



SHEDDING LIGHT ON FEMALE TALENT IN LEBANON'S ENERGY SECTOR

APRIL 2019

Ali Ahmad, Lory Kantarjian, Hana El Ghali, Elisabeth Maier and Samantha Constant

ACKNOWLEDGMENTS

This policy brief is authored by Ali Ahmad (Director, Program on Energy Policy and Security in the Middle East), Lory Kantarjian (Research Assistant, Program on Energy Policy and Security in the Middle East), and Hana El Ghali (Director, Program on Education and Youth Policy) of the Issam Fares Institute for Public Policy and International Affairs at the American University of Beirut jointly with Elisabeth Maier (Senior Operations Officer, Energy and Extractives Global Practice) and Samantha Constant (Gender Consultant, Middle East and North Africa Region) of the World Bank Group under the leadership of Erik Magnus Fernstrom (Practice Manager, Energy and Extractives Global Practice). The authors greatly benefited from peer review by Tu Chi (Energy Economist, Energy and Extractives Global Practice), Jonna Maria Lundvall (Social Scientist, Poverty Global Practice), and Inka Ivette Schomer (Operations Officer, Energy Sector Management Assistance Program).

ABOUT THE INSTITUTIONS

The financial and technical support by the Energy Sector Management Assistance Program is gratefully acknowledged. ESMAP—a global knowledge and technical assistance program administered by the World Bank—assists low- and middle-income countries to increase their know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Canada, ClimateWorks Foundation, Denmark, the European Commission, Finland, France, Germany, Iceland, Italy, Japan, Lithuania, Luxemburg, the Netherlands, Norway, the Rockefeller Foundation, Sweden, Switzerland, the United Kingdom, and the World Bank.

The AUB's Issam Fares Institute is an independent, research-based, policy-oriented institute. Inaugurated in 2006, it aims to harness, develop, and initiate policy relevant research in the Arab region. The Institute is committed to expanding and deepening policy-relevant knowledge production in and about the Arab region; and to creating a space for the interdisciplinary exchange of ideas among researchers, civil society, and policy-makers.

SHEDDING LIGHT ON FEMALE TALENT IN LEBANON'S ENERGY SECTOR

Ali Ahmad, Lory Kantarjian, Hana El Ghali, Elisabeth Maier and Samantha Constant

KEY HIGHLIGHTS:



Enhanced gender diversity can bring a wide set of benefits to Lebanon's energy sector by capitalizing on public investments in education and leveraging an overlooked pool of talents, generating more inclusive solutions and approaches, and boosting the sector's reputation.



A pipeline of female talent in the energy sector exists in Lebanon with 61 percent of female students in public universities enrolled in Science, Technology, Engineering, and Mathematics (STEM) related fields. Furthermore, renewable energy and general energy degree programs have significantly better female participation than oil and gas degree programs and as such offer an opportunity for working professionals, including women, to make career shifts and develop skills to compete in the emerging regional and domestic green energy market.



However, data on distribution of women in STEM majors mask imbalances in terms of concentration of enrollment in the theoretical sciences compared to applied fields such as engineering. Additionally, in regions poised for deployment of renewable energy projects, such as those in rural areas, there is a lack of equitable distribution of tertiary education institutions and knowledge centers for communities, particularly among women, to access and benefit from should they be interested in building their skills in the field.



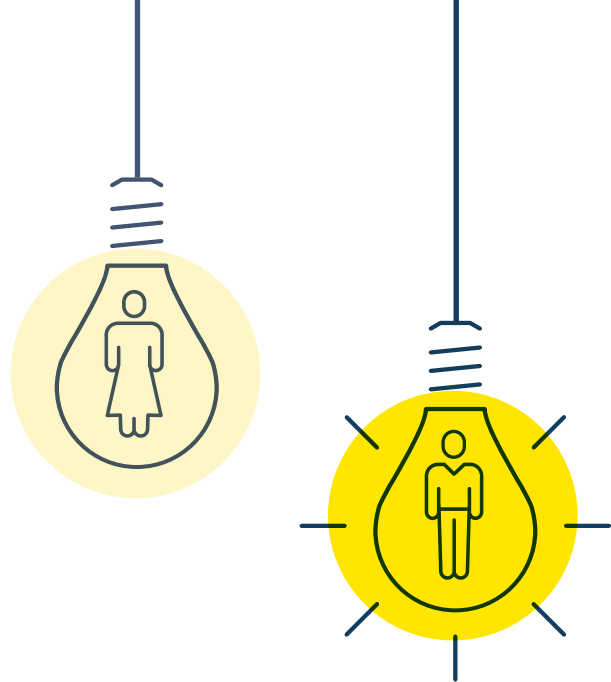
As such, there is a missed opportunity particularly in the renewable sub-sector which is a productive field for potential employment of both high-skilled and middle-skilled female workers across the renewable energy value chain.¹ Harnessing female talent through strategic investments in educational and training infrastructure as well as in affordable, market relevant skills training with specific attention to attracting rural female talent in inland regions will key to getting more women in energy,

¹ High skilled workers are referred to as those with post-secondary degrees.

