

GETTING TO GENDER EQUALITY IN ENERGY INFRASTRUCTURE

Lessons from Electricity Generation,
Transmission, and Distribution Projects





ESMAP MISSION

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FOREWORD

At a time when gender equality is increasingly recognized as smart economics and improving access to modern and clean forms of energy is considered critical to development, there is a clear business case for integrating the needs and voices of both women and men in energy infrastructure projects. The Energy Sector Management Assistance Program (ESMAP), together with the World Bank's Social Inclusion team, prepared this report in response to the urgent need to provide greater evidence and information on potential entry points for mainstreaming gender in upstream energy infrastructure projects. Today, governments and project teams generally have a good understanding of how to design energy access projects in ways that are gender and socially inclusive. But for projects further up the energy value chain, such as large hydropower infrastructure and concentrated solar plants, practitioners are less clear on what concrete actions they can take to better integrate gender into their programs.

To address this knowledge gap and identify ways to move forward, this study seeks to establish a foundation for considering gender in electricity generation, transmission, and distribution projects. A central focus is the gendered impacts of such projects related to labor force participation and land use. The study also focuses on risk prevention and social sustainability, including the promotion of better health and educational outcomes. The role of the energy utilities and businesses as key stakeholders for addressing gender issues is also considered. The study's findings confirm some of the known gendered impacts of large-scale infrastructure investments—those linked to displacement, resettlement, loss of livelihoods, job creation, and land titling, among other issues. In conducting this research, a toolkit and fieldwork guide were developed as a companion piece to this report to help project teams launch their own gender assessments, action plans, and monitoring and evaluation (M&E) initiatives.

The study's mixed-methods research approach included extensive literature and portfolio reviews, as well as critical in-country research to hear firsthand the voices of female and male stakeholders. In Senegal, a qualitative analysis was conducted to identify the gendered impacts of transmission and distribution network extension, densification, and rehabilitation works on land and labor markets. In Morocco, focus group discussions were held with key stakeholders of the concentrated solar power plant in Quarzazate. In Nepal, a qualitative analysis of longer-term gender impacts was conducted at the Kali Gandaki hydropower site. In India, a quantitative analysis of gender issues helped to differentiate labor outcomes for a power grid development project. At the global level, the research team interviewed power utilities to identify success stories and good practices (e.g., those in France and Indonesia).

Early research findings were presented during webinars and technical workshops, where leading experts and external partners agreed on the need for more investment in this type of research. Further research at both country and regional levels is needed to better understand potential interventions for promoting gender-equal project outcomes. Various social and poverty screening and assessment instruments are already in place for the early stages of project design. Using these existing tools to delve deeper into key gender issues, potential impact areas, and mitigation measures will better equip project teams with timely and relevant data to inform their project designs and policy dialogue. This report offers numerous examples and suggested starting points. But it is at the country-specific project and policy level where the piloting and scaling up of work must occur.



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ABBREVIATIONS

CSP	Concentrated Solar Power	M&E	monitoring and evaluation
CSR	corporate social responsibility	NGO	nongovernmental organization
EDF	<i>Électricité de France</i>	OP	Operational Policy (in the World Bank Operational Manual)
ESW	economic and sector work	PSDP	Powergrid System Development Project (India)
GAP	gender action plan	SENELEC	<i>Société Nationale d'Électricité du Senegal</i>
IPP	indigenous peoples plan	STD	Sexually Transmitted Disease
KGA	Kali Gandaki "A" Hydropower Project (Nepal)	STEM	Science, Technology, Engineering, and Math
MASEN	Moroccan Agency for Solar Energy	WBG	World Bank Group

All currency is in United States dollars (USD, US\$, or \$), unless otherwise indicated.



OVERVIEW

Gender equality is an inherent right and fundamental element for achieving a sustainable future for our planet. Beyond its intrinsic value as a core development objective, gender equality is smart economics, as stated in the *World Development Report 2012* (World Bank 2011). The World Bank Group (WBG) has scaled up gender mainstreaming, with a particular focus on the WDR framework (Box 1.1). Greater gender equality can enhance productivity, make institutions' decision making more representative of society, and improve development outcomes for the next generation. Yet gender inequalities persist in many sectors, undermining the rights of women and girls.

In the energy sector, the gender dimensions of risk exposure and benefits, including access to services, are increasingly recognized as part and parcel of effective policy making and project design (ESMAP 2013). The WBG is committed to empowering women as energy users—supporting individual and household welfare, including income-generating and productive-use activities—and providers of energy services (World Bank 2013). However, addressing gender equality and social inclusion in the context of upstream infrastructure development, which is equally important, has been little explored (World Bank 2011). Overlooking the potential gender-differentiated impacts of energy infrastructure projects at any stage in the project cycle runs the risk of undermining project effectiveness, efficiency, and ultimately sustainability; that is, the design of such projects may lead to unintended negative impacts for women, as well as a failure to achieve the project objective and missed opportunities for improving overall development outcomes (ESMAP 2013).

WHAT IS THE BUSINESS CASE? WHAT IS THE NORMATIVE IMPERATIVE?

The advent of power infrastructure holds great promise for the 17 percent of the world's people—some 1.2 billion—still living without electricity (2013 figure, International Energy Agency). Households without electricity access are located mainly in low-income rural areas of Sub-Saharan Africa and developing Asia. Low-income countries, which account for 12 percent of the global population, consume just 1 percent of total global energy, with an average electrification rate of only 30 percent (IEA AND World Bank 2014). Many more households with electricity access suffer from poor-quality supply.

Meeting the growing global demand for energy services will require expanded investments in grid- and complementary off-grid electrification programs. Large-scale projects will require investments in power generation plants; high-voltage transmission lines; and delivery systems, including substations, medium- and low-voltage distribution lines, poles, and transformers (Appendix A). Added investments will be needed to build the institutional capacity of the utility companies to ensure their financial viability and customer service reliability, as well as system expansion planning and sector regulation (Barnes 2007, 2011).

BOX 1.1

Key Definitions

Gender—the social, behavioral, and cultural attributes, expectations, and norms associated with being a woman or a man.

Gender equality—how these aspects determine how women and men relate to each other and to the resulting differences in power between them.

Three key determinants of gender equality are (i) the accumulation of endowments (education, health, and physical assets), (ii) the use of those endowments to take up economic opportunities and generate income, and (iii) the application of those endowments to take actions (agency) affecting individual and household well-being.

Social norms—patterns of behavior that flow from socially shared beliefs that are enforced by informal social sanctions.

Social networks—systems of social relationships and bonds of cooperation for mutual benefit that shape one's opportunities, information, social norms, and perceptions.

Empowerment—process of enhancing the capacity of an individual or group to make strategic choices and transform those choices into desired actions and outcomes.

Source | World Bank 2011.

Institutional Mandate to Achieve Gender Equality

Under the United Nations 2030 sustainable development agenda, governments and development agencies have a renewed mandate to achieve gender equality (Box 1.2). Given that women and girls represent half of the world's energy users, gaining a deeper understanding of the gender-energy linkages is fundamental to achieving these overlapping objectives.

The World Bank Group Gender Strategy (2016–2023) builds on past achievements and reflects both the changes on the global landscape and within the World Bank. This landmark document, based on consultations with representatives of the public, private, and civil sectors in 22 countries, raises the bar on gender equality by focusing on how the World Bank and each of its practices can move toward more impactful and transformative actions. The strategy focuses on four objectives that are relevant to the energy practice: (i) to improve human endowments, such as education, health, and social protection; (ii) to remove constraints for more and better jobs; (iii) to remove barriers to ownership and control of productive assets; and (iv) to enhance women's voice and agency, and engage men and boys.

The second edition of the Sustainable Energy for All (SEforALL) Global Tracking Framework identifies gender as one of four key development areas within the energy nexus (along with water, food, and human health). Co-led by the World Bank/Energy Sector Management Assistance Program (ESMAP) and the International Energy Agency (IEA), the Global Tracking Framework acknowledges

BOX 1.2

Gender Equality and Energy Are Inextricably Linked

Under the United Nations 2030 sustainable development agenda, gender and energy figure among the 17 Sustainable Development Goals (SDGs) for eradicating poverty over the next 15 years.

SDG 5: Achieve gender equality and empower all women and girls.

SDG 7: Ensure access to affordable, reliable, sustainable, and modern energy for all.

Under the Millennium Development Goals (MDGs), progress was made toward achieving gender equality and women's empowerment, particularly in terms of girls' primary education; yet discrimination and violence toward women and girls persist throughout the world. Energy (SDG 7), which was not a MDG, is now recognized as central to making progress on many of the other SDGs, including gender equality (SDG 5).

The SDG 7 targets are consistent with the United Nations SE4All 2030 objectives: (i) ensuring universal access to electricity and modern cooking solutions, (ii) doubling the rate of improvement of energy efficiency, and (iii) doubling the share of renewable energy in the global energy mix. SE4All leads the support of SDG 7 implementation and monitors and reports on progress toward achieving that goal.

existing shortcomings in gender-disaggregated data, and attempts to compile possible indicators for tracking the energy-sector nexus across countries (IEA and World Bank 2015).

Role of the Energy Utility Companies

Beyond the institutional mandate to achieve gender equality, integrating a gender focus is smart business for the energy utility companies. As energy consumers, women represent half of the utilities' clients. Encouraging women's greater productive use of electricity—including affordable financing to purchase more energy-efficient appliances that women prefer—can, over time, contribute to the utilities' financial viability. As energy entrepreneurs, women empowered with economic opportunities can uplift their families and communities from poverty, resulting in higher aspirational goals and thus greater demand for energy services. As employees of the utility companies, particularly in executive and management positions, women's representation can strengthen the utility's business and social performance, better anchoring the company in its operating environment (Chapter 5, Box 5.8).¹ **As job growth in the renewable energy sector continues, it is essential to develop and implement policies that create a more gender-inclusive workplace.**

Gender-differentiated project impacts, such as women's access to land, are generally lacking in the utilities' corporate social responsibility (CSR) frameworks. The scope of the CSR framework is usually limited to gender equality within the utility, while gender issues are not systematically addressed at the project level.²

STATUS OF GENDER AND ENERGY WORK: WHAT DO WE KNOW?

Since the 1990s, most gender-related energy studies have focused on electricity access and cooking energy at the household level (Clancy, Skutch, and Batchelor 2002; Skutch 1998).³ Empirical evidence is well-documented on the cumulative positive impact of electricity access on household income, health, educational advances for girls and boys, and poverty reduction (Barnes et al. 2013; Köhlin et al. 2011). In terms of gender-disaggregated impacts, such studies show that the direct benefits to women include reduced household drudgery made possible by improved household lighting and electric water pumps (Clancy, Skutch, and Batchelor 2002).⁴ Indirectly, women benefit from better outdoor lighting around the house and in public spaces, which improves security and mobility. Women also strongly value access to news and information via TV and radio, which can give them a greater voice in household and community decision making. However, the benefits resulting from energy access may also have unanticipated gendered consequences. For example, shops that adopt electric lighting may result in longer work hours for women, or mills that switch to electric processing machines may replace jobs traditionally done by women.

Recent studies on how the benefits and risks associated with energy access projects affect women and men suggest the need for greater efforts to document evidence. Köhlin et al. (2011) found that the high upfront costs of electricity connection are more likely to be unaffordable for the poor and other disadvantaged groups, including women-headed households, which, in some countries, are overrepresented in the low-income quintiles. A recent study in Sub-Saharan Africa found that, once household income is taken into account, there is no evidence that female-headed households have less energy access than their male counterparts (Kojima et al. 2016). By including effective social marketing and financing schemes to cover upfront connection costs, electrification can have a greater positive impact on poorer households, indirectly improving gender equality. Carefully designed and targeted energy interventions that are context-specific can have significant gender benefits. Limited efforts to document evidence on many of the energy-gender linkages underscore the need for studies that evaluate interventions and identify key elements of gender-sensitive project design. Understanding the key gender issues across energy topics can help project teams and policy makers develop inclusive and equitable energy programs with more gender-equal development outcomes (Table 1.1).

Gendered Impacts of Energy Infrastructure Development

The main issues in electricity generation—land, resettlement, and social impacts—are similar to those found in other infrastructure investments. For example, transport and mining projects may involve resettlement and land acquisition, an influx of labor, and the construction of ancillary infrastructure (e.g., roads and bridges), as well as building health centers and schools. However, the types of jobs and economic opportunities that electricity generation creates require specific skill sets (e.g., involving STEM fields of study) that, in some contexts, are not common among women. The electricity transmission and distribution issues that can have gender impacts are similar to those found in rural transport projects (Table 1.2).

From the outset of planning power infrastructure projects, local markets begin changing in response to the anticipated investments in the construction and operation of power plants and transmission and distribution networks. Typically, land values are directly affected by land purchases and regulatory land-use

TABLE 1.1
Energy Topics and Relevant Gender Issues

ENERGY TOPIC	AVOIDABLE IMPACTS	ACHIEVABLE IMPACTS
Energy Access (Household Energy and Rural Electrification)	<ul style="list-style-type: none"> Time poverty from fuelwood collection Health risks linked to indoor air pollution 	<ul style="list-style-type: none"> Time reallocation to income generation, education, and other productive activities Access to knowledge and information via TV, which can empower women's household decision making
Clean Energy (Renewable Energy, Energy Efficiency, and Climate Change)	<ul style="list-style-type: none"> Excluding women and female-headed households from learning about clean energy technologies Women's lack of access to financing and collateral to purchase clean energy technologies and services 	<ul style="list-style-type: none"> Changes in household decision making about energy use that leads to behavioral change and adoption of improved energy services Entrepreneurial opportunities for generating additional household income
Electricity Infrastructure (Generation, Transmission, and Distribution)	<ul style="list-style-type: none"> Gender-based violence linked to migration of workers and construction of ancillary roads Gender-sensitive work environments that discourage women's employment Women's loss of agricultural land and livelihoods resulting from land acquisitions and displacement inequitable compensation during resettlement exposure to health risks (e.g., HIV/AIDS and water-borne illnesses) Women's lack of participation in project consultations and public meetings 	<ul style="list-style-type: none"> Gender-sensitive training and skills development Use of project targets and incentives to encourage women's employment Gender-inclusive public consultations and gender analysis as part of social assessments and safeguards policies Gender-equitable compensation decision processes (e.g., women's important role in agriculture) and strategies (e.g., joint land titling) Ancillary social development investments to close the gender gap (e.g., girls' boarding schools and maternal health services) Targeted utility outreach initiatives (e.g., health risk management, prevention of gender-based violence, joint land titling, and support of women's self-help groups)
Energy Policy (Subsidies, Tariffs and Reforms)	<ul style="list-style-type: none"> Rapid tariff increases that adversely affect disadvantaged groups Lack of women's participation in policy consultations and decision making owing to societal norms 	<ul style="list-style-type: none"> Subsidies well targeted to the poor, including female-headed households Gender-inclusive policy consultations and decision making (e.g., hiring a gender specialist that meets with women-only groups)

TABLE 1.2
Impact Pathways: Examples of Opportunities and Challenges

IMPACTS	OPPORTUNITIES	CHALLENGES
Land Population displacement and resettlement ^a	<ul style="list-style-type: none"> Improved infrastructure Land titles for women or joint titling for husband and wife 	<ul style="list-style-type: none"> Risk of lower (or no) land compensation for women
Labor Economic changes	<ul style="list-style-type: none"> New business opportunities for men and women Increased female labor force participation 	<ul style="list-style-type: none"> Affordability of electricity service for the poor, including female-headed households
Social changes	<ul style="list-style-type: none"> Better health services to improve maternal health Changes in gender norms Increased social status for women Stakeholder consultations with both men and women 	<ul style="list-style-type: none"> Risk of increased gender-based violence due to migration of workers Health risks (HIV/AIDS and water-borne illnesses) Backlash resulting from women's expanded access to jobs and assets

^aEven without relocation, women may be adversely affected if common grazing areas, forest resources, and travel routes are fragmented or no longer available (Chapter 3; Appendix A).

changes. Whether values rise or fall depends on how the land will be used and land-tenure regimes, actual or perceived impacts of the new infrastructure on the surrounding environment (e.g., new road transport), and the perceived value of compensation for expropriated land. Indirectly, land values may be affected by the community's expectations about possible displacement. If resettlement is required, community members may decide to relocate or organize themselves in order to resist the project. The dynamics of local labor markets may also change. For example, large labor supplies may be needed, resulting in internal or even international migration. Changes in local land and labor markets often affect men and women differently, suggesting that their socioeconomic outcomes and impacts may also be gendered (Appendix B).

At each stage of electricity infrastructure development, investments can directly and indirectly affect communities living in or near the area where the infrastructure is built. To date, few robust studies have attempted to evaluate these socioeconomic impacts, particularly those that are gender-differentiated. Without lessons from rigorous analyses to inform projects, one might expect, based on anecdotal evidence, that women in contexts where gender inequalities persist will benefit less from the new opportunities brought about by the project and suffer disproportionately from any adverse effects.

The ancillary infrastructure that accompanies electricity infrastructure development, particularly the construction of access roads, can have a transformative effect on formerly isolated areas. Better road access can improve school attendance, particularly that of girls; increase injury reporting and trips to the hospital; and increase women's participation in economic activities.⁵ However, few women participate in transportation planning, which tends to ignore women's more complex transportation needs and priorities. Extensive surveys in the Middle East and North Africa (MENA) region, for example, show that lack of safe, affordable, and efficient transportation limits women's social and economic activities.⁶ These findings are corroborated by studies in South Africa, Uganda, and India, which show that women's higher transport burden limits their mobility and access.⁷

The planning and construction of large-scale power generation plants and high-voltage transmission lines may result in loss of access to important resources and displacement and resettlement of communities living in or nearby the project-affected areas. Compensation plans that integrate gender-responsive consultation processes that include resource and interest mapping can mitigate some of the unforeseen negative consequences of resettlement (Aguilar, Granat, and Owren 2015). All too often, however, planned resettlement processes are based on flawed (or lack of) understanding about gender roles and how they are affected by displacement (Cerne 2000). Because of gendered social norms, women often lack property rights or are unaware of them. In most cases, land titles are granted to husbands or other male family members. Many women in low-income rural areas earn their living from small businesses run on unregistered, common-property resources. If the expropriated land is not legally registered in women's names, they may be denied compensation. Resettlement and compensation have been identified as a key risk factor for project delays.

Failure to address potentially adverse social and gendered impacts of upstream infrastructure development early on in the project cycle is a missed opportunity that slows progress toward achieving desirable project outcomes and development impacts. For example, large-scale hydropower

projects with irrigation schemes that fail to recognize women as farmers and water users in their own right may put women at risk of losing access to their land and even the products of their own labor (IFAD 2007). Conversely, well-planned hydropower projects with irrigation schemes that invest in women farmers can have a positive multiplier effect via both electrification and water resources, increasing women's income and agricultural output.

New employment opportunities offered by large-scale power projects may be limited, owing to community members' low technical skills, traditional gender roles, or employer prejudice. Men might benefit disproportionately since higher wage jobs are created in such male-dominated sectors as construction of power transmission and distribution lines and road-building. With few exceptions,⁸ new jobs for women are in traditionally feminine sectors (micro, small, and medium enterprises that provide food and services to migrant workers; financial services; and clerical support). In the case of the Noor 1 Concentrated Solar Power (CSP) Project in Morocco, for example, the activities that could be undertaken by Moroccan companies were identified as civil and electrical works, mounting structure, and power plant installation (Kost et al. 2012). Contractors in charge of construction works have hired local manpower for low-skilled activities (e.g., excavation; road construction; installation of electricity transmission pylons, distribution posts, and cables; and transport services).

