ACCELERATING SDG 7 ACHIEVEMENT

POLICY BRIEF 5

ENERGY AND SDG 8

DECENT WORK AND ECONOMIC GROWTH

POLICY BRIEF #5

ENERGY AND SDG 8 (DECENT WORK AND ECONOMIC GROWTH)

Developed by

International Renewable Energy Agency (IRENA) and the International Labour Organization (ILO)

In collaboration with

European Commission, PowerForAll, The World Bank

Key Messages

New sustainable economic opportunities continue to emerge from the ongoing energy transition. To take full advantage of these, it is essential that the depth and diversity of local labour markets and supply chains be strengthened through appropriate industrial, fiscal, and trade policies.

Renewable energy: According to the most recent estimate by IRENA, employment in the renewable energy sector reached 10.3 million in 2017, a 5.3 per cent increase over the previous year, with solar PV jobs representing the largest segment (IRENA, 2018b). In electricity generation, there is generally higher labour demand related to renewable energy compared to fossil fuel sources. In the transport sector, the manufacturing of electric or hybrid cars will create jobs and demand for new skills, for example in the production of car batteries, specific maintenance skills and emission control engineers.

Energy efficiency: Employment opportunities related to energy efficiency will be concentrated in sectors that manufacture energy efficient goods, as well as the machinery and equipment to produce them. The construction sector is also expected to be a major source of jobs related to energy efficiency. There will be demand for new skills in handling new materials and technologies, sustainable construction processes, and the planning and management of major building projects.

But workers and communities whose livelihoods rely on fossil-fuel based industries will need support and social protection, in order to reorient themselves to the new energy economy. Gains in sustainable energy jobs will not completely offset the loss of fossil fuel jobs, and employment gains and losses will not necessarily match in terms of skills, locations, and availability.

In the ILO's WESO model 2018 analysing net job impacts on 84 occupations in the transition to energy sustainability, 24 million jobs would be created and 6 million lost, out of which 5 million could be filled through reallocation—through job openings in the same occupation in another industry within the same country. Only about 1 million workers are in occupations with no expected equivalent vacancies in other industries.

Decentralised renewable energy solutions are creating increasing numbers of jobs and can support livelihoods through productive use of energy. Depending on the business model, employment opportunities may be more in sales and distribution (cash-based transactions), or in technical jobs such as software design, logistics, and customer service (pay-as-you-go model). Improved energy access enables productive uses of energy and catalyses local economic activity, creating income streams and additional employment.

Employment in the energy sector is traditionally male-dominated. However, findings from an IRENA survey suggest that women represent 32 per cent of the labour force of the responding organisations—substantially higher than the 22 per cent average in the global oil and gas industry (IRENA, 2019). The distributed nature of off-grid renewable energy solutions offers tremendous opportunities for women's engagement along multiple segments of the value chain.

As the renewable energy industry expands, removing barriers to entry, ensuring retention, and prioritising career advancement for women will be essential to meet the growing skills demand. Barriers include: hurdles preventing women from entering an industry or advancing to certain roles; limited transport and insufficient workplace infrastructure; inadequate institutional sexual harassment policies; regressive organisational cultures in male-dominated fields; gender pay gaps resulting from occupational segregation and unequal pay for equal work; and lack of care services.

Introduction

The present text updates the information presented in Policy Brief #13 (UN DESA, 2018), which examined the manifold ways in which SDG 7 on energy and SDG 8 on decent work and economic growth are interconnected.

New sustainable economic opportunities continue to emerge from the energy transition. For an economy to take full advantage of these, it is essential that the depth and diversity of local supply chains be strengthened through appropriate industrial, fiscal, and trade policies.

