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Gender and Renewable Energy: Wind, Solar, Geothermal and Hydroelectric Energy

GENDER AND DIVERSITY DIVISION, SOCIAL SECTOR.



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1. INTRODUCTION

Renewable energy plays an essential role in reducing greenhouse gases and mitigating climate change, while also serving as a tool to improve the energy security of countries and providing social benefits to their respective populations. In 2013, renewable energy met 22.1% of worldwide electricity demand.¹ With more than half of its energy demand served by energy sources without CO₂ emissions, Latin America and the Caribbean is one of the most dynamic regions in this sector.²

In places where a new renewable energy plant is being installed, nearby residents can enjoy benefits associated with this type of project, such as economic opportunities created during the renewable energy farm's construction and maintenance phases or income received from the leasing of land. In the specific case of women, they can gain access to new jobs and income generation opportunities, or improved health and safety due to the improved quality of local social services such as schools and hospitals, among other examples.

However, renewable energy projects may also exacerbate differences within beneficiary communities and generate or deepen gender inequalities. For example, women partici-

pate very little in consultations prior to project design and have more limited access to employment than men. In turn, women typically do not participate in decisions concerning the benefits that the community receives from the company as part of the project.

In order to avoid generating these inequalities, a gender perspective should be included in the design and execution of renewable energy projects that facilitates the inclusion of female voices and meets their most immediate needs, transforming women into active agents of change within their communities. Consequently, not only are inequalities between men and women reduced, but the effectiveness of the project itself can also improve³ by virtue of integrating, for example, skills and knowledge that would not otherwise have been tapped.

This document focuses on how to incorporate a gender perspective in operations that support the construction, operation and maintenance of medium- and large-scale renewable wind, solar, geothermal and hydroelectric energy installations connected to the grid for purposes of power generation. At the end of this document, there is also a section on

BOX 1: Inter-American Development Bank (IDB) Operational Policy on Gender Equality in Development

Approved in 2010, the IDB's Operational Policy on Gender Equality in Development is intended to contribute to gender equality and the empowerment of women through two lines of action:

- **Proactive Action** through direct investment in gender equality and women's empowerment, and the mainstreaming of gender perspective into projects.
- **Preventive Action**, which introduces gender safeguards, to prevent, avoid or mitigate gender-based exclusion and potentially adverse gender-related impacts on men and women resulting from the Bank's activity through its financial operations.

1. REN 21. Renewables 2014. Global Status Report.

2. Bloomberg New Energy Finance, Multilateral Investment Fund part of the Inter-American Development Bank, UK Department for International Development, Power Africa. Climatescope 2014 Report.

3. Narayan, Deepa. 1995. "The Contribution of People's Participation: Evidence from 121 Rural Water Supply Projects" ESD Occasional Paper Series 1. World Bank, Environmentally Sustainable Development Department. Washington, D.C.

rural energy that is applicable to small installations and mini-grids, or to exceptional cases where medium- and large-scale facilities provide electricity to a community.

Using a gender equality approach that recognizes the conditions and needs of both men and women, this document (i) identifies the possible gender equality challenges and opportunities as part of the project assessment, (ii) highlights the risks and potentially negative impacts of the project on gender equality, (iii) offers recommendations for addressing, preventing and mitigating challenges and for maximizing opportunities; and (iv) presents examples of programs that have taken into account gender differences or risks. In

addition, the document includes (v) key questions for analyzing gender issues in renewable energy projects, and (vi) examples of indicators for the monitoring and evaluation of operations in the renewable energy sector.

Because the renewable energy sector currently does not offer sufficient good practices in gender equality that could potentially serve as a reference, some of the recommendations and examples that appear in this document have been drawn from other energy and infrastructure sectors. The recommendations and examples from other sectors set forth in this document have been analyzed to ensure that their use in this sector is appropriate.

2. CHALLENGES, OPPORTUNITIES AND RECOMMENDATIONS FOR ACHIEVING GENDER EQUALITY IN RENEWABLE ENERGY PROJECTS

The startup of a renewable energy installation in the vicinity of a community produces a series of both positive and potentially negative impacts related to its construction and operation.

This chapter reviews some of these challenges and opportunities with the aim of facilitating the incorporation of a gender perspective during the diagnostic, design, implementation and monitoring phases of renewable energy projects.

A series of recommendations is also included at the end of each section related to specific challenges and opportunities. In order to facilitate equal opportunities and benefits for men and women throughout project design and implementation and to avoid negative gender-related impacts, members of the project teams can evaluate these recommendations and then decide which are most appropriate for inclusion in their projects.

During the diagnostic phase of projects, a gender analysis should be conducted as part of the project's preliminary social assessment. Annex 1 includes key questions that can be included in this analysis.

CONSULTATIONS AND DECISION-MAKING

The processes of consultation and community participation in renewable energy projects offer an excellent opportunity for informing the community about the development of the project and related benefits, as well as for improving the project's social acceptance. Furthermore, these processes allow the community to express its opinions, needs and concerns. Consultation is not a single event at the beginning of the project, but rather an ongoing process that facilitates the identification and discussion of key issues during the design and construction of renewable energy operations and their associated impacts.

Increasing the presence of women in consultations contributes to the inclusion of different points of view and interests, which may contribute to the better design and implementation of the project, and better results. Likewise, this may facilitate the empowerment of women, as it can help demonstrate the value of their contribution and strengthen their position in the community and in their respective households.