A useful hierarchy for considering gender entry points in electricity infrastructure projects is as follows: (i) do no harm, (ii) achieve the project objective, and (iii) seek opportunities to improve gender equity. To do no harm, project teams need to ensure the design will not lead to negative unintended gender impacts resulting from the energy project. For example, building ancillary access roads, which may improve women's access to health centers and markets, might also increase safety risks related to prostitution and sexually transmitted diseases (STDs). For transmission line projects, having a cleared and maintained right-of-way is advantageous if it improves women's access/travel options through dense forests and provides grazing options for their animals. Including both women and men in the consultation process can help to identify potential negative impacts in order to mitigate or avoid them altogether (Chapter 3). Teams also need to ensure that the project's design incorporates gender-specific elements necessary to achieve the overall development objective. Initiatives that focus on resettlement, livelihood restoration, and improved electricity access can target women through various credit schemes and longer-term employment opportunities at all levels of the plant—from cleaning staff to administrative and technical maintenance work. Finally, teams can incorporate design features that capitalize on opportunities to reduce gender disparities and improve overall development outcomes; these might include creating dual-title land deeds or including targets and quotas for women in new job markets (Chapter 2) (ESMAP 2013). Because gender is a cross-cutting theme, the potential positive and negative aspects should be considered throughout the project cycle in order to improve gender outcomes and maximize project benefits.

Advancing Gender Responsiveness in the Energy Sector

The WBG and other leading development agencies have indicated a growing commitment to conduct deeper analyses of the linkages between gender and electricity infrastructure development (Box 1.3). These analyses include more standardized collection of gender-disaggregated

BOX 1.3

Key Institutions and Programs across the Gender-Energy Landscape

A growing group of diverse organizations is focused on gender-energy issues. Many have cross-partnerships via projects and operations or the SE4All Global Tracking Framework and other initiatives. These institutions generally lack mandates that are gender-energy specific, even though most have adopted overarching gender policies and frameworks and some have published toolkits and guides. Key institutions and mechanisms are described below:

African Development Bank (AfDB). Mainstreaming gender dimensions into operations is an explicit part of the AfDB's Energy Sector Policy. In 2015, the AfDB, ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), and the National Renewable Energy Laboratory (NREL) formed a partnership and are currently developing an ECOWAS Policy and Implementation Strategy for gender mainstreaming in energy access.

Asian Development Bank (ADB). Under the ADB's Policy on Gender and Development, gender equity is an integral strategy aligned with the SE4All goal. Gender mainstreaming considerations are required in the project results framework. Various toolkits, guides, and case studies are available for conceptualizing and designing gender-responsive energy projects.

Corporate Social Responsibility (CSR). Many large international companies have CSR programs. Among them, **Deloitte** focuses mainly on gender and electricity access issues; in 2014, for example, it hosted a gender-energy conference and released a women-energy and economic empowerment paper.

ENERGIA. The leading international network on gender and energy, ENERGIA works in partnership with various organizations to provide operational guidance and technical assistance and develop knowledge products. ENERGIA's prominent gender-energy programs include the Women's Economic Empower Programme, which is aligned with the SE4All goals, and the Gender and Energy Research Programme, implemented in collaboration with the UK's Department for International Development (DFID).

Global Alliance for Clean Cookstoves (GACC). The GACC is a United Nations Foundation (UNF) initiative to scale up adoption of clean cookstoves by integrating women across the clean-cooking value chain. Its various activities include research, training, development of tools, grant opportunities, national awareness campaigns, and high-level engagement with the energy sector and gender experts.

Inter-American Development Bank (IDB). Under its 2011 Operational Policy on Gender Equality in Development, the IDB committed to systematically applying a gender perspective across all of its programs and analytical work, as well as providing direct investment in promoting gender equality and women's empowerment. In 2014, the IDB released a Gender and Renewable Energy report, which reviews challenges, opportunities, and recommendations for achieving gender equality in renewable energy projects.

International Union for Conservation of Nature (IUCN). Through its Gender Equality for Climate Change Opportunities (GECCO) energy team, the IUCN's Global Gender Office and Knowledge Center engages globally with its partners and working groups in a variety of events to promote and share knowledge on gender and renewable energy. In 2015, the GECCO energy team hosted a webinar on gender-energy infrastructure.

BOX 1.3 (CONTINUED)

Millennium Challenge Corporation (MCC). The MCC has an extensive gender policy framework for all programs to promote gender-inclusive and pro-poor energy-sector development. Ongoing energy projects are centered in South Asia and Africa regions. In 2015, the MCC hosted a gender-energy conference and workshop.

Oxfam/Department of Foreign Affairs and Trade (formerly AusAID)/German Technical Cooperation Agency (GIZ). In partnership with Australia's Department of Foreign Affairs and Trade and GIZ, Oxfam has released gender-hydropower impact assessment (IA) toolkits and mainstreaming guides based on work in the Mekong region. Under this partnership, these organizations have completed gender policy assessments for Burma, Cambodia, Lao PDR, and Vietnam.

Practical Action. This nongovernmental organization (NGO) addresses poverty issues using technology solutions, with a focus on universal access to sustainable energy. Gender inclusion, one of Practical Action's cross-cutting themes, centers on improving the efficiency of stoves and small-scale, low-cost, off-grid electricity supply. As part of these efforts, the NGO has established the Gender and Energy Network of Zimbabwe (GENEZ) and completed a gender audit of Kenya's energy programs.

Solar Sister. This is the world's first women-led social enterprise for eradicating energy poverty at scale by investing in women as clean energy entrepreneurs and leaders. The enterprise is deliberately creating a woman-centered direct sales network to bring the breakthrough potential of clean energy technology to even the most remote communities in rural Africa.

The Hawthorn Club. This international professional network of female executives promotes greater gender diversity within the energy sector as one of its primary goals.

United Nations Industrial Development Organization (UNIDO). Gender mainstreaming is a key strategy for UNIDO. Its Gender Mainstreaming Steering Committee (GMSC), in partnership with the Economic Community of West African States (ECOWAS), is advancing the SE4All agenda, focusing on energy access and women's entrepreneurship issues. UNIDO has an extensive policy framework for gender equality and empowerment, with oversight on operational guidance and operating modalities. It has published a gender-energy guide with a climate change focus. It held a gender mainstreaming side event at the 2015 Vienna Energy Forum.

United States Agency for International Development (USAID). As mandated by the 2012 Gender Equality and Women's Empowerment Policy, USAID's programs analyze and address gender issues for a wide range of projects (e.g., clean cooking projects in Haiti). Its innovative Power Africa program works directly with private-sector partners, complementing critical government efforts at policy and regulatory reform that move the gender-energy agenda forward. It also focuses on gender and climate change through clean energy. With IUCN, it recently released the publication *Women at the Forefront of the Clean Energy Future*, which focuses on large-scale or utility-scale renewable energy.

World Bank. Under the umbrella of social inclusion, the World Bank's **Energy Sector Management Assistance Program (ESMAP)** leads various gender mainstreaming efforts for World Bank projects through technical assistance and knowledge generation and dissemination. Recently, ESMAP hosted a gender-energy learning program via the World Bank's e-Institute platform. ESMAP supports two regional gender and energy programs in Africa and East Asia & Pacific with similar efforts being developed across all World Bank regions.

project and monitoring and evaluation (M&E) data. ENERGIA, the leading international network on gender and energy, is working in partnership with various organizations to provide operational guidance and technical assistance. For example, in partnership with the Norwegian Agency for Development Cooperation (NORAD), ENERGIA provides support for energy projects in Africa and Asia that seek to operationalize gender equality in their programs (e.g., identifying entry points to mainstream gender into Uganda's transmission sector). The Power Africa program of the United States Agency for International Development (USAID) aims to advance critical policy and regulatory reforms to move the gender-energy agenda forward. In addition, the World Bank's Energy Sector Management Assistance Program (ESMAP) has established a foundation of knowledge that shows how gender-informed projects can improve development outcomes, but also spearheaded innovative approaches to mainstream gender considerations in the Africa and East Asia & Pacific energy programs. Going forward, ESMAP will continue to expand its knowledge work across energy topics such as mini-grids, energy efficiency, clean cooking, and geothermal development while also supporting gender and energy knowledge and operational programs across all regions.

ESMAP is also contributing to closing the gender data gap through its work on the Multi-Tier Framework Global Energy Surveys, which address gender issues by collecting sex-disaggregated and gender-relevant data such as time spent by gender on specific tasks (e.g., collecting fuelwood or cooking).

STUDY PURPOSE AND APPROACH

This study's objective is to examine the social and gender footprint of large-scale electricity generation, transmission, and distribution projects to establish a foundation on which further research and replication of good practices can be built. Specific objectives were to examine key gender impact pathways of energy infrastructure projects in the affected communities, identify entry points for actions to ensure gender-equal project outcomes, and build an evidence base through primary and secondary data collection and analysis using a gender lens. In the past, such projects often considered gender dimensions marginal to the main technical work, which hindered their effectiveness and sustainability.

The main impact pathways examined were access to land and labor markets, along with social sustainability considerations (e.g., health and social capital, education and skills training, and gender norms and women's agency). The study adopted this approach since, according to the *World Development Report 2012* (World Bank 2011), **gender equality in access to land and labor markets matters for women's agency and empowerment.** Land assets help to boost women's voice in household decision making, as well as access to capital and overall economic independence (World Bank 2011). In many countries, women who lack land or property are more likely to suffer domestic abuse (World Bank 2011). Cash employment is strongly associated with women's empowerment; higher incomes resulting from women's own earnings increase their voice and bargaining power (World Bank 2011). In terms of access to credit, women are significantly more credit-constrained than men (World Bank 2011). For example, the combination of small land plots, insecure land rights, and binding credit constraints typically hinders female farmers' ability to use agricultural inputs and technology (World Bank 2011).⁹

BUILDING AN EVIDENCE BASE: DATA SOURCES AND METHODS

Given the paucity of rigorous impact evaluations and specialized surveys to directly determine the impacts of electricity infrastructure, this study relied on three main types of data sources: (i) existing household surveys, (ii) primary qualitative data, and (iii) project-level information. These data sources included information on labor outcomes and land ownership prior to required resettlement. The study considered that migration and new economic opportunities in the community could alter gender norms, which, in turn, might affect women's labor force participation. Improved health and educational facilities and services developed in tandem with the energy infrastructure could benefit human capital; in turn, higher levels of human capital for both men and women could help to close gender gaps in land and labor markets.¹⁰

At the study outset, lack of gender-disaggregated data was identified as a considerable challenge to building the evidence on gender actions within projects.¹¹ What was initially viewed as a mainly desk-level study was subsequently transformed into a qualitative data-collection effort comprising field visits, focus group discussions (FGDs) in the project-affected communities, and interviews with governments and project teams to complement existing data and evidence. A detailed portfolio review of World Bank energy-sector lending was conducted across project consultation and preparation documents (Appendix C); yet the lack of systematically collected, monitored, and documented data persisted. The companion guide to this report provides tools and instruments that operational teams can use to improve data collection through existing project processes (household surveys, poverty and social impact assessments, and results indicators) (www.esmap.org).

Existing Household Surveys: Labor Outcomes from Transmission Infrastructure Development in Two Indian States

Nationally representative India National Sample Surveys were used to analyze gender-differentiated socioeconomic outcomes of affected communities in two states. The employment schedules of these surveys provided large samples of individual-level data on various personal and household characteristics (e.g., employment, income, and education). The World Bank–financed India Powergrid System Development Project (PSDP; 2004–09 implementation period) was selected for analysis. This project aimed to strengthen India's transmission system to increase reliable power exchanges between regions and states. The project funded the construction of transmission lines and substations across several states. Two surveys—one implemented before project implementation and the other afterwards—were used to examine changes in labor outcomes of women and men living in project-affected areas (Appendix D).

Primary Qualitative Data

The study team conducted background field work in Nepal, Morocco, and Senegal to better understand how the infrastructure construction had changed the lives of the local people (Box 1.4).¹² Qualitative data was generated through key informant interviews (KIIs), FGDs, and use of online multi-media platforms that engaged diverse stakeholders in such discussion topics as how to better integrate

BOX 1.4

Overview of Projects Selected for In-country Field Work in Nepal, Morocco, and Senegal

In Nepal, the 144 MW, Kali Gandaki “A” (KGA) Hydropower Project was completed in 2002 after a two-year delay, at an estimated cost of US\$452.8 million. The project built four main structures: (i) a 100 m wide, 45 m high concrete gravity dam and reservoir; (ii) a 6 km long, 7.4 m diameter headrace tunnel; (iii) powerhouse; and (iv) access road. The 40 km² area affected by the project spans four districts in western Nepal. The project resettled 18 indigenous minority families, each of whom received about US\$250 (25,000 Nepalese Rupees) in compensation for both land and house. After project completion, the resettled families were provided new modern houses to live in. The KGA Hydropower Project is operated by the Nepal Electricity Authority (NEA), the country’s public entity responsible for power supply.

The NEA has a staff of 8,000, only 600 (7.5 percent) of whom are women. A strong national policy and legal framework for gender equality and social inclusion has been put in place; however, a review of energy policies and national mandates shows that this national framework has yet to be reflected in energy sector policies. At the operational level, the gendered impacts of hydropower and other large infrastructure projects are still little understood.

In Morocco, the 500 MW Noor-Quarzazate Concentrated Solar Power (CSP) plant is the first project of the Moroccan Solar Plan (MoSP) aimed at developing integrated solar development projects to ensure energy security while fostering socioeconomic development, long-term growth, and job creation. The Noor solar complex is located in Ghassate, a sparsely populated rural commune at the edge of the Sahara Desert. The region is highly vulnerable to environmental pressures and suffers from an overall economic decline. Noor 1, the construction phase of the project, was constructed on 3,043 ha of communal land belonging to the community of Ait Ougrouir Toundout with no settlements. Compensation was provided in the form of infrastructure investments to benefit the local population. Construction work started in August 2013. Direct, plant-related employment peaked in October 2014 at 1,917 employees, subsequently declining as the construction phase came to an end. The plant was set to begin generating electricity in 2016. The recruitment policy of Noor 1 aimed to maximize the number of local workers. Training aiming to boost both direct and indirect employment for a range of occupations was offered to the local population and local job seekers. However, local employment fell short of the project recruitment goals, and only a small share of local women benefited from direct employment in the CSP plant owing to a lack of technical qualifications.

In central Senegal, SENELEC, the national utility, has recently completed the construction of medium-voltage distribution lines under the Electricity Sector Support Project (ESSP) (component 1), connecting selected towns and cities in remote regions with the grid network. The upgraded transmission and distribution network means that communities can switch from expensive diesel-run generation sets. The modernized network will also reduce the utility’s technical and commercial losses. Since grid electricity arrived in the city of **Koumpentoum** (Tambacounda region) and the rural community of **Nganda** (Kafrine region), connection requests have soared. Despite delays due to a lack of last-mile infrastructure and related funding, as well as safety concerns, local people have welcomed the arrival of a more reliable power supply.

women in science, technology, engineering, and math (STEM) fields. In addition, data was collected on innovative private-sector initiatives to better understand how electricity companies address gender issues in their projects and organizations (Appendixes E, F, and G).

Project-Level Information

An in-depth portfolio review of the World Bank Group's energy-sector lending was conducted to expand the knowledge base on the potential gendered impacts of energy infrastructure projects. Specific objectives were to (i) identify good practices and lessons learned from completed and ongoing projects and (ii) provide guidance on how to operationalize those lessons to move the gender agenda forward. Out of a total of 327 projects and programs approved by the Board of Directors during FY2000–14, 21 projects were selected for the sample analysis (Box 1.5, Appendix C). The selection process analyzed safeguards-related and operational documents identified as good entry points for collecting baseline data to improve gender outcomes (Box 3.9). Special attention was paid to how well the findings of the environmental and social impact assessments, involuntary resettlement plans (IRPs), and indigenous peoples plans (IPPs) were translated into the project appraisal documents (PADs) and other operational documents and the projects themselves.

BOX 1.5

Portfolio Review of the World Bank Group: Characteristics of Selected Projects

The 21 projects selected for in-depth analysis under the WBG's portfolio review were considered the most relevant to the gender-energy infrastructure focus; meaningfully recognized and incorporated gender social norms into the particular context of the project setting, acknowledging the barriers women faced; and designed actions to improve gender equality. For these projects, gender considerations were pushed through despite capacity, budget, and time constraints commonly faced by energy projects. The various reasons for success included gender-informed task team leaders and social development specialists, country context (e.g., partners with previous experience and capacity in incorporating gender), and cultural-sensitivity requirements of the country.

World Bank energy-project initiatives included efforts to encourage women's participation in consultations and women-targeted initiatives (e.g., livelihood support, vocational training, formation of self-help groups, and credit access schemes). For example, Indonesia's Upper Cisokan Pumped Storage Hydro-Electrical Power Project ensured that both women and men participated fully in consultations and negotiations, had access to grievance redress, and shared benefits of employment and replacement assets. Spouses were to countersign documents for the purchase of replacement assets and cash compensation. In addition, women were provided support to ensure access to training, credit, and business development services. Furthermore, resettled housewives were provided equal opportunity to access empowerment programs.

The findings highlighted the key role of gender specialists, good entry points for collecting baseline data to improve gender outcomes, and potential for partnering with gender-sensitive local partners. The first key step in taking gender considerations into account is hiring a gender specialist to analyze energy project impacts as viewed through a gender lens. Good entry points were identified for including gender analysis and designing an inclusion strategy to mitigate gendered project impacts. These include the poverty and social impact analysis (PSIA), environmental and social impact assessment, resettlement action plan (RAP), and indigenous peoples plan (IPP). Improving M&E through gender-disaggregated data and documenting implementation experiences and lessons learned are priorities for showcasing and building on positive results to move the gender agenda forward in energy operations.

MAIN AUDIENCES AND STRUCTURE OF THIS REPORT

By moving the gender agenda of energy operations forward, this study's results and recommendations can improve the social sustainability of lending in energy infrastructure. The study's primary targeted audiences are energy task teams of the WBG and other leading development agencies, as well as energy practitioners seeking better ways to address the gender aspects of energy infrastructure projects throughout the project and lending cycles. The study is also a resource for social and gender specialists working in energy teams or independently in social and gender assessments of energy projects. Many of the findings and recommendations (e.g., on consultations) also apply to task teams working on large infrastructure projects in transport, water, and other related sectors that share characteristics with those in the electricity sector. In addition, the study contributes to the policy dialogue of regional development banks and bilateral agencies and may be of interest to private infrastructure companies and the broader international development community.

The report is organized into six chapters. Chapter 2 focuses on access to energy labor markets for men and women and other job market opportunities created by the energy infrastructure projects. Chapter 3 examines the gendered aspects of land ownership and access, focusing mainly on displacement and compensation during resettlement. Chapter 4 discusses how projects can be designed to mitigate immediate risks and enhance longer-term social sustainability. Chapter 5 considers the gender-equality initiatives of the electricity utility companies and their existing and potential roles at both project and institutional levels. Finally, Chapter 6 summarizes the key findings and offers recommendations to move the energy-gender agenda forward.

ENDNOTES

¹According to McKinsey & Company (2012), companies in the top quartile for gender diversity are 15 percent more likely to have financial returns above their national industry medians.

²As part of this research, in-depth case studies were conducted on the following utilities: PLN Persero (an Indonesian group operating only in Indonesia), EDF (a French transnational company regrouping 33 subsidiaries and associate companies throughout the world), and ENGIE (a private-sector group comprising international branches and associate companies involved in integrated activities within the energy sector).

³The vast majority of households in poorer countries of developing regions continue to rely on fuelwood and other forms of biomass (either purchased or collected from nearby the household) to meet most of their daily cooking needs.

⁴After households first connect to electricity, they use it mainly for household lighting and often purchase television sets; together, lighting and television watching account for about four-fifths of electricity consumption in rural areas.

⁵For details, see http://siteresources.worldbank.org/INTGENDER/Resources/336003-1250632365376/6396629-1265214711102/nistha_sinha.pdf

⁶http://siteresources.worldbank.org/INTGENDER/Resources/336003-1250632365376/6396629-1265214711102/jean-charles_lamis.pdf

⁷http://siteresources.worldbank.org/INTGENDER/Resources/3360031306268700820/Julie_Babinard_Infrastructure_Transport.pdf

⁸Exceptions include attempts to equalize opportunities by setting quotas for women in construction and maintenance jobs or training local personnel, including women, instead of bringing in workers from other areas (World Bank 2010; IFC 2013).

⁹Access to financial markets is equally important to gender equality and may also be affected by the planning and construction of electricity infrastructure; however, most specialized data sources on access to finance are not gender disaggregated.