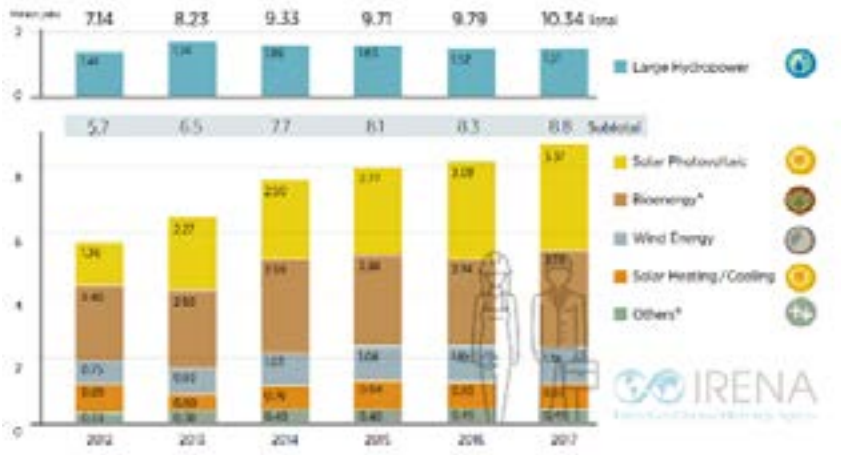
Workers and communities whose livelihoods rely on fossil-fuel based industries will need support and social protection during the transition, in order to have a chance to reorient themselves to participate in the new energy economy. In areas that lack access to electricity and modern energy services, decentralised renewable energy solutions are creating increasing numbers of jobs and can support livelihoods through productive use of energy.

Whether in the modern energy context or in energy access situations, it is becoming increasingly clear that a focus on gender equality needs to be at the core of actions taken in the sector, to both articulate the eeds and views that women have and tap into the vast talent pool they represent.

Employment

The transition to a sustainable energy system implies an expanded role for both renewable energy and greater energy efficiency. The state of knowledge about employment in renewable energy has improved in recent years. The ongoing expansion of installed renewable energy capacity has translated into a growing workforce in the sector. According to the most recent estimate by IRENA, employment in the renewable energy sector reached 10.3 million in 2017, a 5.3 per cent increase over the previous year (IRENA, 2018b)[1]. Solar PV jobs represent the single largest segment and increased almost 9 per cent, to reach 3.4 million in 2017, reflecting the record installation of 94 gigawatts of solar PV (Figure 1).

Figure 1: Global Renewable Energy Employment, 2012-2017



Source: IRENA, 2018b

However, policy makers are concerned with economy-wide employment trends and patterns—the direct, indirect, and net job effects shaped by a wide range of technical, economic, and policy-driven factors, and interlinkages between sectors, supply chains, and global trade structures. In fact, policy makers want

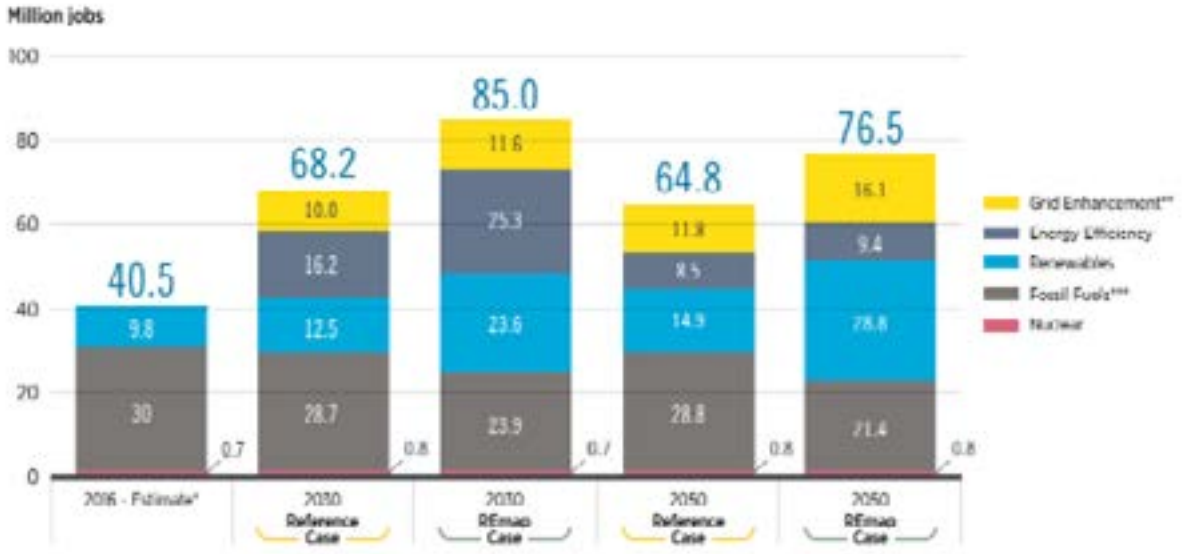
1 The estimate is based on an extensive annual review of available databases, studies and estimates. Except for the hydropower sector, the jobs numbers include direct and indirect employment along the renewables value chain. Induced jobs, which are generated when employees of the renewable energy sector spend their salaries on goods and services throughout the economy, are excluded.