INTRODUCTION

The under-representation of women in the energy sector is a global issue that transcends cultural, regional and technological differences (IRENA, 2018).² Lebanon is no exception in this regard; however, legal constraints such as Ministerial directives on job restrictions that prevent women from working the same way as men in the energy sector combined with prevailing gender norms and societal expectations on the role of women in the household exacerbate the gender gap in the country's energy sector (Assy & Sayed, 2018).³ For example, 60 percent of men and 45 percent of women believe that the women's most important role is to take care of the family (El Feki, Barker, & Heilman, 2017). Beliefs and perceptions of women's role in society can manifest itself in the way girls and boys are tracked in their educational lifecycle, often leading to gender segregation across fields of study; these gaps are not a result of differences in capabilities but rather created by social constructs that shape an individual's access to opportunities (Schomer & Hammoud, Forthcoming - 2019).

Gender disparities in the energy sector are most visible, when one looks at the job market and become more pronounced with increased levels of seniority in the workplace. While data on female employment in the sector is limited, overall labor market statistics point to low female labor force participation at 23 percent compared to male rates at 71 percent and female unemployment hovers at five percent compared to 10 percent among men (World Bank, n.d.).⁴ Gaps in entrepreneurship also exist with self-employment among women at 17 percent, less than half that of male entrepreneurship at 43 percent. Such inequities translate to lost earnings and productivity; studies show that for 141 countries, the loss in human capital wealth due to lifetime gender income inequality is approximately USD 160.2 trillion (Schomer & Hammoud, Forthcoming - 2019). While some of this is due to demand side constraints such as lack of jobs, higher competition and a skills mismatch attributed to the overall disconnect between what is taught at the universities and demand of skills in the market, the root causes of gender gaps in the workplace stem from the differentiated experiences of students in pre-entry stages in secondary and tertiary education. This is an area of growing interest due to the need of having a better understanding of the pipeline of talent in productive fields when we talk about women's economic empowerment.



“Marriage is considered to be the best accomplishment a woman can make after she gets a degree. Getting married is branded as the ‘next step’ after university graduation, rather than finding a job, proving oneself, and aiming for higher positions.”

**Female focus group discussant,
November 2018**

This policy brief aims to contribute to filling the knowledge gap and presenting a sex-disaggregated snapshot of the distribution of students across energy related higher education educational programs as well as the traditional Science, Technology, Education, and Math (STEM) fields, in tertiary education institutions across Lebanon's different regions. The objective is to better understand the “supply” side of female talent, starting with high

² According to the International Renewable Energy Agency (IRENA), women's share of jobs within the energy sector worldwide is between 20 to 25 percent. Even in the renewable energy sector, where gender discrimination is less pronounced, the agency reports a women's share of 35 percent. In the United States, for example, female employment within the solar energy sector is just 27 percent.

³ The Annex 1 of “Women Business and the Law, 2017, Labor Law Article 27” includes list of sectors and types of activities that women and children are prohibited to work, including those relating to the construction and rehabilitation of electrical storage units (Article 12).

⁴ World Bank Indicators.



skilled workers, available to enter the energy job market in Lebanon and propose recommendations when talking about opportunities for women to work in the sector.⁵ While the focus is on assessing the high skilled workforce, the recommendations point to the need to focus also on supporting a middle-skills talent pool where most of the jobs in the sector are likely to be created.⁶

METHODOLOGY

A mixed-method approach was used to build evidence for this study, primarily focusing on: data collection through existing official enrollment statistics, an online survey to targeted staff across 15 energy institutions, and a focus group discussion with professional women working or seeking work in the field. The analysis of enrollment data for the largest eight private universities in Lebanon was supplied by the Ministry of Education and Higher

Education, and for the Lebanese University, retrieved from the Center for Educational Research and Development (CERD).⁷

The identification of STEM majors is based on the National Science Foundation's (NSF) definition of approved STEM fields.⁸ However, the health sciences category has been removed to refine the relevance of STEM majors to the employment needs of the energy sector. The mapping of energy majors and programs was conducted first through an online search on the webpages of all Lebanese universities, public and private. Subsequently, academic leaders of these programs were contacted to obtain additional, detailed data on student enrollment, gender and the focus areas.