The participation of women and men in project consultations or during project implementation depends on many factors:

- **Admission Rules** that can be established by national policies, local policies or the project itself. For example, some projects require title to land in order to attend the consultations, which can considerably limit the participation of women.
- **Social norms.** In different parts of the Americas, women cannot speak freely in public forums. Doing so in some indigenous communities, for example, may adversely affect their reputation or may result in public censure.
- **Levels of education.** Most renewable energy projects are carried out in rural areas populated by remote communities, many of which are indigenous. In these communities, the proportion of women who are illiterate or who only speak an indigenous language is considerably higher than among their male counterparts within the same communities and compared to women in the overall population. This education gap can increase the marginalization or exclusion of women from consultations.
- **Different working hours and division of labor.** The tasks assigned to men and women within the community may prevent women from attending the consultations, for example, if they are scheduled at times when women are caring for their children, preparing meals or fetching water.
- **Lack of identification document.** Without a legal identification document, men and women cannot prove that they live in the community in order to participate in the consultations. This problem disproportionately affects indigenous women relative to other groups of the population.

Recommendations:

During the consultation processes, it is important to identify women's preferences in relation to the renewable energy project. To do so, women's participation should be encouraged during information meetings, decision-making related to project approval and other critical issues, as well as in

community benefit sharing. These meetings are an excellent opportunity to learn about women's needs related to household care and maintenance, their productive activities and other needs of the community, as well as to ascertain how women expect to be affected by the project.

1. **Channels of communication.** Use specific communication channels to reach both men and women. For example, a poster in a school or market or an invitation sent to women's associations could be the most appropriate method for announcing the project to women, while a poster posted at a town hall could reach more men.
2. **Scheduling.** Conduct the consultation at times that do not conflict with daily tasks that cannot be disrupted, e.g., preparing meals.
3. **Venue.** Conduct consultations in places to which people in the community can easily travel, especially women who may have more limited means to do so.
4. **Childcare.** Facilitate childcare during the consultation or allow children to attend.
5. **Education.** Use language suitable for the education level of both men and women.
6. **Language.** Use the common language among the community's residents, which may differ between men and women.
7. **Identification document.** Seek an alternative to the mandatory presentation of an identification document or title of ownership for purposes of attending the consultations. For example, request the person's home address or ask other residents if they belong to the community.
8. **Separate consultations.** If it is not possible to achieve the participation of women in the general consultation processes, conduct separate consultations with men and women in order to enable the latter to speak more freely.

EMPLOYMENT

In 2013, 6.5 million direct and indirect jobs were created in the renewable energy sector worldwide.⁴ According to the International Renewable Energy Agency (IRENA), more than 16.7 million jobs could be generated under an optimistic forecast by 2030. Brazil is a Latin American country

4. IRENA (2014), Renewable Energy and Jobs - Annual Review 2014.

that has created a considerable number of jobs in the renewable energy sector. For example, 32,000 were employed in the wind industry in 2013 in that country.⁵ The figures also demonstrate that the renewable energy sector is over-whelmingly male, with women only accounting for 20-24% of total jobs.⁶

The reasons for this gender gap in employment includes the lower levels of participation of women in certain areas of higher technical education as well as persistent gender stereotypes. These factors can lead to unequal opportunities for women both in hiring processes and the compensation levels they garner for their work.

Highly qualified employment. Renewable energy investments generate jobs for highly skilled professionals. Some phases of the manufacturing of components, project preparation, and construction of the renewable energy operations require skills acquired through the completion of advanced degrees in technical careers where women are underrepresented. In recent decades, more Latin American women have embarked upon scientific and technological careers, but not in engineering, a phenomenon mirroring trends in other regions of the globe.⁷

Likewise, women with careers in science, technology, engineering and mathematics (STEM) are less likely than their male counterparts to work in STEM occupations,⁸ as reflected by the very low percentage of women employed in these types of jobs.⁹ Fifty-two percent of women employed worldwide in STEM occupations abandon their jobs between the ages of 35 and 40 due to lack of female role models, because they feel alone in a male work environment that does not align well with their way of addressing problems, and because they cannot reconcile their domestic responsibilities with the long workdays and extensive travel prevalent in this type of company.¹⁰ A predominantly male environment also may lead to the absence of adequate facilities for women in the workplace, the use

of sexist language, sexual harassment, the absence of other women in the same department or the existence of a business culture with which women do not identify.

Unskilled jobs. Renewable energy plants also can provide job opportunities to workers without specific qualifications or those who may be trained to perform their work prior to initiating the construction of the renewable energy farm. These jobs include site cleanup, road construction, transport of components and the operation and maintenance of installations. Workers from local communities usually perform these jobs, which may be a source of female employment.

Women are sometimes adequately prepared to work in jobs tied to construction, but the male environment in which they work leads them to turn down or abandon such jobs.

Employment in the supply chain. The construction and maintenance of a renewable energy plant may create jobs for micro, small and medium enterprises that provide services related to the operation. These services may be covered by businesses within the community, which may be a source of jobs for local women.

Recommendations:

Highly qualified female employment. In order to promote female employment among highly qualified professionals:

- Offer scholarships to bolster women's access to technical careers with professional opportunities in renewable energy.
- Promote alliances with technical schools and universities in order to support business internship programs for female students.
- Develop strategies to attract women to professional training institutes and universities with renewable energy programs.
- Support the retention of female talent at companies with

5. Ibid.

6. IRENA (2013), Renewable Energy and Jobs.

7. UNESCO Regional Chair. Women, Science and Technology in Latin America, www.catunescomujer.org/catunesco_mujer (Consulted October 2013).

8. United States Department of Commerce, 2011 "STEM: Where are the women?", www.esa.doc.gov/Blog/2011/08/03/stem-where-are-women.

9. 24% in the United States. Ibid.

10. Harvard Business Review, June 2008. "Stopping the Exodus of Women in Science", hbr.org/2008/06/stopping-the-exodus-of-women-in-science/

BOX 2: Women of Wind Energy

Women of Wind Energy (WoWE) is an association based in the United States that supports education, professional development and the promotion of women in order to ensure that the renewable energy sector has a stable and diverse labor force while supporting a robust economy within the same sector.