to know the net employment effect of a sustainable energy transition designed to achieve SDG 7 with an energy system compatible with the 2°C goal of the 2015 Paris Agreement and SDG 13.

Based on different sets of approaches and methodologies, recent econometric studies show varying results. They converge, however, on a shared conclusion—meeting the climate goals will translate into net employment gains in the global economy. An IRENA study (IRENA, 2018a) estimates the gain in 2050 that is around 0.14 per cent higher under the agency's 'Remap' energy transition case than under the Reference Case (which is based on a current policies scenario).

The energy transition will increase employment across the broader economy, and also specifically in the energy sector. As shown in Figure 2, the global energy sector employed some 41 million people in 2016. Under REmap, employment in renewable energy could potentially double to reach 23.7 million by 2030 and then 28.8 million by 2050. It would completely offset the loss of fossil fuel jobs, although gains and losses do not necessarily match in spatial, temporal, or skills terms. Salient examples on how to manage coal mine closure from the perspectives of those impacted, including governments, enterprises, workers, and communities, are highlighted by a recent World Bank Report which presents global best practices and aims to foster new platforms and partnerships (Stanley et al., 2018). Investments in energy efficiency measures and grid enhancement under IRENA's REmap transition pathway create a further 25.5 million employment opportunities.

Figure 2. Employment in the overall energy sector, 2016, 2030 and 2050 (million jobs)

