

The role of women in the decarbonization path

Gender equality is a fundamental condition to achieve a just and efficient transition to a low-carbon economy. A successful inclusion of women in the sector means achieving greater diversity and complementarity as well as expanding the pool of talent to better address the demand for skills. In more advanced economies, actions addressing the existent gender gap in education are needed in order to exploit the employment potential of the clean energy sector. Although varying along with differences in socio-economic and cultural settings, there are specific opportunities for women in developing countries as well

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To this date, women continue to be an underutilised source of value in the vast majority of countries and sectors of the economy worldwide. This severely hinders the development capabilities of each country for it reduces the size of their pool of talent and consequently the possibility to satisfy the demand for skills. The lack of integration of women in the economic sector in general is a cost that in Italy reaches around 7% of GDP, according to Banca d'Italia. Even more, in the transition to a low-carbon economy, the participation of women can be understood

as a necessary condition of success. In fact, such enormous task entails a transformation of society that will not be accomplished without the full participation of all its members. Hence, equal opportunities for both sexes to participate to the process, as well as to benefit from its positive socio-economic impacts, need to be ensured. This is specifically relevant in the energy sector in general, as it is key to a successful transition to a low-carbon economy. Alas, we are far from reaching full gender-equality and the renewable energy sector is one of the least gender-balanced to date. However,

efforts to promote gender-equality are experiencing a positive momentum worldwide. It was within this thrust that ENEA, in collaboration with IEA and Clean Energy Education and Empowerment (C3E) Technology Collaboration Programmes (TCP), organized 'Knowledge Building on Women in Clean Energy', on 11th April 2018[1]. This workshop saw the participation of many representatives from NGOs and Government Agencies of different countries (Italy, Sweden, Austria, Canada, United States, Australia, India and South Africa), International Organizations (UNECE,



FAO, UNIDO, OECD, World Bank, ILO, IRENA) and education and research institutions as well as representatives of private companies of all sizes operating in the sector. The purpose of the workshop was to promote collaboration among all actors to overcome obstacles, such as lack of data and knowledge on gender, and identify priorities to overcome the gender-gap in the clean energy sector.

These can be considered some of the first steps towards a successful exploitation of the many opportunities provided for women by the process of decarbonization. A general but not fully exhaustive introduction to these opportunities is proposed in this article.

Employment in the renewable energy sector

As already mentioned above, the renewable energy sector is one of the least gender-balanced. At the same

time, it has an enormous potential for employment generation.

The sector employed 10.3 million jobs in 2017, a 5.3% increase from the previous year (2016)[2]. Although it has grown across a variety of countries, China, Brazil, the United States, India, Germany and Japan are in the lead (2016) [2]. The greatest increase concerned the Photovoltaic industry, expanding roughly around 9% from 2016.

The share of women employed in the renewable energy sector is hard to determine due to a severe lack of sex-disaggregated data at the global level (relevant contributions on this aspect in the above-mentioned workshop will be discussed further below). However, IRENA has recently conducted several surveys aiming to extract sex-disaggregated data by addressing private companies in the clean energy sector. As a result, in 2016 the average share of women employed in the 90 companies which responded the survey was

around 35%, a number higher than the respective for traditional fossil-fuel sector (2016) [2]. The lower degree of gender discrimination in the renewable energy sector with respect to the traditional energy sector was confirmed by a later survey in 2017 [2].

Future trends

Recent estimates suggest that a progressive decarbonization in electricity, transport and construction, and consequent improvement in sustainability in the energy sector, will create roughly 18 million more jobs by 2030 in comparison to a business-as-usual path [3]. This net job growth is the result of roughly 24 million jobs created and 6 million jobs lost. It will concern the renewables sector (+11%), the manufacturing sector (+0.5%), the construction sector (1.7%) as well as services, waste management and agriculture sectors, though by a smaller magnitude[3]. At the regional level, the Americas (0.45%), Asia and the Pacific (0.32%) and Europe (0.27%) will experience net job growth, while the Middle East and Africa are likely to experience net job losses (-0.48 and -0.04% respectively) if maintaining the historical trend in their economic structure [3].

Importantly, the fossil-fuel and related sectors are expected to experience job-losses. According to IRENA, this is already happening due to automation in extraction, oversupply and lowering prices of oil and the pressure of renewable energy among the factors (2016) [2].