The association offers scholarship programs to female students at universities or technical programs; face-to-face and online mentoring; development of networks of contacts through professional events comprising forums, lunches and local activities; recognition awards that annually honor outstanding women in the industry, as well as online courses that serve as a knowledge exchange platform for subject matter related to renewable energy, as well as broader issues necessary for professional development.

Source: www.womenofwindenergy.org

work arrangements that facilitate the reconciliation of family and professional lives.

- Facilitate the promotion of women within the organization through career development and leadership programs. See Boxes 2 and 3.

The presence, promotion and support of women in businesses not only promotes gender equality in the workplace but also may contribute to a company's financial success, as revealed by several studies. One such study, conducted by McKinsey and Company¹¹ in Europe, demonstrates that companies with a higher proportion of women serving in managerial positions correlated with a 17% increase in their respective share prices between 2005 and 2007.

Unskilled female employment. In order to increase the employment of women in jobs not requiring specific qualifications:

- Promote gender equality in hiring. To that end, projects may encourage the employer to adopt practices such as the facilitation of hiring under equal conditions, the review of hiring requirements to detect criteria that potentially exclude women, and the exploration of targets related to women's participation.
- Include women in training activities in order to carry out construction, operation and maintenance work that does not require specific qualifications.

Working environment. The following actions are recommended for improving the working environment of women employed by renewable energy companies:

- Create exclusive facilities, e.g., bathrooms or lactation rooms, for women in construction areas.
- Provide women with appropriate uniforms. For example, make uniforms available in sizes appropriate for women, including pregnant women.
- Create or support childcare options.
- Promote an environment free from sexual harassment in which this type of attitude and behavior is prevented, and where conflict reporting and resolution are facilitated.

Employment in supply chain:

- Support a shift from the informal to the formal sector for women's businesses that provide services such as cleaning, security, textile production, food services, etc. to renewable energy plants. For example, women's cooperatives could be formed to help support and facilitate such a shift.
- During the procurement process, assess the gender certification of vendors, suppliers and other partners by relying upon a system similar to that offered by National Institute for Women (*Instituto Nacional de la Mujer*) in Mexico.¹²

11. McKinsey and Company. *Women Matter*. 2007.

12. In 2003, *Instituto Nacional de la Mujer* implemented a gender equity certification program in Mexico for public and private companies. More than 300 certified companies have reported improved performance and labor productivity, the narrowing of gender gaps and the promotion of women to leadership positions.

COMPENSATION FOR LAND

Renewable energy installations require extensive land areas to conduct their activities. Once construction is underway, neither the communities that own these lands nor residents living nearby will be able to use them. Therefore, this type of project acquires land where such projects will be permanently established through lump-sum payments.

After turbines are installed at wind farms, however, lands surrounding those areas may continue to be dedicated to original uses corresponding to forestry, agriculture or livestock. Thus, the sponsoring companies regularly rely upon a leasing contract as a formula for obtaining the right to use land where wind turbines are installed. To that end, a contract is formalized with the landowner for a period equivalent to the life of the renewable energy farm and provides for an annual rent payment that may be a fixed amount or tied to production.

Expropriation, a less common form of land acquisition, is a technique employed to resolve ownership and tenancy issues such as an unknown owner or contradictory titles.

Financial compensation. In the three scenarios described above, financial compensation is paid to landowners for use of their land. In most cases, land is communally owned or registered under the name of a male rather than female heads of household.¹³ Therefore, women rarely receive direct compensation from the renewable companies and often do not receive a share of the benefits from their partners despite the fact that they live in the same household.¹⁴ This can worsen economic inequality within both the community and households.

Joint ownership. In cases where both partners jointly own the land, one may act without the other's authorization. Even if they are co-owners, women often do not participate in discussions concerning the project and its potential

BOX 3: Company Equality Plan

Gamesa, a technological leader in the global wind industry, put in place an Equality Plan that promotes, among other objectives, non-discriminatory hiring of personnel, equal opportunities between men and women in professional development and promotion, as well as the reconciliation of personal and work life. The Permanent Equality and Diversity Committee is responsible for monitoring the plan and introducing necessary improvements.

Additionally, Gamesa maintains a Sexual Harassment Prevention Protocol in the workplace and measures to support victims in cases of gender-based violence.

In turn, the company upholds the Women's Empowerment Principles, an initiative guided by UN Women and the United Nations Global Compact (UNGC), which among other issues, calls for the abolition of discriminatory business practices in the realm of employment and occupation.

Source: www.gamesacorp.com.

Principles for the empowerment of women weprinciples.org/

United Nations Global Compact (UNGC) <https://www.unglobalcompact.org/AboutTheGC/TheTenPrinciples/index.html>

13. For example, data from rural household surveys conducted in the early 2000s in Latin America demonstrate that the gender gap in land ownership is substantial. Female land ownership ranges from 11% in Brazil to 27% in Paraguay. Deere y León, 2002. "Género, propiedad y empoderamiento: tierra, Estado y mercado en América Latina" (Gender, ownership and empowerment: land, the State and the market in Latin America) Mexico, Bogotá.

14. Deere, Carmen Diana & Doss, Cheryl R., 2006. "Gender and the Distribution of Wealth in Developing Countries," Working Paper Series RP2006/115, World Institute for Development Economic Research (UNU-WIDER).

benefits. On other occasions, women do not even sign the leasing contracts.

Exclusionary documentation. Generally, property registration formats include only one line, with a sole owner typically assumed to be the head of household. This may occur with leasing contracts generated by the company as well, generally excluding the woman's name from the document.

Recommendations:

- **Communal ownership.** In cases of communal ownership, ensure that both men and women receive a portion of the financial compensation for use of communal lands. To that end, women should be informed of their rights under communal ownership.
- **Inclusionary documentation.** All project documentation that requires the inclusion of the name of landowners should provide two lines in order to ensure adequate space for entry of the names of both the man and the woman.
- **Different compensation models.** Explore other compensation models that enable distribution of economic benefits not only to the holder appearing on the property record but also to the household associated with land ownership. For example, the creation of a joint bank account where the property's lease payment is deposited can be encouraged, thereby avoiding cash payment and promoting bank use among the poor.

