



# Pathways to Power

South Asia Region Baseline Assessment for  
Women Engineers in the Power Sector





Front Cover: Shahin Akter Parvin West Zone Power Distribution Company Ltd. (Bangladesh), 2018. Back Cover: USAID and Tetra Tech (Afghanistan).  
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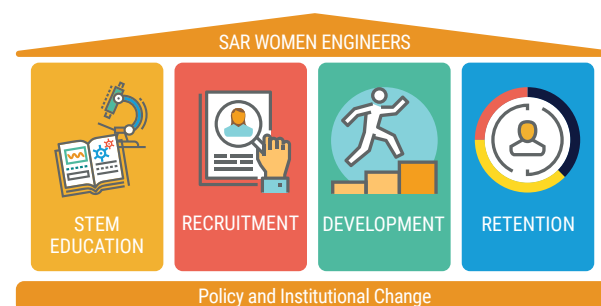
# Executive Summary

The World Bank is planning to establish a regional network for women practitioners in the power and energy sectors in South Asia (WePOWER) to help expand opportunities for women in energy projects and at the corporate utility level. Rapid baseline assessments were conducted for each of the eight countries in the South Asia Region: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. Gender-disaggregated data were collected from over 100 power sector and academic institutions. In total, 515 female and male power sector professionals and engineers contributed to the study through interviews and focus group discussions.

The data confirm the very low female representation in the power sector. Representation in utilities is low for women in all roles (3%-25%) and even lower for women in technical roles (0.1%-21%). Women tend to work in the middle- to lower-level nontechnical (i.e., administrative) positions, but an encouraging number of women are now in senior and leadership positions. Low female enrollment in engineering education (0.5%-31%) contributes to the small pool of qualified job candidates. The assessment participants identified the lack of role models/networking support, limited fieldwork/training opportunities, and inadequate facilities (i.e., separate toilets/safe transportation/daycare/flex-leave) as the major barriers to women's careers in the power sector.

The recommendations from these assessments have already informed the development of the WePOWER work program.<sup>1</sup> WePOWER will work with local and international partners, including power sector utilities and engineering programs, to address the gender employment gap in the power sector. Although WePOWER's initial focus was on women engineers and technical employees, the plan is to extend the network to all women employees in the power sector. The 1st Regional WePOWER

conference was held in Nepal on Feb 21-22 and featured over 250 participants, including senior management from power utilities, female power sector professionals and engineering students. The regional approach has already helped to improve partnerships between local organizations. Planned activities will emphasize a holistic approach under four key pillars underpinned by Policy and Institutional Change:



- **STEM education:** Raise girls' interest in science, technology, engineering and math (STEM) subjects, increase female enrollment in engineering programs.
- **Recruitment:** Raise awareness of viable jobs/opportunities in the power sector through job fairs and networking events.
- **Development:** Foster personal and professional development opportunities, such as mentorship programs, leadership training/coaching.
- **Retention:** Support instituting family-friendly HR policies, providing reintegrating services for returning mothers and access to facilities such as daycare services, separate toilets, and safe transportation services. Exploring gender certification for utilities (i.e., EDGE) can also serve as an incentive.
- **Policy and Institutional Change:** This cross-cutting area affects all four pillars. Work to institutionalize and enforce gender considerations at the national and institutional levels will be crucial to achieving long-term normative change.

<sup>1</sup> For further information and updates, please visit [www.wepowernetwork.org](http://www.wepowernetwork.org) and join the WePOWER Linked group at <https://www.linkedin.com/groups/12139181>

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*Disclaimer – Please note that the report reflects the views of the World Bank and incorporates inputs from the women and men interviewed as part of the study. The report does not necessarily reflect the views of the government of the countries covered by the study. The findings of the report would, thus, not be binding on the countries covered by the study.*

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# Abbreviations and Acronyms

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<b>AF</b>	Afghanistan
<b>BH</b>	Bhutan
<b>BN</b>	Bangladesh
<b>BPC</b>	Bhutan Power Corporation
<b>BPDB</b>	Bangladesh Power Development Board
<b>CEB</b>	Ceylon Electricity Board (Sri Lanka)
<b>CST</b>	College of Science and Technology (Bhutan)
<b>DABS</b>	Da Afghanistan Breshna Sherkat (Afghanistan national power utility)
<b>DGPC</b>	Drunk Green Power Corporation (Bhutan)
<b>EESL</b>	Energy Efficiency Services Limited (India)
<b>ESMAP</b>	Energy Sector Management Assistance Program
<b>GDP</b>	Gross domestic product
<b>IEEE</b>	Institute of Electrical and Electronics Engineers
<b>IIT</b>	Indian Institute of Technology
<b>IN</b>	India
<b>IT</b>	Information technology
<b>JNEC</b>	Jigme Namgyel Engineering College (Bhutan)
<b>ML</b>	The Maldives
<b>MWSC</b>	Maldives Water and Sewage Company
<b>NE</b>	Nepal
<b>NEA</b>	Nepal Electricity Authority
<b>NTPC</b>	National Thermal Power Corporation, Ltd. (India)
<b>PK</b>	Pakistan
<b>RE</b>	Renewable energy
<b>SAR</b>	South Asia Region
<b>SL</b>	Sri Lanka
<b>STELCO</b>	State Electricity Company, Ltd. (Maldives)
<b>STEM</b>	Science, technology, engineering, and math
<b>WAPDA</b>	Water and Power Development Authority (Pakistan)

# I. About the Study

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The World Bank is planning to establish a regional network for women practitioners in the power and energy sectors in South Asia (WePOWER) to help expand opportunities for women in energy projects and at the corporate utility level. This professional network is designed to help connect and build the capacity of women practitioners and promote career advancement in the power sector. It would also promote normative change regarding women and girls in science, technology, engineering, and mathematics (STEM) education. Improved representation of women—at all level—in the sector is key to bringing about a more inclusive gender environment at the project and institutional levels. This assessment served as the first point of engagement for potential members of the professional network, helping to corroborate anecdotal evidence with limited qualitative and quantitative data.

**Rapid baseline assessments were conducted for each of the eight countries in the World Bank’s South Asia Region (SAR):** Afghanistan (AF), Bangladesh (BN), Bhutan (BH), India (IN), the Maldives (ML), Nepal (NE), Pakistan (PK), and Sri Lanka (SL). These assessments, a first attempt to understand the complex and multidimensional problem of the underrepresentation of women in the SAR power sector, were carried out specifically to inform the design of WePOWER. Following an extensive literature review, a conceptual framework and standardized methodology—including a fieldwork guide and questionnaires—were developed for all the countries. The companion online annex and country briefs provide a more detailed overview of the methodology and country-specific information.

The report collects data from over 100 power sector organizations and engineering programs. In many cases, this is the first time institutional data have been shared or broken down by sex and grade.<sup>2</sup> The study also interviewed 524 female and male power sector professionals and engineering students (Figure 1).<sup>3</sup> The study covered women engineers and technicians who work in or with the power sector, including in both public and private utilities. It also covered women who were trained as power engineers but are working at universities or consulting firms, graduating engineering students, and male professionals in the sector. Women from energy ministries and electricity regulatory agencies also contributed to the discussions. These data are by no means a complete picture of the power sector, especially on the private sector side, but the findings can be considered a snapshot of the current situation for engineering students and for women professionals in the power sector. Overall, the response to the study was very positive.

**This regional report synthesizes the information gathered in the eight-country assessments.** It is organized into five sections. This first section explains the objectives and scope of the study. Section II provides background and context, including the results of the literature review. Section III summarizes the status of women in the SAR power sector today, Section IV presents the findings of the primary research, and the final section presents recommendations and the way forward to WePOWER.

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2 There is some scattered information (newspaper articles, blogs, etc.) on the gender gap in STEM (India), and features about women working in utility companies and cases of harassment; lack of equal employment opportunities for new recruits, gender-biased promotions; and communication barriers between men and women (Pakistan). See also Engendering Utilities Report by USAID: [https://pdf.usaid.gov/pdf\\_docs/PBAAF230.pdf](https://pdf.usaid.gov/pdf_docs/PBAAF230.pdf).

3 The total number of respondents differ for each country due to the varying response from the individuals and utilities (or no. of women working). In India, the universities were on break so we were unable to arrange for FGDs. However, the consultants were able to speak with some students on an individual basis.

**Figure 1. Total People Interviewed**



Note: For the number of focus group participants, F=Female, M=Male



## II. Background and Context

With economic growth topping 6.9 percent in 2018 and set to accelerate to 7.1 percent next year, SAR is the world's fastest-growing economic region. Access to energy and development of infrastructure are critical to the regional development strategy. South Asia is by no means a homogenous region. Countries' population, size of the economy, and development indicators vary greatly. Social sustainability issues, including gender, play an important role in the region, where most countries rank at the lower end of human development and gender inequality rankings (Table 1). Women's labor force participation ranges from 19% in Afghanistan to 83% in Nepal (where there is a high rate of male migration for jobs abroad). According to the World Bank's Women, Business and the Law report (2018), of the economies in all Regions, those in SAR have the most restrictions on women regarding getting a job. Encouragingly, though, SAR is also the most improved Region, with half of the countries passing at least one reform toward improving the legal/policy framework. Indeed, all eight South Asian countries were found to have no legal/policy restrictions preventing non-pregnant and non-nursing women from working in the energy sector equally with men.<sup>4</sup>

### What does the literature tell us?

Directly relevant literature on gender disparity in the power utilities, especially from peer-reviewed academic journals, is rare. Much of the literature is restricted to case studies and reports, such as the 2015 Engendering Utilities Report by the United States Agency for International Development,<sup>5</sup> and the World Bank's 2018 Gender in Large Infrastructure report. Both reports highlight the dearth of women in the energy industry and stress the need to improve women's opportunities,

### Box 1. Growing Opportunities in the Renewable Energy (RE) Sector

A 2019 study by the International Renewable Energy Agency (IRENA) found that women accounted for 32% of the RE workforce, a share greater than in the traditional energy sector. For RE power and utility companies, the board representation of women was 16%. However, even in this sector, the survey found greater perceived barriers to entry/advancement (75% vs. 40%) and wage equity bias (60% vs. 29%) for women compared to men.