Among the determinants of net job creation is the higher labour demand of clean energy vis-à-vis fossil-fuels produced energy, including employment demand of the value chain of

renewable energy, electric vehicles and construction [3]. In addition, skilled personnel previously employed in the traditional energy sector could be transferred to the renewable energy sector (for example, electrical engineers and technicians sourced from the conventional electricity industry) (2013) [2].

In the context of the workshop, Bipasha Baruah (Global Women's Issue, University of Western Ontario, Canada) presented the campaign 'Blue Green Canada' launched to capture public opinion concerning an increase in investments in clean energy. Accordingly, investing a million dollar in the traditional fossil-fuel sector in Canada would result in 2 new jobs created against 15 new jobs in the renewable energy sector. Unfortunately, while this scenario may seem to suggest a net increase in job creation for women, ILO warns that there is an elevated risk that decarbonising the economy will only confirm the current gender gap, if considerable effort is not taken to narrow gender segregation at the educational and occupational level [3].

The issue of training

One of the factors contributing to occupational segregation, particularly in more advanced economies, is certainly the under-representation of women in STEM fields (Science, Technology, Engineering and Maths) at advanced career levels (graduate and research). This remains a major concern, broadly identified worldwide and discussed during the workshop, for it hinders the achievement of gender equality in the renewable energy sector. Ultimately, it translates into a limitation in size and diversity of the pool of talent available to each country for satisfying the

demand for skills and reaching the maximum development potential.

Gender gap in STEM fields varies from country to country as it depends on different socioeconomic and cultural factors. In Europe, data on the level of progress made in gender equality for Research and Innovation is provided for by the latest edition of 'She Figures' [4]. Accordingly, in 2012 women were over-represented amongst PhD graduates in most fields in the EU, except for in science, mathematics and computing, engineering, manufacturing, construction and services [4]. In the same year, women represented only 28 % of PhD graduates in engineering, manufacturing and construction in the EU [4].

In the workshop, some participants have presented several initiatives designed as a response to this issue. Monica Parrella (Department for Equal Opportunities, Presidency of Council of Ministers, Italy) presented the three-year program started by Italy last year, promoting two-week summer schools for lower-education school members to counter stereotypes and introduce them to STEM fields. Sabine Mitter (Austrian Federal Ministry for Transport, Innovation and Technologies) presented FEMtech, a project aiming to raise awareness and sensitisation to achieve equal opportunities in industrial and non-university research, which included a data-base of female professionals and the nomination of a 'Female of the Month' to provide for role models. Kimberly C. Ballou (Department of Energy, USA) introduced the programs adopted to promote gender balance in STEM fields in the United States: STEM Role Model Training to empower STEM professionals from across the Department of En-

ergy to effectively prepare colleagues to serve as confident role models for under-represented students in STEM fields; STEM Mentoring Cafes to promote introduction of middle school students to STEM through interaction with STEM professionals and Women@Energy to create dialogue on personal experiences of women employed in STEM fields. Alexandra Nowak (Department of Energy, OECD) illustrated recent publications by OECD dealing with the promotion of women in STEM fields [5].

Furthermore, Francesca Zajczyk (Department of Sociology and Social Research, Bicocca University, Italy) has provided a general overview of educational and cultural models for youth, based on data gathered at Italian and EU level. She emphasised the role of self-perception in shaping educational and professional choices. This is relevant as gender gap in STEM fields starts forming when different career paths are chosen for boys and girls as young as 15 years of age [5]. Her study showed gender segregation across disciplines is favoured by widespread stereotypes and prejudices towards scientific subjects, in schools and in families as well as in society in general. As a result, only 31% of the girls between 11 and 17 years old "consider Maths a funny subject" and a meaningful share of girls believe males are more talented than females in scientific subjects. Moreover, the lack of female role models reinforces such segregation.

These findings suggest action is to be taken in the system of early education, to contrast stereotypes formation that can result in educational segregation, in the long-term.

However, as mentioned by Rabia Ferroukhi (Knowledge, Policy and

Finance Centre, IRENA), the clean energy sector does not exclusively provide employment opportunities in STEM fields. Environmental specialists, legal and administrative positions are widely available in most companies operating in the sector, a valuable source of employment for women that should not be overlooked.