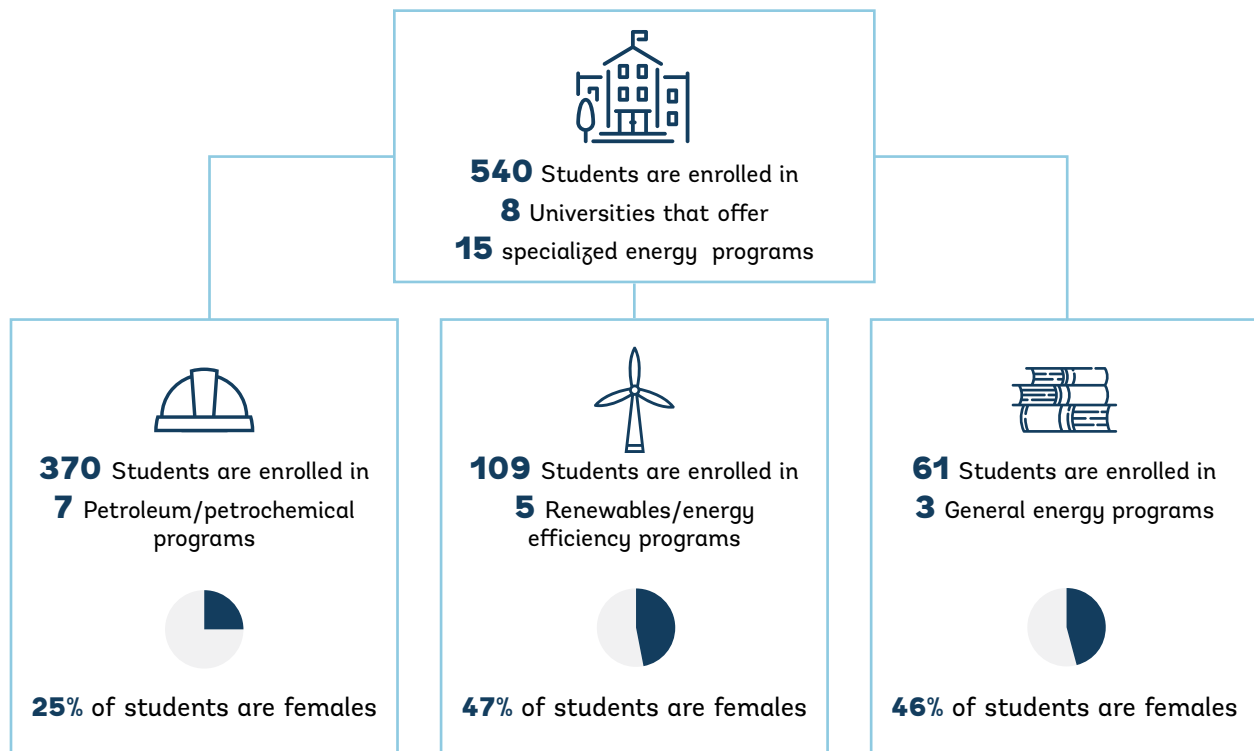
-
- 5 The STEM educational assessment primarily covered higher education programs due to multiple reasons. Firstly, constraints around availability of data at lower levels (such as in secondary and vocational training) made it more feasible to focus on distribution of students in higher education institutions where data is available. Secondly, young women with university degrees are a readily available resource in Lebanon that when unemployed for months, and sometimes years, become a missed opportunity. Finally, the focus on higher education is not exhaustive, and there is future scope for conducting a similar mapping across secondary and vocational educational institutions. In that context, it will also be important to look at middle skills workforce development.
 - 6 Middle-skill jobs are defined as those that would require more training than a high school diploma (such as associate degrees, occupational certifications, apprenticeships) but less than a four-year or university degree. Such jobs are vary significantly depending on the industry and the needs of the particular institution in that sector. In the energy sector, these could be the operations and maintenance of smart meters, renewable technologies, as well as clerical and customer service positions.
 - 7 These eight universities have been chosen because: (1) Together, they count for more than 75 percent of the total tertiary education enrollment in Lebanon; the remaining balance is shared between more than forty small universities; (2) they are well-established academic institutions with a track record of STEM majors and programs.
 - 8 NSF approved STEM fields fall under categories that include: i) chemistry, ii) computer and information science and engineering, iii) engineering, iv) geosciences, v) life sciences, vi) materials research, vii) mathematical sciences, viii) physics and astronomy, ix) psychology, x) social sciences, xi) stem and learning research (NSF, n.d.).

OVERVIEW OF EDUCATIONAL ENERGY PROGRAMS IN LEBANON

In Lebanon, there are eight universities that offer 15 energy-related degrees as part of their 4-year university diploma and graduate degrees (including Master's and PhDs).⁹ The distribution of women and men as well as type of programs are shown in Figure 1. In total, there are currently 540 students enrolled in energy degree programs across the country. While overall enrollment in higher education institutions has increased from 180,850 to 210,720 during the past 10 years, it is difficult to say if this trend has been similar in energy related majors, as new majors have

emerged within the sector, particularly in Lebanon where the energy sector has gained more attention in the past few years. In fact, the development of the renewable energy market and the prospects of offshore oil and gas in Lebanon led to the establishment of new majors at the tertiary education level. These majors vary between renewable energy related and oil and gas related topics. As such, young people have started to engage in such programs as the local demand for jobs (or its perception in the case of oil and gas jobs) started to increase across the country. Today, most students (68 percent) are enrolled in petroleum and petrochemical programs, while the rest is divided between renewables/energy efficiency (20 percent) and general-energy programs (12 percent).¹⁰ Renewable energy and general energy degree programs have better participation of women than that of the oil and gas programs (47 and 46 percent female representation compared to 25 percent, respectively).¹¹