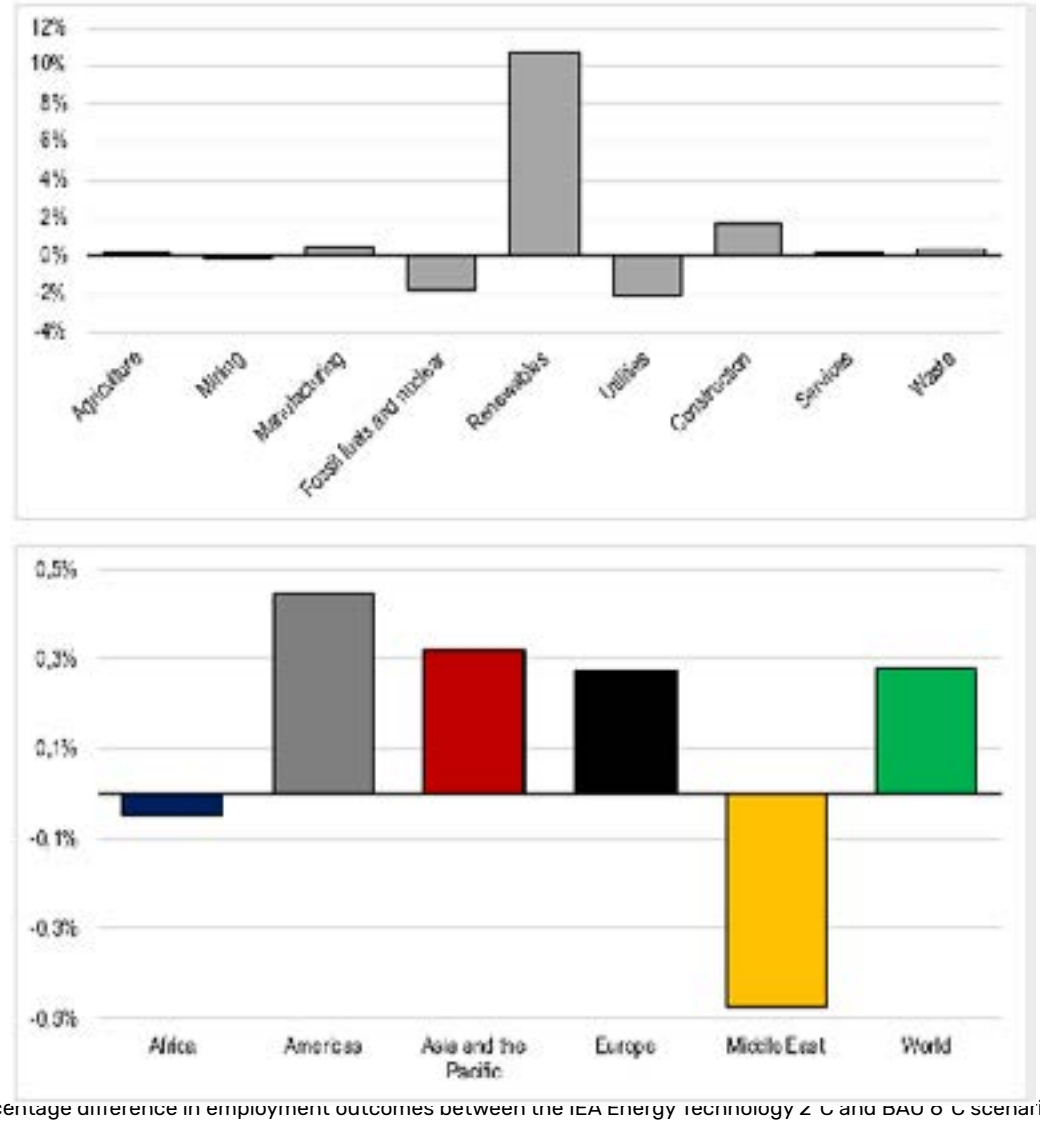


Source: IRENA, 2018a

Similarly, the ILO developed a global model to estimate net employment, based on International Energy Agency (IEA) country-specific scenarios that decouple the energy sector from fossil fuels in the electricity, transport, and construction sectors, thereby achieving SDGs 7 and 13 (ILO, 2018). The projected net job creation of 18 million by 2030 is the result of around 24 million jobs created and 6 million jobs lost globally. The global figures mask significant differences across regions, countries, and sectors (see Figure 3). Employment creation is driven by the higher labour demand of renewable energy sources in comparison with electricity produced from fossil fuel sources where losses are greatest. Employment demand grows in value chains associated with renewable energy and electric vehicles and construction. In the renewables sector (hydro, biomass, solar thermal, solar photovoltaic (PV), tide and wave, and geothermal), job creation

is expected to be higher by around 11 per cent in the Renewable Energy 2°C scenario, as compared to the business-as-usual scenario. Information on the quality of these jobs, such as wage levels and workplace quality, is important to consider.

Figure 3. Employment in 2030 associated with energy sustainability, compared with the business-as-usual scenario, by region and sector



Notes: Percentage difference in employment outcomes between the IEA Energy Technology 2°C and BAU 6°C scenarios by 2030.

Source: ILO calculations based on Exiobase v3

Accounting for jobs related to energy efficiency is a complex undertaking because efficiency is a fluid concept, rather than a fixed threshold. Further, it entails diverse technologies and stretches across the entire economy. The traditional focus of energy efficiency policy on energy savings is linked to an underestimation of the benefits that energy efficiency can bring, such as improved sustainability of energy systems, economic and social development, health and wellbeing, and improved industrial productivity. Direct and indirect linkages between energy efficiency, employment, and social welfare are very clear, although less information exists compared with other energy sectors.

According to Assessing the Employment and Social Impact of Energy Efficiency, a study published in

December 2015, energy efficiency employs nearly 1 million people in the European Union. Sectors with the greatest levels of energy efficiency jobs were those that produce, or are part of the supply chain for, investment goods. This includes jobs related to manufacturing of machinery and equipment that enables the production of energy efficient goods, as well as the energy efficient goods themselves. More jobs can be created thanks to the manufacturing and installation of energy efficient products, although the sectors that will provide the most opportunity for job creation will be the building and transport sectors.