The lack of sex-disaggregated data

Because of the lack of sex-disaggregated data reported above, there is a risk for gender inequalities to remain mostly unnoticed, particularly in STEM fields. The issue was addressed during the workshop which dedicated a session to discussing the tools and methods to assess women workforce in clean energy at country level.

In this regard, Branislava Jovicic (BGEN and WISE SEE, Serbia) presented the work of Women in Sustainable Energy, South East Europe (WISE SEE), a project that promotes active engagement, representation and strengthening the role of women in sustainable energy, climate action and environmental protection. A pilot study was conducted in Serbia, designed to be replicated in other countries of the region. The methodology included a mapping of professionally engaged women in sustainable energy, climate action and environmental protection. Furthermore, interviews focused on attitudes, roles and professional position held were conducted for 1100 women through CAWI (Computer-Assisted Web Interview). As a result, some sex-disaggregated data was acquired and there is evidence of low participation of women at the top institutional decision-making level, in Serbia. In addition, a growing par-

ticipation of women in STEM fields was observed.

Bipasha Baruah acknowledged the difficulty encountered in finding sex-disaggregated data in both developed and developing countries, adding that it is also crucial to analyse gender equality in the sector against the backdrop of general economic and political environments. Although important determinants of gender gap, they remain seldom addressed.

Efforts to tackle the issue were also announced by Caroline McGregor on behalf of SEforALL, while Valerie Green (UNIDO, South Africa) underlined the need for categorization to ensure that future data gathering can tune in with existing methods. All in all, there was a general recognition of the need for improvement in data collection and develop case-studies to favour efficient policy development.

Energy access and clean energy

In developing countries, where energy access is limited, renewable energy can be an important means for women empowerment. As they are more likely to be involved in the procurement and consumption of energy at the local level, decentralised renewable energy systems offer an opportunity of participation to the decision-making process, and would foster the establishment of small-scale clean energy enterprises, in which women tend to be more involved (2017) [2]. Moreover, limited energy access is likely to have the worst impact on women as they might be forced to spend hours collecting fuelwood, instead of pursuing education or employment (2017) [2]. As a result, employment opportunities arise in the context of

energy access and in the form of employment creation from women-led enterprises.

A crucial issue in developing countries is the one of clean cooking. Massimo Gaiani (Ministry of Foreign Affairs and International Cooperation, Italy) emphasized the urgency to provide adequate technology and access to electricity to the estimated 3 billion people worldwide. Not only would this reduce an unsustainable use of biomass in the form of fuelwood, but it would also limit the use of indoor open fires which are currently killing an estimated 1.9 million people per year of pneumonia, cancer and chronic respiratory diseases. Approximately 60% of these victims are women and 56% are children under five years of age (2017) [2].

Along with evident environmental and health benefits, clean cooking would also provide important economic benefits. As already mentioned, women, more than men, would be better able to pursue employment or education. Moreover, employment creation in the manufacturing and construction of improved cook-stoves increases women's employment opportunities.

Final Remarks

There seems to be widespread agreement that gender equality is a fundamental condition to achieve a just and efficient transition to a low-carbon economy. A successful inclusion of women in the sector means achieving greater diversity and complementarity as well as expanding the pool of talent to better address the demand for skills.

In more advanced economies, actions addressing the issue of training

are needed in order to exploit the employment potential of the clean energy sector and close the existent gender gap. Moreover, increase flexibility in the workplace to guarantee greater work-life balance and equal pay are crucial targets. In general, specific policies addressing gender differences need to be tailored to favour the inclusion of women in all sectors. In addition, women's responsiveness to environmental issues is an impor-

tant asset. This is particularly evident in developing countries, where women have been shown to be the main beneficiaries of improvement in energy supply. Although varying along with differences in socio-economic and cultural settings, there are specific opportunities for women in developing countries. Improving energy access at the local level, favouring the emergence of small-scale clean energy enterprises and providing for clean-cooking will re-

sult in women empowerment. Finally, efforts in the educational system are needed to foster a more comprehensive change in individual behaviour that is the necessary condition for both the achievement of a gender-equal society and a successful transition to a green economy.

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