COMMUNITY BENEFIT SHARING

Benefit sharing mechanisms represent a vehicle for transferring a portion of the benefits obtained by companies to communities affected by renewable energy installations, while also improving the project's social acceptance. The most frequently used mechanisms include improvements to infrastructure and social services, reduction of electricity prices, creation of a community fund, shared ownership of the renewable energy farm, and the payment of taxes or compensation.

Benefits for women. Men within communities ultimately receive the majority of benefits due to the low level of fe-

male participation in consultations and decision-making, in tandem with limited formal ownership of land by women and difficulty securing employment during project execution.

Recommendations:

- **Participation in consultations.** Encourage women's participation in consultations and project decision-making when discussions concerning benefit sharing occur, as previously cited.
- **Women's preferences.** Take into account women's preferences in the selection of beneficiary projects within the community, which will generally include aspects related to education, health and finance. See Box 4.
- **Benefits for households.** Define whether benefits will be delivered individually or by household based upon the conditions experienced by women within the community.

RESETTLEMENT AND CHANGES IN LIVELIHOOD

In some cases, geothermal or hydroelectric operations result in significant resettlement. In cases of wind or solar farms, resettlement of residents are minimal as are changes in their livelihood although there can be a reduction of cultivated area due to use of a portion of the land by the wind turbine tower or solar panels or the temporary stoppage of activities conducted on land during certain phases of the farm's construction.

Inclusionary resettlement. Involuntary resettlement processes or changes in people's lifestyles may pose a high risk for women and their dependents if plans are designed and implemented without the effective participation of women, focusing instead solely upon male heads of household.

The resettlement of households or communities frequently represents a component that can alter the way of life of affected residents and the type of land tenure applicable to their land. The loss of a part of their property due to the resettlement process may deprive affected men and women of not only their homes but also their workplace,

BOX 4: Benefits for women at hydroelectric plants

A hydroelectric project in Bujagali, Uganda instituted a \$2.4 million community fund to support investments and programs related to community development over a five-year span following construction of the hydroelectric plant there. The project offers a specific program to women that includes a facility for maternal-child health care. To ensure the sustainability of works executed in the community, they actively promote the creation of water boards from which a village's inhabitants can receive training to operate and maintain water pumps. Similar committees address issues such as health, agriculture, etc. Women chair many of these boards.

Source: World Bank. *A Guide for Local Benefit Sharing in Hydropower Projects* (2012).

BOX 5: Resettlement in Laos - Hydroelectric project

The resettlement that occurred during the construction of the NamTeum 2 Dam in Laos affected 6,300 people in 17 communities. In order to ensure the effective participation of women in all phases of the project, the power company hired gender specialists led by the Laos Women's Union. This ensured the effective implementation of the Social Development Plan and the Resettlement Action Plan, which included important gender considerations.

Among the key actions, it is worth noting that land titles were issued jointly to the man and women, as was the compensation for those who were resettled. In addition, alternative livelihoods were created, such as raising chickens and producing handicrafts, for the most vulnerable resettled households.

Source: Energy Sector Management Assistance Program, ESMAP. 2013. *Integrating Gender Considerations into Energy Operations*. World Bank.

markets and income-generating opportunities. Hence, compensation for these losses is essential to protecting the economic security of affected persons and their families, and, in particular, women, who tend to work from home or in informal markets and jobs, and who are primarily responsible for their children and other dependents.

The IDB Involuntary Resettlement Operational Policy (PO-710)¹⁵ considers the risks women face during the resettlement process, especially the loss of income sources, and proposes measures to address such risks.¹⁶

Recommendations:

- **Participation.** Ensure the participation of women in negotiations concerning the resettlement plan.
- **Joint title and compensation.** Ensure that titles to land and the right to compensation are issued on behalf of the couple, when relevant.
- **Improved standards of living.** Ensure that living conditions are improved relative to those present prior to resettlement. The new resettlement should facilitate permanent access to water, electricity, quality housing, and

15. Available on the IDB website at publications.iadb.org/handle/11319/2585?locale-attribute=en.

16. Inter-American Development Bank, 2013. "Salvaguarda de género sobre los derechos de la mujer a la propiedad de la tierra, vivienda y otros recursos: Lineamientos para su aplicación en los proyectos del Banco" (Gender safeguards for women's rights to the ownership of land, housing and other resources: Guidelines for application thereof to the Bank's projects).

BOX 6: HIV/AIDS prevention and treatment

The multinational mining company Rio Tinto supports employees and communities in which they work to prevent the spread of HIV/AIDS given that some of its operations are carried out in countries with high rates of infection from the disease. Under the purview of a multi-year plan, all of its operations must evaluate the risks inherent to HIV, and, if necessary, establish a mitigation program that covers the full life of the operation, while also identifying the accompanying risks. Among other elements, Rio Tinto's programs include prevention, education, voluntary testing and treatment.

One of Rio Tinto's companies, Richards Bay Minerals, located in South Africa, uses theater to reinforce safety and awareness-building messages during employee meetings. In 2004, the company produced *United against AIDS*, a simple and informative brochure describing issues such as the nature of sexually transmitted diseases, the importance of people knowing their HIV status and how AIDS is treated. Furthermore, Richards Bay Minerals uses peer educators, free testing and condom dispensers in bathrooms and changing rooms at its facilities and in high-risk areas within the community.

Source: www.riotinto.com. Consulted October 1, 2013.

maternal and child health care, among other services.