Figure 1: Overview of academic energy programs in Lebanon and their type and gender distribution (undergraduate and graduate)



⁹ This does not mean that students enrolled in non-energy programs are not calculated from the possibility of obtaining jobs in the energy sector. In fact, there are various positions such as accounting, financial management, communications, administration and customer service that do exist across energy institutions. For reasons of efficiency, this paper focuses on narrow parameters to define supply side of talent in the sector (such as energy-related fields, STEM, and applied engineering) while at the same time recognizing that positions vary by type of work.

¹⁰ The spread of petroleum programs is mainly due to the demand for Lebanese workforce to work in oil and gas companies in the Gulf. The prospects of oil and gas offshore discoveries in Lebanon may have also played a role in luring students to study petroleum or petrochemical engineering.

¹¹ This could be attributed to the increasingly acknowledged reputational advantages of renewable energy. As Lebanon scales up its investments in renewable energy, the demand on these programs will likely increase. Due to lack of student information management systems, reporting of student enrollment over time is limited.

Another interesting feature of the renewable energy and energy efficiency degree programs is that two of them are also classified as “continuing education” programs; namely the pro-green diploma programs at the American University of Beirut and the Lebanese American University, Lebanon’s largest two private universities. These programs offer working professionals the opportunity to develop skills and compete in the emerging and rapidly expanding regional and domestic green energy market.

STEM ENROLLMENT NUMBERS REVEAL MAJOR IMBALANCES WITH STRIKING REGIONAL DISPARITY

Both public and private universities witness a decrease in female enrollment numbers in STEM majors, compared to overall enrollment numbers.¹² In public universities, the drop is about 10 percentage points, while it is 14 percentage points in private universities. Furthermore, the percentage of females in STEM within the public university is 61 percent, which is quite high, even compared to developed countries¹³. This may not be entirely surprising: recent global evidence points to a paradoxical relationship between gender equality and STEM enrollment rates, with less gender-equal countries faring much better than countries deemed more gender equal (Stoet & Geary, 2018). Reasons for this paradox is explained by the fact that a STEM education can provide women with more opportunities for income generation

and financial autonomy, particularly in countries where gender-based restrictions would limit their work options (Stoet & Geary, 2018). Additionally in Lebanon, as enrollment data is examined more closely, the combined STEM numbers appear to hide major imbalances between the more theoretical sciences and engineering, which tends to focus on applied disciplines.¹⁴ These STEM imbalances are further confirmed, when we compare the numbers of enrollment in sciences and engineering across all universities within the sample as shown in Figure 2. Therefore, the average enrollment of females in sciences is about 54 percent, while it is only about 25 percent in engineering.

The distribution of men and women across in STEM majors across different regions of Lebanon is shown in Figure 3, demonstrating a high concentration of STEM students studying at universities located either in the Beirut or Mount Lebanon governorates. The concentration of students within these two regions is primarily due to the geographic distribution of universities in the country, with a larger number of institutions in the greater Beirut region. It is also important to note the absence of academic institutions in more rural Beqaa and Baalbak-Hermel, regions poised for deployment of renewable energy projects.¹⁵ This highlights the importance of responding to such a shortage by increasing the presence of existing institutions in the region and supporting them to be better able to equip a properly skilled workforce that would be ready to be mobilized once the expected deployment of renewable energy projects commences.¹⁶ The availability of such educational and training infrastructures could facilitate the participation of females in energy related programs by resolving mobility and cost obstacles that prevent women who reside in those regions from studying and living in Beirut.¹⁷

12 There is one public university in Lebanon (the Lebanese University), but it has many branches across Lebanon

13 For example, in the United States and based on 2016 numbers, 60 percent of college graduates are females. However, only 35 percent graduated with a STEM degree (Institute of Education Sciences, National Center for Education Statistics, 2016).

14 These imbalances matter because the knowledge and skills preferred by energy companies when recruiting are largely drawn from technical and applied fields.

15 There is a limited number of branches of institutions of tertiary education within this region. It is also very important to note that the one public university has one branch within this region, making tertiary education less accessible for residents of the region.

16 It is important to note that expanding the presence of tertiary education institutions is not meant to encourage establishing branch campuses of existing institutions, but rather technical with some multi-disciplinary programs which could support the need for capacity building in new and growing job markets, particularly in the renewables. Additionally, such training centers can help with the supply of female talents to the demand for middle-skilled jobs, which are predominant in the energy sector.