IRENA estimates that the global RE sector could triple in size by 2050, providing 29 million jobs, with most of the growth being led by Asia. Indeed, the RE sector created 47,000 new jobs in India in 2017, and employment opportunities are expected to almost double by 2022.

Source: IRENA, 2019.

both in energy projects and at the corporate utility level. The reports find no systematic studies on women's employment or systematic discussions of programs that help improve employment opportunities for women in power utilities. There is a distinct data gap; it is difficult to find clear and comprehensive statistics on women in the power sector that include such granular details as a breakdown by position, department, or salary.

It is clear that low female representation in the energy sector is a global issue. Women make up only 5 percent of executive board members at the top of 200 power and utility companies in the world (although their representation is higher in renewable energy companies).<sup>6</sup> Indeed, the renewable energy sector is a promising field where female job participation is expected to grow (Box 1).<sup>7</sup> Considering the scale and importance of electric

<sup>4</sup> World Bank Group, Women, Business and the Law 2018: <http://pubdocs.worldbank.org/en/999211524236982958/WBL-Key-Findings-Web-FINAL-2.pdf>.

<sup>5</sup> USAID, Engendering Utilities: Improving Gender Diversity in Power Sector Utilities: <https://www.usaid.gov/energy/engendering-utilities>.

<sup>6</sup> Catalyst, Quick Take- Women in Energy: <https://www.catalyst.org/knowledge/women-energy-gas-mining-oil>.

<sup>7</sup> IRENA, News Release: <https://www.irena.org/newsroom/articles/2019/Jan/Gender-equality-for-an-inclusive-energy-transition>, <https://www.irena.org/newsroom/articles/2009/Apr/Active-participation-of-women-essential-to-the-global-energy-transformation>. Business World India, Article: <http://www.businessworld.in/article/Women-In-Renewable-Energy-Sector-Growth-and-Prospect/07-08-2018-156963/>.

**Table 1. Regional Data**

Indicators	Afghanistan	Bhutan	Bangladesh	Pakistan	Nepal	India	Maldives	Sri Lanka
Total population (millions)	35.53	0.81	164.67	197.02	28.31	1,339.18	0.44	21.44
GDP per capita (current US\$)	586	3,110	1,517	1,548	835	1,940	10,536	4,065
Women's labor force participation (%)	19	58	33	25	83	27	43	35
Women tertiary school enrollment (%)	3.6	8.9	14	9	12.2	27	20.5	22.9
UNDP Gender Inequality Index (rank among 189 countries)	0.653 (153)	0.476 (117)	0.542 (134)	0.541 (133)	0.48 (118)	0.524 (127)	0.343 (76)	0.354 (80)
UNDP Human Development Index (rank among 189 countries)	0.498 (168)	0.612 (134)	0.608 (136)	0.562 (150)	0.574 (149)	0.64 (130)	0.717 (101)	0.77 (76)

Source: World Bank Databank, UNDP.

utilities in all economies, excluding women from such a critical (higher-paying and more productive) sector has potentially harmful impacts for them and for the sector itself.<sup>8</sup> Persistent employment segregation by gender traps women in low-productivity, low-paying jobs.<sup>9</sup> A growing body of evidence indicates that companies with greater gender diversity outperform their peers and score higher regarding employee satisfaction.<sup>10</sup> Indeed, a recent study found that the top 20 gender-diverse power utilities outperformed the bottom 20 by a 14.8 percent increase in return on equity.<sup>11</sup> Unfortunately, no South Asian utilities were part of the study.

**There is a wealth of literature exploring gender in STEM in both academic and nonacademic settings.** Most relevant to WePOWER's role is the literature on women's networks and the impact of mentorship and role models. Some of the best hiring practices suggested to companies include providing coaching and mentoring and forming women's networks.<sup>12</sup> The research shows the importance of mentoring and using formal women's networks help confront the barriers presented by male "old-boys"-dominated informal and formal networks.

8 See USAID, Engendering Utilities.

9 World Bank, 'Gender Differences in Employment and Why They Matter', in World Development Report 2012: <http://siteresources.worldbank.org/INTWDR2012/Resources/7778105-1299699968583/7786210-1315936222006/chapter-5.pdf>.

10 For further information on the topic, please refer to Credit Suisse, Gender diversity and corporate performance: [https://www.calstrs.com/sites/main/files/file-attachments/csi\\_gender\\_diversity\\_and\\_corporate\\_performance.pdf](https://www.calstrs.com/sites/main/files/file-attachments/csi_gender_diversity_and_corporate_performance.pdf)

11 Ernst & Young, Index of women in power and utilities: <https://www.ey.com/gl/en/industries/power---utilities/women-power-and-utilities>.

12 Equate Scotland, Women in Engineering Employer's Best Practice Guide: <http://www.equatescotland.org.uk/wp-content/uploads/2016/06/Women-in-Engineering-Employers-Best-Practice-Guide.pdf>. See also Institute of Education Sciences, Factors that Contribute to Women's Career Development in Organizations: A Review of Literature - <https://files.eric.ed.gov/fulltext/ED492334.pdf>.

# III. The current status of women in the power sector

The SAR countries' power sectors vary greatly in size and number of institutions. India, in particular, has a large and complex power sector, with state- and federal-level institutions and heavy investments from private sector conglomerates like Tata Power. Indeed, India alone accounts for over 87 percent of the total installed capacity in the region (345,495 MW/394,140 MW).<sup>13</sup> Most countries are moving away from vertically integrated public utilities with unbundled generation, distribution, and transmission companies, and toward greater involvement by the private sector/independent power plants. In SAR, several public utilities are not profitable, they have tariffs that are not cost-reflective and that rely on government subsidies, and the systems suffer from high transmission and distribution losses and leakages/theft. But because most of the countries have ongoing reforms to improve the governance and performance of their power sector, the situation has been improving significantly. The electricity access rate for the region has also improved dramatically, and there is a growing push toward more renewable sources. Thus, there is a unique opportunity for gender mainstreaming in the sector. The study was able to survey a total of 84 organizations, which includes all the major public institutions and some prominent private sector companies – except in India, where it was necessary to limit the scope of the review because of the size and complexity of the system (87 power sector utilities<sup>14</sup> and over 6,400 accredited engineering programs<sup>15</sup>).

*“Working women usually cannot help their parents financially, even though they are earning.”*

– Female engineer in Bangladesh

There are many engineering programs throughout the region, but their availability and quality vary greatly by country. The study identified at least 76 nationally accredited engineering programs and technical/vocational schools in the region. India, of course, is home to the world-renowned Indian Institutes of Technology (IITs) and around 6,466 engineering programs offering education ranging from diploma- and undergraduate-level to postgraduate and Ph.D.-level studies. Of these, 357 institutions are for women only.<sup>16</sup> However, in the smaller countries of Bhutan and the Maldives women have limited options, especially if they want to pursue M.S. or Ph.D. degrees; for advanced study, most women must study abroad, either in the region or farther afield. Public universities are highly competitive, with limited seats, and they can be expensive.

## Few national policies and programs address female employment in the energy sector

The principle of equal rights for women and men is enshrined in each country's national constitution, and all the countries have stringent national labor and employment laws that cover women working in the power sector and, on paper, protect women from discrimination. The laws cover unbiased hiring, access to basic amenities/facilities, protection against sexual harassment, and access to maternity leave and on-site day-care facilities. For example, countries like Pakistan and Bangladesh mandate workplace facilities such as daycare and separate bathrooms and bed/quarters for women. Interestingly, the Maldives Gender Equality Act (2016) includes a provision for eliminating discrimination in job advertisements. The Indian Government has also have passed many corporate initiatives, such as the Vishaka

13 South Asia Regional Initiative for Energy Integration, Presentation: <https://sari-energy.org/wp-content/uploads/2018/09/1.Overview-of-SARI-EI-Innaugural-New-Logo-vkk.pdf>.

14 World Bank Indian Power Sector Review: <https://datacatalog.worldbank.org/dataset/india-power-sector-review>.

15 AICTE, India Approved Institutes: <http://www.facilities.aicte-india.org/dashboard/pages/dashboardaicte.php>.

16 AICTE 2017-18 data: <http://www.facilities.aicte-india.org/dashboard/pages/dashboardaicte.php>.

## Box 2. Pakistan's 2012 Federal Wedlock Policy

The Wedlock Policy encourages posting with the spouse to help women keep both their jobs and their marriages intact. Utilities also try to station unmarried women in the same city as their parents. For example, the Water and Power Development Authority (WAPDA) recently granted transfers to two female engineers working at a power plant: one transferred to her hometown to look after her ailing parents, and the other transferred to be close to her spouse.

Guidelines mandating an Internal Complaints Committee to address Sexual Harassment at the workplace, the newly reformed Maternity Benefits Bill and the Parental Leave policy. In Pakistan, flexible policies for hiring women have been well implemented in the energy sector (Box 2). All the countries except Bhutan<sup>17</sup> and Pakistan<sup>18</sup> have full-fledged Women Ministries and National Women's Commissions that are responsible for protecting and promoting the interests of women and for investigating grievances submitted by women.

**Most countries have instituted quotas for women in their civil services, but it is unclear how this has translated to actual implementation at the public sector power utilities.** Afghanistan, which has a high proportion of women in the civil service, plans to increase the percentage of female civil servants to 30 percent by 2020. Nepal also has a policy to reserve 45 percent of civil service jobs for women and minority ethnic groups. Bangladesh, India, and Pakistan require that women be hired for 10 percent of civil service positions, and have even higher state-level government quotas.<sup>19</sup> However, the policies do not include any further requirements such as grade or job types (administrative vs. technical), and no clear guidance is provided to the institutions on how to achieve this target in practice. Only Da Afghanistan Breshna Sherkat (DABS), the national power utility in Afghanistan, was found to have instituted a specific recruitment process aimed at women (described in Box 11). It must be noted, however, that the existence of national laws, policies, and strategies does not guarantee enforcement.

## Box 3. Bhutan's Maternity/ Paternity Leave and Breastfeeding Policy

Since March 1, 2016, women working under the Royal Government of Bhutan enjoy 6 months of paid maternity leave, and men receive 10 days of paid paternity leave. To facilitate breastfeeding, a mother with a baby up to 24 months of age is allowed to take a two-hour lunch break.

Bhutan is also the only economy in South Asia to provide the incentive of tax-deductible child care payments.