- **Maintenance of informal networks.** Facilitate the maintenance of informal assistance networks, relocating women and their families to places near relatives or friends.
- **Income enhancement.** Increase income through the creation of lending groups, training in different trades, access to markets, access to productive assets and promotion of equal employment opportunities for women.¹⁷

HEALTH

Improved standard of living. The construction of an energy installation generally requires road repair or construction in areas surrounding the installation in order to facilitate the transport of materials and personnel to the site. These projects sometimes span hundreds of miles, including wind projects for which enormous turbine parts must be transferred from ports to the interior of the country. Such road repair can boost a community's standard of living, especially among women, by improving access to markets, information and services and by facilitating faster access to health centers.

HIV/AIDS and commercial sex. However, the construction phase of renewable energy operations and farms attracts a considerable volume of temporary workers — most of whom are men — to an area where they interact with the local population. This interaction may facilitate the spread of HIV/AIDS and other sexually transmitted diseases, as well as commercial sex and the sexual exploitation of children. Women and girls living in areas near construction sites are more vulnerable than other social groups due to their lack of knowledge on this subject matter, a low level of coverage for services offered in places where they live and because of existing cultural and social norms.¹⁸

Recommendations:

Sexually transmitted diseases. Implement communications and awareness-building campaigns, develop community plans to prevent HIV/AIDS and other sexually transmitted diseases, establish local health services, and develop codes of ethics for contracted staff and monitoring systems.¹⁹ See Box 6.

17. Ibid.

18. UNAIDS, 1998. "Expanding the global response to HIV/AIDS through focused action: reducing risk and vulnerability. Definitions, rationale and pathways" Geneva.

19. Inter-American Development Bank, 2014. "Informe sobre la salvaguarda de género sobre violencia contra las mujeres, trata de personas y propagación del VIH/SIDA" (Report on gender-related safeguards to prevent violence against women, human trafficking and the spread of HIV/AIDS).

Commercial sex, human trafficking, violence and exploitation. Carry out communications and awareness-building campaigns concerning commercial sex and its potential consequences, provide for medical and psychosocial care services, and create codes of conduct, which, for example, warn about the commercialization of sex with minors.

SAFETY

Partner violence. The employment of women in new jobs generated within the community that have traditionally been performed by men may increase the risk of intimate partner violence resulting from changing economic roles and relationships within the family.

Traffic accidents. Road construction or improvements necessary during the construction phase of renewable energy installations may lead to an increase in traffic accidents in neighboring areas. This is due to an increase in traffic, particularly of heavy vehicles, and to modification of traffic flow. More than three quarters (77%) of deaths from road accidents around the world occur among men.²⁰ As pedestrians, boys also die more frequently than girls because the former are more likely to cross the street unaccompanied by an adult.^{21 22}

Recommendations:

Partner violence. An awareness-building module concerning the risks and negative impacts of intimate partner violence and the benefits of female employment both for households and the community may be included during the processes corresponding to consultation and worker training in work pertaining to construction and maintenance of the renewable energy installation.

Traffic accidents. Support driver education campaigns that provide information on how traffic flow will change within the area and how to prevent possible accidents.

Include adequate signage that warns of new road layouts, and construct sidewalks and pedestrian bridges, where needed.

RURAL ENERGY

The use of small wind turbines, solar panels or mini-hydroelectric systems facilitates the introduction of electricity in rural communities. In certain cases, large-scale renewable energy operations and farms agree to deliver electricity to the community. In both cases, the population receives a series of benefits arising from the introduction of electricity to rural areas. Potential benefits for women include the reduction of time dedicated to household tasks, income generation, as well as health and safety improvements. Women may also incur negative impacts in certain circumstances.

Consultations and decision-making. General recommendations on the aforementioned consultations will be applied to rural energy projects. In addition, as part of the ongoing consultation process, women may be involved in local decision-making bodies related to the management of turbines and energy generated, such as groups of electricity users and management of public services, committees and electricity boards within the community.

Recommendations:

- Establish targets for female representation on community electricity boards or equivalent bodies.
- Train women to increase their capacity to attend and participate in decision-making processes. See Box 7.

Self-employment. The introduction of electricity to households may facilitate the development of women's enterprises and boost household income levels. Electricity enables women to (i) reduce the number of hours dedicated to household tasks and reallocate such time to productive activities, (ii) expand their workday in order to continue working at nightfall, and (iii) purchase electrical appliances

20. Examples of statistics by country: Colombia 80%, Jamaica 82%, Peru 76%, Mexico 78%, Costa Rica 87%, Belize, 86%. World Health Organization, 2013. "Global Status Report on Road Safety" www.who.int/violence_injury_prevention/road_safety_status/2013/en/index.html.

21. World Health Organization, 2002. "Gender and Road Traffic Injuries", whqlibdoc.who.int/gender/2002/a85576.pdf.

22. Although the majority of challenges, opportunities and recommendations set forth in this work are directed towards women, the project's potential impacts upon men should also be borne in mind.

BOX 7: Women leaders in risk management

In 2007 and 2008, the Peruvian Sierra Irrigation Subsector Program (Programa Sub-sectorial de Irrigación de la Sierra del Perú) prepared a Gender Plan to improve the standing of women in water user associations (WUAs). Activities such as the following were implemented: workshops on leadership, communication and self-esteem for women; visits to exchange experiences with women who served in relevant capacities in other WUAs; training on regulations and comprehensive management of irrigation water; and awareness-building workshops for male leaders and users concerning the importance of focusing on gender within WUAs.

Though the overall number of jobs held by women did not increase, female representation rose at the WUAs. Women attained positions of greater importance in decision-making. During project implementation, water-rationing measures were implemented since users have better management capacity, yielding a reduction in conflicts over water use.

Source: www.worldbank.org/en/breve. December 2011. Number 173.

BOX 8: Solar Women of Totogalpa

Founded in 2010 in Nicaragua, Solar Women of Totogalpa (Mujeres Solares de Totogalpa) is a cooperative comprised of 19 women and one man who focus on promoting, producing and researching renewable energy for the sustainable development of the family and community.

