the network members
- Development of sex disaggregated data of women employment (both technical and non-technical) in public and private sector companies in the green energy sector
- Prepare and maintain a database of women professionals in green energy

Outputs

- 100 scholarships to women in STEM studies
- 50 study tour for women in STEM studies in RE power plants/project sites
- 100 internship placements for women graduates in RE companies
- 300 women receive training and certifications
- 300 women receive career counselling
- Sex disaggregated data development of women employment in green energy
- Database of women professionals in green energy sector

Potential benefits

- Increased admission of women in STEM studies
- Increased skills and capacity of women graduates for technical jobs in RE industries
- Increased leadership skills development and job specific technical for women employee in government agencies facilitating promotion in higher ranks
- Increased number of employment of women in green energy companies
- Increased technical capacity of women employees in green energy companies

Duration: 5 years

Potential partners: BSREA, Universities, Energeia, We power, Power Division

Potential funding modality of the project: Grant (Technical Assistance)

Risks/lessons learned

- Stakeholder consultation needs to be carefully designed and implemented to ensure acceptance of the program by relevant key stakeholders
- The goal should be also to promote equality and diversity in conferences, panel discussions, expert talks, media appearances, advisory committees, and boards of directors, and to, thus, increase women´s participation in the public discourse and decision-making related to green energy transition in Bangladesh where women can be important change agents

Concept Note 3: Encourage women entrepreneurship in the green energy sector

Problem identified

Female entrepreneurs face a number of additional constraints in comparison to male entrepreneurs to avail finance in terms of processing necessary documentations and to meet the requirement from Banks/FIs or Investors.

Although Bangladesh Bank has excellent facilities and programs for Women, some constraints were found which is hindering the access to finance for women entrepreneurs.

Analysis

Female entrepreneurs face a number of additional constraints. In addition to the financial barriers faced by green energy project developers in general, women led companies face some distinctive barriers which are as follows[151]:

Although there is no such rule imposed by Bangladesh Bank, local Banks often ask women entrepreneurs to provide a Guarantee from a Male family members.

Women entrepreneurs struggle seriously to obtain required documentation for financing such as TIN, Trade License, Bank Account and statements Land or other collateral papers, Rent Deed etc.

Overall, women-led CMSMEs depend more on informal sector loans and own sources of fund for investment[152] the interest rate of which is very high.

Restrictive social norms and inheritance laws[153] reduce opportunities for women to claim the ownership of land and other resources, the lack of which is a major constraint to access finance, particularly in rural areas. Men hold most of the decision-making power in households, as well as the control of the money.[154]

Although Bangladesh Bank has excellent facilities and programs for Women, some constraints were found which is hindering the implementation of the programs

- Sustainable Finance facilities do not have a gender specific window
- Credit Guarantee Scheme has a gender specific window but do not have a specific focus on green energy and deals with any sector.
- Lack of awareness amongst the women entrepreneurs in rural and peri urban areas regarding the facilities already provided by Bangladesh Bank
- Relationship Managers of different branches of the participatory and the bankers are not fully aware of procedures and requirements for extending loan to women entrepreneurs and sometime often are reluctant to extend additional supports

[151] https://www.prothomalo.com/bangladesh
[152] BRAC Study on Women CSME Entreprenuers
[153] In Bangladesh, inheritance is governed by a person's religion, which has left much of the inheritance process of women unequal and discriminatory. In Bangladesh, under Islamic law, the wife inherits a fixed share of one-eighth of the deceased husband's property if he leaves children, whereas the husband receives one fourth of his deceased wife's property. If he does not leave any children, then the wife inherits a quarter of the husband's estate. A daughter, who is an only child, inherits half the estate of her late father or mother. If there is more than one daughter and no son, then the daughters jointly inherit two-thirds of the estate. However, if there is a son, then the daughter's share will be equal to half of the son's share. In all cases, men inherit more than the women do. Among Hindus in Bangladesh, a large number of women are also excluded from inheritance. According to Hindu law, not all daughters of a man are equally eligible to inherit. Unmarried daughters and married daughters with sons can inherit, while childless widowed daughters or daughters having no son are excluded. (Source: https://www.yourcommonwealth.org/uncategorized/bangladesh-women-and-the-equal-distribution-of-inherited-property/)