**Maternity leave policies and benefits vary greatly.** Bangladesh, Bhutan (see Box 3), and India offer around six months of paid maternity leave; Sri Lanka, Afghanistan, and Pakistan offer around three months; and the Maldives offers only 60 days (less than two months). Nepal updated its Labor Act in 2017, improving maternity benefits from 52 days to 98 days and introducing paid paternity leave—15 days.<sup>20</sup> None of the countries requires a guarantee that on returning from maternity leave women will have the same position or will be able to benefit from any impending promotions.

**All the countries have clear policy goals to improve women's participation in the labor force, although not all specify promoting women in STEM or technical fields.** Bangladesh has a National Strategy for Promoting Gender Equality with the explicit aim of increasing female participation in technical and vocational education and training. The strategy outlines a strategic framework and objectives, with a clear set of priorities and targets. Objectives include increasing female enrollment by at least 25 percent and transforming mindsets and attitudes to eliminate negative perceptions of “nontraditional skills” for women. In India, the National/Regional Vocational Training Institutes for Women are set up as exclusively female institutes that provide facilities for structured, long-term regular, advanced-skill, and post-advanced training. Also, a network of institutes under both central and state governments has been set up to stimulate employment opportunities among women of various socioeconomic levels and age groups.

17 Bhutan does have a National Commission for Women and Children.

18 In Pakistan, the Ministry of Human rights has been mandated to work on women's issues with implementation being decentralized to the provincial level in 2011.

19 At the state level in India, Maharashtra has established a 30 percent quota for women in the state government institutions. In Pakistan, all provinces have their respective quotas on women's employment in the public sector (Khyber-Pakhtunkhwa 20%, Punjab 15% and Sindh 15 %).

20 The new law also removes restrictions for the times women can work (from 6 a.m. to 6 p.m.), allowing them to work at any hour as long as they are provided transportation before sunrise or after sunset. See Nepal Economic Forum: <https://nepaleconomicforum.org/neftake/nepal-labor-act-2074/>.

#### Box 4. Indian Institutes of Technology (IITs) - Push to Improve Female Enrollment

To improve female enrollment to 20 percent by 2020, the IITs are taking such measures as the following:

- Interactive sessions with qualified girls and parents.
- Targeted advertisements to parents to enroll their daughters, highlighting better results and safe environment.
- Exempting girls from paying tuition fees.
- Welcome packet for admitted girls.
- An online “female helpdesk” and a dedicated page on a social networking site to connect female student mentors and teachers.
- Almost all the IITs have a women’s cell or forum for redress of complaints of sexual harassment.

These efforts have resulted in a jump in enrollment rates to 15.42 percent in 2018 from under 10 percent in the previous 5 years.

India has several national initiatives to improve the participation of girls and women in STEM education at all stages. In line with India’s 2013 Science Policy, which specifically requires empowering women scientists, the Ministry of Human Resource Development has instituted a national mandate to achieve 20 percent female enrollment in engineering by 2020. As a result, the IIT has taken various measures to increase women’s applications to its campuses (Box 4). Other national initiatives include the 2002 Women Scientists’ Scheme, which supports women returning to their careers after a family break; the 2014 Udaan campaign, which supports STEM mentoring and tutoring support for qualified girls; the 2018 Vigyan Jyoti program, which provides scholarships and STEM summer camps and supports visits to tech institutions to learn first-hand about career prospects; and Mahila Samakhya: Education for Women’s Equality, which provides post-doctoral fellowships. The study did not identify any other proactive national policies or strategies in SAR to improve women’s participation in STEM education.

In all SAR countries, providing equal opportunities for women is considered part of a national commitment to gender equality, but it is not endorsed in the energy sector policy. Energy sector policies do not have any

overarching agenda to improve women’s (or men’s) economic participation in the sector. The gender considerations in energy primarily focus on improving women’s access to clean cooking, using renewable energy, and improving energy efficiency at the household level. There is a clear opportunity that has not been leveraged to use energy sector development to help ensure gender equality by overcoming the stereotyped division of professional opportunities in utilities.

#### Female representation in power sector organizations is very low overall, and even lower among technical staff

The share of women working in the 35 surveyed institutions ranges from 3 percent to 25 percent, and the share of women engineers and technicians<sup>21</sup> is even lower – less than 1 percent and 21 percent. The study was also able to collect gender-disaggregated data from an additional 18 power sector organizations, ranging from utilities to energy ministries. The HR departments of utilities in the Maldives, Bangladesh, and Pakistan provided a detailed breakdown of employees in technical and nontechnical positions. Some utilities provided an additionally detailed breakdown by grade and position level. Unfortunately, many utilities do not routinely maintain sex-disaggregated data, and the figures had to be compiled from their database manually. There was not enough information from private utilities to draw any significant distinctions or conclusions. The data provided do not account for women who may be trained as engineers but are working in nontechnical positions—for example, in human resources or finance.

For Bhutan, the Maldives, Nepal, and Pakistan, the assessments have almost complete coverage of women working in the power sector (there are not many). In each country, the scope of the inquiry reflects the size and complexity of the power sector and the population of the country. For example, in the Maldives, there are 11 female engineers in the three public utilities, while India has 87 power utilities spanning 29 states, so the scope of the study had to be limited from the start.

<sup>21</sup> Utilities provided gender-disaggregated data split by technical employees (including engineers and electricians working in distribution/transmission/generation sections) and nontechnical employees (working in management, legal, human-resources, and administrative positions). Some utilities also provided separate counts for engineers (specified in text).

- In **Afghanistan**, there are 14 (21%) women engineers (out of 68 total engineers) working at the national power utility DABS. Overall, the representation of women in the utility is only 3 percent (281 women out of a total of 9,367 staff). In addition, an additional 68 women engineers (accounting for 16 percent of total engineering staff) work in the Ministry of Energy and Water, the Ministry of Rural Rehabilitation and Development, and the Ministry of Rural Rehabilitation and Development, although not all the women work in the power/energy sector at the latter two ministries. In total, women account for 8 percent of total staff at the three ministries.
- In **Bangladesh**, six power sector utilities provided a breakdown of male/female engineers and technicians. Overall, only 304 out of 5,006 technical staff (6%) are women, and 80 percent of them are in assistant (34%) or sub-assistant (46%) positions. In 13 surveyed power sector organizations, only 16 out of 276 (6%) total board members are female. Bangladesh Power Development Board (BPDB) has the highest representation of women with 1,500 out of 16,040 total staff (9%) and 217 out of 2,455 technical staff (9%).
- In **Bhutan**, aggregate data from four power sector institutions find a relatively high 894 women out of total 4,103 staff (22%). In total, women hold 414 of the 2,510 technical positions (16.5%). Many of the women are working in mid to senior level positions as chief engineers, senior managers, and senior engineers. In Bhutan Power Corporation (BPC), there are a total of 443 (19%) women working at the utility, with 229 (14%) women working in technical positions. Similarly, at the Druk Green Power Corporation (DGPC), there are a total of 417 (25%) women working at the company, of which 112 (20%) are working in technical positions.
- In **India**, we were not able to obtain a detailed gender breakdown. However, data collected from 11 power sector organizations 4,225 women out of a total of 52,008 staff (8.1%) as of 2018. Looking at just the power utilities, North Eastern Power Corporation Ltd. employs 15.2 percent women (351/2,308). National Thermal Power Corporation (NTPC) and Power Grid Corporation had the lowest share, with 6.31 percent (1,300/20,593) and 6.7 percent (598/8,887) female employment, respectively.

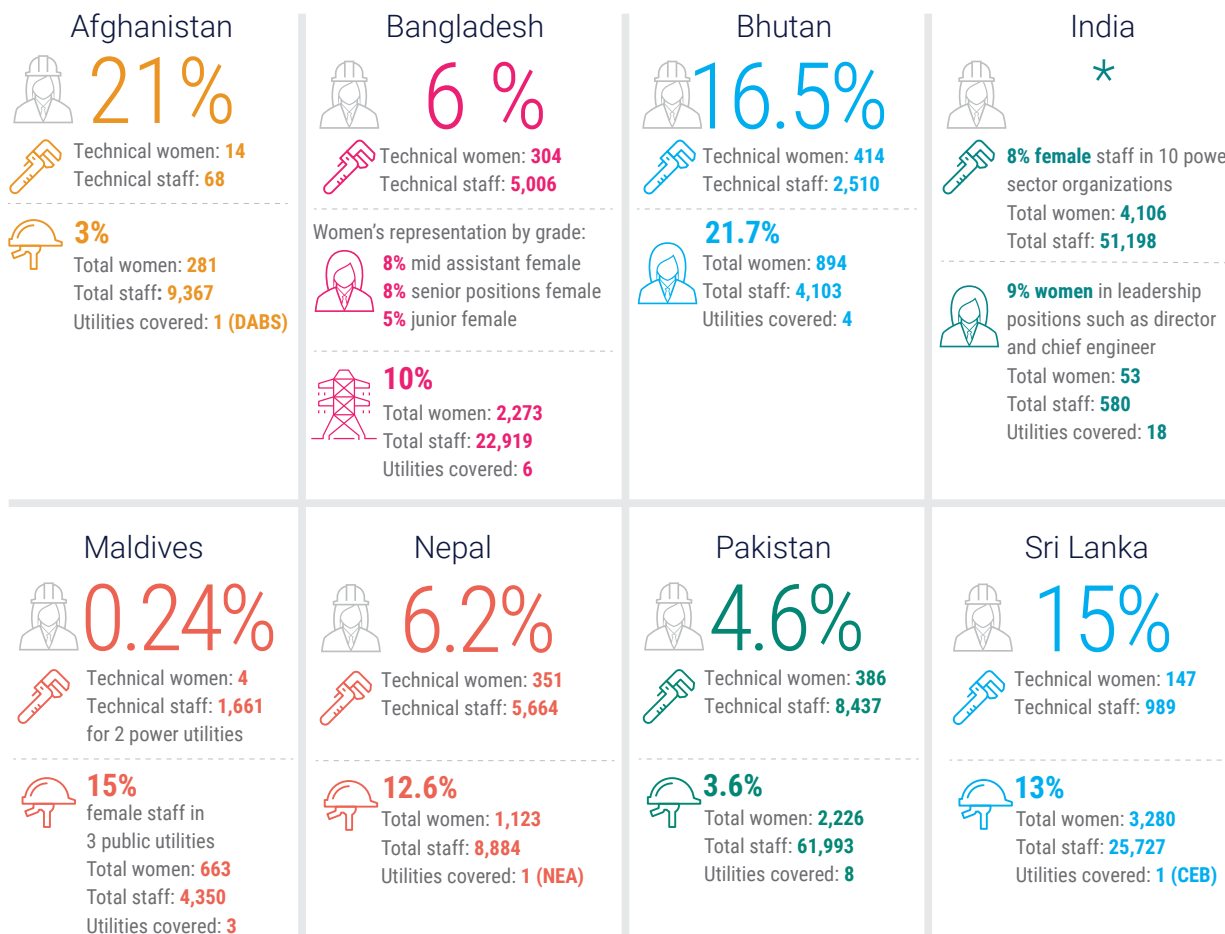
It is unclear what the breakdown is between technical and nontechnical women staff, but it is likely skewed toward nontechnical staff.