With support from the National Engineering University (Universidad Nacional de Ingeniería), this initiative began in 1999 with a project for reintegration of victims of mines. The project's objective was to train this vulnerable population in the production and installation of photovoltaic panels in order to generate jobs and in the use of alternate energy sources in communities that did not have access to electricity. During this project, women in the community realized that solar energy could be used to replace their wood stoves and improve their own lives and those of their families. Solar Women was founded in 2003 to produce photovoltaic panels, solar stoves and dryers, in addition to medicinal products and plants cooked and dried on these stoves. These products are made and sold in the "Solar Center" created in the community. Solar Women of Totogalpa received the SEED Award in 2008.

Source: SEED Initiative. www.seedinit.org and Mujeres Solares de Totogalpa www.facebook.com/casitasolar.

like refrigerators or irons, which improve the quantity and quality of the products corresponding to their work. All of these improvements can contribute significantly to the creation of home-based microenterprises by women.

However, certain factors may limit the capacity of women to carry out income-generating activities, such as difficulty accessing credit, unreliable electricity supply and lack of information on efficient energy use.

Recommendations:

- **Training:** Train women on the productive use of electricity in their homes and for their businesses. See Boxes 8 and 9.
- **Access to credit:** Facilitate women's access to credit in those projects that include funding for the community.

Tariffs. Projects that facilitate connection to the electricity grid face some challenges and opportunities related to the tariff system:

BOX 9: Training women for management roles in renewable energy

A regional project is being implemented during the electrification of remote rural communities in Bhutan in order to improve gender inclusion in access to clean and renewable energy. The project supports pilot interventions in order to increase the access of poor women located in rural areas to reliable and affordable energy and technology services. An important aspect of activities focuses on the training of women in skills related to the energy sector in order to boost their prospects for survival, enabling them to access non-traditional sectors.

One of the project's main objectives is to train 120 technicians in villages to operate and maintain off-the-grid household solar energy systems and to maintain on-the-grid systems — objective: 40% of women.

Project impact indicators include reduction of time women dedicate to household tasks and increase of time dedicated to learning and recreational activities; increase in the number of microenterprises owned by women that use electrical appliances; and an increase in the participation of women in community decision-making activities.

Source: Asian Development Bank. 2011. Proposed Regional Grant Assistance to Improving Gender-Inclusive Access to Clean and Renewable Energy in Bhutan, Nepal, and Sri Lanka. Manila.

BOX 10: Electricity for the rural poor in Laos

The Rural Electrification Project for the People's Democratic Republic of Laos supports the development of the energy sector and the expansion of the electricity grid to rural areas. To that end, a component referred to as "Energy for the Poor" was developed that offers interest-free loans to families so they can connect to the electricity grid. In designing "Energy for the Poor", special attention was devoted to households headed by women, divorced women or widows with children, who tend to be the poorest and most vulnerable within communities. Thanks to the program, connection to the electricity grid among households headed by women grew from 67% to 95%.

Source: World Bank, Energy Sector Management Assistance Program, ESMAP, 2013. "Integrating Gender Considerations into Energy Operations". Washington, D.C.

- **Poor households.** The lack of capacity to among poor households to pay for the connection to the electricity grid or monthly fees can be an obstacle to accessing electricity services. Female heads of poor households with children under their care are even more vulnerable since they are overrepresented among the poor.
- **Fraud reduction.** Lower electrical maintenance costs and fraud in tariff management have been observed when groups of women collect electricity tariffs from households.²³

Recommendations:

- **Tariffs for the poorest.** Create subsidies, inexpensive loans, special tariffs or long-term payment plans with low interest rates for poor households that facilitate

23. World Bank, Energy Sector Management Assistance Program, ESMAP. 2013. "Integrating Gender Considerations into Energy Operations".

women's connection to the electricity grid. See Box 10.

- **Tariff collection.** Include women in the management and collection of electricity tariffs.

Health and safety. Households receiving electricity for the first time may experience health and safety improvements, especially in the case of women, such as those identified listed below:

- **Reduction of deaths and respiratory diseases.** Some three billion humans worldwide cook and heat their homes with biomass or coal in open fires or non-airtight stoves. Each year, more than four million die prematurely from diseases attributable to indoor air pollution due to the household use of solid fuels.²⁴ The replacement of these fuels with electricity may reduce death and disease among women, children and infants due to the inefficient

combustion of traditional ovens.

- **Reduced occurrence of illness due to ingestion of poorly preserved foods.** The use of refrigerators facilitates better preservation of foods, which may reduce illnesses caused by the ingestion of food in poor condition.
- **Reduction of violence.** Electrical lighting provides greater security and may facilitate nighttime social entertainment activities. Some communities have exhibited lower levels of sexual violence in places where electricity has been introduced.

Recommendations:

Try to promote initiatives to replace inefficient cookstoves for clean cooking solutions, introduce refrigerators in homes, and install streetlights.

3. MONITORING AND EVALUATION

This section includes a table with examples of indicators for measuring the results of actions that contribute to gender equality and/or the empowerment of women in renewable energy projects related to local participation in consultations, employment, compensation for land and the receipt of benefits, among other indicators. In cases of rural energy, the measurement of benefits or impacts, e.g. productivity and health, associated with the connection of households to the electricity grid is also recommended.

The list of indicators is not exhaustive because each project must develop its own indicators based on the specific context. In order to ensure that the indicator can measure

changes over time, a baseline and targets should be established for men and women that facilitate the monitoring of gender gaps detected in the project. Indicators that include beneficiaries, such as those concerning the number of people employed in the project, should be disaggregated by sex.

To date, no evaluation has been conducted of renewable energy projects that confirm that the indicators included in the table below are the most appropriate. These indicators have been extracted from existing good practices in other sectors that include similar challenges and opportunities to those described in this document.