Skills Requirements of Renewable Energy

Policy Brief #13 pointed to the diverse array of skills and occupations in the renewable energy sector, with findings from studies of labour requirements in solar PV and onshore wind projects of a typical size. Additional insights are available for offshore wind, where a total of 2.1 million person-days are needed for a typical 500 MW facility (see Figure 4). Procurement and manufacturing represent 59 per cent of the total; operation and maintenance, 24 per cent; and grid connection and installation, 11 per cent.

Figure 4: Employment impacts in the onshore wind power value chain

The ILO Skills for Green Jobs Report 2019 analyses skills and occupational needs in a transition to energy sustainability and achieving SDGs 7 and 13 (forthcoming ILO Global Skills for Green Jobs, June 2019). In addition, it compares 32 countries in terms of their policy coherence regarding green jobs, renewable energy policies, and skills policies. By expanding the results explored by the ILO WESO model 2018 to analyse net job impacts in an 'Energy Technology 2 degree world by 2030,' it quantifies the implications for skills, genders, and occupations. In the 84 occupations analysed in the transition to energy sustainability, out of the 24 million jobs that will be created and the 6 million lost, 5 million of those can be filled through reallocation. This means that those 5 million workers are in occupations where they will lose their jobs because of the downsizing of a particular industry, but will find that a job opens in the same occupation in another industry, within the same country. As result, a little more than 1 million workers are in occupations with no equivalent vacancy in another industry (jobs in occupations lost, not reallocatable). This also means that skills needs are required for occupations in around 19 million new jobs (ILO 2019 forthcoming).

Energy efficiency and skills

In the EU transport sector, manufacturing electric or hybrid cars will create both jobs and demand for new skills, for example, in the production of car batteries, specific maintenance skills and emission control engineers. The construction sector is also expected to be a major source of both low- and high-skilled jobs related to energy efficiency. There will also be demand for new skills in handling new materials and

technologies, sustainable construction processes, and planning and management.

In general, there will be demand for high-skilled workers in jobs that involve auditing, consulting, organisation, and consultation, such as managers of major building projects. When it comes to building a skilled workforce, training in science, technology, engineering, and mathematics will be key, due to the technological nature of many of the occupations.

Results from ILO also show that most job creation and reallocation is concentrated among mid-skill level occupations. These results suggest that the growth in mid-skill level jobs under a transition to energy sustainability scenario can partly offset the global trend of skill-based technological change.

Employment through Reliable Energy Access

As business models for providing energy access spread and mature, the expansion of off-grid renewable energy solutions creates growing employment. Information remains relatively sparse, but a number of reports are shedding light on this fast-evolving situation. A 2017 study (Hystra, 2017) compiled information on direct employment provided by companies operating in the energy access field. A 2018 study by the organisation GOGLA regarding direct employment in the off-grid solar sector (looking at sales data and information from close to 40 companies), estimated that direct employment in the off-grid solar sector in sub-Saharan Africa and South Asia runs to about 450,000 full-time equivalent jobs and could rise to 1.5 million by 2022 (see Figure 7).

Figure 7. Direct Employment in the Off-grid Solar Sector, 2018 and 2022 projection

	Employment (thousands)	
	2018	2022
East Africa	77	350
West Africa	26	150
Central Africa	7	70
South Asia	340	970
Total	450	1,540

Source: GOGLA, 2018a.

This estimate covers the sales and distribution, installation and maintenance, and customer support segments of the value chain, but excludes manufacturing and assembly, which takes place primarily in countries like China (PV panels) and Germany (batteries). Depending on the business model, employment opportunities are either more present in sales and distribution (cash-based transactions), or in technical jobs such as software design, logistics, and customer service (pay-as-you-go model). Improved energy access enables productive uses of energy and catalyses local economic activity, creating income streams and additional employment (GOGLA, 2018b).