- In the **Maldives**, women hold only 4 out of 1,661 (0.24%) total technical positions at the two power utilities, State Electricity Co. Ltd. (STELCO) and Fenaka Co. Ltd. In total, 11 women engineers are working in the country's three public utilities, which also includes Maldives Water and Sewage Co. (MWSC). Encouragingly, women account for 635 out of 4,307 (15%) total staff, at the three public utilities.
- In **Nepal**, 351 out of 5,664 technical staff (6.2%) at the Nepal Electricity Authority (NEA) are women. Women account for 1,123 out of 8,884 (12.6%) of total staff. The highest position held by a woman is that of Deputy Director.
- **Pakistan's** utilities provided a very positive response. The Water and Power Development Authority (WAPDA), which employs 18,192 people, has 1,003 female staff (5.5%). Of the 1,152 technical staff in the organization, only 40 (3.5%) are women. National Transmission Development Corporation (NTDC) also shared data showing that 4 percent of its employees are women (371/8,939). Encouragingly, a majority of the women are officer level and technical staff (grade 17 and up), representing 16 percent (189/1,181) of all staff at those levels. Karachi Electric has 329 women out of 10,755 total staff (3%), of whom 87 were identified as engineers. The situation in two independent power plants surveyed is mixed: Hub Power Company has 6 percent women staff (37/599) and only 1 percent technical female staff (3/238), while Nishat Chunian Power Ltd. has 10 percent total women staff (27/254) and 2 percent female technical staff (5/224).
- In **Sri Lanka**, women account for 3,280 out of 25,727 (13%) of total staff at the Ceylon Electricity Board (CEB). Overall, 147 of the 989 (15%) of engineers are women. Encouragingly, 537 out of 3,131 (17%) of positions at the management and executive levels are held by women.

**It was encouraging to find women in senior and leadership positions in energy ministries and public utilities.**

- In **Bhutan**, at the BPC there are 34 (15.5%) women holding senior or managerial levels positions out of

**Figure 2. Women's Representation in the South Asia Power Sector Organizations (2018)**



Source: Data provided by HR in power sector organizations.

220 total, which includes department and division heads. At DGPC, women account for 27 percent (171/641) of staff in the executive (2) or managerial/supervisory grade levels. Two out of seven board of directors are women. Similarly, in the power sector related departments at the Bhutan Ministry of Economic Affairs, three out of the six technical department heads are women. Two of the women are chief engineers in the transmission and hydro-power divisions. At the Bhutan Electricity Authority (BEA), two women are chiefs of the Monitoring and Tariff divisions.

- In **Sri Lanka**, 7 of 16 senior-level positions (44%) in the Ministry of Energy are filled by women; in the CEB, 33 percent (3/9) are acting general managers in corporate strategy, generation, and distribution divisions, but only 6 percent (5/77) are working as deputy general managers; and in Lanka Electric

Company, around 16 percent of the positions at the senior decision-making level are held by females.

- In **India**, a survey of 18 power sector organizations found that 9 percent (53/580) of leadership positions such as director and chief engineer are held by women. Likewise, the recent Energy Efficiency Services Limited (EESL) internal gender baseline assessment found that women accounted for 13 percent (73/566) of executive roles, 8.7 percent (6/69) in supervisory roles, and 22 percent (40/175) of workman roles which included technicians and office attendants.
- In **the Maldives**, the Ministry of Environment and Energy (now renamed Ministry of Environment) has 32 directors, 10 of whom are female: one deputy director-general, two directors, one deputy director, and seven assistant directors. In MWSC, three out of the six (50%) board of directors are women.

However, most women tend to work in the middle- to lower-level positions. For example, in Bangladesh, women are underrepresented in classes I and II (officer levels) and overrepresented in classes III and IV. In WAPDA, 39 percent of women staff are in the lowest quintile grade levels, 16-20 – at officer level or below. Similarly, Nepal's NEA has less than 0.5 percent of women are in the top-third grade levels (4 out of 1,105 total, and 2 out of 748 technical), while over 86 percent of women (of whom 80 percent are technical) are at or lower than grade 5 out of 12.

### Female enrollment rates for graduate engineering programs vary, and representation in faculty/staff is low

Female enrollment rates for graduate programs in electrical, mechanical, and power systems engineering range from 0 to 30 percent—rates that are comparable to those in western countries such as the United States of America.<sup>22</sup> Bhutan's Jigme Namgyel Engineering College (JNEC) has 321 female students (30%) studying relevant engineering degrees (2013-2018); of all students studying power systems engineering (2015-2018 cohorts), 27 (25%) are women. Similarly, the B.S. in electrical engineering rates for women in India (national) is at an encouraging 28 percent. Pakistan, Sri-Lanka and Nepal are not too far behind, at 21 to 23 percent of women in the surveyed institutions. Bangladesh (12%), Afghanistan (3%), and especially the Maldives (0%) are the three lagging countries. Unfortunately, data on graduation rates and jobs could not be obtained. Overall, female enrollment in STEM-related subjects remains low. For example, in Bhutan, only 142 out of 916 girls (15.5%) pursued STEM-related degrees; a majority chose arts and humanities (448) and business/management (283). Of the 300 students pursuing engineering-related degrees, only 76 are females (25%).<sup>23</sup>

The data from seven IIT campuses and six public universities in Bangladesh show 6-13 percent female faculties in the electrical and mechanical engineering

departments. Afghanistan's Kabul University has no women faculty in the engineering department. In Bhutan, JNEC has 3/19 women lecturers/instructors/technicians in the civil engineering department, 3/12 women in the electrical engineering department, and 1/11 women in mechanical engineering. Similarly, at Bhutan's College of Science and Technology (CST), the electrical engineering department has no female lecturers/instructors. Clearly, the teaching body in energy-related departments is overwhelmingly male-dominated.

### Civil engineering is a popular concentration for women.

This is especially relevant for hydro-dependent energy sectors, such as those in Bhutan and Nepal, because civil engineers are important in the design and construction of dams and reservoirs. Indeed, in Bhutan, the available data show that 21 of the 38 women receiving Department of Adult and Higher Education scholarships for engineering were studying civil engineering. In Nepal, the cumulative data for women engineers registered in the Nepal Engineering Council between 2001 and 2017 show that over 55 percent (1,461/2,646) are civil engineers.<sup>24</sup> This representation is similar to that at NEA, where 6/13 women interviewed for the study were civil engineers.

### There are no regional or national professional networks that focus on women power sector engineers

Most women belong to either university alumni associations or engineering societies such as the Institute of Electrical and Electronics Engineers (IEEE). The assessment also discovered a few informal networks at the organizational level, with 10-20 women – mainly WhatsApp groups—but these were not very active. In total, the scoping exercise identified six active power-/energy-specific organizations, of which the most prominent are described below.

- **Women in Energy, Pakistan.**<sup>25</sup> WIE was established through a partnership between the Energy Department, Government of Punjab, and the Punjab

22 Brookings Institute, Breaking the STEM Ceiling for Girls: <https://www.brookings.edu/blog/future-development/2017/03/07/breaking-the-stem-ceiling-for-girls/>.

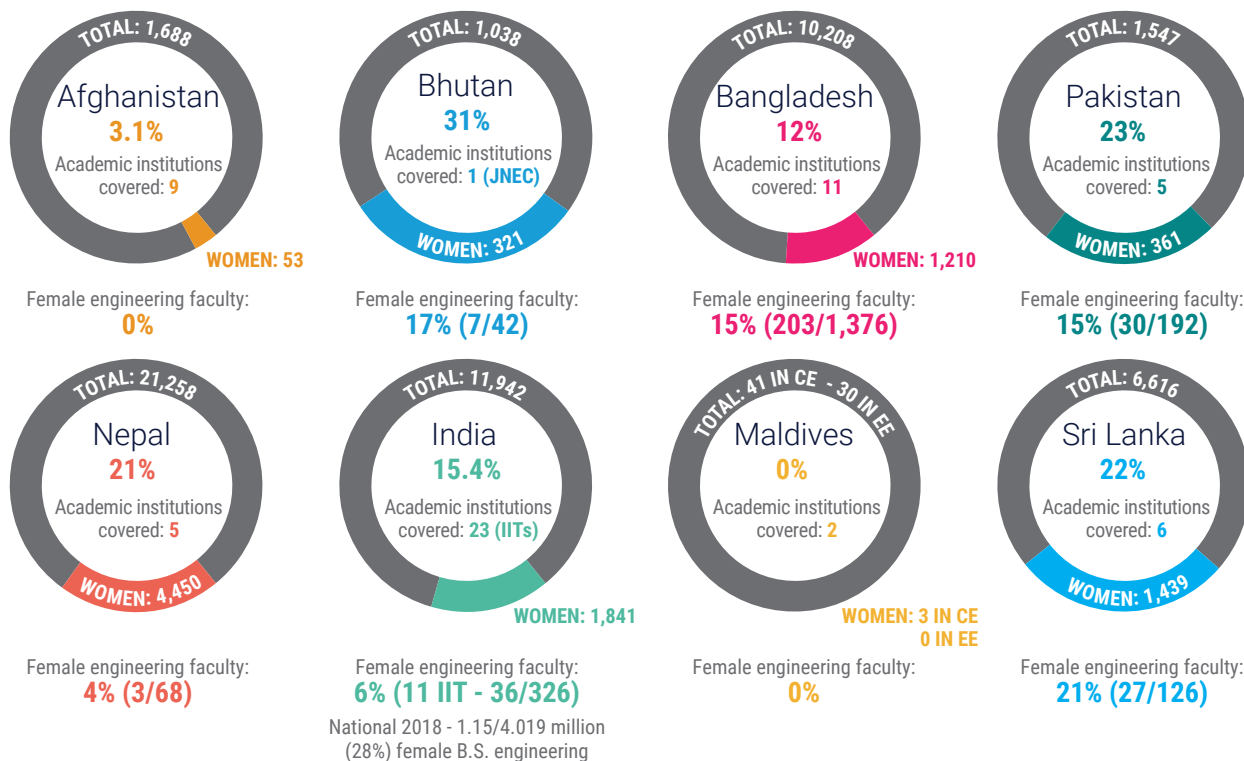
23 Bhutan Ministry of Labour and Human Resources, Beyond Graduation Survey 2017 : <http://www.molhr.gov.bt/molhr/wp-content/uploads/2018/03/BGS-Report-2017.pdf>.