¹⁰In this study, analysis of social and human capital markets is limited to their role as determinants of men and women's access to land assets and labor markets. The human capital impacts of large electricity infrastructure development on men and women are quite important for gender equality; however, analysis of these impacts requires more specialized data sources and expertise on education and health. This topic, which was beyond the scope of this study, deserves further analysis. Similarly, this study did not consider linkages between gender equality and the projects' environmental impacts.

¹¹During the project design phase, the ample time provided for conducting feasibility studies, consultations, and baseline surveys provides an opportunity for project teams to gather basic gender data from consumers, beneficiaries, the utility company, and other project-related organizations.

¹²FGDs and KIs asked about changes in employment opportunities, land use, and access to markets and services. They also explored perceptions about the project, as well as the role of ancillary infrastructure. Detailed instruments and research guides can be found online.

REFERENCES

- Aguilar, Lorena, Margaux Granat, and Cate Owren. 2015. *Roots for the Future: The Landscape and Way Forward on Gender and Climate Change*. Washington, DC: IUCN Global Gender Office.
- Barnes, Douglas F., ed. 2007. *The Challenge of Rural Electrification: Strategies for Developing Countries*. Washington, DC: RFF Press.
- . 2011. "Effective Solutions for Rural Electrification: Lessons from Successful Programs." *Opinion in Environmental Sustainability* 3: 260–4.
- Barnes, D.F., H. Samad, C. Calderon, and S. Banerjee. 2013. "The Development Impact of Energy Access." Unpublished draft report, World Bank, Washington, DC.
- Cernea, M. 2000. "Risks, Safeguards, and Reconstruction: A Model for Population Displacement and Resettlement." In *Risks and Reconstruction: Experiences of Resettlers and Refugees*, edited by M. Cernea and C. McDowell, 11–55. Washington, DC: World Bank.
- Clancy, J. S., M. Skutch, and S. Batchelor. 2002. *The Gender-Energy-Poverty Nexus: Finding the Energy to Address Gender Concerns in Development*. Report of DFID Project CNTR998521. Enschede, Netherlands: University of Twente.

- ESMAP (Energy Sector Management Assistance Program). 2013. "Integrating Gender Considerations into Energy Operations." Knowledge Series 014/13 (http://www.esmap.org/sites/esmap.org/files/ESMAP_Interating_Gender_Into_Energy_Operations.pdf).
- FAO (Food and Agriculture Organization of the United Nations). 2007. *Coping with Water Scarcity: Challenge of the Twenty-First Century*. Rome: FAO.
- IEA (International Energy Agency) and World Bank. 2014. "Sustainable Energy for All 2013–2014: Global Tracking Framework Report." Washington, DC: World Bank.
- . 2015. "Sustainable Energy for All 2015—Progress Toward Sustainable Energy." June. Washington, DC: World Bank.
- IFAD (International Fund for Agricultural Development). 2007. *Gender and Water: Securing Water for Improved Rural Livelihoods—The Multiple-Uses System Approach*. Rome: IFAD.
- IFC (International Finance Corporation). 2013. *Invest in Women's Employment* (http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/publication_report_investingin_womensemployment).
- Köhlin, G., E.O. Sillis, S.K. Pattanyak, and C. Wilfong. 2011. "Energy, Gender, and Development: What Are the Linkages? Where Is the Evidence?" Background paper for World Development Report. World Bank, Washington, DC (<http://elibrary.worldbank.org/doi/book/10.1596/1813-9450-5800>).
- Kojima, Masami, Xin Zhou, Jeessun Han, Joerie Frederik De Wit, Robert Bacon, and Christopher Philip Trimble. 2016. "Who Uses Electricity in Sub-Saharan Africa?: Findings from Household Surveys." World Bank Policy Research Working Paper, No. 7789. Washington, DC: World Bank.
- Kost, C., J. Thomsen, T. Schlegl, T. Fluri, S. Philipps, S. Lude, I. Hädrich, D. Weber, W. Platzer, and H. Wirth. 2012. *Support for Moroccan Solar Plan, Solar Technologies in Morocco: Industry and Value Chain Assessment*. Freiburg, Germany: Fraunhofer Institute for Solar Energy Systems.
- McKinsey & Company. 2012. *Making the Breakthrough*. Women Matter Series.
- World Bank. 2011. *World Development Report 2012: Gender Equality and Development*. Washington, DC: World Bank.
- . 2013. *Toward a Sustainable Energy Future for All: Directions for the World Bank Group's Energy Sector*. Washington, DC: World Bank.

ENERGY INFRASTRUCTURE AND EMPLOYMENT: HOW DO WOMEN BENEFIT?

HIGHLIGHTS

- Key barriers to women's direct employment in electricity infrastructure projects are gender roles and social norms that discourage their labor force participation, lack of technical and professional skills, occupational segregation by gender, and gender-insensitive work environments.
- Indirectly, projects can induce women's economic activity; these opportunities offer important gains in household welfare, but their income potential and impact on gender norms are limited.
- Opening opportunities for employing women in electricity infrastructure can be enhanced at the project level through gender-sensitive training and skills development, employing women in nontraditional occupations where possible, and ensuring women's safe working conditions.
- In addition, greater policy focus is needed on removing legal barriers to women's employment in the energy sector and addressing skills gaps through training and STEM education for girls.

The arrival of a large electricity infrastructure project can induce significant changes in local labor markets. A project's scale and complexity—along with local economic development, labor market conditions, governance structures, and social norms—influence how much local labor can be employed, as well as any spillover effects. Generally, short-term demand for labor (e.g., construction, management, and coordination) expands. Indirectly, increased demand for services may generate jobs for new or existing firms and self-employed individuals. In cases where connectivity to communities outside the project-affected area expands, new job opportunities may benefit workers in the project-affected community or those from other towns and areas, depending on specific skills requirements. Households' expectations about local employment and wages may change, affecting their decisions about labor force participation and migration.

Energy infrastructure projects have tended to employ mainly men for both skilled and unskilled jobs. The nature of the work also affects the extent to which women and men are affected. For example, the construction of transmission and distribution lines may not require a large pool of workers, and the project may bring in its own external workforce that moves from one project area to another.

Large energy infrastructure projects have mainly offered women self-employment opportunities in traditionally female-dominated areas. These self-employment opportunities (e.g., hospitality services) resulting from the arrival of external workers have contributed to women's access to income and decision making. In some cases, gender norms and occupational segregation by gender have started to change as a result of women taking on new roles in the community.

Key barriers women face in taking advantage of new labor market opportunities are lack of construction and engineering skills, occupational segregation by gender, and employer stereotyping. Working conditions in construction areas may also be a deterrent. Surmounting these persistent barriers will generally require the long-term commitment of national and local governments and public policies and investments. Despite such constraints, some projects have succeeded in overcoming biases toward women's involvement in electricity infrastructure by using targets or quotas and job training (Chapters 4 and 5).

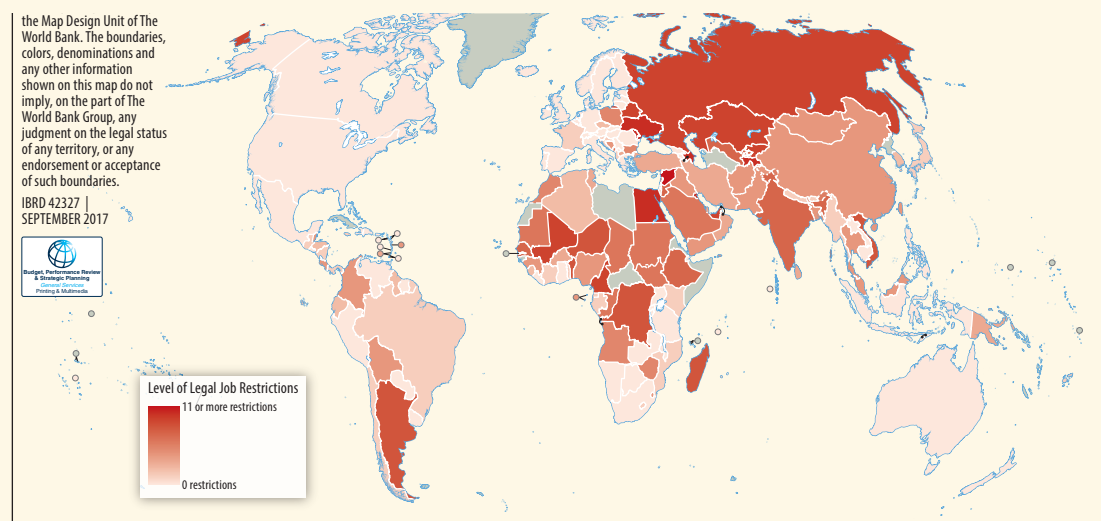
CONSTRAINTS TO WOMEN'S LABOR MARKET ACCESS

Men and women may be differently affected by a project's induced changes in local labor markets.

New jobs directly created by energy infrastructure projects have mainly attracted men since infrastructure construction is traditionally a highly male-dominated industry. Typically, women's direct employment opportunities in electricity infrastructure projects have been restricted by gender roles and social norms in the local community or nationally, women's low technical construction and professional engineering skills, low aspirations, and employer bias (Panjwani 2005). Figure 2.1 shows the level of legal restrictions on women's employment worldwide, while Table 2.1 highlights such restrictions specific to the electricity sector for selected countries.

FIGURE 2.1

Heat Map: Level of Legal Job Restrictions for Women



Source | World Bank Group's Women, Business and the Law database, available at wbl.worldbank.org

TABLE 2.1**Legal Barriers to Women's Electricity-Sector Employment for Selected Countries**

COUNTRY	LAW
Belize	Women cannot work at night in the generation of electricity. <i>Labor Act, Secs. 2 and 161</i>
Cameroon	Women are not allowed to work in transporting, producing, and delivering electric energy (i.e., field of electricity) at night. <i>Arrêté No. 16/MTLS du 27 mai 1969, Arts. 2(3)</i>
Democratic Republic of the Congo	Women cannot work at night in the transmission of electricity and motive power. <i>L'Arrêté Ministeriel No. 68/13 du 17 Mai 1968 portant Conditions de Travail des Femmes et Enfants, Art. 21</i>
Egypt	Women are prohibited from working in the electrical industry. <i>Decree of Minister of Manpower and Immigration No. 155 of 2003, Art. 1</i>
Kiribati	Women are prohibited from working at night in the generation, transformation, or transmission of electricity or in the production or distribution of gas or motive power of any kind. <i>Employment Act, Secs. 2 and 77.</i>
Kyrgyz Republic	Women cannot be electricians. <i>Decree No. 158 of 24 March 2000</i>
Malaysia	Women cannot work at night in the generation, transformation, and transmission of electricity or motive power of any kind. <i>Employment Act 1955, Arts. 2 and 34</i>
Mongolia	Women cannot do jobs where they are exposed to a legally specified amount of electric power. <i>Standard of Mongolia No. MNS0012-099:1991</i>
Nigeria	Women cannot work at night in any electrical undertaking or in gasworks. <i>Labor Act, Arts. 55 and 91</i>
Russian Federation	Women cannot be electricians. <i>Resolution No. 162 of 25 February 2000</i>
St. Vincent and the Grenadines	Women cannot work at night in any electrical undertaking or in gasworks. <i>Employment of Women, Young Persons and Children Act, Part III, Arts. 3 and 6</i>
Swaziland	Women cannot work at night in the transmission of electricity or motive power of any kind. <i>Employment Act of 1980, Secs. 2 and 101(1)</i>
Vietnam	Women are prohibited from working in the maintenance and repair of power lines in underground sewers or on high-voltage power lines and the erection of high-voltage power column. <i>Joint Circular No. 40-2011-BL-ĐTBXH-BYT, Appendix 1</i>

Traditional Gender Roles and Social Norms

Women's direct employment by energy infrastructure projects is constrained mainly by pre-existing gender roles and social norms that influence their labor force participation. Women's labor force participation is conditioned by traditional gender roles and social norms at the household, community, and national levels (e.g., disparity in the educational levels of females and males and women's dominant

role as caretakers of children and the elderly). From a project perspective, this exogenous factor often presents a dilemma. Even so, the background field work commissioned for this study documents some potential positive impacts of projects, including the rate of working-age women employed or actively seeking a job.

In Morocco, for example, women’s labor force participation—among the lowest in the world—has remained unchanged since 1990. In 2014, about 27 percent of working-age women (15–64 years old) participated in the country’s labor force, compared to 79 percent of men of working age (World Bank 2015a). That year, the employment rates for women and men were 15 percent and 62 percent, respectively, for urban areas, compared to 36 percent and 78 percent for rural areas (World Bank 2015b).¹ In Quarzazate province, site of the Noor 1 Concentrated Solar Power (CSP) Project, women’s labor force participation in 2011 was estimated at just 17 percent (AfDB 2011).²

Moroccan women’s decision making about their economic activity is often influenced by male household members. Only one-third of Moroccan women make decisions about their own employment (World Bank 2015b). For the remaining two-thirds, such decisions are made by men in the family. Women may give up seeking employment outside the home if it is considered socially unacceptable by their family (World Bank 2015b). Traditionally, women are restricted to household activities (e.g., housework, child rearing, agricultural work, handicrafts, and firewood and forage collection) and lack access to education and work outside the home.

Remarkably, in India’s fast-growing economy, women’s labor force participation is on the decline. Despite increased investment in female literacy and girls’ school enrollment, entrenched societal norms and structural constraints, as well as safety concerns, limit women’s opportunities in the more productive sectors (Surie 2016). Studies on female labor force participation in India have found that improvement in a family’s social status is associated with women’s withdrawal from the labor force (Das and Desai 2003; Das 2006); rather than accept low-status (menial) jobs, educated women choose to opt out of the labor force (Das 2006).

A large segment of the country’s working women are still engaged in the agriculture and informal sectors (Surie 2016). In 2004, before India’s third Powergrid System Development Project (PSDP III) was implemented, women’s labor force participation in the project-affected districts of Madhya Pradesh and Maharashtra was 47.5 percent, significantly higher than the national average of 29 percent. Not surprisingly, agriculture and informal sectors accounted for the majority of women’s employment in these two districts, which feature less urbanization, younger populations, a larger household size, and a greater share of historically disadvantaged social groups.

Lack of Technical and Professional Skills

A second exogenous constraint to women’s employment in the context of energy infrastructure projects is their lack of technical construction and professional engineering skills (USAID 2016). In addition to legal restrictions on work opportunities for women, systematic gendered differences in educational trajectories contribute to the shortage of qualified women engineers and technicians. Studies

suggest that lack of encouragement from parents and teachers and their gender biases are among the determining factors in girls' attitudes toward education and careers in the fields of science, technology, engineering, and math (STEM) (Pollack 2013).

In middle school, I expressed a strong interest for professional training in technical sectors. My teachers expressed concern, but I insisted.

TECHNICAL OPERATOR, EDF (EDF SUBSIDIARY)

Stereotypes and gender biases persist even when women defy their traditional roles and choose professional careers in STEM fields (Chapter 5). Numerous studies have documented strong gender biases that prevent women from entering STEM professions, getting jobs, or advancing in their careers (Williams, Phillips, and Hall 2014; Professionals Australia 2015; Moss-Racusin et al. 2012; Reuben, Sapienza, and Zingales 2014). A woman interviewed for a logistics operator position in France, for example, recounted being asked discriminatory questions about her physical strength, even when it was not the most important aspect of the job.

During the interview, the recruiter asked questions about my physical strength. I was highly motivated and proposed that they hire me on a trial basis, so I could get the opportunity to demonstrate my motivation.

LOGISTICS OPERATOR, EDF (EDF SUBSIDIARY)

Occupational Segregation by Gender

A third factor that frames the available opportunities for women in electricity infrastructure development is occupational segregation by gender. In many cases, the new project-related jobs offered to women involve traditionally feminine tasks (e.g., catering and food supply, laundry services, and financial services and clerical support) (Box 2.1). This situation can be improved by setting quotas for women in construction and maintenance jobs, encouraging the establishment of women's recruitment bureaus, and ensuring separate washrooms and toilet facilities for women and men at work sites.

Training and skills development can play an important role in reducing occupational segregation by gender (Chapter 4). Successful private-sector experience in hiring female graduates in the traditionally male-dominated field of engineering, especially in the areas of quality, environment, and health and

BOX 2.1

How Do Projects Affect Occupational Segregation by Gender?

A robust body of literature in developed countries shows that women's entry into paid market work often mirrors the activities they previously carried out at home, as well as the "feminization" of certain occupations over time (Folbre and Nelson 2000). In other cases, projects can have a double-barreled effect on the gender dynamics of families. In China, for example, construction of the Manwan Dam and changes in the rural economy resulted in males seeking wage-earning jobs outside the community (Tilt, Braun, and He 2008). Agriculture became women's domain, and they took on plowing and other jobs traditionally done by men. While women gained more decision-making power at home, they also took on greater household responsibilities and depended more on men for wage income (Xiaogang and Jiquo 2002). Still other studies suggest that the opening of labor-market opportunities linked to energy infrastructure projects can lessen occupational divisions by gender.

safety management, highlight the importance of utility companies investing in workforce diversification, as discussed in Chapter 5.³

Gender-Insensitive Work Environment and Unsafe Conditions

Yet another aspect that may discourage energy infrastructure employment for women is a gender-insensitive work environment (e.g., lack of job flexibility and work-life balance or unsafe working conditions) (Ceci and Williams 2011). Many large-scale electricity infrastructure projects are implemented in remote areas, requiring constant travel and relocation. It may be harder for women to take up such jobs, given their roles as caregivers and homemakers. Also, housing and catering conditions at construction sites are often cited as inadequate and discouraging for women. For such reasons, women in Ethiopia working as bilingual/trilingual assistants were reluctant to move from the capital city to a remote area where the Gilgel Gibe I Hydroelectric Project was being constructed; however, provision of better housing and a cafeteria helped to attract some candidates.⁴ In Jordan, the Electricity Distribution Company (EDCO) said that "it is not appropriate for women to serve in positions where they are alone with men or expected to travel in locations without a relative accompanying them" (USAID 2016). Obviously, such societal bias presents an obstacle to hiring women for positions within the company, especially in rural areas.

Safety is a significant concern for women considering jobs in infrastructure. Safety encompasses regulations and environmental guidelines at construction sites, as well as appropriate healthcare provisions and prevention of sexual harassment. Women can be put at risk when there are no established systems to prevent sexual abuse, alcoholism, and drugs consumption. These potential dangers make women unwilling to move for work in an area they deem unsafe, even if the job is well-paid. This issue is of particular concern in the context of hydropower infrastructure construction, which typically occurs in

remote areas, involving an influx of male migrant workers, which, in some cases, has increased the risk of gender-based violence.

By ensuring a gender-sensitive work environment and safe working conditions for women, energy infrastructure projects can encourage female labor force participation. In Morocco, where the majority of women either do not work outside the home or work in traditionally feminine jobs, the Noor 1 CSP Project succeeded in directly employing some women in various occupations. This success was due to the project's sensitivity to creating a positive work environment, including safe working conditions, for women.

DIRECT EMPLOYMENT OPPORTUNITIES

Evidence from the qualitative and quantitative background field work shows that direct employment opportunities from energy projects for the local labor force, especially women, are generally limited and short-term. A project's type, scope, and difficulty level account for much of the variation in demand for local labor. Also, in sparsely populated rural areas where most electricity infrastructure development takes place, economic development is low and the local labor force usually lacks the required technical skills. However, evidence suggests that opportunities to employ unskilled labor are often underutilized. Several examples show that infrastructure developers sometimes bring in their own employees to implement projects.⁵

Evidence from Existing Household Surveys: Two Indian States

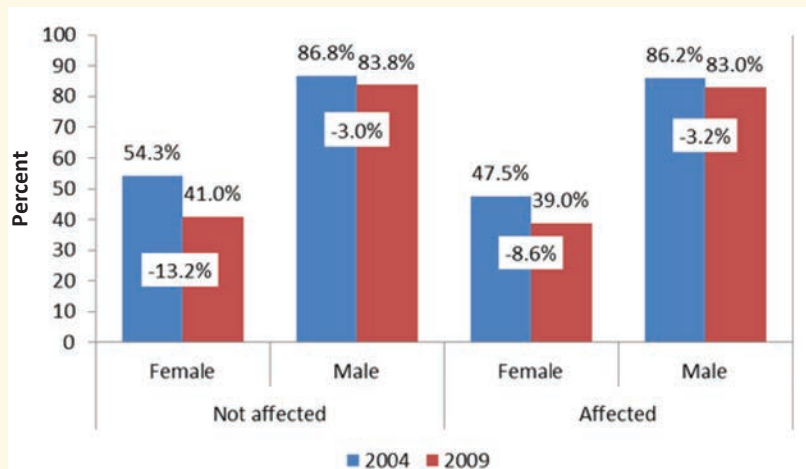
Analysis of gender-disaggregated, labor market outcomes under India's Powergrid System Development Project (PSDP) shows that the decline in women's labor force participation over the project period analyzed was a bit less in project-affected districts. While the results cannot be directly attributed to the project, they are indicative of potential job opportunities that energy projects can generate. Using nationally representative household survey data, the labor force participation rates of women and men in the project-affected districts of Madhya Pradesh and Maharashtra were compared before (2004) and after (2009) construction and strengthening of the transmission system; they were also contrasted with those of men and women living in non-affected project districts of the two states. Over the 2004–09 period, the decline in women's labor force participation in the project-affected districts was 4.6 percent less than in non-affected districts (Figure 2.2).