Meanwhile, in 2018, the group Power for All launched an annual jobs census on the decentralised renewable energy (DRE) sector in low-energy access countries, as part of its #PoweringJobs campaign. This is the most comprehensive jobs census known to date for the DRE sector, surveying nearly 150 companies in India, Kenya, and Nigeria across the DRE technology spectrum (including solar lanterns, solar home systems, solar irrigation, commercial and industrial solar systems, and mini-grids), as well as the supply chain (from manufacturing and wholesale imports to sales, installation, and operations). This is a first-of-its

kind bottom-up source of jobs data for the sector. The survey will expand its geographic scope each year, aiming to cover 10 countries in 2019 and 25 the following year.

Initial findings show tens of thousands of people employed directly by the DRE sector in the three countries, and many more induced jobs stimulated through access to electricity in rural communities. The quality of DRE jobs—in terms of retention and compensation—is high when compared to other energy sectors. The survey provides data specific to these and other areas, including women and men and youth representation in the workforce. The data show that women are heavily under-represented in the current workforce, while youth representation is mixed. The research identifies significant gaps in skills and training, in particular management and business development, that need to be filled in order to build a robust energy access workforce and ensure that universal electricity access is achieved. Full results will be released later in 2019.

Gender equality as a central factor for success

The business case for tackling gender equality is growing. A 2018 World Bank Group (WBG) report indicates that for 141 countries, the loss in human capital wealth due to lifetime gender income inequality is approximately US$ 160 trillion. This suggests that globally, human capital wealth could increase by 21.7 per cent and total wealth by 14 per cent if there was gender equality in earnings (Wodon and de la Brière, 2018b). In addition, emerging research has shown a link between greater gender equality in employment and positive business outcomes, such as increased productivity, retention, and firm performance.

Employment in the energy sector is traditionally male-dominated. However, findings from an IRENA survey (IRENA, 2019)[2] suggest that women represent 32 per cent of the labour force of the responding organisations—substantially higher than the 22 per cent average in the global oil and gas industry. These findings are consistent with reports from a range of countries. In the US, for instance, the share of women in the solar industry rose quickly from 19 per cent of the workforce in 2013 to between 26 per cent and 28 per cent in recent years (Solar Foundation, 2019). Data from an 8 country baseline assessment in South Asia showed that in Afghanistan, there were 14 women engineers out of a total of 68 (21 per cent) working at the national power utility (World Bank, 2019a). In Africa, Ethiopia Electric Utility has about 20 per cent female employees out of a staff of over 14,000 (EEU, 2018), pointing to significant gender gaps.

When looking at gender gaps in science, technology, engineering, and mathematics (STEM), it is important to note that these gaps begin early as girls and boys embark on different educational tracks. The gaps grow as girls and boys progress through primary, secondary, and tertiary education and contribute to the underrepresentation of women in STEM. There are more women enrolled than men overall at the tertiary education level globally, but only around 30 per cent of women pursue STEM-related fields of study (UNESCO, 2015). As they move along the pathway of employment, close analysis is needed of various barriers faced by women, including in areas relating to entry into the labour force, retention, and career advancement. A range of factors at the societal, institutional, and individual levels come into play.