17 For women who come from rural regions to study in Beirut, they would have to pay the cost of accommodation (rent), transport and food. The combined cost could well be one of the obstacles, even if the students do not pay tuition fees at the public university. It is also important to note that many families may choose not to send their daughters away from home for studying, also presenting yet another obstacle for enrollment in programs of tertiary education away from home.

Figure 2: Percentage of females in Sciences and Engineering fields in public and private universities in Lebanon (2018 data)

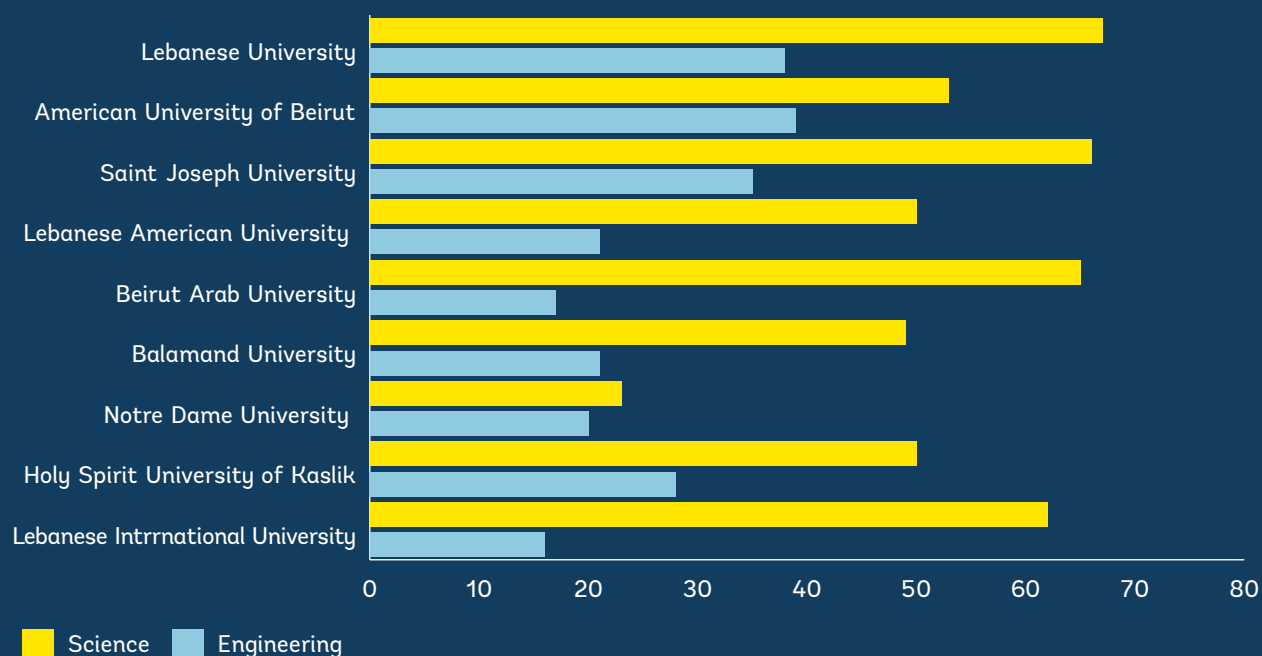
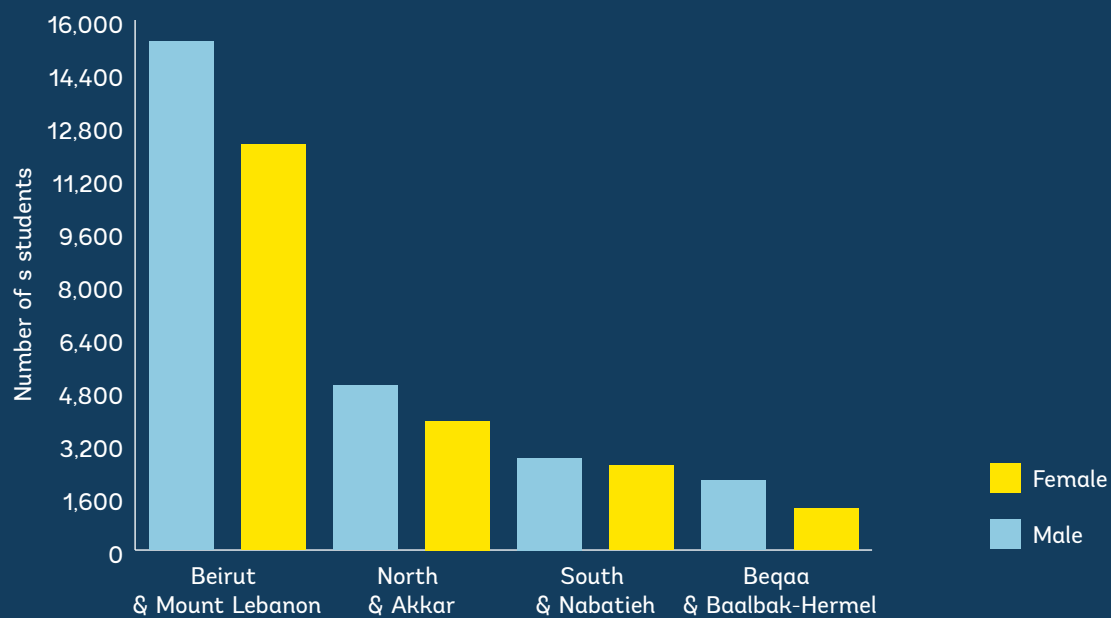