Over the same five-year period, men's employment status changed marginally (with one exception), while the most important change for women was a reduction in self-employment. The project-affected districts in both states saw increases in men's casual labor, at 4 percent in Madhya Pradesh and 1 percent in Maharashtra. Women's share of nonfarm self-employment increased in the project-affected districts of Madhya Pradesh, while other districts saw a withdrawal of women from the labor force and a decline in the share of women in other types of employment (Figure 2.3).⁶

In project-affected districts, the share of men in primary and tertiary sectors shifted to the secondary sector (including construction), and women's employment in the secondary and tertiary sectors increased. In project-affected districts, the secondary sector increased by 4 percent (compared

FIGURE 2.2

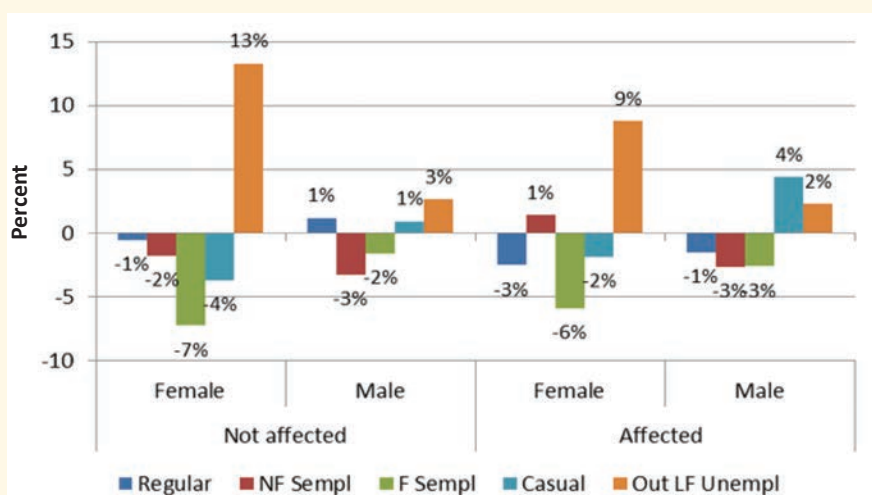
Labor Force Participation of Men and Women in Project- and Nonproject-Affected Districts, 2004 and 2009



Source | Authors estimates, based on National Sample Survey data.

FIGURE 2.3

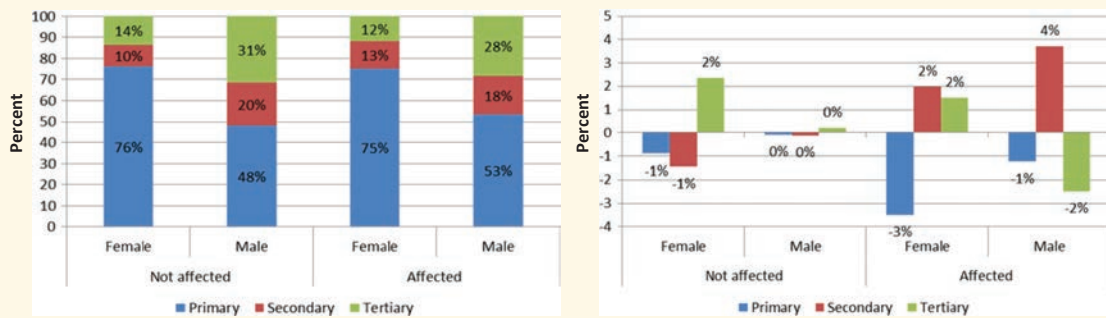
Change in Employment Status of Men and Women, India PSDP II Project, 2004–09



Source | Authors estimates, based on National Sample Survey data.

FIGURE 2.4

Shift in Sectoral Distribution in Project- and Nonproject-Affected Districts



Source | Authors estimates, based on National Sample Survey data.

to no change in nonproject-affected districts); this increase was due entirely to the greater share of men and women in the secondary sector of Madhya Pradesh. In that state's project-affected districts, women's employment in the secondary and tertiary sectors increased; however, no such change was seen in nonproject-affected areas, except for a small increase in the tertiary sector (Figure 2.4) (Appendix D).

Employment in the construction industry increased visibly for men and women in all districts, but the share of men in construction increased more in the project-affected areas.⁷ This increase cannot be solely attributed to the project since such unobserved factors as construction activities for other projects and other economic activities and programs that increased employment are not controlled for.

The econometric results of the difference-in-differences estimator show that the project effects on women and men's labor outcomes are not statistically significant (Appendix D). In addition to limitations of the empirical estimation, other potential reasons for lack of statistical significance is that project-related construction was implemented in less densely populated areas. The construction of transmission lines does not require large land plots and therefore spillovers in job creation are minimal. Furthermore, the small population size of the project areas may not translate into observable labor impacts. When considering the routes for transmission lines, safeguards aspects require planners to select less populous, usually rural areas, keeping a certain distance from people's settlements.

EVIDENCE FROM IN-COUNTRY FIELD WORK

In all countries where background field work was conducted, women generally had less education and skills compared to men and had fewer opportunities for being hired directly by the project. As previously mentioned, local women tend to benefit indirectly from the arrival of external labor to the

project area through short-term self-employment, spurred by the increased demand for catering and hospitality services.

Nepal

Construction of the Kali Gandaki “A” (KGA) Hydropower Project in Nepal during 1996–2002 brought little direct employment for the local community, especially women. Participants in focus group discussions (FGDs) revealed mixed messages about project employment and economic opportunities. Although a majority of both male and female FGD participants agreed that the project had brought immense economic benefits to the area, they all expressed grievances about the lack of direct local benefits (e.g., priority employment during project construction and training in enterprise development to generate a sustainable income) (Appendix E).⁸

Some women managed to obtain employment during the operational stage of the KGA Hydropower Project, mostly as cleaners. During project construction and operation, some men were employed. Among the resettled indigenous Bote families, eight men were hired—three on a full-time basis and five part-time—and they later continued working for the Nepal Electricity Agency (NEA). However, none of the Bote women were hired. This lack of opportunity for women can be attributed to not prioritizing recruitment of women, as well as the project’s policy of restricting employment to only one person per affected household (usually a man).

Morocco

A small share of local women were directly employed during construction of the Noor 1 Concentrated Solar Power (CSP) plant in Morocco, despite social and gender norms and lack of technical skills. In the context of the rural province of Quarzazate, characterized by declining agricultural yields and loss of agricultural income caused by environmental degradation, these jobs were especially welcome. Illiteracy in that province, at 68 percent overall and 85 percent for women, exceeds the national average. In the municipality of Ghassate, agriculture comprises the main economic activity, while remittances constitute the main income source. About half of the working-age population is engaged in the agricultural sector, while about one-fifth works in construction (Wuppertal Institute and Germanwatch 2015).

The recruitment policy of the Noor 1 CSP Project aimed at maximizing the number of local workers and increasing benefits to the local population. As a result, priority was given to recruiting workers from nearby communities, particularly those in Ghassate (5 Capitals 2012a). Also, the Moroccan Agency for Solar Energy (MASEN), Morocco’s solar energy utility, set a voluntary target of 30 percent for locally sourced components within the plant’s capital costs. Thus, the bidding process gave priority to companies that promised to use a high proportion of locally sourced materials. The goal was to attract local companies to invest in new production lines and encourage international investors to create local subsidiaries (World Bank 2011) (Appendix F).

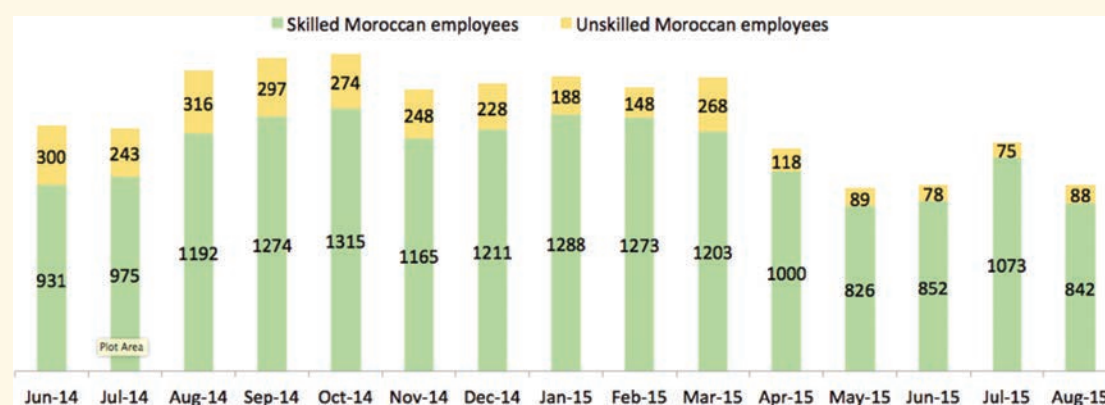
Unfortunately, the share of local employment was lower than expected, owing to the mismatch between the project’s required technical skills and local workers’ low qualifications. Ghassate

represented an average of only 6 percent of project manpower over the June 2014–August 2015 period. The Quarzazate province accounted for 34 percent of Noor 1 workers; another 45 percent came from other Moroccan provinces, while 21 percent were from other countries (mainly Spain). Among Moroccan workers, 85 percent were skilled, with unskilled workers represented mainly by Ghassate and the wider Quarzazate province (Figure 2.5). In the FGDs held in Tiflit, participants complained that the share of local workers was far less than the 70 percent promised. Men in Sidi Ben Naji indicated that positive discrimination was not applied, and the recruitment process was not transparent. However, project operators explained that the low level of local employment resulted from local workers' lack of formal qualifications and that the 70 percent proportion was respected for unskilled jobs (5 Capitals 2012b).⁹

As expected, the Noor 1 CSP Project provided relatively few direct employment opportunities for women. Project operators stated that women often lacked the required professional qualifications or were constrained by gender norms, particularly in rural areas. During the June 2014–August 2015 period, female workers represented just 4 percent of the total workforce at the CSP plant (Figure 2.6); of this handful of women employees, 71 percent were Moroccan.

Despite the small number of women employed by the project, they held a wide range of positions within the Noor 1 CSP plant. The diverse positions held by women covered catering, administration, quality control, technical areas, cleaning, health and safety, welding, and topography (Table 2.2). Although data by village of origin are not available, one female FGD participant indicated that four young women from the village of Tasselmant were recruited to work in quality and control over a 10-month period.

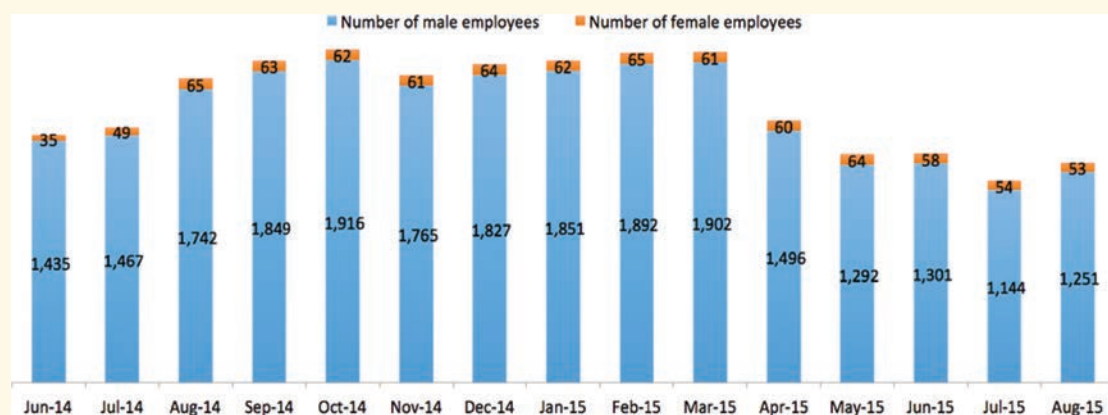
FIGURE 2.5
Proportion of Skilled and Unskilled Moroccan Employees, Noor 1 CSP Project



Source | MASEN 2015a.

FIGURE 2.6

Noor 1 CSP Project Employees, by Gender



Source | MASEN 2015a.

TABLE 2.2

Position Types Held by Female Employees of Noor 1 CSP Project

SITUATION IN DECEMBER 2014	NUMBER
Female Employees	
Total Female Employees	64
Quality Control	10
Cleaning	8
Catering	13
Administrator	12
HSE	5
Technical department	10
Topographer	1
Commercial	1
Welder	4
Total Moroccan Female Employees	42
Total Expatriate Female Employees	22

Source | ACWA 2015.

Both women and men in the local community wanted to learn how to get high-quality jobs at the Noor 1 CSP plant and information on required qualifications. FGD participants expressed the need for training, especially in preparing young workers to obtain white-collar jobs and more stable positions during Noor 1's operational phase. Specifically, young people would benefit from learning about job qualifications in the CSP plant so they could direct their studies and training toward developing the relevant competencies.

The ANAPEC [National Agency for the Promotion of Employment and Skills] does not share information regarding profiles required by employers and does not make any effort to orientation and guidance for job seekers. The agency only demands CVs, either women's or men's.

YOUNG WOMAN, TASSELMANT, MOROCCO

Senegal

Construction of the transmission and distribution network under Senegal's Electricity Sector Support Project did not provide women direct employment opportunities; few local men were hired and only for short periods. Given the project's relatively narrow coverage area and short duration period, its limited impact on the local labor market is not surprising. Under the project, Senegal's power utility, SENELEC, implemented grid extension and modernization works in northern and central regions of the country.¹⁰ Field-based research focused on two project-affected communities: the rural community of **Nganda** in the Kaffrine region and the city of **Koumpentoum** in the Tambacounda region (Appendix G).^{11, 12}

Senegal law mandates that infrastructure projects prioritize the hiring of local unskilled workers whenever possible. Despite the subcontractor's initial expressed interest in employing unskilled local workers, it brought in its own outside workers. Participants in FGDs confirmed they had heard about project job opportunities advertised on the radio. Apparently, however, no unskilled laborers from the communities were hired for project construction, and no positions were offered to women.

Gender discrimination is not explicitly prohibited in Senegal, and the law mandates some industry restrictions for women. The labor law does not mandate nondiscrimination based on gender in hiring or equal remuneration for work of equal value for men and women. Women and men cannot do the same jobs, although they can work the same night hours. The law states that women cannot be employed in such areas as mining, factories, and construction and cannot undertake such tasks as metalwork and heavy lifting. The law also mentions that women can participate in hazardous and arduous work, but not in morally and socially inappropriate jobs. Women and children also need a medical certificate stating that the work tasks to be performed are within their physical capacities (Camara 2010).

INDIRECT EMPLOYMENT OPPORTUNITIES

The qualitative background field work suggests that, in areas of low economic development, energy infrastructure projects can induce women's economic activity; indirect job opportunities include self-employment and traditional occupations that are often extensions of women's work within the home. These indirect employment opportunities provide important gains in household welfare; but their income potential and impact on gender norms are limited. In Senegal, for example, the influx of workers into communities allowed women with better entrepreneurial skills or more resources to benefit by providing hospitality services (e.g., accommodations and laundry). Similarly, in Morocco, women in the project-affected communities requested training in traditionally home-based activities (e.g., weaving, knitting, and embroidery). After the KGA Hydropower Project in Nepal was completed, local women began forming farmer cooperatives and special agriculture producer groups that collectively managed marketing and other produce-related activities.

Immediately following dam construction under the Kali Gandaki “A” (KGA) Hydropower Project, both men and women reported lower earnings. Many people had to shift from traditional fishing and agriculture livelihoods to other types of employment and livelihood support (e.g., wage labor and boat driving), and some are still struggling to adjust to their new occupations. Dam construction had brought higher incomes to the local community, which led to lifestyle changes and habits that later had to be given up. After the construction boom ended, incomes declined. Frustrated by high unemployment and underemployment, men (especially younger ones) migrated to such countries as Korea, Malaysia, and Qatar in search of higher wages.

With extra cash in hand, I got used to better things in life and providing for my family in a better way; with no work after the construction, I had to go back to my older lifestyle, which was very depressing.

SHOPKEEPER, GUTHIZ (Key Informant Interview), NEPAL

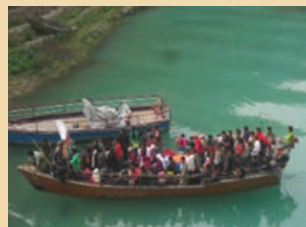
In the long run, however, the identified benefits of the KGA Hydropower Project—new access roads, increased electricity supply, and compensation for resettlement and loss of land—have contributed to women's stronger participation in economic activities. Fourteen years after project construction, women and men—many from ethnic minorities—have benefited from the resulting economic opportunities in the services sector. Some women are running new microenterprises, while men have returned to their traditional self-employed occupations (e.g., blacksmithing and fisheries) (Box 2.2).

In the case of the Senegal Electricity Sector Support Project, an influx of workers provided some self-employment opportunities for locals by inducing demand for catering and hospitality services.

BOX 2.2

Ferry Service Crossing Nepal Reservoir Opens Opportunities from Tourism

The reservoir created by Nepal's Kali Gandaki "A" (KGA) hydro dam has been a boon for local businesses. For the first time, people and goods can be easily and inexpensively transported by ferry to village development committees, saving several hours in walking time. The Holy Stone (*Saligram Sila*), situated near the end of the reservoir, has become a popular destination for religious tourists. Each day during the winter season, as many as 400–500 people catch the ferry to visit the site. Tourism, in turn, supports an array of local businesses, ranging from lodges and restaurants to souvenir shops and streamer/boat service. Many of these businesses, including restaurants and shops, are managed by women and their families.



Sources | FGDs; Bhattarai 2013.

In the city of Koumpentoum, local restaurants, exclusively run by women, serviced project workers over the construction period. In the rural community of Nganda, women provided accommodations, meals, and laundry service to external workers who stayed there for six months. A construction team of 8–10 workers lived in rented rooms or houses. One woman who lived in a large house reported renting out rooms to workers; a second woman was in charge of their meals, while a third took care of laundry services. Women also sold ice on a daily basis. **These services-sector opportunities were reinforced by the improved access to electricity provided by the project.** Interestingly, local hardware shops, owned mostly by men, did not significantly benefit from the construction work. Although workers occasionally purchased basic materials (e.g., cement and iron) from local shops, subcontractors brought in most materials and tools from outside the project areas.

I was aware of the presence of external workers as I used to sell breakfast to them and sometimes they also bought take-away breakfast for their co-workers.

WOMAN, NGANDA TOWN, KAFFRINE, SENEGAL

In sum, the arrival of workers provided locals, especially women, greater self-employment opportunities or at least higher incomes from hospitality services. However, these opportunities were temporary and mainly benefited those women who already had businesses or were better entrepreneurs. Also, the jobs women performed for pay were an extension of their domestic responsibilities at home, which perpetuated gendered divisions of labor. Finally, it is not known whether the women continued in these economic activities once the workers left the construction sites or what happened to them afterwards.

Electricity infrastructure projects focused on power generation generally offer women more direct and indirect employment opportunities than transmission and distribution projects. The latter project type features a much shorter time frame for construction work, typically 5–6 months, with teams moving quickly from one area to another; in the context of such projects, self-employment might be the only area of women's employment opportunities that can be enhanced. Bid contract clauses with targets and incentives are often proposed as a way to encourage local employment of both women and men (ENERGIA 2015).