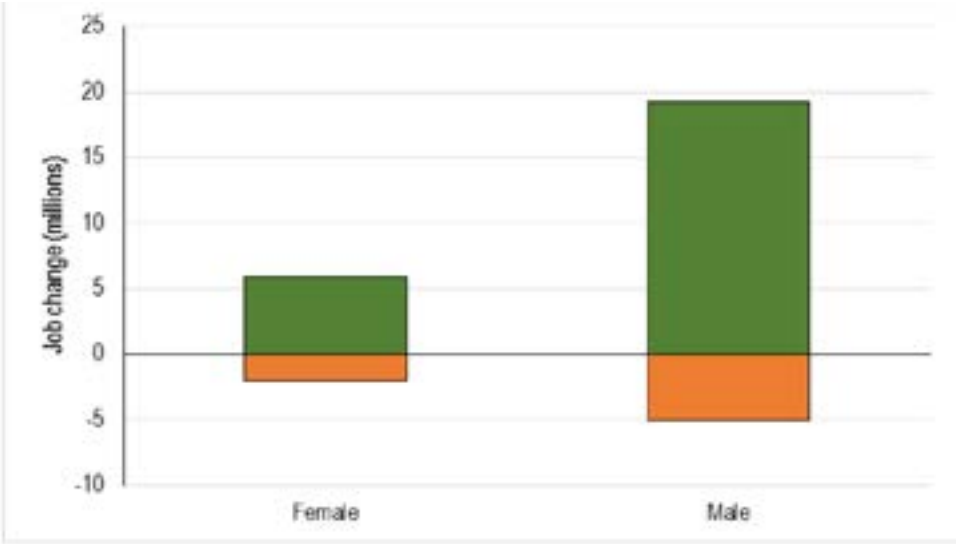
As the renewable energy industry expands, removing barriers to entry, retention, and career advancement for women will be essential to meet the growing skills demand. Barriers that need to be addressed include: hurdles preventing women from entering an industry or advancing to certain roles; limited transport and insufficient workplace infrastructure; inadequate institutional sexual harassment policies and reporting mechanisms; regressive organisational cultures in male dominated fields; gender pay gaps resulting from occupational segregation and unequal pay for equal work; and a lack of care services. (Orlando et al., 2018; World Bank, 2019b). Ingrained social and cultural norms are behind many of these barriers. Changing norms inevitably takes time, but will allow remedial measures to be more effective, including workplace policies that promote training, gender-sensitive policies, diversity targets, networking, and mentoring, (IRENA, 2019).

ILO model results on achieving SDG 7 in conjunction with SDG 5 (Gender equality) show that most job creation

2 The multi-stakeholder survey attracted close to 1,500 respondents from 144 countries working for private companies, government agencies, non-governmental organisations, academic institutions, and other entities.

and reallocation is concentrated among male-dominated occupations. If no policy action is taken, most of the jobs that will be destroyed would be concentrated in occupations which are male-dominated, and the same is true for the majority of jobs that will be created. This would mean a continuation of current discrimination in energy-related occupations, with no equal access to employment opportunities for women.

Figure 8: Jobs created and destroyed in an energy transition scenario by gender, 2030



The distributed nature of off-grid renewable energy solutions offers tremendous opportunities for women's engagement along multiple segments of the value chain. Evidence also points to the fact that engaging women as entrepreneurs, employees, and consumers can enhance development outcome. For example, evidence from Kenya shows that when female entrepreneurs are engaged in the clean cooking value chain, they outsell men by almost 3:1 (Shankar, 2015). Moreover, when women purchased cookstoves from female entrepreneurs, they were more likely to report consistent and correct use of cookstoves. In Indonesia, initial assessments indicate that users are more likely, by almost 20 percentage points, to report sustained use of their cookstoves when they are purchased from women as opposed to men (World Bank, 2016). Many of the skills needed to take advantage of those opportunities can be developed locally and women are ideally placed to lead and support the delivery of off-grid renewable energy solutions. However, women face barriers to participation in the sector, including cultural and social norms, as well as a lack of programmes and policies tackling barriers to employment and livelihood programmes, and lack of skills and training opportunities. Better access to training and skills-development programmes, reduction in time and drudgery constraints, enhanced mobility, and improved access to finance, are some of the intervention that could reduce the barriers to women's employment in value chains.

Recommended actions

To advance the energy transition, Policy Brief #13 recommended a comprehensive package of measures, including macroeconomic and growth policies, industrial and sectoral policies, enterprise policies, skills development, occupational safety and health, social protection, active labour market policies, rights and social dialogue, and ensuring that a focus on women's employment is at the core of energy sector engagement. These policy tools and interventions remain salient.

Among the next steps to be taken is an improved and more fine-grained analysis of the benefits of energy

efficiency. This Update expands the analysis in Policy Brief #13 to cover net employment and recommends policy actions to ensure a 'just transition' as outlined by the ILO (ILO, 2015).

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7 AFFORDABLE AND CLEAN ENERGY