[154] Wolf; Dipali, 2014

- Lack of funds to support to properly educate Bankers in peri urban and rural branches of participatory financial institutes about the facilities for women entrepreneurs
- Lack of funds to support women entrepreneurs with documentation and loan processing to avail the finance

CSME (Cottage, micro, small and medium) sector contributes to 25% of the GDP. There are around 8 million business and 9.93 % of them falls under CSME and only 7.2 % are women lead business. Women business owners facing problems to avail loan from Bank. Majority of the women do not about women focused loan facilities already existing. They lack proper licenses and documentation to be eligible for loan. They need improvement of business knowledge, financial knowledge. Women do not own lands or building and it hard for her to offer collateral in order to take loan from Bank. In most cases eligibility criteria is gender blind but women need easier terms than man. Although there are some good policies but there are challenges in policy implementation

General objective

To promote women entrepreneurship in green energy business.

Specific objectives

- To conduct awareness raising campaign for women entrepreneurs
- To conduct awareness raising campaign for banks and FI staff
- To conduct capacity building of Bank staff to process loan under CSME credit guarantee scheme and refinancing scheme under sustainable finance
- To conduct capacity building for women entrepreneurs in loan documentation and fulfillment of the required terms and conditions by the bank/FI
- To encourage women startups to enter into green energy business

Suggested budget by EU: 3 million Euro

Interventions Recommended

Component 1: Technical Assistance for Awareness raising and capacity building

Sub component 1: Awareness raising and capacity building of Bank staff

- Awareness on Bangladesh bank (BB) funds
- Detail understanding on the loan processing under CSME credit guarantee scheme and refinancing scheme under sustainable finance
- Special training on terms and conditions for women entrepreneurs to avoid any undue conditions imposed on women entrepreneurs

Sub component 2: Awareness raising and capacity building of female entrepreneurs

- Awareness on BB funds
- Business entrepreneurship set up support
- Loan processing and documentation support
- Business management support

- To assist the Banks/FIs to build pipeline and encourage women led green energy enterprises to develop investment projects and to apply for funds

Component 2: Result based grant finance for Women CSME entrepreneurs

- A pilot grant for women CSME green entrepreneurs may be set up
- Women green business may avail result-based grant finance.
- A part of the grant may be released after commercial operation and part of the grant may be released annually after successful repayment of loan installments. The grant will work as interest rate subsidy to soften the interest rate burden of women entrepreneurs.

Component 3: Promotion of women startups in green energy sectors

- Collaboration with Startup Accelerators and VC funding in Bangladesh
- Awareness raising and capacity building of women startups in green energy space
- Financial support to green energy startups to pay fees to accelerator, training
- Financial support to develop minimum viable product (MVP) to be eligible for pitching to investors.
- Establish an online platform for women led green energy startups to raise finance

Outputs

- 100 national/regional capacity building workshops around the country for awareness and capacity building of Bank/FI staff
- 100 national/regional capacity building workshops around the country for awareness raising of women entrepreneurs
- 1000 female CSME business owner receive support in Loan processing and documentation, company set up
- 25 women startups receive support

Potential benefits

- Increased number of women entrepreneurs know about the BB facilities
- Increased number of bankers have the capacity to process loan under the BB facilities
- Increased application from women entrepreneurs under different BB schemes
- Increased number of women startups entering into the green energy space

Duration: 5 years

Potential partners: **Bangladesh Bank**

Potential funding modality of the project: Blended finance (Grant from EU and loan support from Banks/FIs, refinance and credit guarantee from Bangladesh Bank)

Risks/lessons learned

Integration of refinancing scheme under the sustainable finance department and CSME credit guarantee scheme managed by credit guarantee department and

women entrepreneurship development managed by SME department will be one of the main challenges. Successful implementation will be replicated in future for such integrated development approach.

Concept Note 4: Strengthen women/s decision making power at household level

Problem identified

Analysis

Discriminatory social and gender norms and patriarchal attitudes[155] are a significant barrier to women´s equal involvement in the green energy transition at all levels (end users, training, employment, entrepreneurship, decision-making, policy making).

The restrictions caused by prevalent gender and social norms have traditionally perpetuated women's economic dependency on men, their mobility restrictions and access to markets, their assumed inability to operate and manage technology and energy and vulnerabilities to GBV which constrain women's independence and any decision-making regarding use of equipment and energy appliances.