WOMEN'S EMPLOYMENT OPPORTUNITIES IN THE TRANSFORMING ENERGY SECTOR

As investments in renewable energy increase, one may expect that more opportunities for direct and indirect employment will open for both men and women. The International Renewable Energy Agency (IRENA) reports that the renewable energy sector could potentially add millions of jobs in the years ahead (IRENA 2015). Although the number of women employed by the sector is growing, women still face significant barriers, particularly in management and technical positions. It is imperative that policies focus on closing skills gaps through training, education, and employment incentives for women (Box 2.3).

CONCLUSION

Historically, women's direct employment created by energy infrastructure projects has been constrained by traditional gender roles and social norms in the local community or nationally, lack of technical and professional skills, occupational segregation by gender, and gender-insensitive work environments and working conditions. Women have mainly benefited indirectly from projects through the self-employment opportunities offered in traditionally female-dominated areas. In some cases, women have taken on new roles in the community, which has induced changes in gender norms and occupational segregation by gender. At the project level, various low-cost interventions can be implemented to enhance women's access to energy-infrastructure job opportunities (Box 2.4). Over the longer term, systematic policy efforts and public investments are needed to create a level playing field for women's employment in the energy sector.

BOX 2.3

Promoting Gender Diversity in the Transforming Energy Sector

As the energy sector transitions to more efficient and renewable energy systems, it is critical to prioritize gender diversity within the energy industry to capture these new opportunities for a more inclusive energy workforce. At present, the energy industry lags behind other major global industries in terms of gender diversity. Despite studies showing that more gender-diverse companies have increased productivity, greater innovation, and higher net income, women are still underrepresented in the energy sector. They account for 35 percent of the renewable energy workforce, 20–25 percent of the energy workforce overall, and just 16 percent of board members for the world's 200 largest utilities.^a

Three key job areas in the energy sector could be targeted for greater gender diversification: (i) engineers and technicians; (ii) construction, installation, and manufacturing; and (iii) public- and private-sector leadership. Currently, a limited number of women engineers are being graduated who could be hired by the industry. Those who do enter the field may face discrimination in hiring and promotion and struggle with unfriendly workplace policies.

A first key step toward promoting gender diversity is closing the knowledge gap through systematic data collection and sharing on gender in the energy workforce. This will encourage greater awareness about gender equity, support opportunities for women's advancement, and highlight the multiple benefits of hiring and advancing more women. SolarCity's Women in Power, General Electric, Chevron, and PG&E are at the forefront of companies advancing women's career and leadership skills in the energy industry. The transforming energy sector presents an opportunity to create a more gender-inclusive workforce. If not addressed, the transition to renewable energy technologies could perpetuate and deepen gender inequality.

Sources | Pearl-Martinez and Stephens 2016; Chanavat and Ramsden 2013; IRENA 2016.

^aAccording to McKinsey & Company (2010), Fortune 500 companies in the United States with the highest representation of women on their boards (19–44 percent women) generate 16 percent higher net income as a percentage of revenue than companies without such representation.

BOX 2.4

Harnessing Opportunities for Lasting Change: Recommended Actions

What can be done at the project and sector levels to enhance women's access to job opportunities generated by electricity infrastructure? Based on the World Bank portfolio review and background field work conducted for this study, the following recommendations emerge:

Project Level

- **Take women's constraints and occupational segregation by gender into account in the development of training programs.** Lack of technical skills bars both men and women in local communities from taking advantage of electricity infrastructure jobs. Skills development occurs over the life cycle, requiring substantial public and individual investment. At the project level, training programs that promote women's participation are making a difference.

BOX 2.4 (CONTINUED)

- **Consult with the local community.** Consultation with the local community can generate job opportunities in the local labor market and enhance access to opportunities elsewhere. Connecting communities and providing information on ancillary infrastructure and other resources can harness project benefits for all. Including women in community consultations in culturally appropriate ways is critical to their participation.
- **Seeks ways to reduce gender bias in employing women.** In the case of equivalent skills, it is important to break the silos created by occupational segregation by gender from both an equity and an efficiency perspective. Enhancing workers' mobility and expanding choices for both men and women can foster the employment benefits of electricity infrastructure.
- **Pay attention to safety and working conditions at project construction sites and in operational areas.** Relatively low-cost interventions (e.g., separate restrooms and improved lighting) can yield high returns and potentially attract more women to energy infrastructure construction jobs, as well as project operations.

Sector Level

- **Focus policies on changing legal restrictions to women's employment and eliminating women's skills gaps** through training, employment incentives, and encouraging STEM education for girls.

ENDNOTES

¹Higher employment rates in rural areas are somewhat unique to Morocco; in most countries, the opposite is true.

²The literature suggests that traditional gender divisions gradually fade away in the city of Quarzazate, especially among young people (Wuppertal Institute and Germanwatch 2015). Women that benefit from greater educational opportunities are more likely to enter the workforce and contribute to household income. However, in the rural community of Ghassate, women's roles have remained virtually unchanged (i.e., women are responsible for housework and are not supposed to work outside the home).

³A 2016 survey by McKinsey & Company and LeanIn.org, entitled *Women in the Workplace*, finds that national economic competitiveness correlates strongly with levels of gender equality. It estimates that if women achieved full parity with men in labor markets, global economic growth could increase by US\$12 trillion by 2025.

⁴CDD Link: <https://collaboration.worldbank.org/groups/gender-and-energy/blog/2014/12/16/highlights-from-the-2-e-discussions-on-our-project-on-energy-infrastructure-and-gender>

⁵Apparently, the rationale for this practice is related to a lack of specific skills and the relatively high cost of training, versus mobilizing workers.

⁶During the project period examined (2004–09), the Indian government launched the National Rural Employment Guarantee Act (NREGA) in 2005, which entitles all of India's rural households to a minimum of 100 days of paid work each year. The Act also mandates that women comprise one-third of workers and ensures equal wages for men and women, with gender-specific productivity norms in the rates schedule. One possible explanation for increased casual labor is that some employment for unskilled workers might have been generated through this scheme, given that people employed through the NREGA can work for small infrastructure projects that may be related to and counted as construction.

⁷Although it is possible to disaggregate employment industry by a detailed sector (3-digit level), the sample sizes for the two states are not large enough to estimate and compare gender differences in labor outcomes before and after the project.

⁸Overall, 30 percent of FGD participants said there were fewer or no employment benefits, and 80 percent of female participants said that women received no employment opportunities; responses were similar across all social groups.

⁹A commission was put in place to apply positive discrimination for local job seekers and formalize the recruitment process (Appendix F).

¹⁰The WBG is providing US\$85 million in funding for a project to improve the reliability of SENELEC's electricity services and reduce its technical and commercial losses; at the time of this writing, project implementation, which began in 2012, had an expected closing date of September 2016.

¹¹Construction of the distributions line occurred during 2014–15: August 2014–January 2015 (Nganda) and January–April 2015 (Koumpentoum).

¹²In both regions, electricity supply was previously provided by diesel generators at a high cost to SENELEC.

REFERENCES

- AfDB (African Development Bank Group). 2011. Ouarzazate Solar Power Station Project II. Summary Environmental and Social Impact Assessment (ESIA) (http://www.afdb.org/fileadmin/uploads/afdb/Documents/Environmental-and-Social-Assessments/Morocco_-_Ouarzazate_Solar_Power_Station_Project_II_-_ESIA_Summary.pdf).
- Bhattarai, H. P. 2013. "Lessons Learned Study of KGA Project." Research report submitted to the Centre for Inclusive Growth (CIG), Patan Dhoka, Lalitpur, Nepal.
- Camara, F. K. 2010. "Les Droits de la Femmes en Droit Senegalais. Cours de Master 2009/2010." Institut des Droits de l'Homme et de la Paix (IDHP), Faculté des Sciences Juridiques et Politiques (FSJP). Université Cheikh Anta Diop (UCAD) (<http://fsjp.ucad.sn/files/power3.pdf>).
- Ceci, S. J., and W. M. Williams. 2011. "Understanding Current Causes of Women's Underrepresentation in Science." *Proceedings of the National Academy of Science* 108 (8): 3157–62.
- Chanavat, A. and K. Ramsden. 2013. "Mining the Metrics of Board Diversity." Thomson Reuters (http://accelus.thomsonreuters.com/sites/default/files/mining_the_metrics_of_board_diversity.pdf).
- Das, M. B. 2006. "Do Traditional Axes of Exclusion Affect Labor Market Outcomes in India?" *Social Development Papers, South Asia Series*, Paper No. 97. Washington, DC: World Bank.
- Das, M. B., and S. Desai. 2003. "Are Educated Women Less Likely to Be Employed in India?" *Social Protection Discussion Paper Series*, No. 313. Washington, DC: World Bank.
- ENERGIA 2015. "Gender Mainstreaming in Rural Electrification Programmes" (http://energia.org/wp-content/uploads/2015/02/03.-GENDER_MAINSTREAMING_IN_RURAL_ELECTRIFICATION_PROGRAMMES1.pdf).
- 5 Capitals (5 Capitals Environmental & Management Consulting). 2012a. "Quarzazate Solar Power Complex, Phase 1 Morocco: Specific Environmental and Social Impact Assessment," vol. 1. Rabat.
- . 2012b. "Quarzazate Solar Power Complex, Phase 1 Morocco: Specific Environmental and Social Impact Assessment," vol. 2. Rabat.
- Folbre, N., and J. A. Nelson. 2000. "For Love or Money—or Both?" *The Journal of Economic Perspectives* 14 (4): 123–40.
- IRENA (International Renewable Energy Agency). 2015. *Renewable Energy and Jobs—Annual Review 2015*. Abu Dhabi: IRENA (www.irena.org/DocumentDownloads/Publications/IRENA_RE_Jobs_Annual_Review_2015.pdf).
- . 2016. *Renewable Energy and Jobs—Annual Review 2016*. Abu Dhabi: IRENA (www.irena.org/DocumentDownloads/Publications/IRENA_RE_Jobs_Annual_Review_2016.pdf).
- McKinsey & Company. 2010. *Women at the Top of Corporations, Making It Happen*. Women Matter Series.
- . 2012. *Making the Breakthrough*. Women Matter Series.
- . 2016. *Reinventing the Workplace to Unlock the Potential of Gender Diversity*. Women Matter Series.

- McKinsey & Company and LeanIn.org. 2016. *Women in the Workplace* (<http://www.mckinsey.com/business-functions/organization/our-insights/women-in-the-workplace-2016>).
- Moss-Racusin, C. A., J. F. Dovidio, V. L. Brescoll, M. J. Graham, and J. Handelsman. 2012. "Science Faculty's Subtle Gender Biases Favor Male Students." *Proceedings of the National Academy of Sciences* 109 (41): 16474–79.
- Panjwani, A. 2005. "Energy As a Key Variable in Achieving Universal Primary Education: A Gender and Energy Perspective on Empirical Evidence on MDG #2." Department for International Development (DFID) Discussion Paper (http://r4d.dfid.gov.uk/PDF/Outputs/Energy/R8346_mdg_goal3.pdf).
- Pearl-Martinez, R., and J. Stephens. 2016. "Toward a Gender Diverse Workforce in the Renewable Energy Transition." *Sustainability: Science, Practice & Policy* 12 (1). March 22 (http://sspp.proquest.com/archives/vol12iss1/1510-025.pearl-martinez_stephens.html).
- Pollack, E. 2013. "Why Are There Still So Few Women in Science?" *The New York Times Magazine* (http://www.nytimes.com/2013/10/06/magazine/why-are-there-still-so-few-women-in-science.html?_r=2&).
- Professionals Australia. 2015. "The Slower Track: Women in the STEM Professions Survey Report" (<http://www.professionalsaustralia.org.au/professional-women/wp-content/uploads/sites/48/2014/03/2015-Women-in-the-STEM-Professions-Survey-Report.pdf>).
- Reuben, E., P. Sapienza, and L. Zingales. 2014. "How Stereotypes Impair Women's Careers in Science." *Proceedings of the National Academy of Sciences* 111 (12): 4403–08.
- Reuters. 2008. "Women Drivers Better Than Men in the Mining Monster Trucks" (<http://blogs.reuters.com/commodity-corner/2008/04/10women-drivers-better-than-men-in-the-mining-monster-trucks/>).
- Surie, M. D. 2016. "Where Are India's Working Women?" *In Asia: Weekly Insights and Analysis*. March 9. San Francisco: The Asia Foundation.
- Tilt, B., Y. Braun, and D. He. 2008. "Social Impacts of Large Dam Projects: A Comparison of International Case Studies and Implications for Best Practice." *Journal of Environmental Management* 90: S249–57.
- USAID (United States Agency for International Development). 2016. *Engendering Utilities: Improving Gender Diversity in Power Sector Utilities*. Washington, DC: United States Agency for International Development.
- Williams, J. C., K. W. Phillips, and E. V. Hall. 2014. "Double Jeopardy: Gender Bias against Women of Color in Science." UC Hastings College of Law, Research Report. San Francisco: University of California.
- World Bank. 2011. "Appraisal Document on a Proposed Loan in the Amount of US\$200 Million and a Proposed Clean Technology Fund Loan in the Amount of US\$97 Million to MASEN for the OZZ1 CSP Project." World Bank, Washington, DC.
- . 2015a. "Labor Force Participation, Male and Female." International Labour Organization (ILO) estimate (<http://databank.worldbank.org/data/home.aspx>).
- . 2015b. "Morocco Mind the Gap: Empowering Women for a More Open, Inclusive, and Prosperous Society." MENA Region, Report No. 97778-MA. Washington, DC: World Bank.
- Wuppertal Institute and Germanwatch. 2015. "Social CSP—Energy and Development: Exploring the Local Livelihood Dimension of the Noor I CSP Project in Southern Morocco." Final Report to the German Federal Ministry for Economic Cooperation and Development (GIZ). Wuppertal and Bonn: Wuppertal Institute for Climate, Environment, and Energy; Germanwatch (www.wupperinst.org/en/projects/details/wi/p/s/pd/449/).
- Xiaogang, Yu, and Jia Jiquo. 2002. "An Overview of Participatory Social Impact Assessment for Manwan Hydropower Station in Lancang River" (<https://www.internationalrivers.org/resources/manwan-dam-social-impact-assessment-2576>).

LAND-RELATED IMPACTS OF ENERGY INFRASTRUCTURE: DISPLACEMENT AND COMPENSATION

HIGHLIGHTS

- Women are often disproportionately affected by the land-use changes typically involved in large-scale energy infrastructure projects, such as loss of agricultural land for small-scale cultivation.
- Where projects require involuntary displacement and resettlement, men and women are differently affected by the induced economic, social, and environmental risks; however, women often suffer disproportionately.
- Even if environmental and social safeguards policies are systematically integrated into international development projects, gender-inclusive public consultations may not occur, owing, in part, to social and gender norms in the affected communities.
- Gender analysis should be an integral part of social assessments and safeguards policies to ensure gender-equal project outcomes.
- The compensation decision process should consider women's property rights and important role in agriculture, and strategies should be gender-targeted; important elements include joint registration of assets and spousal co-ownership rights titles.

Because land serves many, often incompatible needs and uses, energy infrastructure development—if unmitigated—can disrupt existing land uses, impacting men and women differently. Land is a precious but finite resource. It serves to secure food production and is needed for a myriad of other purposes, including infrastructure and human settlements. Consequently, there are frequent struggles over access to land and conflicts over the best uses to which land should be put (Gerstter et al. 2011).

Invariably, energy infrastructure projects require the transformation of a certain amount of land and use of water and other natural resources, which may conflict with existing uses. In addition, people may be displaced and natural habitats may be disrupted. Once the energy infrastructure is established, new uses may emerge for the transformed land surrounding it. Furthermore, men and women may be impacted differently owing to gender and social norms and gender unequal access to land, with women usually bearing a disproportionate share of the costs. Mitigation measures at the project level, however, can help to minimize adverse impacts. Gender-targeted compensation strategies can lead to more gender-equal outcomes (Appendix B).

IMPACT OF LAND USE CHANGES ON MEN AND WOMEN

Large energy infrastructure may lead to changes in land use. The most dramatic land use change is caused by flooding a reservoir in hydropower projects, although other energy sources may also result in land use changes. For example, constructing power plants on large tracts of land requires clearing and grading, possibly resulting in soil compaction, alteration of drainage channels, and increased runoff and erosion (EIS n.d.). In addition to permanent impacts, short-term disturbances can result from ancillary investments (e.g., access roads and storage) along the electricity value chain (i.e., generation, transmission, and distribution) (Denholm et al. 2009) (Appendix B).

Access to Agricultural Land

Energy generation facilities can decrease the land available for subsistence agriculture. Energy facilities may interfere with existing land uses (e.g., livestock grazing and food production) or impact the natural ecosystems upon which most rural livelihoods in agricultural communities depend. When ecosystems are disrupted, livelihoods can suffer or even be destroyed (Clancy 2012). Agriculture can be affected, by the elimination of cropland, the temporary loss of crop production due to construction, and the incompatibility of certain crops and agricultural activities with transmission facilities (Williams 2003).

Electric power transmission projects can lead to significant land use changes and impact land values. Even rights-of-way limited to narrow tracts of land can fragment existing land uses (Appendix B). The magnitude of the impact depends on the length of the transmission line and existing land uses. Easements can also result in loss or fragmentation of natural habitats and ecosystems. The effects can be significant in fragile areas, such as wetlands, or land that is home to indigenous people (Box 3.1). Property values may also be affected (either positively or negatively) due to aesthetic reasons, perceptions

BOX 3.1

Lessons from Transmission Network Construction in Nepal

The transmission network constructed under the Nepal Kali Gandaki “A” (KGA) Hydropower Project—though less intrusive than the project’s hydro generation infrastructure—fragmented land parcels, which interfered with existing land uses for agriculture, and reduced property values. Transmission towers were constructed in the middle of cultivated areas, which made plowing difficult and increased the cost of cultivation. Furthermore, banks would not accept the land as collateral and property values fell. More recent transmission projects in Nepal have learned from such unintended negative consequences. Today the country has some of the world’s most progressive practices regarding right-of-way land for transmission lines, providing cash compensation for 10 percent of the land value under the lines. In addition, resettlement plans (e.g., under the Kabeli Transmission Line Project) offer women livelihood/skills and enterprise training.

Source | Kali Gandaki ESW study.

BOX 3.2

Impacts on Women from Loss of Agricultural Land

In Nepal, land acquired by the Kali Gandaki “A” (KGA) Hydropower Project was converted into workspaces with cemented surfaces that deprived families of agricultural land and communal green patches. Women were predominantly impacted by this change, which resulted in loss of fertile soil for growing vegetables in small kitchen gardens and loss of fodder and grass for livestock.

At the Pak Mun dam in Thailand, the loss of local edible plants due to submergence resulted in reduced incomes and sources of subsistence. Women were affected disproportionately since they are responsible for collecting and processing these plants.

Sources | Kali Gandaki ESW study; WCD 2000.

of hazard, and road access. Many industrial, commercial, and residential uses are incompatible with the requirement to keep transmission rights-of-way clear of obstacles and structures, as well as for reasons of safety and public health (Williams 2003).

Women may be disproportionately affected by land use changes and reduction of agricultural land. Women in rural areas may be disproportionately affected since they more often depend on common property resources. For example, women’s subsistence agriculture activities may occur more frequently on unregistered land, as opposed to fields owned by men. As a result, women may be denied compensation since plots are not legally registered under their names (Box 3.2). Loss of access to common land can lead to fodder and fuelwood shortages, resulting in a decline in traditional craft activity, income opportunities, and food availability (Joji 1999). In the case of hydropower projects, new reservoir and water regimes can lead to a change in cropping patterns toward high-value monocultures, which may displace women engaged in small-scale cultivation. Women living or working on land as tenants have even fewer options once the land is no longer available. If they lose traditional livelihoods and are excluded from new opportunities and compensation, they may have no choice but to leave the area or take low-wage, menial, and insecure jobs or even prostitution to survive (Clancy 2012).