24. World Health Organization, "Burden of disease from Household Air Pollution for 2012", www.who.int/phe/health_topics/outdoorair/databases/HAP_BoD_results_March2014.pdf?ua=1

TABLE 1: Proposed Gender-Related Results and Indicators

Outcomes and outputs	Indicators	Sources of information
CONSULTATIONS AND DECISION-MAKING		
Consultation outcome Incorporation of contributions from women during consultations in project design	<ul style="list-style-type: none"> - % of contributions by men and women during consultations included in project design - Level of satisfaction of men and women consulted about the consultation process 	<ul style="list-style-type: none"> - Drafts of consultation processes - Project design document - Satisfaction questionnaires completed after consultation
Outputs of consultations Women participate in consultation processes related to the project	<ul style="list-style-type: none"> - Number of men and women who participate in consultations 	<ul style="list-style-type: none"> - Consultation attendance lists, disaggregated by sex
Consultations designed with a focus on gender equality	<ul style="list-style-type: none"> - Number and % of consultations with a focus on gender equality (appropriate scheduling, gender segregation, provision of childcare, etc.) - Gender equality elements included in the consultations (appropriate scheduling, gender segregation, provision of childcare, etc.) 	<ul style="list-style-type: none"> - Operations manual - Monthly reports from the executing unit
EMPLOYMENT		
Employment outcomes Higher proportion of women employed in management positions or highly skilled jobs, with a reduced gender gap in these jobs.	<ul style="list-style-type: none"> - Number of men and women employed within the project in management positions or highly skilled jobs 	<ul style="list-style-type: none"> - Monthly project reports on workers, disaggregated by sex
Higher proportion of women employed in construction, management and/or maintenance, with a reduced gender gap in these jobs	<ul style="list-style-type: none"> - Number of men and women employed in construction management and/or maintenance of renewable energy installations²⁵ 	<ul style="list-style-type: none"> - Monthly project reports on workers, disaggregated by sex
Employment outputs Strategies to encourage employment among women adopted or implemented	<ul style="list-style-type: none"> - Number and % of job offers that explicitly invite women or incorporate inclusive recruitment criteria - % quota for jobs assigned to women - % of exclusively women's bathrooms in work zones 	<ul style="list-style-type: none"> - Operations manual - Monthly project reports
Strategies to encourage the presence of women in training processes aimed at enhancing human capital	<ul style="list-style-type: none"> - Number and % of announcements explicitly inviting women to training - Number of courses designed for women - Number and % of women trained in construction, operation and/or maintenance work at renewable energy installations 	<ul style="list-style-type: none"> - Operations manual - Monthly project reports

25. The level of employment in similar sectors in the community or the area in which the project is installed may be analyzed in order to establish this indicator's baseline. This would enable an evaluation as to whether the project has contributed to closing the gender gap in employment. If this baseline cannot be obtained, indicate the employment rate of men and women.

TABLE 1: Proposed Gender-Related Results and Indicators (cont.)

Outcomes and outputs	Indicators	Sources of information
COMPENSATION FOR LAND		
Compensation outcomes Women receive financial compensation from the leasing of land belonging to the household	- Number and % of women who receive financial compensation for leasing land as sole beneficiaries or as a member of a couple relative to the overall beneficiaries	- Household surveys
Women receive financial compensation in cases of communal property	- Number and % of women who receive financial compensation in cases of communal property	- Project surveys
Compensation outputs Measures implemented to ensure that women receive financial compensation for the leasing of land belonging to the household	- Number and % of women who attend the signing of the leasing contract alone and jointly with their partner. - Number and % of women who appear in contracts as sole owner or jointly with their partner - Number of men and women who attend information meetings/consultations on financial compensation from leasing - Increase in the number and % of women who are aware of their rights to the household's properties	- Monthly project reports - Leasing contracts - Information meeting/consultation attendance lists - Questionnaires conducted at the end of information meetings/consultations
Measures implemented to ensure that women receive financial compensation in cases of communal ownership	- Number of men and women who attend information meetings/consultations on financial compensation from leasing - Increase in the number and % of women who know their communal property rights	- Information meeting/consultation attendance lists - Questionnaires conducted at the end of information meetings/consultations
COMMUNITY BENEFIT SHARING		
Benefit sharing outcome Women receive some type of benefit from the project	- % of women in the community who receive some type of benefit from the project (social, reduction of the price of electricity, compensation, etc.) of the total of all beneficiaries within the community	- Monthly project reports - Household surveys
Benefit sharing output Community benefits that benefit women	- % of community benefits that benefit women	- Monthly project reports - Household surveys
RESETTLEMENT		
Resettlement outcome/impact Men and women improve their economic and social conditions after the resettlement	- Increase in levels of consumption and average income of men and women after resettlement - Improvement in housing quality after resettlement - Improvement of access to maternal and child health care services after resettlement - Increase in the number of ownership titles issued on behalf of women or jointly between men and women	- Monthly project reports - Household surveys
Resettlement output Negotiations concerning the resettlement plan that include women	- Number and % of women who participate in negotiations on the resettlement plan among the overall participants	- Negotiations meeting attendance list

TABLE 1: Proposed Gender-Related Results and Indicators (cont.)

Outcomes and outputs	Indicators	Sources of information
HEALTH		
Health outcomes HIV/AIDS cases do not increase during project execution	- Number of new cases of men and women infected with HIV/AIDS within the community or project area compared to new cases from the previous year	- Health center records
Health outputs Measures implemented to avoid the transmission of HIV/AIDS (trainings, publications, access to condoms, free test, etc.)	- Number of measures implemented in order to avoid HIV/AIDS transmission	- Monthly project reports
Greater knowledge about HIV/AIDS prevention measures among men, women and children	- Number of men and women aware of the risks and mitigation measures related to HIV/AIDS transmission due to strategies developed by the project	- Surveys completed during informational activities concerning HIV/AIDS - Household surveys - Surveys for workers
SAFETY		
Safety outcomes The number of traffic accidents does not increase during the project's construction phase	- Number of men, women and children involved in traffic accidents during project preparation compared to the previous year	- Health center records
Safety outcome Training in road safety	- Number of men and women trained in road safety	- Training course attendance lists
Introduction of adequate signage	- Increase in the number of traffic signs	- Monthly project reports
RURAL ENERGY		
Rural energy outcomes Consultations and decision-making Increase in women's participation on electricity boards or other equivalent bodies	- Number and % of women who participate on electricity boards and other equivalent bodies	- Decision-making group participation lists
Rural energy outputs Consultations and decision-making Strategies carried out to increase the presence of women in decision-making bodies at the community level (capacity building, quotas, etc.)	- Number of men and women who take part in capacity building activities related to decision-making bodies	- Training activity attendance lists, disaggregated by sex

TABLE 1: Proposed Gender-Related Results and Indicators (cont.)