To tackle these constraining norms should be a cross-cutting topic in all kind of support. Useful activities could be the dissemination of success stories of women who could serve as role models through leaflets, films, social media, public events etc.

A survey of 630 households in Bangladesh reported that women are typically the primary cooks and spend on average 80 minutes a day on cooking alone. Combined with the collection of biomasses, the time spent by women each day on cooking-related activities can be over 5 hours, 40 minutes.

Another survey found that on average female students get to study 37 minutes less per day than their male counterparts, and access 17 minutes less per day of leisure time. However, decision-making regarding energy choices and its purchase is found to rest predominantly with the men, requiring policies to enable fuel switching to empower women and/or involve them strongly (IISD, 2020; Practical Action, 2017). [156]

According to SREDA, even though women do most of the cooking in households, and women empowerment is on the rise, but often times, men are the ones making purchasing decisions in general, e.g. cooking fuel and cookstoves, as they are the household heads in the family. In other words, the awareness on the benefits of clean cooking should be infiltrated among the whole family, not just women to ensure a sustainable change. Clean cooking programs focused on women as the receiver of technology. Women can also be viewed as change agents to promote clean cooking solutions among the neighbors and peers that would likely to increase diffusion.[157]

As part of the current study, some primary data was collected during a field trip to Dhaka from 13th of May 2022 to 24th of May 2022 and to Jessore that took place between 5th of June 2022 and 07th of June 2022.

[155] UN Committee on the Elimination of Discrimination Against Women (CEDAW) 2016
[156] Nagpal, D., Lamichhane, N., Kafle, S., & Gyeltshen, M., 2022, p. 22
[157] SREDA (2020) : National Action Plan for Clean Cooking 2020-2030, p. 3

During field visits it is observed that women and men both are involved in decision making process but not in the same level or same aspects. For example: to install a biogas plant, the decision has been taken mostly in consultation of the female members of the households. Female members of the households are mainly benefited from the smoke free cooking and family can reduce the cost of fuel rather having compost fertilizer from the waste of cow dung. Improved cookstove or Bandhu Chula is brought to the household level by the vendor so women directly have access to buy and take decision as it cost minimum amount which they could manage. Here is also same benefit by the women folk and the family having good cooking environment and reduced cost of fuel rather have savings as it takes less fuel than traditional cook stove.

- Purchase decision for biogas plant is taken mostly in consultation of the family. Women are benefited from the clean cooking while the total family is benefited from cost savings in fertilizer and fuel wood purchase.
- Purchase decision for improved cookstove is taken mostly women. Women are benefited from the clean cooking while the total family is benefited from cost savings in fuel wood purchase.
- Purchase decision for SHS is taken mostly by Men sometime in consultation with women. However, Women and children are benefited from the lighting while the total family is benefited from cost savings in electricity bill.

General objective

To strengthen women/s decision making power at household level

Specific objectives

Increased participation of women in household energy uses related decision making

Suggested budget by EU: 0.5 million USD

Interventions Recommended

Component 1: Awareness raisin withing communities and household

- Working with men to enable them to support women's access to different energy sources, use of appliances, establishing and running energy-based enterprises and managing unpaid care work together to enable focus on enterprises is important.
- Network for promoting gender justice should be explored in this regard to ensure that approaches are adapted to the local context.
- To avoid any unintended negative impact, men should be involved in all kind of activities targeted at women, especially at community level.
- Sustained dialogue with men and family decision-makers and reflections by women themselves regarding these aspects should be supported.

Component 2: Women as change agents to achieve household energy efficiency and access to sustainable energy

- Educate high school and college girls on
  - Climate change and impact of renewable energy and energy efficiency.
  - Save household energy consumption through behavior change

- Study STEM subjects and build career in Green

- To develop a training curriculum and support in arranging awareness programs in their respective premises.
- School/college girls become the change agent and advocate for energy efficiency and access to renewable energy in households

Outputs

50% more women are involved in household decision making after participating awareness raising campaign

Potential benefits

- Increased participation of women in household decision making
- Increased knowledge and capacity of women regarding impacts of energy in their life
- Change of perception at community level to consider women's need in decision making related to energy use

Duration: 3 years

Potential partners: IDCOL and POs in SHS, ICS and Biogas programs

Potential funding modality of the project: Grant (Technical Assistance)

Risks/lessons learned

Key success factor will be men's support in women's access to different energy sources, use of appliances