Access to Natural Resources

Energy operations may adversely affect water resources and put additional pressure on areas of high water stress. The energy sector not only withdraws and consumes water, altering water flow patterns and quantities, but also generates substantial wastewater. Energy operations can greatly undermine water resources through post-production discharge and possible contamination of aquifers during drilling (IRENA 2015). Water scarcity already affects every continent,¹ and the increased demand for energy could put additional pressure on already constrained water resources (IEA and World Bank 2015).

Better integration of energy-water planning and shifting to more efficient renewable-energy sources and technological innovations can help to reduce water dependency and increase welfare.²

Biodiversity, wildlife, and forest areas can also be impacted by large energy infrastructure projects, ranging from hydropower development to transmission networks. The greatest impact on wildlife comes from loss of habitat resulting from reservoir filling and land-use changes in the watershed (World Bank 1999). Transmission line construction and maintenance can lead to the permanent removal of woody vegetation, the complete conversion of strips of forest ecosystem into bare land (in some cases), and soil erosion and alteration of hydrology (Williams 2003). Fragmentation, pesticide use in rights-of-way, and invasive plant species within the right-of-way can also affect surrounding forest areas and biodiversity (Williams 2003).

Traditional economic activities may decline after project completion, disrupting local economies. The long-term impact of hydropower development on fisheries can be significant. Migratory riverine species are the fish community most likely to suffer major adverse impacts because of changes in river flow, deterioration of water quality, loss of spawning ground, and barriers to migration. Changes in freshwater flows and thus the salinity balance in an estuary alter species distribution and breeding patterns of fish. Changes in nutrient levels and a decrease in river water quality can also profoundly affect the productivity of an estuary (World Bank 1999).

We used to catch 5–15 kg of fish per day before the project; now it is only 1–5 kg per day. Sometimes there is no catch, and we have to return home empty handed.

**BOTE WOMEN GROUP (FGD), YAMGHA, PALPA,
KALI GANDAKI “A” (KGA) HYDROPOWER PROJECT, NEPAL**

Loss of natural resources and pollution makes women particularly vulnerable. Women are usually responsible for gathering food, water, and firewood for their families, and land-use changes can cut off their access to those resources (Box 3.3). Less availability and lower quality of these resources can increase the time women must allocate to household chores and the associated burden; in turn, this can further constrain school attendance for girls and limit other activities (Clancy 2012). As part of energy resource development, pollutants and land conversion (including inadequate wastewater treatment from construction camps) make clean water less accessible. In these cases, such basic tasks as washing clothes and cooking food become more arduous. Water pollution can jeopardize the health of women who work in agriculture, collect water, or do laundry in rivers. Children and family members may be sickened by dirty water, meaning that mothers must devote more time to seeking and giving family health care, taking time away from income generation, farming, and other needed tasks (Clancy 2012). Beyond having an environmental management plan in place, energy projects can mitigate this negative impact by implementing benefit-sharing and community-development initiatives that provide for clean water

BOX 3.3

Drinking Water Issues in the Kali Gandaki “A” Hydropower Project

Women living in the rural community affected by Nepal's Kali Gandaki “A” (KGA) Hydropower Project complained that clogging of local wells with mud during construction interfered with their ability to meet their household responsibilities of collection drinking and irrigation water. Drinking water was directed to the utility office site, further diminishing the community's water supply.

Source | Kali Gandaki ESW study.

from the reservoir via installing hand or electric pumps or by bringing in water tankers as was done in the case of India's Rampur Hydropower Project. Providing the local community access to project medical centers may help with immediate care. In addition, information campaigns on the use of alternative water sources need to effectively target women in order to induce positive behavioral change.

DISPLACEMENT AND INVOLUNTARY RESETTLEMENT

Energy infrastructure projects may cause population displacement and involuntary resettlement.

One of the most serious impacts of large infrastructure development is taking over land and displacing people to make way for the power plants, transmission lines, and other new facilities. The extent and implications of such forced relocation are diverse and variable, depending on the project's nature and density of the affected population. Displaced populations can vary widely in size, ranging from just a few households to tens or even hundreds of people in the case of large hydropower projects. Large dams, requiring flooding of large land areas to form the reservoir, have serious implications in terms of displacing vulnerable populations—often indigenous communities—living in remote but resource-rich areas (WCD 2000; Mehta 2011). The need to clear land for transmission rights-of-way and associated facilities can also result in the removal of people living in those locations (IFC 2007).

Experience indicates that involuntary resettlement, if unmitigated, often gives rise to severe economic, social, and environmental risks.

It is quite difficult to relocate people without damaging their livelihoods and well-being. When communities or individuals are forced to move, the consequences can be traumatic. Production systems are dismantled, which, in turn, may cause people to lose their productive assets or income sources and thus face impoverishment. People may also be relocated to environments where their skills are less applicable and the resource competition is greater. Jobs may be lost, and community institutions and social networks may collapse. Kinship groups may be scattered, and cultural identity and traditional authority may be diminished, especially in the case of tribal and ethnic minorities. Forced resettlement tends to be associated with increased sociocultural and psychological stresses and higher morbidity and mortality rates (Zaman 1990; Clancy 2012; World Bank 2013).

BOX 3.4

Gendered Impacts of Involuntary Displacement from Dam Projects

Women tend to suffer disproportionately as a result of involuntary displacement associated with hydropower dam projects. In **Pakistan**, coastal and mangrove areas downstream of the Tarbela dam experienced dwindling fishing opportunities, resulting in fewer jobs for men. This led to male outmigration, which, in turn, destroyed family structures traditionally organized around fishery activities, further accelerating male outmigration. As a result, women faced increased responsibilities as de facto heads of households, while household incomes were severely reduced. In **Ghana**, impoverishment resulting from involuntary displacement associated with the Akosombo dam led to increased male migration to urban areas, which placed greater burden on women as household heads. In **South Africa**, farm workers' households headed by women suffered unduly during the displacement process caused by the Gariep and Vanderkloof dams. Only 15 percent of female-headed households resettled successfully, compared to 30 percent of male-headed households.

Source | WCD 2000.

Men and women are differently affected by displacement and resettlement, and women often suffer disproportionately. Displacement, resettlement, livelihood loss, job creation, and benefit-sharing triggered by large infrastructure can be unequal between men and women (ESMAP 2013). The general impoverishment of communities and the social disruption, trauma, and health impacts resulting from displacement have typically had more severe impacts on women, mainly due to existing gender inequalities (WCD 2000; Mehta 2011). Large energy infrastructure projects often aggravate existing gender inequalities as planners tend to ignore the interests of women and other vulnerable groups (Mehta 2011). Women often suffer disproportionately due to loss of their use of fertile land, forest and water resources, and the kinship and social networks they depend on for support (Clancy 2012). Women are harder hit by resettlement than men since they are more likely to earn their living from small businesses located at or near their residences (WCD 2000). Also, women tend to have less access to land ownership due to inheritance laws or social norms or experience legal and practical barriers to land registration and titling. As a result, women and girls are likely to face greater risks during the resettlement process (Box 3.4).

The men handled everything. We didn't see any money.

DALIT WOMEN, JAGTARADEVI VDC ON LAND ACQUISITION (FGD),
KALI GANDAKI "A" (KGA) HYDROPOWER PROJECT, NEPAL

DESIGN OF GENDER-INCLUSIVE MITIGATION MEASURES

Multilateral development banks, governments, and the private sector have developed safeguards policies and regulations to avoid, mitigate, or minimize adverse environmental and social impacts of supported energy infrastructure projects. Although various environmental and social safeguards

policies are in place, gender-inclusive consultations and gender-informed social assessments have rarely occurred. This section examines the reasons why many past projects have failed to achieve gender inclusiveness, offers examples of best practices, and provides World Bank experience in integrating environmental and social safeguards policies into its operational policies and potential gender entry points for projects (Box 3.9).

Lessons from Past Projects and Best Practices

Women's low participation in public consultations can be explained through social and gender norms. Pervasive social and gender norms play a key role in women's low participation in public consultations. The burden of household work strongly influences women's ability to participate in consultation meetings. Other barriers may be related to language and illiteracy. Often, information dissemination does not reach women. Lack of awareness also plays a role; in many cases, men discourage women's participation, believing that development issues are not women's concern or that they know better (DOED 2005).

Nonetheless, men and women should be equally considered in public consultations to avoid unintended negative impacts on women. If women are not fully consulted during the design of mitigation measures or a resettlement program, resources specific to women's livelihoods may not be given sufficient priority, which could lead to unintended negative gender impacts (ESMAP 2013). It is thus crucial to ensure that women are equally represented and enabled to actively participate in public consultations to avoid harming their livelihoods and living standards.

Women's involvement can be ensured through project-level measures. Various practical measures can be implemented at the project level to ensure women's participation in public consultations. For example, in 2010, the World Bank issued a Guidance Note that encourages projects to ensure that women are included in public consultations (World Bank 2010a). Women may need special arrangements to facilitate physical access owing to childcare and transportation needs or interference with domestic duties. Meetings may be arranged at a time convenient for women to attend in venues where they feel comfortable and free to engage in discussion. Separate meetings for women should be scheduled when necessary. The language used in the meetings should be accessible to women, and female facilitators and women interpreters should be considered (DOED 2005; Oxfam Australia 2013). Engaging women's groups often encourages women's participation, facilitating communication over time. Projects can also require representation and presence of women from various socioeconomic groups. Targets and quotas for women participants can be applied (ADB 2013).

Gender analysis should be an integral part of social assessments and safeguards policies since men and women are differently affected by large infrastructure projects. Men and women have different roles in society and are differently considered by legal and social norms. Disregarding gender issues in the assessment and preparation process can aggravate existing imbalances in the affected communities' gender relations, leading to women bearing a disproportionate share of the project's social

BOX 3.5

Gender Assessment of the Nam Theun 2 Hydropower Project in Lao PDR

Addressing gender issues was integral to the design of the Nam Theun (NT) 2 Hydropower Project, a 1,070 MW effort initiated in Lao PDR in 2010. The gender assessment conducted for the project identified women and girls in marginalized ethnic groups and disadvantaged households with limited access to education, off-farm employment, production markets, cash assets, and sociopolitical empowerment. The assessment concluded that these groups would face greater risks during the resettlement process and thus would require ongoing intensive attention and support. The project's comprehensive environmental and social mitigation design can serve as a global model for future dam construction projects.

Source | World Bank 2011.

costs (WCD 2000). Regarding land-related impacts, gender assessments identify who owns and uses what type of land likely to be affected by the project and how available compensation options are likely to positively or negatively affect men and women. By taking gender roles, social norms, and power relations into consideration, gender assessments ensure that project activities do not disadvantage one gender over the other and enhance gender quality (Oxfam 2013) (Box 3.5).

Cash compensation levels should be sufficient to replace lost land and other assets at full replacement cost in local markets. Also, infrastructure and public services should be provided in resettlement sites or host communities, as needed, to improve, restore, or maintain accessibility and service levels (Box 3.6). The displaced persons or host communities should be provided alternative or similar resources to

BOX 3.6

Infrastructure Investment as Compensation: Experience in Morocco

In Morocco, the Noor 1 Quarzazate Concentrated Solar Power (CSP) Project constructed the power plant on communal land without settlements and thus did not require displacement. The Ait Ougroul Toundout community, to which the land belonged, was offered cash compensation for the land acquired. However, the local people decided they preferred to receive the compensation in the form of infrastructure investments instead of cash. In response, the Office of Rural Affairs (DAR), the agency responsible for implementation, collected information on the local people's needs and prioritized infrastructure projects. During the consultation process, selected local community stakeholders identified key infrastructure projects and social actions.

Source | ESW Morocco study.

compensate for lost access to community resources (e.g., fishing or grazing areas, fuel, or fodder). Because women's rights and lives are more often rooted in natural resources than marketable commodities, they tend to appreciate the non-quantifiable value of resources more than men. **When confronted with displacement, women tend to prefer non-cash compensation, and usually reject cash compensation** (Mehta 2013).

The authorities have set up several committees to consult the local population and identify projects based on the needs expressed. The representative of collective land, together with members of the village, have identified [various] needs, such as mosques, health centers, irrigation channels, roads, [and] professional training.

MALE FGD PARTICIPANT, IZNAGUEN ESSOUR, MOROCCO

The compensation decision process tends to overlook the value of women's property rights and roles in traditional land use. Typically, the household is seen as homogenous, with male members usually being targeted as the main recipients for compensation. Such an assumption often serves to worsen existing inequalities (Mehta 2013). In assessing impacts and determining compensation, past projects have tended to link women with household activities and ignore their important role in agriculture, water use, forestry, and animal husbandry. Typically, men—the land titleholders—are compensated for loss of land, while women, who work the land and are severely impacted by the loss of access to fresh water, vegetable gardens, firewood, food, and ceremonial uses, are often not compensated for the resources lost (USAID 2005). While property owners are compensated, most affected people—including tenants, employees, or squatters in urban as well as rural areas—may receive no form of compensation (Clancy 2012) (Box 3.7).

BOX 3.7

Awareness and Sensitization Campaigns on Women's Land Rights

In Lao PDR, the power company involved in the Nam Theun (NT) 2 Hydropower Project hired gender specialists to support and work closely with local government agencies led by the Lao Women's Union. The participation of gender specialists resulted in more effective implementation of the gender-sensitive Social Development Plan and Resettlement Action Plan and facilitated women's participation in all stages of the project cycle, ensuring their adequate compensation.

Source | ESMAP 2012.

F1

F1

BOX 3.8

Gender-Targeted Compensation Measures in Hydropower Projects

The Bumbuna Hydroelectric Power Project in **Sierra Leone** triggered the Involuntary Resettlement operational policy (OP 4.12), resulting in the design of several gender-targeted compensation mechanisms. First, it provided funding and support directly to women without men's intermediation. Second, it required women to set up savings groups, which enabled them to access a revolving loan facility and skills training. Finally, it granted joint titles of land, houses, and assets in the names of both husband and wife, facilitating women's access to credit. Women also played key roles as community leaders (e.g., water and sanitation subprojects). In fact, women comprised 50 percent of village resettlement committees, which enhanced their social and economic empowerment and welfare.

The Nam Theun (NT) 2 Hydropower Project in **Lao PDR** mainstreamed gender considerations into the Social Development Plan and Resettlement Action Plan, which were legally enforced. Land titles for affected persons were issued jointly to husband and wife, and all compensation payments were handed over jointly to husband and wife. Similarly, in **Indonesia**, the Upper Cisokan Pumped Storage Hydro-Electrical Power Project required that spouses countersign documents for replacement assets purchased and cash compensation.

Sources | Ahmad 2008; World Bank 2010b; ESMAP 2013.

and individuals. Formalization can free individuals from constraining social relations and dependency on stakeholders that benefit from perpetuating informality and insecurity. Granting property titles to women or jointly to couples can increase women's bargaining power in family decisions, which, in turn, can affect women's choices regarding labor force participation or fertility (Durand-Lasserve and Selod 2007). Women in Ethiopia, for example, claimed that joint land certificates had improved their economic and social status (UN-Habitat 2008).

WORLD BANK SAFEGUARDS POLICIES AND GENDER ENTRY POINTS

The World Bank systematically integrates environmental and social safeguards into its operational policies for all projects, aiming to protect the environment and communities living in the project-affected areas (Box 3.9). Safeguards policies include the Operational Policy (OP) 4.01 Environmental Assessment. This policy evaluates potential impacts of the proposed project on the natural environment (air, water, and land); human health and safety, social aspects, and transboundary and global environmental aspects;³ as well as specific policies addressing Natural Habitats (OP 4.04), Water Resource Management (OP 4.07), Pest Management (OP 4.09), Indigenous Peoples (OP 4.10), Physical Cultural Resources (OP 4.11), Involuntary Resettlement (OP 4.12), and Forests (OP 4.36). The

BOX 3.9

Analysis of the World Bank's Safeguards Policies

The World Bank created safeguards policies to ensure that all of the projects and programs it supports are environmentally and socially sound and sustainable. The current umbrella safeguards policy, Operational Policy (OP) 4.01 (Environmental Assessment), mandates that the borrower must carry out a process of environmental and social assessment when a safeguards policy is triggered. Although OP 4.01 does not explicitly include project-level gender assessments, gender is referenced in the context of consultations (OP 4.10, Indigenous Peoples) and vulnerable groups (OP 4.12, Involuntary Resettlement).

A new Environmental And Social Sustainability Framework, approved in 2016, will start in 2018. The new framework establishes 10 Environmental and Social Standards that the borrower and project will meet through the project life-cycle, as follows:

- 1: Assessment and Management of Environmental and Social Risks and Impacts;
- 2: Labor and Working Conditions;
- 3: Resource Efficiency and Pollution Prevention and Management;
- 4: Community Health and Safety;
- 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
- 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;
- 8: Cultural Heritage;
- 9: Financial Intermediaries; and
- 10: Stakeholder Engagement and Information Disclosure.

Source | http://consultations.worldbank.org/Data/hub/files/consultation-template/review-and-update-world-bank-safeguard-policies/en/materials/the_esf_clean_final_for_public_disclosure_post_board_august_4.pdf

borrower is responsible for carrying out the environmental assessment and the World Bank's task team ensures it is conducted properly and that safeguard policies are fulfilled.

GENDER-INCLUSIVE PUBLIC CONSULTATIONS

Public consultations are an integral part of the World Bank's Environmental Assessment process and are included in specific safeguards policies. The environmental assessment process mandates the borrower to involve stakeholders, including project-affected groups and local nongovernmental organizations (NGO), in the project's preparation phase and throughout implementation to ensure that their views and concerns are made known to decision makers and taken into account. Local communities

and NGOs are also consulted on various operational policies, such as Natural Habitats (OP 4.04), Indigenous Peoples (OP 4.10), Physical Cultural Resources (OP 4.11), and Involuntary Resettlement (OP 4.12), to assess the nature and extent of potential impacts and design and implement mitigation and compensation plans, as well as grievance procedures.

Although gender considerations are included in Involuntary Resettlement (OP 4.12), in practice, women are rarely informed about project development. The environmental assessment process and most safeguards policies do not refer to gender considerations or explicitly require women and men to equally participate in public consultations. However, OP 4.10 and OP 4.12 both stress the need to pay particular attention to the needs of vulnerable groups, such as women and children, and use consultation methods appropriate to the social and cultural values of the affected communities. OP 4.12 states that displaced persons should be meaningfully consulted and have opportunities to participate in planning and implementing resettlement programs. Displaced persons, their communities, and any host communities receiving them should be provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementing, and monitoring resettlement. Appropriate and accessible grievance mechanisms should also be established for these groups. Patterns of community organization appropriate to the new circumstances should also be based on choices made by the displaced persons. However, in practice, women are usually not involved in public consultation and are rarely kept informed about project development and compensation processes. Rural populations, who usually have completed only basic education, may face serious challenges in dealing with regulations and procedures related to energy infrastructure activities. They have limited and inadequate access to information, and do not know their entitlements. Compared to men, women tend to have lower levels of access to information and less voice in negotiations (Clancy 2012) (Box 3.10).

BOX 3.10

Including Women in Compensation Processes

Including women in land acquisition and compensation processes can be a challenge, depending on the context.

In **Morocco**, the local population claimed that few people were officially informed about the Noor 1 Quarzazate Concentrated Solar Power (CSP) Project, despite the developer's efforts to ensure that women's associations were also invited to the public consultations. According to the local people, the public consultations were inadequate, mainly involving representatives of the collective lands. Women did not fully participate in the land acquisition consultation process nor were they considered in decisions on how to utilize the related compensation.

In **Nepal**, during the land acquisition and compensation process within the Kali Gandaki "A" (KGA) Hydropower Project, the property was registered under men's names. No formal consultations or information dissemination were provided to women, and men mainly made decisions about use of the money. Women's influence in how the compensation was used was low, except within the indigenous Janajati group, where women traditionally have a more equal role within families. All land and houses bought with the compensation money were registered under men's names.

Sources | ESW Noor 1 CSP study; ESW Nepal study.



The local population has been informed only once the works had started. This has led to resistance from the population.

MALE FGD PARTICIPANT, TASSELMANT, MOROCCO

Representatives of collective land did not understand the land acquisition process. They were just attending the meetings. Our representative could not follow the discussion and did not understand the conclusions.