Figure 3: Regional distribution of male and female students in STEM fields (2018 data)¹⁸



¹⁸ It is important to note that the imbalance in the distribution of students across the different regions is also impacted by the imbalance in the geographic distribution of institutions of tertiary education.

Table 1: Major pre-employment challenges women face in the energy sector in Lebanon ¹⁹

Challenge	Frequency	Extensiveness	Intensity	Importance
Social norms and expectations	High	High	High	High
Information gap	Low	Low	Medium	Medium
Immobility	Medium	Medium	Medium	High
Energy sector's reputation	Low	Low	Medium	Medium
Lack of role models	Medium	High	High	High

FACTORS CONTRIBUTING TO GENDER GAPS IN THE EDUCATION TO WORK TRANSITION NEXUS²⁰

There has been in depth research carried out about the constraints Lebanese women face in the world of work (Assy & Sayed, 2018). Table 1 provides a snapshot of pre-employment challenges that are specific to women seeking work or having sought work in the energy sector based on questions around three key thematic areas: (i) assessing women's ease of jobs in the sector, (ii) effectiveness of existing interventions to promote women's participation in the sector, and (iii) impact of energy reforms on women's economic empowerment. The responses of the FGD's participants were recorded and coded by their frequency (How often was a concept mentioned?), extensiveness (How many different participants mentioned the concept?), intensity (How much passion or force was behind the comments?), and importance (Did participants cite this as an important concept?).

Some challenges, such as the existence of impeding social norms and lack of information about the options available, are global. Others are particularly relevant to Lebanon's case, such as immobility due to lack of safe and secure transportation and the energy sector's negative reputation. It is interesting to note the alignment of

the results obtained from the tertiary education gender differential and the challenges suggested by the focus group. First, although the number of women studying STEM majors in Lebanon is relatively high, the share of women enrolled in engineering majors is just 25 percent. The combined effects of the impediments outlined in Table 1 could explain the low level of women's enrollment in engineering majors.

Second, social and cultural norms may restrict females living in rural areas from accessing tertiary education institutions offering energy related majors because they are primarily located in the Beirut and Mount Lebanon regions, and a decision to enroll in such majors may require the female to move away from her parents' residence, which is a culturally less acceptable practice. Expectations surrounding women's role in society and family influence may also impact what young women choose to focus on during their time in school. In fact, the decision-making processes of young women during their transition from school to work are often shaped by the role they are expected to play later in society, driving many to choose majors that will allow them to work in sectors that are perceived as more family supportive. This would include jobs in the public sector or in the education and health fields where, for example, working-hours are shorter and more socially acceptable, allowing women to better balance care and household responsibilities (Saleh-Isfahani et.al., 2012).

Third, the tertiary education gender differential data also shows that the greatest disparity between men and women studying STEM majors is in the rural regions, particularly in the Beqaa and Baalbak El Hermel region, where the share of women in STEM drops to 37 percent.

¹⁹ These results were obtained from the focus group and should be viewed as indicative only and are not meant to be comprehensive in nature.

²⁰ Challenges are based on outcomes of the focus group discussion (FGD) with women working in leadership positions in the energy sector in Lebanon. Coded elements presented in the table and their definition were chosen from Richard A. Krueger's book "Analyzing & Reporting Focus Group Results" (Krueger, 1998). Designated rapporteurs were asked to score responses (1 = low; 2 = medium; 3 = high) for each contribution against the coded elements during the discussion. The assigned scores shown in Table 1 were based on average scores of the rapporteurs.



compared to 45 percent in Beirut. This observation may stem from the mobility challenges faced by women who live in rural areas and are unable to safely travel to the university or are obstructed by their families from going due to the lack of safe and reliable public transport (Latif, 2016).

Fourth, the effect of the energy sector's reputation, which is identified as one of the entry challenges, is also reflected in the numbers of female students who are subscribed to energy majors at Lebanese universities. The sector is perceived as unstable and problematic, faced with challenges of inclusion, accountability and governance (World Bank, 2008). Women prefer to work in more stable environments, such as within the banking and education sectors, and thus may be discouraged from joining the energy sector. As shown earlier, there are many more women choosing to study majors related to renewable energy (47 percent) and energy science (46 percent) than oil and gas related majors, such as chemical

and petroleum engineering, which have a female share of 25 percent.²¹ Therefore, less females choose to enroll in such programs given that the expectation is, that they would not be able to join the sector after graduation.