24 Civil engineering – 1,461, electrical engineering – 142, electrical and electronics – 151, electronics & communication engineering – 804, electronics – 18, mechanical engineering – 69.

25 Women in Energy Pakistan: <http://www.womeninenergy.org.pk/>.



**Figure 3. Women's Representation in South Asia Academic Engineering Programs (2018)**



Note: Includes electrical engineering, mechanical engineering, power systems engineering and civil engineering programs. Faculty count includes visiting lecturers, teaching assistants and technical support staff.

Commission on the Status of Women and its Women in Leadership project. WIE's agenda for 2018-19 includes hosting quarterly events such as power networking lunches and workshops, curating mentorships, and lobbying with Women in Leadership for women to be placed on the boards of public utilities.

- **IEEE – Power in Energy Society - Women in Power (PES-WIP) and Women in Engineering (WIE) branches active in universities throughout the region.** Some of their activities include:
  - IEEE Women in Power group, Bangladesh University of Engineering and Technology. Organized the IEEE Region 10 (Asia Pacific) Humanitarian Technology Conference, December 2017, at the University.
  - IEEE North South University, Power and Energy Society Student Chapter. Organized a mega-event, "POWERBUZZ," February 2018, at the University.
  - IEEE Power and Energy Society Day 2018 was celebrated on April 28 at the University of Asia Pacific by the Women in Power group.

- **Gender and Energy Network, Bangladesh.** GEN-Bangladesh is an informal network of professional women, men, and organizations engaged in promoting gender awareness activities in the energy sector since 2004. The network is hosted by Prokaushali Sangsad Ltd.
- **Women in Energy—India.**<sup>26</sup> This is a web-based networking platform for women working in the energy sector. The website hosts blogs/news/events and posts job opportunities for members.
- **National Thermal Power Corporation Ltd. (NTPC) WINCORP, India.** Women working in NTPC had set up WINCORP (Women in NTPC Corporate sector), an informal WhatsApp-based group that shared information on office news, policies, and job opportunities. Although many members found the group useful, it did not continue for very long. The women explained that since the group was not institutionalized in the organization, the women who started the initiative because of their interest could not continue to give it the time and effort it needed to thrive and grow.

26 Women in Energy India: <https://www.wei.org.in/>, <https://www.facebook.com/wei.org.in/>.

# IV. Key Takeaways from Women's Experiences as Engineering Students and Power Sector Professionals

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This section gives an overview of the key messages and takeaways drawn from the desk review and primary research. Over 500 women and men from over 50 power sector and academic organizations in the eight countries contributed to the study. The study highlighted the importance of family support and role models as key enablers for girls to pursue STEM-related subjects. However, the lack of practical training opportunities, the absence of basic facilities and supportive policies, and the double burden of home and work responsibilities some of the key barriers affecting women's academic and professional experiences. Many of the exceptional women interviewed who "make it" have a deep love for science/mathematics subjects which pushes them forward.

## Family support and role models and affinity for math and sciences are key factors in women's pursuing STEM education and power sector careers

Many women had educated parents or relatives who encouraged them to pursue engineering because of the prestige and career prospects the field offers. However, these women also faced bias from other parts of the family to choose more "appropriate" career paths. The limited number of acceptable or realistic "good" career options may limit engineering as a choice for some women. For example, even in Bhutan, where women were more aware of power sector jobs because of the visible national hydropower development initiatives and

had a good (31%) representation in engineering programs, only 15.5 percent choose STEM-related bachelor programs. A majority of women still choose arts and humanities (50%) and business/management (30%).<sup>27</sup>

**When girls do choose science (and mathematics), they are likely to be advised to get into a career path like teaching rather than engineering.** Engineering is widely considered to be a "man's job," since if a boy becomes an engineer, his ability to be a breadwinner is secured; for girls, however, being able to be a breadwinner is not considered necessary, because they are seen as having a larger role to play in family life than in a workforce. Most of the women in the study told about friends or acquaintances in the same stream (during schooling years) who were dissuaded by parents from pursuing engineering studies. In Nepal, however, the decision of school friends was also seen as a major reason for choosing engineering, as respondents felt that friends would help one another in the new environment. In Bhutan, female students freely interacted with male classmates and teachers and were frequently the top students in the class. In contrast, in Afghanistan, because of strict social norms and low numbers, it is difficult for female students to form study groups and get support from male fellow students.

**Females' choices are limited by the availability of nearby engineering programs and by the quality of education offered** (see Box 5). Although this issue also affects males, they are generally freer to travel elsewhere to study and are more likely to get practical fieldwork opportunities. Indeed, both women and men in all countries complained

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<sup>27</sup> See Bhutan Ministry of Labour and Human Resources, Beyond Graduation Survey 2017.

that excessive focus on theoretical aspects and lack of practical training left them ill-prepared for their jobs.

*Two engineering students shared their experience of having asked a male student for help with solving a formula. The boy was willing to help, but he asked the girl to join him in the main library. He explained, "If we sit together in our department's library and work together, people may take it wrong and discuss us. Therefore, we can meet in the main library where no one will recognize us."*

**- Female students in Afghanistan**

- In **Afghanistan**, women attend only universities like Kabul University, which have dorms and facilities for women. The percentage of female students declines to zero in some of the universities in provinces where they do not have such facilities. Some 80 percent of the existing hostels are for men. All the big universities are located only in five or six large provinces, and families do not send their daughters if they are not sure about their safety.
- In **India**, the perceived safety and availability of nearby programs is a big consideration in parents' approval. Most Indian parents do not want to send girls to far-off places to study engineering. Some women said they had to settle for colleges within their state that were not very good/high ranking, or for a different branch in a nearby engineering college.
- In **Bhutan**, the growth of the energy sector and hydropower has meant that good jobs are available; therefore, over the past decade, an increasing number of women have joined graduate engineering programs to prepare for such jobs. From 2009 to 2011, female graduates with diplomas/bachelors from JNEC and CST increased from 22 percent to 44 percent and 53 percent respectively.<sup>28</sup> JNEC started its first B.E. program in power engineering in 2015 and inaugurated its bachelor of science (B.S.) program in mechanical engineering in 2018. The sole master's-level engineering program offered in Bhutan is CST's master of science in engineering (M.S.E.) in renewable energy. Consequently, most of the women in the study had pursued further studies abroad, in India or Australia.

### Box 5. Engineering: A Real Choice?

An interesting discussion among participants was whether joining engineering is really a choice. For example, in Pakistan, at the intermediate science level, students have to choose between pre-medical and pre-engineering for their future course of study. Those who do not like biology choose engineering because it is the only way for them to remain in science.

Thus, the decision at this crucial level is not much of a free choice for those who want to have a broader science palette to select from. The choice of academic field is also influenced by sociocultural factors. Female students are often encouraged to join "softer" fields that lead to culturally acceptable jobs; however, this factor is slowly changing, as the findings in this report demonstrate.

Most of the girls were top students in their class and had scholarships for B.S. studies.

- In **Nepal**, the wide campus layout and general safety concerns limited the ability of female students to take advantages of resources on campus such as IT or the library, especially during after-class hours. The lack of modern facilities also meant that students relied on their personal computers and internet connections from home.
- In the **Maldives**, none of the educational programs has modules on energy- or power-sector-specific issues or renewable energy. Currently, the highest qualification in the energy and power sector is provided by the Maldives Polytechnic, a government training institute; students can pursue the electrician program up to the advanced level, but there is no further education in the sector. Many students felt unprepared for coursework from their formal education; indeed, of the 25 students that joined the electronics and electric program, only 6 remained toward the end of the program.

*"There is a lack of academic programs for studying engineering in the Maldives, and the absence of practical hands-on training does not prepare you for the job. No adequate career information and guidance are given."*

**- Female assistant engineer in the Maldives**

<sup>28</sup> Asian Development Bank, Bhutan: Gender equality diagnostic of selected sectors, 2014: <https://www.adb.org/sites/default/files/institutional-document/149350/gender-equality-diagnostic-bhutan.pdf>

## Box 6. Life on Campus for Girls

In India, three of the top concerns for students were physical safety (70%), an overprotective/strict atmosphere for girls (40%) but not for men, and inadequate amenities (35%). There was a common narrative—that there are different sets of rules/norms for boys and girls. Rather than improving their safety and raising awareness among the boys, the strict hostel curfew timings and enforcing separation between the boys and girls made life constricting for girls who felt “caged”.

Surprisingly, the cost of education was not raised as a concern for many of the students pursuing engineering degrees. Most of the girls were high-achieving students who were at the top of their class and had scholarships or were already working. In Bhutan between 2013 and 2018, 36 percent (26/72) of electrical and mechanical engineering students who received country scholarships were female. Only in the Maldives did lack of financial support come up as a crucial barrier. For example, a female assistant engineer had found it difficult to raise funds for a good university with the necessary facilities and a focus on power engineering studies. Women who wish to go on to further studies need to go abroad, to Malaysia or Sri Lanka, and without finances, this is not possible. However, stringent financial requirements make it very difficult for students to qualify for a loan.<sup>29</sup> As one woman explained, “If a female had bought a washing machine on loan, the increased liabilities would make her ineligible for a study loan.”