MALE FGD PARTICIPANT, TASSELMANT, MOROCCO

We have not been officially informed. We noticed some early signs of foreign people visiting the site with 4 × 4 vehicles. Only rumors were going around about a solar energy project.

FEMALE FGD PARTICIPANT, IZNAGUEN ESSOUR, MOROCCO

Gender-Informed Social Assessments

The World Bank's Indigenous Peoples (OP 4.10) and Involuntary Resettlement (OP 4.12) operational procedures include specific social assessments to identify a project's potential economic and social impacts and design appropriate mitigation measures. OP 4.10 undertakes social assessments to identify the project's potential beneficial and adverse impacts on indigenous people and give full consideration to options preferred by the affected population in the provision of benefits and design of mitigation measures. To avoid or minimize involuntary resettlement and, where not feasible, assist displaced persons to improve or at least restore their livelihoods and standards of living in real terms (relative to pre-displacement levels or prevailing ones prior to the outset of project implementation), the OP 4.12 uses census and socioeconomic surveys of the affected population to identify and address the potential economic and social impacts of the project caused by involuntary taking of land (e.g., relocation or loss of shelter or assets or loss of income sources or means of livelihood) or involuntary restriction of access to legally designated parks and protected areas.

Nonetheless, gender assessments are not explicitly required. None of the operational policies recommends integrating a gender assessment within the social assessments. Indigenous Peoples (OP 4.10) is the only operational policy that refers to gender considerations as part of identifying social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive and developing measures to avoid, minimize, or mitigate adverse impacts on indigenous peoples.

Gender Targeted Compensation

Affected persons should be compensated for the adverse economic and social impacts caused by taking land for World Bank–assisted projects. Involuntary Resettlement (OP 4.12) states that, where not feasible to avoid, involuntary resettlement should provide sufficient investment resources to assist displaced persons in their efforts to improve their livelihoods and living standards, or at least restore them in real terms, and enable them to share in project benefits. OP 4.12 covers the direct economic and social impacts resulting from World Bank–assisted investment projects caused by the involuntary taking of land resulting in relocation or loss of shelter, loss of assets or access to assets, or loss of income sources or means of livelihood, whether or not the affected persons must move to another location. Displacement or access restrictions should not occur before the necessary measures for resettlement are in place.

BOX 3.11

Cash-for-Land Compensation Policy: Experience in Nepal

People displaced by the Kali Gandaki “A” (KGA) Hydropower Project in Nepal perceived that cash-for-land compensation alone was inadequate to mitigate project-induced impacts. The recipients complained about the lack of follow-on rehabilitation support, including financial counseling. Once the project was earmarked, land values in the surrounding area had skyrocketed, especially along the access road. More savvy members of the project-affected community used their compensation money primarily to construct houses along the roadside, while others made property investments in the cities or productive farmland in the south. But the less fortunate, lacking proper guidance, quickly wasted the money on alcohol or poor business decisions.

Source | ESW Nepal study.

A resettlement plan, including measures to ensure effective relocation and compensation, should be prepared and implemented. When OP 4.12 is triggered, the borrower becomes responsible for preparing a resettlement plan that includes measures to ensure displaced persons are informed about their options and rights pertaining to resettlement, consulted with, offered choices, provided technically and economically feasible resettlement alternatives, and offered prompt and effective compensation at full replacement cost for loss of assets directly attributable to the project. If the impacts include physical relocation, the resettlement plan should include measures to ensure that the displaced persons are provided residential housing or housing sites or agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the previous site, as well as relocation assistance (e.g., moving allowance). Where necessary, the resettlement plan should include measures to ensure that the displaced persons are offered support during the transition period after displacement, including restoration of livelihoods and living standards and development assistance (e.g., land preparation, credit facilities, training, and jobs).

Compensation may be in cash or in kind. OP 4.12 suggests that land-based compensation be given to displaced persons whose livelihoods are land-based. Replacement land should provide a combination of productive potential, locational advantages, and other factors at least equivalent to the advantages of the land taken. While cash compensation for lost assets may be appropriate, it must be recognized that the land taken for the project represents only a small fraction of the affected asset and the residual is economically viable (Box 3.11).

CONCLUSION

Men and women are often differently impacted by the advent of large energy infrastructure projects due to gender and social norms, with women usually bearing a disproportionate share of the costs. The impacts of community displacement and involuntary resettlement are diverse and variable, depending

on the nature of the project and density of the affected population. If unmitigated, involuntary resettlement often gives rise to severe economic, social, and environment risks. Women may suffer disproportionately, given their role as small-scale cultivators and lack of access to land title and rights. Project-level measures (e.g., arranging separate meetings for women in an accessible language or hiring female facilitators and interpreters) can be taken to ensure women's involvement in public consultations. In addition, gender assessments should be undertaken early on, in conjunction with feasibility studies, to ensure better project design and mitigation measures with more gender-equitable outcomes. Finally, compensation policies and strategies need to take women's needs and interests into account to ensure adequate compensation that contributes to women's empowerment.

ENDNOTES

¹Some 1.2 billion people live in areas of physical scarcity; 500 million are approaching this situation, and another 1.6 billion face economic water shortages since countries lack the infrastructure to take water from rivers and aquifers (FAO 2007).

²<http://www.worldbank.org/thirstyenergy>

³Projects are classified into categories determining the appropriate extent and nature of the environmental assessment required, depending on the type, location, sensitivity, and scale of the project and nature and magnitude of its potential environmental impacts. An extensive environmental assessment is required for category A projects—those that have the most extensive environmental impacts (e.g., a large power plant or hydroelectric dam). A more limited environmental assessment is required for category B projects (e.g., power transmission projects). Category C projects are deemed to have negligible environmental impacts and do not require an environmental assessment.

REFERENCES

- ADB (Asian Development Bank). 2013. *Nepal: Tanahu Hydropower Project*. Project Administration Manual. Project Number 43281, January. Manila: Asian Development Bank.
- Ahmad, N. 2008. "World Bank Gender Action Plan: Gender Equality as Smart Economics." Presentation at Gender and Energy Workshop, May 21–22 and Manila Workshop on Gender and Infrastructure, November 10–11.
- Clancy, J. 2012. *Mainstreaming Gender in the Energy Sector: A Training Manual*. ENERGIA International Network on Gender and Sustainable Energy. The Hague, Netherlands: ENGERIA International Secretariat; Hivos, People Unlimited.
- Denholm, P., M. Hand, M. Jackson, and S. Ong. 2009. *Land-Use Requirements of Modern Wind Power Plants in the United States*. Technical Report NREL/TP-6A2-45834, August. Golden, CO: National Renewable Energy Laboratory (NREL).
- DOED (Department of Electricity Development). 2005. *Manual for Addressing Gender Issues in Environmental Impact Assessment/Initial Environmental Examination for Hydropower Projects*. Kathmandu: Department of Electricity Development.
- Durand-Lasserve, A., and H. Selod. 2007. "The Formalization of Urban Land Tenure in Developing Countries." Background paper prepared for the World Bank's Urban Research Symposium, May 14–16, Washington, DC.
- EIS (Environmental Impact Statement). n.d. "Solar Energy Development Environmental Considerations." Solar Energy Development Programmatic EIS (Solar PEIS). Washington, DC: U.S. Department of Energy, Energy Efficiency and Renewable Energy Program and U.S. Department of the Interior, Bureau of Land Management.

- ESMAP (Energy Sector Management Assistance Program). 2013. "Integrating Gender Considerations into Energy Operations." Knowledge Series 014/13 (http://www.esmap.org/sites/esmap.org/files/ESMAP_Interating_Gender_Into_Energy_Operations.pdf).
- FAO (Food and Agriculture Organization of the United Nations). 2007. *Coping with Water Scarcity: Challenges of the Twenty-First Century*. Rome: Food and Agriculture Organization of the United Nations.
- Gerstter, C., T. Kaphengst, D. Knoblauch, and K. Timeus. 2011. "An Assessment of the Effects of Land Ownership and Land Grab on Development—with a Particular Focus on Small Holdings and Rural Areas." Ad-hoc briefing. Brussels: Directorate-General for External Policies of the Union, Policy Department, European Parliament.
- IEA (International Energy Agency) and World Bank. 2015. *Sustainable Energy for All 2015—Progress Toward Sustainable Energy*, June. Washington, DC: World Bank.
- IFC (International Finance Corporation). 2007. *Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution*. April. Washington, DC: International Finance Corporation.
- IRENA (International Renewable Energy Agency). 2015. *Renewable Energy in the Water, Energy, and Food Nexus*. Abu Dhabi: International Renewable Energy Agency.
- Joji, C. 1999. "The World Commission on Dams: A Review of Hydroelectric Projects and the Impact on Indigenous Peoples and Ethnic Minorities." *Cultural Survival Quarterly* 23 (3): 53–6.
- Mehta, L. 2011. "No Plot of One's Own: How Large Dams Reinforce Gender Inequalities." *World Rivers Review* Vol. 26, No. 1 (March).
- Oxfam Australia. 2013. *Balancing the Scales: Using Gender Impact Assessment in Hydropower Development*. Carlton, Victoria: Oxfam Australia, Challenge Program on Water and Food.
- UN-Habitat. 2008. *Secure Land Rights for All*. Global Land Tool Network. Nairobi: United Nations Human Settlements Programme.
- WCD (World Commission on Dams). 2000. *Dams and Development: A New Framework for Decision-Making*. Report of the World Commission on Dams. London and Sterling, VA: Earthscan Publications, Ltd.
- Williams, J.H. 2003. "International Best Practices for Assessing and Reducing the Environmental Impacts of High-Voltage Transmission Lines." Paper prepared for the Third Workshop on Power Grid Interconnection in Northeast Asia, Vladivostok, Russia, September 30–October 3.
- World Bank. 1999. *Environmental Assessment Sourcebook 1999*, Chapter 10. Washington, DC: World Bank.
- . 2004. *Involuntary Resettlement Sourcebook: Planning and Implementation in Development Projects*. Washington, DC: World Bank.
- . 2010a. "Consultations in Investment Lending." *Guidance Note*, March. Washington, DC: World Bank.
- . 2010b. *Making Infrastructure Work for Women and Men: A Review of World Bank Infrastructure Projects (1995–2009)*. Social Development Department, Sustainable Development Network. Washington, DC: World Bank.
- . 2011. *Doing a Dam Better. The Lao People's Democratic Republic and the Story of Nam Theun 2*. Washington, DC: World Bank.
- . 2013. "Operational Manual (OP) 4.12: Involuntary Resettlement," Revised. Washington, DC: World Bank.
- Zaman, M.Q. 1990. "Land Acquisition and Compensation in Involuntary Resettlement." *Cultural Survival Quarterly* Vol. 14, No. 4, Land and Resources.

RISK PREVENTION AND ENHANCING POSITIVE SOCIAL IMPACTS

HIGHLIGHTS

- Health risks—transmission of HIV/AIDS, water-borne illnesses, and occupational safety—comprise the most immediate negative impacts of energy infrastructure construction in the project-affected communities.
- Numerous case studies suggest these health risks and their gendered impacts are commonly overlooked during the design phase of energy infrastructure projects; similarly, the risk of violence and gender-based violence in communities could be exacerbated by large labor influx (mostly male workers) or other changes in the community.
- Many such projects are turning their focus to investing in local development activities—mainly education and health services—to build project acceptability and ownership while improving social and development outcomes.
- Evidence from various energy infrastructure projects confirms that ancillary investments sensitive to the gender context of the affected community can build trust and positive social outcomes, while those that ignore gender considerations lead to missed opportunities and project delays.
- The indirect ways in which energy infrastructure projects alter gender norms over time—both positively and negatively—are little understood and warrant more in-depth research.

Significant transformations in social and human development are likely to accompany the advent of electricity generation, transmission, and distribution projects. Changes in the project-affected communities, both positive and negative, are induced in a variety of ways. Direct negative impacts of projects are mainly related to health risks, signaling the need to integrate safety and prevention risks, include gender considerations, into project design.¹ Increasingly, projects are investing in ancillary infrastructure and benefit-sharing schemes that can contribute to enhancing social and human development outcomes for the community. If well-designed, such investments may also advance gender equality.

Well before energy infrastructure work gets under way, a project may already be having negative impacts involving health risks, which may affect men and women differently. For example, women may be more adversely affected by the inflow of migrant workers, which is often accompanied by increased incidence of HIV/AIDS and other sexually transmitted diseases (STDs) due to new demand

for sex workers, potentially involving sex trafficking and gender-based violence. Men and women are about equally affected by the incidence of water-borne illnesses, caused by a project's poor environmental and social management. Finally, occupational segregation by gender suggests that men are more likely to suffer from occupational health risks, which, if not prevented or mitigated, can result in accidents and fatalities.

Innovative energy infrastructure projects are integrating ancillary infrastructure and benefit-sharing schemes into project design to ensure long-term social sustainability. Beyond compensating displaced communities for their immediate losses, energy infrastructure projects increasingly are trying to build project ownership within the affected community and acceptability in the larger surrounding area. Some projects are investing in innovative benefit-sharing schemes and local area development activities, such as building education or health facilities and offering training, skills-building, and livelihood support. Investing in such activities can not only help reduce resistance and negative sentiments toward the project; it can contribute to enhancing social and human development outcomes in the community. **If ancillary investments are designed to address pressing gender gaps (e.g., in educational outcomes), the project can also advance gender equality in the community.**

The myriad ways in which energy infrastructure can alter gender norms have been significantly understudied. Ancillary investments (e.g., roads, bridges, and ferries) can indirectly influence a transition toward more egalitarian gender norms by increasing women's mobility, access to information, and participation in market work. But the way change happens is highly dependent on contextual factors, and no studies to date have moved beyond conjecture.

PREVENTING AND ADDRESSING GENDER-BASED VIOLENCE

Gender-based violence is an umbrella term for any harmful act perpetrated against a person's will that is based on socially ascribed (i.e., gender) differences between males and females. The term is primarily used to underscore that structural, gender-based power differentials between males and females around the world place females at risk for multiple forms of violence. As agreed in the Declaration on the Elimination of Violence Against Women (1993), gender-based violence includes acts that inflict physical, mental, or sexual harm or suffering, threats of such acts, or coercion and other deprivation of liberty, whether occurring in public or private life.

The impact of gender-based violence can be felt across every sector—from education to energy and extractives, from governance to transport—and in every context, especially fragile or conflict affected situations. The recently published World Bank Group (WBG) gender strategy acknowledges that gender-based violence is an expression of oppressive gender inequality that undermines our development objectives (World Bank 2015). The strategy calls for increased investment in the prevention and response to violence against women and girls, either through stand-alone prevention and response programs and/or as part of other sectoral operations. The energy sector has a role to play in the prevention and response to gender-based violence.

The enhanced mobility of construction workers hired by large-scale infrastructure projects and other dynamics may create demand for sex workers and/or exacerbate the risk of sex trafficking

and gender-based violence in project communities. Lessons from projects in the transport, mining, and related infrastructure sectors provide useful guidelines on how to prevent gender-based violence in large-scale energy projects (e.g., ADB 2009; World Bank 2015). Recently, an inspection panel documented serious allegations regarding adverse social impacts and male road workers having sexual relations with minors in the communities in the context of the Uganda Transport Sector Development Project, which led to its cancellation.² Because of the seriousness of the allegations, the WBG took some steps, even while the inspection panel was in process, including compensatory measures for the communities and an emergency response program for child victims of abuse. A global task force on gender-based violence was launched in the fall of 2016 in order to provide additional recommendations. Lessons learned included working with government agencies, contractors, and communities to prevent and address gender-based violence in the context of infrastructure projects, as well as through other vehicles, including specialized projects and policy dialogue.

Gender-inclusive energy policies and projects that integrate gender-based violence prevention and response result in interventions that avoid unintended consequences (e.g., by requiring robust sexual harassment policies for construction contractors) or proactively respond to existing gender-based violence through analysis and design decisions. This approach, in turn, leads to well-designed projects that take into account the needs and safety of all users, culminating in less gender-based violence and more empowered women (O'Neil et al. 2015). In the energy sector, such projects as the Upper Cisokan Pumped Storage Hydro-Electrical Power Project in Indonesia have added gender-based violence prevention, along with education on health and STDs, as a project design component (Box 4.1).

One initial action that projects can take to prevent gender-based violence is establishing codes of conduct for energy project employees and contractors. These codes of conduct—signed and agreed to being upheld by all staff involved in construction—would clearly outline unacceptable behavior and consequences for harassment and gender-based violence. In addition, mechanisms must be created for the community to report cases of abuse by staff (World Bank 2015). Innovative use of information and communication technologies would facilitate reporting, feedback, and grievance redress and improve women's security; for example, mobile phone applications could provide information to women and girls who have experienced or are at risk of violence.

Another key step is implementing social gender-based violence prevention campaigns in the project-affected area. An important aspect of such campaigns is to engage communities and civil society in raising awareness about violence and its prevention. Participatory processes to design and evaluate violence prevention programs and mechanisms can result in more effective solutions overall. Women themselves can propose strategies for improving their safety in the project area and can influence program design. A toolkit developed by the United States Agency for International Development (USAID) for addressing gender-based violence in its energy projects could be useful to the energy teams of international development agencies (USAID 2015).

Enhancing the capacity of utilities, contractors, and local government, as well as schools and health centers, is another important contribution toward preventing gender-based violence and addressing it when it occurs. Enhancing the gender-based violence capacity of the local government and community,

as well as the project team, is crucial for coordinated efforts to create an environment that does not tolerate gender-based violence and where cases are reported and addressed (including support for victims). The World Bank Group and other international development partners have recently launched a resource guide on addressing gender-based violence, which provides specific information on risks and prevention strategies, as well as best practice examples on the provision of quality services to violence survivors.³

PREVENTING AND MITIGATING HEALTH RISKS

Large-scale energy projects can result in negative social outcomes if the health risks, including their negative gender aspects, are not anticipated and incorporated into project planning.

Inflows of migrant workers and construction of access roads can increase the transmission of disease, especially HIV/AIDS and other STDs. Also, water-borne illnesses, a major health risk affecting men and women equally, are linked to specific energy-generation sources. For example, the water pollution and deteriorated water quality caused by building hydropower dams and reservoirs can lead to the spread of water-borne illnesses in the local population.⁴ Furthermore, projects lacking adequate safety precautions for workers may increase occupational health hazards, resulting in accidents and fatalities. While gender-disaggregated data on such incidents is nonexistent, men are more likely affected, given the traditionally gendered division of market work. Finally, projects that fail to communicate safety risks to end-user consumers may lead to accidents or be associated with long-term, adverse health effects.

Ensuring safety and prevention of health risks should be an integral part of project design; however, the background field work conducted for this study and numerous case studies suggest this is not yet the norm. Energy infrastructure projects need to integrate social and health-risk management components (e.g., STDs and health education) into the project design phase. It is critical to include women on an equal footing with men in all consultations and communication plans in order to grasp the social context and create adequate mitigation mechanisms to protect families and promote health risk management. Women can be key actors in signaling potential health risks, as well as agents of change in fostering positive health behaviors. Thus, if necessary, extra efforts must be made to ensure that women participate and that project implementation takes the results of these consultations into account (IEG 2016).