Outcomes and outputs	Indicators	Sources of information
RURAL ENERGY		
Rural energy outcomes/impacts Productivity and use of time Increase in time dedicated by women to productive activities due to the introduction of electricity	<ul style="list-style-type: none"> - Number of hours dedicated by women to household tasks before and after the introduction of electricity - Number of hours dedicated by women to productive activities before and after the introduction of electricity 	<ul style="list-style-type: none"> - Operations manual - Monthly project reports - Training activity attendance lists - Household surveys
Increase in the proportion of female entrepreneurs in the community due to the introduction of electricity	<ul style="list-style-type: none"> - Number of men and women in households with new electrical connection that undertake productive activities relative to all new productive activities 	<ul style="list-style-type: none"> - Household surveys
Rural energy outputs Productivity Training for women on productive electricity use	<ul style="list-style-type: none"> - Number of men and women trained in the productive use of electricity at home and in their businesses 	<ul style="list-style-type: none"> - Operations manual - Monthly project reports - Training activity attendance lists
Strategies to boost lending among female entrepreneurs	<ul style="list-style-type: none"> - Number of men and women who received loans or credit (new and expanded) 	<ul style="list-style-type: none"> - Operations manual - Monthly project reports
Rural energy outcomes Tariffs Poor households headed by women are connected to the electricity grid due to financial incentives	<ul style="list-style-type: none"> - Number and % of poor households headed by women connected to the electricity grid because of reduced tariffs, financing, etc. 	<ul style="list-style-type: none"> - Household surveys - Monthly project reports
Rural energy outputs Tariffs Economic incentives (reduced tariffs, financing, etc.) granted to the poorest households without access to electricity, accounting for the percentage of households headed by women in the community	<ul style="list-style-type: none"> - Number of poor households headed by women that receive financial incentives in order to access an electricity connection relative to the total number of poor households headed by women without an electricity connection - % of poor beneficiary households headed by women relative to the total number of beneficiary households²⁶ 	<ul style="list-style-type: none"> - Monthly project reports
Rural energy outcomes/impacts Health Reduction of respiratory diseases in women and children	<ul style="list-style-type: none"> - Reduction of the number of women and children who visit the health center with respiratory problems 	<ul style="list-style-type: none"> - Health center records
Households that use electric stoves instead of biomass	<ul style="list-style-type: none"> - Increase in the number of households using electric stoves instead of biomass 	<ul style="list-style-type: none"> - Household surveys

26. The percentage of beneficiary poor households headed by women should correspond to the percentage of poor households headed by women in the community.

ANNEX 1

KEY QUESTIONS FOR GENDER ANALYSIS IN THE SECTOR

GENERAL

- How could the project contribute to improving equality between men and women and to reducing the gender gap in beneficiary communities?
- What are the potential risks of the project for men, women and the relationships between them?
- Are there relevant studies on gender issues in the sector or communities where the project is being implemented? Is there any type of resource that can be used to obtain gender-specific data useful to the project?
- What are women's preferences as recipients of different types of benefits of the project and as users?

CONSULTATIONS AND DECISION-MAKING

- How are women represented in the community's decision-making bodies?
- What level of education do women in the community have?
- What type of information do women receive about the project? How do women participate in project monitoring activities conducted by the community?

EMPLOYMENT

- How are women employed in the sector? What are the gender employment gaps?
- Does the project offer work both to women and men in the affected area? Are there qualified women to take the potential jobs?

COMPENSATION FOR LAND

- Is there national legislation related to marriage and inheritance that guarantees and protects women's access to property? Do women know their property rights?
- Do you know the number of beneficiaries with and without title to their respective plot of land or home in the area of influence of the project? How many female heads of household are single, widowed or separated?

BENEFIT SHARING

- Is the receipt of benefits tied to the possession of a title of ownership to the land (plot, property) or housing?
- What community projects do women identify as most important?

RESETTLEMENT

- If any resettlement is required, how will such resettlement affect men and women differently in terms of their social, labor and economic conditions and relationships?

KEY QUESTIONS FOR GENDER ANALYSIS IN THE SECTOR

HEALTH

- What factors related to the project may negatively impact the health of men and women?
- Are there information campaigns on the most important health issues affected by the project?
- Is the company taking any measure to ensure the health of its employees and the community?

SAFETY

- What factors related to the project may negatively affect the safety of men and women?
- Are there information campaigns on the most important safety issues affected by the project? Are women and men involved in these campaigns?
- Is the company taking any measure to ensure the safety of its employees and the community?

RURAL ENERGY

- Are there barriers to access and use of electricity for women or poor households headed by women?
- How will the introduction of electricity impact men and women in the community in terms of time dedicated to unpaid household tasks and productive activities?
- Do women have adequate training to develop home-based businesses after the introduction of electricity?
- Do women have access to credit in order to start businesses?
- Can the community's lowest-income households afford to pay the respective electricity tariff?
- Are there income differences between households headed by men and women? Do these income differences mean that households headed by women lack the resources necessary to connect to the electricity grid?
- Do men, women and children have any type of health problems resulting from lack of electricity (smoke inhalation, etc.)?

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