Informational gaps were also identified by participants as a challenge with some intensity and relative importance. Many respondents highlighted that systemic issues with how information about available career options in energy is communicated to female high school students as a contributor to the small number of women entering STEM majors. For those who do major in engineering and STEM related fields, there is little information about what to expect once employed, and many women after graduation reportedly feel ill-equipped because they lack the softer skills such as those linked to inter-personal and communications needed to succeed on the job or advance in their career (Baytiyeh, 2012). In addition to the above impediments, the socioeconomic backgrounds of the students and their families play a major role in directing

²¹ There is a substantial existing literature on women's higher concern for the environment compared to men. In a 2012 research by the Institute for Women's Policy Research found that "women are less likely than men to support environmental spending cuts and are less sympathetic to business when it comes to environmental regulation. They also have more positive feelings about environmental activists and are concerned about environmental risks to health, especially locally" (Polakovic, 2012).

“Dealing with and overcoming stress is never tackled throughout a woman’s life. The educational system does not emphasize the importance of stress management and mental health, especially in a working mother’s life.”

**Female focus group discussant,
November 2018**

a male or female student towards a specific major. This goes back to the point on social norms and expected role of women as caretakers, compared to role of men who are often seen as the ones who should be the primary breadwinners.²²

In this context, completing graduate studies (such as a Masters) in engineering or in any energy-related field can be time intensive and prohibitive for students, mostly women, who may have family commitments and household responsibilities. In Lebanon, there is little if any support from education institutions to address the differentiated needs of students with regard to child-care provision or organizing flexible study arrangements. As a result, one finds that married female students with children tend to drop out of master’s programs due to their family commitments, especially in the second semester (thesis stage). This also seems to affect the research preferences female students choose to study in school.

CONCLUSION

There seems to be some gaps in the participation of women in energy related programs of study across tertiary education institutions in the country. The imbalances are evident in the limited gender diversity represented in the energy employment landscape in Lebanon. As noted, this is due to a number of institutional, structural, and normative challenges influencing women’s participation in programs of study as well as their engagement in the sector. It is important to address such challenges through a multi-level strategy that harnesses talent and builds skills across the different stages of a young woman’s education pathway to her employment transition, including pre-tertiary, tertiary education, and post-tertiary levels or continuing education.

The pivotal role of school counselors is widely recognized in helping students make higher education and career decisions (Murphy, 2016). Essential interventions at the pre-tertiary education level could include the integration of pre-college counselling programs targeting female students in secondary schools to expose them to options of STEM programs during their study at university as well as raise awareness of the options they may have within the energy sector once they enter the labor market. Involving families as part of the counselling program could also lead to positive engagement of fathers and male guardians (brothers, husbands, etc.) and better awareness of the benefits in having both women and men work in the sector. In this context, a Harvard Business School study reveals that one of the most useful engagements for parents to have with their children lower secondary is to help them associate what they learn in middle school with their goals and interests, as well as aspirations post high-school (Blagg, 2009).

Most of the challenges outlined earlier can be also addressed through interventions at the tertiary education level, such as introducing internship and practical experiences for students enrolled in STEM and other energy related programs at local universities. Providing a more holistic curriculum that can break gender stereotypes while incorporating multi-disciplinary coursework such as interpersonal communications, stress management, etc. can help reduce societal pressures about future work choices and help build more confident female employees who are better prepared to manage work-life balance. Exploring the establishment of centers of excellence

²² This MENA region-wide challenge: Lundvall, Jonna Maria; De Paz Nieves, Carmen; Constant, Samantha M.; Atamanov, Aziz. 2017. Progress towards gender equality in the Middle East and North Africa region (English). Washington, D.C.: World Bank Group.

for renewable energy with specific attention paid to constraints facing women in remote and rural areas across the country can also send positive signals about engagement in the sector as well as make it easier for young women to enter and remain in the field. The idea for such an initiative is bolstered by recent trends indicating that many energy companies and institutions in Lebanon have started to hire local graduates for their projects, except in some low skilled jobs like in the construction sector, where most of the supply remains dependent on foreign workforce. Introducing interventions focused on the high and middle skills workforce, ranging from recruitment, retention and advancement could include initiatives that attempt to change perceptions of the sector through targeted communications that promote women's role in the sector through multi-media channels, event platforms that showcase role models and success stories.