**Safety, facilities, and campus life concern many students** (see Box 6). Most public universities offer separate hostel facilities for boys and girls. In private universities, campus housing may not be offered. However, if the location allows, the preference is for girls to stay at home with their parents for safety and financial reasons. In Nepal and Pakistan, female students felt the campus design left them exposed and, for the sake of safety, they would take a longer route just to go from one class to the next. In Bhutan, no such issues were raised. CST provides excellent facilities that cater to both women and men in their hostels.

*“Our hostel gates close at 8 pm, where is the possibility to work on joint projects with boys? I felt caged and not trusted.”*

**- Female engineering student in India who recently graduated**

## In both studies and career, women are subjected to various active and passive forms of discrimination that limit their advancement

The women frequently expressed frustration at not being taken seriously and at having to work extra hard to prove that they belong. Some of the students noted that when female students select engineering, they are often questioned and criticized for doing so. “This is a man’s field; what will a girl do in engineering?” was a common statement from parents and other elders in most countries. At times the girl’s character was called into question, especially when she returned late from classes.

*One respondent shared that when she first entered the classroom her male teacher looked at the male students and remarked, “Look, they have also come.” She went on to say that he would demotivate the female students by making comments about washing dishes later in their life as a wife and asking, “Why are you girls studying engineering?”*

**- Female engineering student in Pakistan**

- In **Bangladesh**, many women shared their experiences of job-hunting when advertisements were geared toward hiring males.
- In **India**, recruitment policies encourage women to apply. However, at the time of job interviews, it is not uncommon to be asked questions like: “Would you be willing to stand out in the sun?” “Would you be willing to take a transferable job?” and “How will you manage when you have a child?” Of the women engineers interviewed in India, 76 percent said that once in the job, in spite of their competence, they “have to prove again and again that they are just as good as the men at their

<sup>29</sup> Student loans are now available from the Government (dhe.gov.mv, 2018) and Bank of Maldives (BML, 2018). For a BML loan, a security of 150% of the loan amount is required. The information a student needs to provide in applying for a loan includes liabilities with other institutions, employment, income and expenditure, and equity investment details. This would be out of the reach of young females just starting their education.

work.” There seems to be an inherent feeling among male colleagues that women are not “as serious” as they are about their work. However, although the feeling of male dominance persists in the workplace; both the junior and senior engineers who were interviewed agreed that the overall situation has improved.

**Because supervisors frequently restrict women from working in certain “inappropriate” non-office-based jobs, women in the power sector are not equally represented in all departments/job types.** Technical field operations, high-voltage line operations, and field maintenance (which can involve staying in campsites in tents for days and climbing electric poles and towers) remain overwhelmingly dominated by men, and women remain more in administration and secretarial positions.<sup>30</sup> It is important to note that women also showed a preference for less tasking jobs that are close to home—but that is a function of societal pressures, responsibilities at home, and safety concerns, rather than ability or preference.

*“Women should ask for and be given field postings in the initial years. This is good for our careers.” - A senior woman director, India*  
**- Senior woman director in India**

- In **Afghanistan**, when there is a job outside the office, men are directly hired, and women are rarely if at all, consulted: “They decide for us without asking if that is what we want.” All the female participants in the sector work behind a desk, often in design, management, secretarial, or administrative roles. For instance, in DABS, the country’s electricity utility, only 14 women are working in technical positions that deal directly with electric technical matters—and they are all in the Breshna headquarters office and work in areas such as policy analysis or the design of networks and stations.
- In **Bangladesh**, the women engineers usually do not want to engage in field-level work such as plant operations and maintenance, in which night shift work is expected. Work in the planning section and office-based technical work is considered to be more suitable for women with the required educational background, although women can choose to work

in the power plants or transmission/distribution sections. Sometimes women are not allowed to take difficult and risky positions and are not given the opportunity for training in those areas.

- In **Pakistan**, men consider that working at hot thermal power plants is too taxing for women, compared to working in a hydropower plant. Irregular shifts and remote locations may mean a long daily commute or staying at the power plant, which women do not favor since there are no live-in facilities for women. In Karachi Electric, there are no women in the transmission department or in meter-reading activities that require direct dealing with the public because of safety concerns—having to face potentially angry customers who are dissatisfied with power cuts. A male senior manager also identified sociocultural factors as hindering women’s participation in the transmission department—for example, women feeling shy about wearing the body-hugging safety overalls the job requires and about being in the public eye while climbing transmission towers.

*“When I first started working in the power sector, I found it very difficult to earn the respect of customers. My technical comments or opinions were disregarded, not by colleagues, but by some of the members of the public. Sometimes when I carried out wiring or automation jobs on my own, the customer would not take my opinion, but when I brought in a male colleague who had no technical knowledge and asked him to say the same thing, it was accepted (by the customer).”*

**- Female assistant engineer in the Maldives**

- In **Sri Lanka**, women with less experience in the industry (all with less than 8-10 years of experience) were more interested in doing field-based work, which is seen as less suitable for women. At the field level, most of the technical tasks are assigned to technically trained males simply because of concern about women’s safety. However, the women noted that there are no prohibitions against their working in all power engineering jobs.

<sup>30</sup> Source: Interviews conducted as part of the primary research.

## The absence of basic facilities and transportation for women restricts their job and training opportunities, especially in the field

The gender-friendly design of buildings and facilities matters. Many women said that amenities for women—separate toilets, feeding rooms, and resting rooms—were either nonexistent or of poor quality and lacking maintenance, especially in the plant locations. Women’s most common complaint was about workplaces that lacked proper toilets that are functional and sanitary, are located in suitable places and provide reasonable privacy. Women also say that when they have to work after office hours, management should provide transportation to ensure their security. The availability of child daycare was also inconsistent; most plants do not offer it.

*“I had to use the men’s toilet at a remote site. I requested a male colleague to stand outside (the toilet).”*

**- Female engineer posted at a power plant**

- In **Bangladesh**, at times women cannot participate in field training, especially in remote areas, because no suitable quarters are available for them.
- In the **Maldives**, none of the utilities or Government ministries has day-care facilities. Day-care facilities are becoming more common in the Maldives, although finding suitable premises in the congested capital is daunting.
- In **Nepal**, especially in NEA, the female staff appreciated being given a choice to do fieldwork. They opined that fieldwork was necessary to build their careers; however, the lack of facilities at the sites—lodging, food facilities, and toilets—was a major deterrent.

A common challenge mentioned in the discussions was the lack of hands-on experience and practical training opportunities for women engineers. Even for staff who have had excellent studies and training, many jobs in the energy sector require a lot of hands-on experience and know-how that can only be gained over time and through mentorship/on-the-job learning from senior employees—but such employees may or may not be willing to take a woman under their wing. Also, women are actively and passively restricted from taking technical and

### Box 7. Gender Initiatives at WAPDA in Pakistan

WAPDA is the only utility in Pakistan that has a gender expert (grade 18). After the expert’s arrival, separate bathrooms for women were installed. Women engineers were encouraged to visit remote sites—such as Gilgit Baltistan and Tarbela and Mangla dams—to get hands-on experience.

Facilities have been provided for some of the women in the field. In Pakistan, for Ghazi Barotha Hydroelectric Plant, women were provided with separate living space and house help. The Government has flexible policies for women, such as the Wedlock Policy, which encourages posting with the spouse so that women are not forced to choose between their jobs and marriages. Similarly, WAPDA tries to station single women in the same city as their parents.

field positions and benefiting from practical training/internship opportunities because of the concerns about “safety” and facilities such as toilets. In the **Maldives** and **Bangladesh**, women noted that energy shortages and lack of redundancy/alternative measures in the system had left very little room for maintenance error, contributing further to limit opportunities for women, who may be considered less capable. Only in **Bhutan** did the women say that the selection for training in their offices was based solely on whoever qualified for it.

- In **Afghanistan**, language barriers and access to technology are the greatest obstacles women identify in their careers. To succeed in jobs, workers need to keep their technology skills up to date, attend training, and read more about recent developments in their fields. Unfortunately, training beneficiaries need to know English, and a large percentage of women participants are not fluent in English. Dari and Pashto, not English, are taught at school, and women cannot afford the cost of English classes or the time to attend them, because of their home commitments; one woman laughed and said, “Who will cook the dinner if I go to English class after work?”
- In **Bangladesh**, women get less preference for overseas or local training and paid study leave, as well as for field inspections, site visits, and so on—either because such assignments might be considered difficult or risky or because women require “extra” facilities (transport, rest houses, security measures). Thus, women cannot gain the practical knowledge they need to compete with men.

*“My husband and I were engineering classmates at the university and we both work in the power sector now. I was the top student in the class. However, after graduation, my husband got the chance to work in field-based positions and do practical work in power plants and stations. My understanding remained limited to theories I learned in the class. When I ask my husband for some information, he seems shocked that I don’t know those details because he still expects me to be on top of everything. I tell him, because I did not go to the field I did not get the chance to have the first-hand learning experience.”*

**- Female engineer in Afghanistan**

*“The decision on foreign training of employees working in Government utilities depends on the Ministry, which uses various criteria for selection. However, women claim not to get due attention most of the time.”*

**- Female engineer in Bangladesh**

- In **Nepal**, the shortage of funds limits the number of staff selected for further studies, and it is mainly the male staff who are chosen.

## Many women have been subjected to various degrees and forms of harassment

Instances of abuse and harassment are seldom reported. Regardless of where the harassment happened (private or public sector) and for how long, most victims feared being stigmatized and did not report it. Sometimes they may not even have realized that it was a form of harassment (i.e., marriage proposals from teachers). Women often felt that it was easier to get used to harassment than to report it and risk being exposed. During the group discussions that were part

of the assessments, although there were indirect hints, only in Pakistan did the women openly recount their experiences. For many, this was the first time they had shared these experiences with anyone. Despite the strict national laws, the absence of an effective complaint mechanism was raised as a common issue.<sup>31</sup>

In **Pakistan**, although all public energy sector organizations surveyed have adopted the Anti-Sexual Harassment Law, female respondents shared stories about internships during which their male colleagues would not take them seriously, and about being subjected to various degrees of discrimination, harassment, and abuse from male fellow students, teachers, and internship supervisors. Women recounted various instances of troubling behavior toward them by male colleagues and supervisors—being told to dress appropriately (not just by men, but also by older female colleagues); patronizing and overprotective behavior that is best termed psychological abuse; and overt sexual harassment.<sup>32</sup> As a consequence of the threat of harassment, all respondents felt isolated and discouraged. It is worth noting that none of the institutions involved in this study had a gender focal point to help implement gender-related/sexual harassment policies.

- In **Afghanistan**, male students, teachers, and supervisors avoid personal interactions with female colleagues in both private and public settings. For cultural reasons, the women did not feel comfortable sharing instances of harassment, sexual or otherwise.

*“As the only girl among my classmates, I was the constant target for cat-calls, jokes. One had to laugh it off, but mostly, it wasn’t nice!”*

**- Female senior engineer in India who graduated 20 years ago**

- In **Nepal**, the female staff emphasized their constant fear of harassment in the workplace. There is no complaint mechanism for such issues, so when

31 Here it must be noted that this was not a study on gender-based violence, and direct questions were not asked about this subject. Information emerged organically as a result of the general discussions about barriers, issues, and gaining an understanding of women’s experiences. Regardless, the confidentiality and consent of the women has been ensured.

32 A respondent reported her experience of being harassed by her male subordinate, indicating that it happened regardless of her higher level in the hierarchy. He sent her some obscene texts. She spoke to friends and found the courage to report this to her supervisor, who took immediate action and asked the man to leave. But such cases are only rarely reported.

women are victimized—even by a lower-level staff member (support staff)—they are not able to register complaints. Often they remain silent, although occasionally they discuss the problem among themselves—but rarely with male colleagues.

### **In Bhutan (and to a lesser extent, Sri Lanka) women were noticeably more positive about their experiences.**

- In **Bhutan**, women were extremely positive about their engineering programs, saying they had experienced no gender gaps or discrimination. The engineering classes were like any other class in the school: no boys undermined the girls' capacity, and women were normally at the top of the class. Both male and female students worked together to solve problems and complete assignments. The respondents said that they were not singled out because they were women, and they do not think of themselves as women engineers but as engineers who are ready to serve the country. When questioned about support for women in the workforce, the respondents said that they get wonderful support from their colleagues in the office. They said they had had supportive office experiences, explaining that opportunities to get involved and feel connected were there if women wanted to take advantage of them. The selection for training in their offices was based on whoever qualified for it.
- In **Sri Lanka**, no women thought there were serious societal or institutional barriers. Almost all (15/15 in the public sector and 5/6 in the private sector) said they have strong collegiality from male colleagues. The first-hand experience of three senior female power sector engineers in the utility affirms that competence is key to making progress in a career path and especially in the CEB; they have experienced no gender-based discrimination.

## **For all women, their double burden is an overwhelming challenge**

**In the absence of supportive institutional policies, balancing the demands of both home and work can be overwhelming to women.** Responsibilities at home restrict

their ability to study for admission/recruitment exams, do field postings, and work long hours; thus, many women themselves choose the “softer” options like an office position, limiting their career growth within the organization. Many communities lack reliable infrastructure, including daycare and transportation options. Women have traditionally relied on extended family for support. When young families leave behind a strong family and social support system in their hometowns, employees—especially women—face particular challenges meeting life demands such as raising children while pursuing a career. Some women who are posted to a power plant live alone, leaving the husband and children in larger cities.

*“Men with working wives have problems similar to ours—they have to live alone when their wives get posted to field locations, or compromise on their career.”*

**- Retired HR director, India**

- In **Bhutan**, women have tried to maintain a good work-life balance; however, respondents with no domestic help highlighted the challenges for working mothers to manage both the house and the office. They said that at times they think it is not possible to have a career and be a mother as well. Many young mothers who cannot find domestic help quit their regular jobs to become a housewife or to take flexible work.
- In **Bangladesh**, women observed that in many cases higher officers are not interested in having female assistants, citing the likelihood of service interruption because of maternity leave and domestic priorities such as a health-related or other crisis at home with children or the elderly.
- In **India**, almost all women reported some unwritten practices that adversely affect their performance and career growth. A commonly stated one is that “staying late” is synonymous with “working hard.” If men are in the office until a late hour, they are considered better or particularly hard-working workers. Most women need to leave the office on time, to attend to their children or perform other domestic chores. In such situations, peers, especially male colleagues, view women as less productive and not serious about their jobs



*“We have rights to a wide range of leave, including maternity leave. But the family commitments and domestic responsibilities often grow because the responsibilities of schooling, tuition, children’s homework, food, and social works fall heavily on us. Children and teachers expect mothers to come to all the events like parents’ meetings and sports meets. When my son was doing the university entrance examination, I took a transfer to that town and stayed in a rented apartment, delaying my next possible promotion because I had to take him for evening tuition classes. I returned home after his examination and took the next promotion.”*

**- Female chief engineer in Sri Lanka**

## **The rigid salary/promotion structure in the public sector can serve to insulate women from discrimination**

For most of the women (as for most men), getting a secure government job was the compelling reason for joining a public utility. The stability of public sector jobs is highly sought by both men and women, and almost all the women surveyed were satisfied with their pay and felt the hiring process was fair. Promotion and pay raises were largely determined by rigid public sector schedules based on years worked. However, this does not mean that women were not denied career growth/promotion opportunities. Indeed, women tended to feel not only that their career choices had been restricted (as discussed earlier), but that their professional growth had been hindered by maternity leaves and lack of practical field training opportunities. Nepotism has also been raised as an issue in the public sector organizations.

- In **Afghanistan**, the women recognized that, because of their limited field experience, they often do not receive the salaries and benefits that come with career progression.
- In **India**, among the persons interviewed, there were no instances of wage gaps, and women seemed to have the same prospects as men for professional growth. While women are fully entitled to take maternity leave, many emphasized that when they take

such leave, they automatically lose seniority, putting them behind their male colleagues—an experience that is demotivating for them.

- In **Sri Lanka**, almost all of the people interviewed—16/16 in the public sector and 5/6 in the private sector—felt that they received a wage commensurate with their experience.

For women in the private sector, the sample was not large enough to distinguish their experiences from those of women working in the public sector. In the limited cases from Sri Lanka and Pakistan, there is some indication of overt discrimination in the private sector. It was also noted that the application of national law could be inconsistent.

- In **Sri Lanka**, 4 out of 6 women in the private sector reported discriminatory behavior (harassment by field staff) at work, compared to 0/16 in the public sector. Indeed, the women noted that the private sector prefers to recruit men to avoid the need to provide better services and improved facilities in field-level projects.
- In **Pakistan**, four young female engineers working in the private sector all agreed that discriminatory attitudes were the primary reason why women were passed-over for leadership positions at site-based work. From the point of view of four experienced male engineers who were also interviewed, sending female engineers for field-based work requires additional resources such as suitable transportation and overnight accommodation. The conversations suggest that in practice private sector employers select men for economic reasons—to avoid the difficulty (and cost) of providing additional facilities for women for field-based work, especially in more isolated locations.

## **Women rely on empathetic supervisors to fill gaps in national/institutional policy**

There are clear gaps in the national and institutional laws, and the existing laws are inconsistently adopted. Although all government organizations had adopted the minimum national requirements, women depended on the understanding and flexibility of their bosses to make up for the gaps. The bosses are usually lenient and try to accommodate women in desk work or allow flex-leave.

## Box 8. Gender Considerations at Tata Power Delhi Distribution Limited, India

- **Independent promotion/work assessment of women returning from maternity leave.** This ensures that taking maternity leave does not affect women's career growth.
- **Maternity leave.** In addition to the 26 weeks mandated by law, new mothers are allowed to extend their maternity leave by another 12 weeks without pay. Adoptive mothers are also entitled to the 26-week maternity leave.
- **Flexible working hours for young mothers.** After returning from maternity leave or adoption leave, women employees can arrange for flexible working hours for the first six months, with the company's approval.
- **Break-in-service option after maternity.** Women employees may take a two-year break in service to give extra care to their child during the initial, crucial life stage.
- **Returning mothers program.** A reorientation program for women coming back from maternity leave—called "Back in the Game"—includes update sessions and presentations on what changes happened in their absence.
- **Day-care and nursery facilities.** The company provides 50 percent of the fees of partner nurseries. These facilities are extended to all employees, men as well as women.
- **Mandatory mentoring for women managers.** Each employee (man or woman) is assigned a mentor on joining the organization. For all mid-level women employees (manager and above), a senior (of VP level) is assigned as a mentor.
- **Learning and sharing platform for women employees.** Women are also introduced to various platforms, training initiatives, guest lectures, and external programs that are designed to meet their particular needs.

Source: Tata Power DDL - please see: <https://www.tatapower-dcl.com/careers/Life@Tata-Power-DDL/inspiring-women@work>

- In **Pakistan**, there was arbitrariness in the application of laws between public and private sector utilities. All public sector organizations had adopted the Anti-Sexual Harassment Law along with laws providing for other benefits (such as maternity leave), whereas private sector organizations showed no consistency. For instance, all the public sector organizations had provision for day-care centers, but private sector companies did not—some did not have enough space, others had it in their plans or sometimes waited until a mother returning to her job from maternity leave needed it. All government organizations had flexible timings, a quota for employing women, and three months of paid maternity leave. In the private sector companies, there was neither a quota nor any affirmative action policies for hiring women, apart from maternity benefits and leave.
- In **India**, many of the women interviewed were full of praise for supportive bosses (mostly men), who permitted them to leave early to take care of a sick child or take leave when required. However, this was more of a personal trait of the person involved than an organizational norm. Private companies such as Tata Power offer competitive benefits for women that go beyond national requirements, especially regarding retaining female staff and helping them develop their careers (see Box 8).

### Men's perspectives varied, but they were generally supportive of women in the power sector

All the male participants were aware of the gender issues in the power sector. They agreed that negative attitudes, societal stigma, and the narrow-mindedness of families restrict women to desk jobs or more "suitable" jobs in nursing and teaching. The interviewed men were generally supportive of encouraging more women to work in the power sector. In Pakistan male staff at the power plant indicated that they were open to working with women. The consultant noted that during the site visit and focus group discussions, the overall environment appeared conducive and supportive towards female staff. However, this particular organization did have an anti-sexual-harassment policy in place.