Finally, strong attention should be paid to facilitating favorable work environments and working conditions for women already employed in energy-related fields in coordination with the government and private sector. This can be done through the fostering of reforms that support flexible work arrangements, parental leave and equality at work as well as of strategies that expand child care provision and encourage return and retention of working mothers. While private investments in market-driven apprenticeships and on-the-job training programs

that cater to the differentiated realities and needs of employees can build the capacity of future female workers, it is also important to keep an open pathway for women to continue their education post-graduation as they seek work as well as during employment to encourage their professional development and improve their chances at assuming leadership roles. Women's participation in the energy sector is not an add-on, but rather a need for the modernization of the sector in the country.

“When our [Oil & Gas] company asks employees to come to work after midnight [which is common in the sub-sector], usually only the male employees attend, while the female ones rarely attend. The latter is for numerous reasons, including the lack of transportation means, lack of safety, parental norms which prevent a female from leaving the house late at night, and family and childcare responsibilities. In such cases, it is very probable that any potential promotion will be given to the male employees and not the females.”

**Female focus group discussant,
November 2018**

BIBLIOGRAPHY

- Assy, A., & Sayed, H. (2018). WHY AREN'T MORE LEBANESE WOMEN WORKING? *Number 170*(Quick Note). Washington DC: World Bank. Retrieved from <http://documents.worldbank.org/curated/en/919711526913175663/pdf/126361-BRI-add-series-PUBLIC-QN-170.pdf>
- Baytiyeh, H. (2012). Women Engineers in the Middle East from Enrollment to Career: A Case Study. American Societ for Engineering Education: American University of Beirut. Retrieved from https://www.researchgate.net/publication/289611367_Women_engineers_in_the_Middle_East_from_enrollment_to_career_A_case_study
- Blagg, D. (2009, October). The Parental Involvement Puz̄gle. Harvard Graduate School of Education. Retrieved from <https://www.gse.harvard.edu/news/uk/09/10/parental-involvement-puz̄gle>
- El Feki, S., Barker, G., & Heilman, B. (2017). Understanding masculinities, results from the International Men and Gender Equality Study in the Middle East and North Africa. Cairo and Washington, D.C.: UN Women and Promundo-US. Retrieved from <http://www.unwomen.org/-/media/headquarters/attachments/sections/library/publications/2017/images-mena-multi-country-report-en.pdf?la=en&vs=3602>
- Institutite of Education Sciences, National Center for Education Statistics. (2016). Retrieved from https://nces.ed.gov/programs/digest/d16/tables/dt16_318.45.asp?current=yes
- IRENA. (2018). Renewable Energy and Jobs Annual Review 2018. Retrieved from https://irena.org/-/media/Files/IRENA/Agency/Publication/2018/May/IRENA_RE_Jobs_Annual_Review_2018.pdf
- Krueger, R. (1998). *Analyzing & Reporting Focus Group Results*. doi:<http://dx.doi.org/10.4135/9781483328157>
- Latif, N. (2016). Gender Profile - Lebanon. Institute for Women Studies in the Arab World. Retrieved from <http://iwsaw.lau.edu.lb/publications/documents/Country%20Gender%20Profile%20Lebanon-Online%20.pdf>
- Murphy, J. (2016, September). The Undervaluing of School Counselors. *The Atlantic*. Retrieved from <https://www.theatlantic.com/education/archive/2016/09/the-neglected-link-in-the-high-school-to-college-pipeline/500213/>
- NSF. (n.d.). NSF Approved STEM Fields. Retrieved from <https://www.btaa.org/docs/default-source/diversity/nsf-approved-fields-of-study.pdf?sfvrsn=2>
- Polakovic, G. (2012, June). Are women greener than men? *Los Angeles Times*. Retrieved from <http://articles.latimes.com/2012/jun/13/opinion/la-oe-polakovic-gender-and-the-environment-20120613>
- Salehi-Isfahan, Djavad, Belhaj Hassine, Nadia & Assaad, Ragui A. (2012). Equality of Opportunity in Education in the Middle East and North Africa. Available at SSRN: <https://ssrn.com/abstract=2178600> or <http://dx.doi.org/10.2139/ssrn.2178600>
- Schomer, I., & Hammoud, A. (Forthcoming - 2019). Women in STEM: Promoting Women's Employment in Infrastructure Sectors. World Bank Group.
- Stoet, G., & Geary, D. (2018, February). The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education. *29*(4), pp. 581-593. doi:10.1177/0956797617741719
- World Bank. (2008). Lebanon: Electricity Sector Public Expenditure Review. Wahington DC: World Bank Group. Retrieved from <http://siteresources.worldbank.org/INTMNAREGTOPENENERGY/Resources/LebanonElectricityPER.pdf>
- World Bank. (n.d.). *World Bank Development Indicators*. Retrieved December 2018, from <http://datatopics.worldbank.org/world-development-indicators/>

This report or any portion thereof may not be reproduced or used in any manner whatsoever without the express written permission of the authors. The views expressed in this document are those of the authors, and do not reflect the views of the World Bank Group or the Issam Fares Institute for Public Policy and International Affairs, or the American University of Beirut.