From Sri Lanka to Afghanistan there was a general concern about women's safety/comfort/dignity and about the lack of qualified women. Some men felt that women waste their degrees by not working and that they should not go into engineering, a field that belongs to males, who can continue their careers regardless of marriage. Some men were of the view that there are not enough institutional incentives to invest in women in the technical field and that hiring them means spending more resources to retain them. Many men pointed out that the biggest challenge was to change the mindset of the

parents who do not allow their daughters to perform field duties. In a separate case, the director of a solar company appeared to be open-minded and supportive of hiring women. However, the strenuous requirement for lifting heavy solar panels—which, the director said, women are not interested in doing—was cited as the reason for not hiring technical women. Similarly, the

chief engineer of a transmission department worried that sending women staff to the field for transmission-related duties could leave them vulnerable to harassment. This would mean providing security so they could do the job, and taking these kinds of measures costs the organization. Therefore, transmission jobs are open only to males.

*“In field situations, especially in utilities, one has to think about gender norms and “social stigma” that force men to keep women from undertaking work that is not accepted as safe for them. It is not discrimination that impedes women’s taking the work with risks, but it is influenced by social concerns over the safety and dignity of women. In field sites we do not expect women to work on rooftops while male engineers are on ground available to take such site work. In practice men often do not allow women to engage in risky tasks and also provide support for women, especially in remote areas.”*

**- Professor of electronics and electrical engineering in Sri Lanka**

## **WePOWER is a timely and much-needed initiative**

During the interviews, women (and men) were overwhelmingly supportive of establishing a regional network. There are no regional or national professional networks exclusively focused on women in the power sector. Discussions made it clear that the paucity of information and the lack of an established central hub is a serious impediment to women’s career advancement,

especially for those who are interested in building their capacity. Women felt that men are better informed because of their greater freedom in society and their “old boys” networks, which allow them to take advantage of formal and informal opportunities. For example, in **Pakistan**, a common challenge that women reported was that they lack the strong networking opportunities their male colleagues enjoy. The men may meet after work to talk, and not being included in the after-work socialization affects women’s knowledge of things.

# V. Lessons for WePOWER

Despite the diversity of the women interviewed—in age, position, and cultural background—it is startling how much overlap there is in their experiences during their academic and professional lives. Women tend to work in lower levels, and the retention rate for women is low in power-related organizations. It may be that women leave and do not continue in the profession because systemic discrimination against them hinders their advancement opportunities. Pakistani women were very vocal about sharing their discouraging experiences, from demeaning behavior to outright sexual harassment. In other countries, like Nepal and India, it is unclear whether women were sharing their experiences openly. A distinct exception was in Bhutan (and to a lesser extent Sri Lanka), where the women were noticeably more positive about their interactions with their fellow students/staff and teachers/supervisors. Nevertheless, the marked difference in levels of abuse and discrimination must be acknowledged.

**It is clear that the institutional cultures at the schools and power sector organizations are very important.** Every utility and university in the study highlighted its gender-neutral approach in describing its admission/hiring/promotion practices, despite women’s experiences to the contrary. Indeed, everything is based on national test scores and qualifications. Some of the private companies held a different view: they see hiring and training a woman staff as a risky investment that will go to waste if she marries and has to leave the job because of family commitments. A more proactive approach will be needed to enable meaningful cultural change at the institutional and national levels.

**Early exposure to STEM, role models, and family support are crucial.** The power sector is largely unknown to most STEM students, who consider it a difficult area that would require fieldwork and relocation. Family support is the number one reason for pursuing this career path, and lack of it explains why women are less likely to join the power sector: they are constantly questioned and discouraged. The pool of eligible female candidates that graduate from engineering programs is already small; therefore, WePOWER must work with engineering programs, and the power sector

## Box 9. Power Sector Awareness and Career Guidance in the Maldives

The ADB POISE (Preparing Outer Islands for Sustainable Energy Development) project has a component on sector awareness, which covers nine atolls. The awareness program invited both parents and students to attend informative sessions on jobs and opportunities in the power sector, and several female students expressed interest in joining the sector.

must make a more systematic effort to raise awareness and engage girls/families at an early age. An easy example: institute a “bring your daughter to work” day. (Box 9 describes an interesting sector awareness program.)

**Marriage and safety concerns are underlying factors that not only affect women’s decisions but are also used by society (family/supervisors) to justify continued bias and discrimination.** Whether or not the concerns are valid, women in the region are expected always to have a “protective” male figure—a father, brother, or husband (see Box 10). This concern for safety influences access to higher education, valuable fieldwork, and practical internship and training opportunities because it restricts women’s mobility and strives to keep them out of an “unsuitable” work environment. Balancing work life with domestic responsibilities is a universal challenge for working women. Indeed, even considerate laws such as the Wedlock Act allow women to better fulfill their roles as daughters or wives while working, rather than be better professionals. The post-marriage double burden is very real—even in countries like Bhutan and the Maldives, which have near-equal literacy rates for both boys and girls (and in the Maldives, women outnumber men in tertiary education), women still have higher unemployment rates. WePOWER’s goal of long-term normative change will be crucial to addressing this gap.

**Utilities are open to having more women working in their organizations but will benefit from more concrete guidance on how to achieve this.** For example, many of the utilities contacted said that the main barrier they

### Box 10. Family Oversight

- In Sri Lanka, unmarried women are expected to inform their parents about their field programs, travel schedules and arrangements for travel and accommodation, while married women have to furnish the same types of information to their spouses.
- In Pakistan students usually go with their father to buy parts and equipment for school projects. This illustrates both the importance of family support and the need to have a protective male figure present in all parts of a woman's life.

face is finding qualified women to take the positions, but they do not have any provisions to advertise to and attract more women applicants. Their openness in the discussions suggests that they can be good partners who will work with academic institutions to help ensure a steady pipeline of qualified women entering the power sector. In Afghanistan, at the beginning of the year, the President of Afghanistan's Office officially requested the Ministry of Energy and Water and the Civil Service Commission to increase the number of women in the energy sector and also facilitate a better working environment for them. DABS has instituted a more proactive recruitment method targeted towards women (Box 11) – a direct acknowledgment of the fact that many women do not have as much time to study for exams because of their home responsibilities.

**The findings of the rapid baseline assessment will inform the five pillars of the WePOWER network and align well with the inputs provided by the strategic partners.** The WePOWER work program and activities will be developed in five areas suggested by the feedback of the women who participated in the study: (i) STEM education; (ii) recruitment; (iii) development; (iv) retention; and (v) Policy and Institutional Change.

- **STEM Education and Recruitment.** It is clear that WePOWER will need to focus its efforts to improve outreach and awareness. Most interviewed women were not aware of career opportunities in the power sector, and almost all women mentioned the lack of formal and informal support systems such as networks. None of the women interviewed had career counseling or employment surveys/career fairs to guide them in choosing a career in the power sector. They depended on periodic government

### Box 11. Positive Discrimination under DABS, Afghanistan

To promote hiring of more women, DABS adds 10 additional marks (points) for women in the recruitment exams—5 marks for a written test and 5 for the interview – compared to men. The exams usually consist of 80-100 questions. This surpasses the requirements by Afghanistan's Civil Servants Law, which stipulates only 5 marks as evidence of positive discrimination.

circulars for information about recruitment opportunities. Women who were interviewed mentioned previous bosses who had provided mentoring and the motivation for them to pursue higher education, which pushed them further up the career ladder.

- **Development and Retention.** Women requested personal and professional development opportunities and supportive gender policies. They valued mentorship, personal and professional career development services (e.g., public speaking training to build confidence), and opportunities for international learning and knowledge exchange through exchange programs and seminars. Understandably, entry- and junior-level women gave greater priority to training and networking opportunities. Other suggestions were to establish internship programs and scholarships for girls in engineering colleges. The need for better work facilities (daycare, transport, toilets) and for supportive policies to help balance home and work life—especially for returning mothers—was raised repeatedly. The lack of a functioning sexual harassment reporting mechanism is also a common issue in the utilities.
- **Policy and Institutional Change.** The women want WePOWER to pursue more ambitious goals by promoting normative change and raising awareness about STEM and power sector jobs. There is a clear understanding that this issue needs to be tackled on many fronts. The women suggested engaging with children and families and working to influence and improve national and institutional gender policies. In Pakistan, it was suggested that WePOWER should monitor compliance with laws and be a place for women to register their grievances. Women understood that there are research and data gaps on the topic and suggested that WePOWER should serve as a knowledge hub and repository for data, research, and outreach to keep the issue visible in the public sphere.

## VI. Closing thoughts

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**The assessment captures the major issues and barriers affecting women in the region.** The findings largely align with expectations in the conceptual framework. Regarding data, in the smaller countries like the Maldives and Nepal, our data cover most of the utilities. However, for a country as large as India, more work is needed, especially on the data front. Key areas for future research include renewable energy and the private sector, and lessons learned other sectors in regards to improving gender diversity, such as in water and gas utilities. Analyzing STEM graduation rates and post-graduation employment rates, job placements, corporate recruitment practices, and expanding the scope to include the entire energy industry supply chain (such as fuel supply, power system equipment manufacturing) will also help to paint a more complete picture. Although the study is primarily focused on women engineers with bachelor's and higher degrees, programs and graduates from technical/vocational training centers warrant further attention to see how they can fit into the larger WePOWER program. Migration was also mentioned but not fully explored: nearly all of the women who go for advanced studies abroad never return because of better prospects and

greater acceptance, and this is an important group to tap into as a resource. Continued engagement with HR specialists to institute regular collection of sex-disaggregated data will be critical to measuring the progress of WePOWER's goals.

**Many of the women shared their difficult experiences for the first time during the assessment discussions.** In that respect, the mission of WePOWER to connect women practitioners has already begun. Many of the interviewed mid-career women have overcome hurdles to get to where they are in the power sector, and they appreciate the work the World Bank is doing to establish the WePOWER Network. The study team is grateful to them for taking the time out of their very busy schedules to contribute to the study. The assessment has already identified innovative partners at the national level who will also benefit from a more formal strategic structure under the WePOWER umbrella. The research clearly shows that (a) there is growing awareness and acknowledgment of the gender gap in the sector, and (b) a sizable number of women are eager to take advantage of a regional network. There is still a lot of work to be done in this sphere, but we hope that this assessment is a crucial first step forward.





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