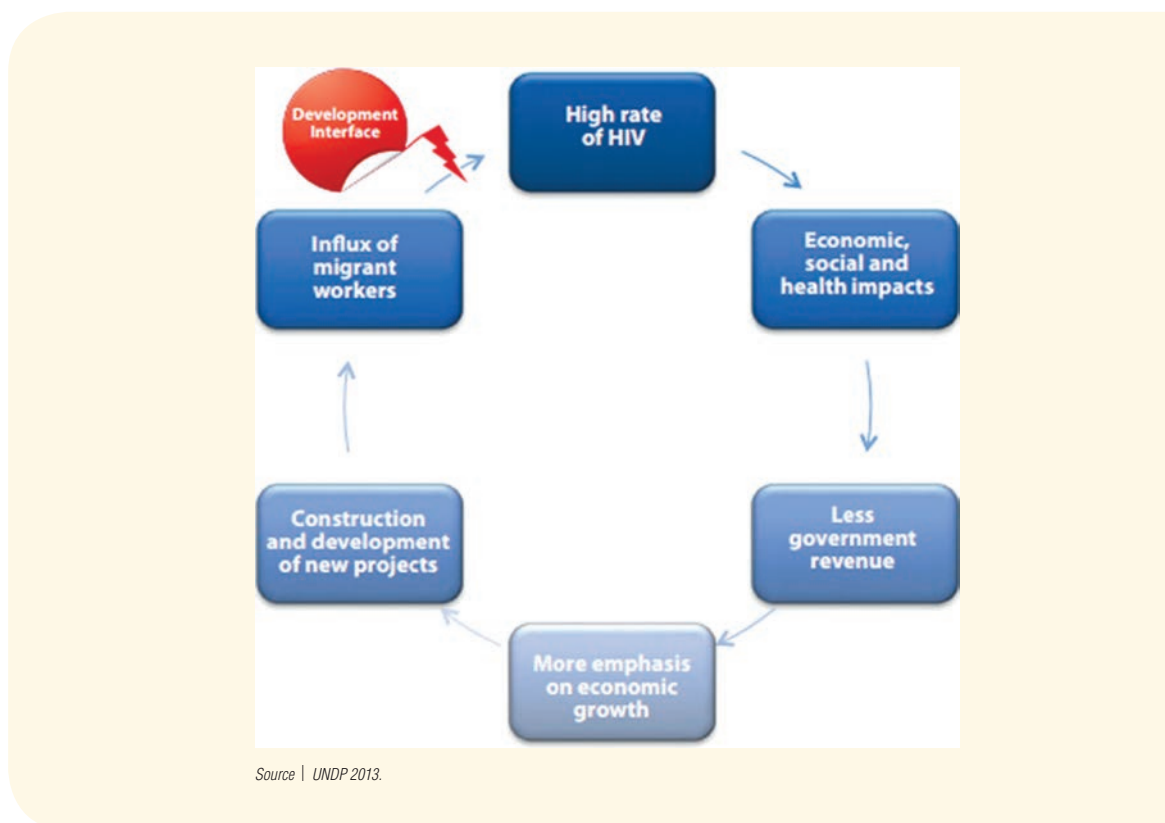
Preventing Disease Transmission and Their Gendered Impacts

The linkages between increased HIV prevalence and large-scale infrastructure projects due to the presence of mostly male migrant workers are well documented. In Africa, for example, large infrastructure projects have been identified as a key driver of the HIV epidemic (UNDP 2013).⁵ The combination of mobility, loneliness, money, alcohol, and a high-risk work environment often results in men having unprotected sex with local sex workers (ADB 2007; IOM 2010). It has also been established that increased trade—along road routes, through ports, and at border crossings—can increase the incidence of HIV, prostitution, and stigma (ADB 2007; Selvester, Cambaco, and

Bié 2011). In Brazil, for example, dam construction by migrant workers has been underpinned by numerous reports of sex trafficking, overt prostitution, and increased violence against women (Hurwitz 2013).⁶ Similar findings were reported in Lesotho during construction of the Katse dam, which had mainly negative impacts on health, gender equality, and cultural assets. The dam construction provided women no formal work opportunities, which led to a rise in sex work and STDs, raising violence/stigma and impacting marital relations in the broader community (Tilt, Braun, and He 2008) (Figure 4.1).

The background field work conducted for this study shows that affected communities realize the potential health risks that energy infrastructure projects may be bringing. In Nepal, for example, participants in focus group discussions (FGDs) expressed their concern about the potential spread of disease under the Kali Gandaki “A” (KGA) Hydropower Project. In Morocco, participants in both FGDs and consultations voiced strong concerns about the influx of foreign workers under the Noor 1 Concentrated Solar Power (CSP) Project, along with other concerns (e.g., air pollution, wastewater discharge, and road traffic) (5 Capitals 2012a, b).

FIGURE 4.1
Vicious Circle of Development and Spread of HIV



During the project, 40,000 people [were brought] here, which increased the number of people coming in and also increased number of hotels/ lodges in the area. Naturally there was a lot of interaction between locals and outsiders, which resulted in prostitution and an increased number of HIV and AIDs cases.

SHALIGRAM NEUPANE, LOCAL LEADER, BELTARI, NEPAL

To address these risks and concerns, some energy projects have added STDs, health education, along with gender-based violence prevention, as project design components. The Upper Cisokan Pumped Storage Hydro-Electrical Power Project in Indonesia offers a good example of how a gender strategy supports implementation of an HIV/AIDS prevention component (Box 4.1).

Preventing Spread of Water-Borne Illnesses

Energy generation projects using hydroelectric and other power sources pose environmental risks linked to pollution and water quality, which may lead to health issues. The World Health Organization (WHO) has documented instances where dam reservoirs often created a breeding ground for water-borne illnesses (e.g., schistosomiasis, malaria, and cholera) and potentially toxic bacteria. These health risks are corroborated by numerous other studies. For example, a study conducted

BOX 4.1

Reducing Public Health Risks of Large Hydropower Project in Indonesia

An impact analysis conducted for the Upper Cisokan Pumped Storage Hydro-Electrical Power Project in Indonesia suggested that (a) an influx of workers would likely increase public health risks for both construction workers and the local population and (b) relocating households during resettlement would have potential health impacts. A gender-mainstreaming and HIV/AIDS strategy was then prepared and included in the Land Acquisition and Resettlement Action Plan (LARAP).

To reduce the risk of the transfer of the HIV virus between and among the contractor's personnel and the local community, the project made the contractor responsible for conducting a HIV/AIDS awareness program through the local health department. To promote early diagnosis and assist affected individuals, counseling services on transmission and prevention were held once a month, with routine diagnostic examinations provided every two months. Also, condoms were given out once a month through the local health department. This initiative targeted all project employees, as well as the surrounding community.

Source | World Bank EAP Gender Energy Facility forthcoming.

in Côte d'Ivoire documented a significant increase in schistosomiasis following the construction of two large hydroelectric dams (N'Goran et al. 1997). In Sri Lanka, an outbreak of malaria was tied to disruption of new hydroelectric and water irrigation schemes, aggravated by increased migration caused by resettlement (Wijesundera 1988). Studies in Canada and Brazil documented elevated levels of mercury in fish downstream of dam projects, which pose long-term health risks linked to fish consumption. Similar concerns were raised about China's Three Gorges Dam. These risks can affect women and men equally; who suffers more depends on a multitude of contextual factors. That said, including women in consultations and communication efforts is crucial for protecting families and promoting risk management.

Minimizing Occupational and Safety Risks

Construction of energy infrastructure can also pose health risks to workers and locals due to lack of safety provisions. Construction of all types of electricity infrastructure carries occupational health risks, including a certain number of fatalities, with hydropower having the highest fatality rate among workers. Over the 1969–2000 period, hydropower had the highest number of registered workplace fatalities, at nearly 30,000, mostly in non-OECD countries (Table 4.1).^{7,8} The construction of coal, oil, and natural

TABLE 4.1
Summary of Severe Accidents in Fossil Fuel, Hydro, and Nuclear Energy Chains, 1969–2000

ENERGY CHAIN	OECD COUNTRIES			NON-OECD COUNTRIES		
	ACCIDENTS (NO.)	FATALITIES (NO.)	FATALITIES/GWey ^a	ACCIDENTS (NO.)	FATALITIES (NO.)	FATALITIES/GWey ^a
Coal	75	2,259	0.157	1,044	18,017	0.597
Coal (with China) ^b				819	11,334	6.169
Coal (without China) ^b				102	4,831	0.597
Oil	165	3,713	0.132	232	16,505	0.897
Natural gas	90	1,043	0.085	45	1,000	0.111
LPG	59	1,905	1.957	46	2,016	14.896
Hydro	1	14	0.003	10	29,924	10.285
Nuclear	0	0	—	1	31 ^c	0.048
Total	390	8,934		1,480	72,324	

Source | Data provided by the Paul Scherrer Institute to the OECD Nuclear Energy Agency (<http://www.oecd-nea.org/ndd/reports/2010/nea6862-comparing-risks.pdf>).

^aGWey = gigawatt-year of electric power.

^b1994–99.

^cImmediate fatalities only.

gas infrastructure had much lower fatality rates proportionate to the number of plants and electricity output. Although gender-disaggregated data is unavailable, it is likely that men are more affected by these occupational health risks than women owing to their higher prevalence in construction jobs.

Lack of communication on the safety risks induced by energy infrastructure projects underscores the need for effective awareness-raising campaigns in the project affected communities. In Nepal, for example, Dalit women living nearby the KGA Hydropower Project voiced anxiety about being electrocuted or having fire breakouts due to electricity distribution poles having been installed directly in front of their houses. Similar safety concerns were expressed by communities in central Senegal affected by upgrading of the transmission network, including reported cases of electric poles being placed inside or close to houses. Local authorities were particularly concerned about the safety of farmers, who were unaware of the dangers of electric utility poles. Another common concern among local communities is the potential long-term negative health effects (e.g., miscarriages and birth defects) of electromagnetic radiation from high-voltage transmission lines.⁹

Careful implementation of safety measures and having adequate sanitary facilities in the project area can help prevent occupational health risks, as well as spread of disease. The projects analyzed in this study offer useful lessons on preventing health risks. In the case of the Noor 1 CSP Project in Morocco, for example, services supporting workers, including canteens and sanitary facilities (e.g., rest-rooms, water tanks, and drinking water) were provided on-site during the construction period. In addition, solid and liquid waste-collection systems have been established. Furthermore, contractors provide daily transportation for staff between a central location and the project site; thus, buses, vans, pickup trucks, and cars are used for staff commute and equipment transport. During preparation of Vietnam's Trung Son Hydropower Project, the power utility company, Vietnam Electricity, assessed the potential health risks to workers and local people (e.g., physical injuries, STDs, and sanitation) to better understand their needs and how to address them. Project developers identified limitations in the capacity of local health systems to address diseases, especially those in remote rural locations where most disadvantaged people live. Based on the health impact assessment, Vietnam Electricity chose various methods to minimize adverse health impacts on local communities and promote better health outcomes. Solutions included establishing annual health check-ups for workers, offering labor safety and first aid training, and providing preventive health-care services against malaria and HIV/AIDS, among others. Additional solutions comprised awareness-raising campaigns on water and sanitation and better nutrition in communities.

EXTENDING POSITIVE IMPACTS FOR BETTER EDUCATIONAL AND HEALTH OUTCOMES

Increasingly, energy infrastructure projects are devoting more attention to ensuring a project's social sustainability. Any large infrastructure project disrupts not only the local environment but also the social fabric of the affected communities. For this reason, many communities decide to resist the project, threatening its overall implementation and sustainability. The potentially negative project impacts are usually addressed by compensating the affected people so they are better off or at least can maintain their former level of well-being. Even when a project provides seemingly adequate compensation,

however, negative externalities may remain unaccounted for, depending on the context in which the project operates. For example, people may incur livelihood losses due to gradual environmental degradation or changes in culture and community relations that increase unrest or conflict. In addition, project developers may create expectations, which, if left unfulfilled, may lead communities to resist any future projects. Managing such negative aspects is important to enhance a project's acceptance and ownership by the local people and thus ensure longer-term social sustainability. Citizen engagement and communication with project beneficiaries and stakeholders are an important part of gaining project acceptance within the community (Box 5.2).

Innovative compensation measures and benefit-sharing schemes can partly minimize potential negative externalities and sentiments. By investing in such local area development activities as education, skills training, and health services, energy infrastructure projects can contribute to the project-affected communities' well-being. Further targeting of these activities to reach the most disadvantaged groups, including women, can help address gender gaps in human and social development outcomes, as well as reduce social exclusion.

Several projects shed light on how potential social impacts and social sustainability issues have been increasingly incorporated into project design. For example, developers of the Rampur Hydropower Project in the northern state of Himachal Pradesh, India went beyond one-time compensation and resettlement support, treating the displaced people and local communities as legitimate partners and beneficiaries in the development process.¹⁰ The project adopted a proactive approach toward supporting local infrastructure improvement, opportunities for employment and skills upgrading, and various welfare and cultural activities. One project feature that also influenced the state's hydropower policy was a requirement to earmark 1.5 percent of the project's costs for the Local Area Development Fund to finance infrastructure development chosen by local communities in the project area (e.g., a schoolroom, irrigation channel, or concrete path). Another innovation was unconditional cash transfers paid to the communities affected by the hydropower project from the revenues of power sales over the project's operational lifetime. The Moroccan Agency for Solar Energy (MASEN), Morocco's solar energy utility, has addressed the development needs of the local community affected by the Noor 1 CSP Project by establishing a social development plan as part of the project's overall design. This plan includes a range of infrastructure projects and cultural activities funded through a separate budget. The socioeconomic projects focus on education, health, tourism, entrepreneurship, agriculture, and drinking-water facilities, among others (MASEN 2014). Similarly, in Vietnam, developers of the Trung Son Hydropower Project have initiated activities beyond compensation and resettlement support to benefit the affected households and the larger communities in the surrounding areas. These ancillary activities include building local roads and bridges, providing livelihoods assistance, and establishing healthcare facilities.

Enhancing Opportunities for Education and Skills Training

One area where energy infrastructure projects can contribute to local development efforts is education and skills training, which can help build trust and partnerships. The objective of skills

development and training components is to facilitate local workers' access to employment opportunities brought about by the project or increase opportunities for self-employment. In contrast to basic livelihood restoration efforts focused on project-affected people, these efforts center on the larger community via training programs in the surrounding impact area. In many developing countries, women tend to be less educated than men and have a lower rate of labor force participation. In such contexts, training opportunities for women may be especially effective in reducing gender gaps in skills and access to jobs (Chapters 2 and 5). In fact, a systematic assessment of gender in the World Bank's energy projects portfolio (conducted for years 2000–14) concluded that a major avenue for inclusion of gender considerations in projects is through the design and provision of vocational training in the affected community.

According to the Morocco field study, the Noor 1 CSP Project aimed to boost direct and indirect employment by training local job seekers and the local population across a range of occupations.

The Office of Professional Training and Work, which coordinates training for local job seekers (particularly local youth), focuses on providing skills required in the CSP plant located in the provincial capital of Quarzazate. It also directs training efforts for the local population in income-generating activities (e.g., running small shops and restaurants). Project operators, in cooperation with local authorities, have set up mobile training units for the local people. Although the project's training opportunities have targeted both men and women, the activities offered appear to perpetuate occupational segregation by gender (Box 4.2). That said, it is noteworthy that, in a country context where so few women participate in the workforce, this project has been able to employ some women directly, owing, in part, to its gender-sensitive work environment.

Other examples show how projects can promote nontraditional occupations for women. The Nepal Village Micro-Hydro Project has helped empower local women and other excluded groups in the project-affected area by engaging them to build, own, operate, and maintain micro-hydropower microenterprises. Training was provided to 34,045 people overall, including 15,000 women, of whom 2,596 were trained in micro-hydro operation, maintenance, and management. Of the 264 energy-based microenterprises established, 41 percent were owned by women entrepreneurs. In most community micro-hydro function groups, women represented at least half of the membership.¹¹ Women living in the impact area of energy infrastructure projects can also benefit from partnerships with local non-governmental organizations (NGOs) that empower women through self-help groups (Box 4.3). The Power Sector Development Project in India, for example, used self-help groups to train women in livelihood activities, vocational training, bookkeeping, and financial discipline.

Project investments in social development and sustainability activities can target areas where gender gaps are the most pressing. For example, in rural Morocco, girls and women tend to lag behind men in educational attainment. In Quarzazate province, home to the Noor 1 CSP Project, illiteracy is 68 percent overall—higher than Morocco's national level—and 85 percent for women (Wuppertal Institute and Germanwatch 2015). For families living the city of Quarzazate, investing in education is a priority, while those in rural areas view it as a luxury. Financial constraints lead many rural families to withdraw their children, especially girls, from school. As a result, girls tend to have attained only a rudimentary level of education (Wuppertal

BOX 4.2

Gendered Training under the Noor 1 CSP Project in Morocco

The series of gender-segregated training activities created for men and women under the Noor 1 Concentrated Solar Power (CSP) Project in Morocco include welding for men and weaving, knitting, and embroidery for women. Project developers signed an agreement with the Office of Professional Training and Work and the municipality of Ghassate to carry out welding training, and a mobile training unit was launched in September 2014 (Table B4.2.1).

TABLE B4.2.1

Welding Training Datasheet

Type of Training	Welding
Welding processes used	- Manual Metal Arc welding (MMA)
	- Tungsten Inert Gas welding (TIG)
	- Metal Active Gas welding (MAG)
Beneficiaries	23 beneficiaries. All from villages of Ghassate, divided into 2 groups
Launch date	Tuesday 18 September 2014
Duration of Training	- 3 months in workshop, followed by an Internship on site (3 at 4 weeks)
Assessment and Monitoring	A committee was appointed to assess and monitor the training.
Qualification	It is a qualifying training. A certificate will be given to the beneficiaries by the end of the session.
Estimated trainees during the construction phase	80–100

To initiate training activities for women, a partnership agreement between the project developer and the Ministry of Craft was prepared in January 2015. The action plan was validated by the Institute of Traditional Arts of Quarzazate, and the Women's Association of Ghassate was involved in establishing a list of candidates. The project developer committed to fund trainers, work materials, transportation of beneficiaries, and insurance costs (Table B4.2.2).

TABLE B4.2.2

Women Training Datasheet

Type of training	- Weaving
	- Knitting (by hand and machine)
	- The embroidery (hand and machine)
Beneficiaries per session	40–50 women from Ghassate
Launch Date	Immediately after signing the agreement
Duration	From 3 to 4 months
Trainers	Trainers from the institute, specialized in each activity

BOX 4.3

Promoting Gender-Inclusive Finance and Women's Empowerment in India

The Self-Employed Women's Association (SEWA), a member-based grassroots organization of poor, self-employed women based in India, works with informal communities across Asia to advance women's decision-making agency through inclusive finance for energy access, livelihoods strengthening, and productive energy use. In 2010, SEWA launched its Green Livelihoods (Hariyali) program through the Grassroots Trading Network for Women, a nonprofit company. Green Livelihoods aggregates women's self-help groups and cooperatives and builds partnerships with technology and finance providers to offer its members products and capacity-building, training, and credit services. Women participate across the entire energy value chain as owner-managers.

Green Livelihoods has identified four main appropriate-technology appliances to replace inefficient and polluting ones to meet SEWA members' energy needs: (i) solar lanterns, (ii) energy-efficient cook stoves, (iii) solar pumps, and (iv) mixed grids to power small tools. The program works through the vast SEWA network to raise awareness, provide training on energy uses and benefits, and offer affordable financing of appliances. In India, SEWA has observed that the level of program success varies by district and state. It has also observed a number of positive trends among program participants (e.g., women's confidence in taking up electronics maintenance, speed in identifying productive energy uses, and allocating earnings to providing better food for children and families and pension investment).

Source | <http://sewa.org>

Institute and Germanwatch 2015). **To promote girls' educational attainment, the Moroccan Agency for Solar Energy (MASEN), Morocco's solar energy utility, built a secondary-level girls' boarding school in Ghassate.** The utility company provides a mini-bus that transports children to school, finances latrines in the school, distributes school supplies and equipment, and regularly organizes summer camps. Although the project successfully provided education-related benefits, the population interviewed during the field study seemed to expect additional education services, such as student day-care activities between lessons.¹² Also, women are waiting for day nurseries so they can spend more time on other activities.

In India, the Rampur Hydropower Project, as part of its local development efforts, implemented a new technical education program for ambitious local youth. The program sponsored 195 candidates, including 31 females, to acquire technical skills in the Indian Training Institutes. Eighty-nine percent of all candidates completed courses, and 55 percent, including 13 females, subsequently found employment with contractors.¹³ The program was later complemented by an apprenticeship program and merit scholarships to make youth more employable or enable them to pursue higher education. The Rampur Hydropower Project also built a senior secondary school and provided grants to other schools in the area to cover infrastructure and equipment needs and school fee concessions for children from project-affected families.

Addressing the specific needs of women and youth requires an understanding of gender differentials in educational attainment and gender roles within the household and community. For training opportunities to be fully inclusive of women and girls, it is important to carefully consider the hours and duration of training sessions, as well as the actual and perceived safety of the premises. These aspects can be identified during community consultations held separately with men and women. For example, developers of the Bumbuna Hydroelectric Power Project in Sierra Leone, after conducting extensive consultations with the community, decided to focus on the needs of youth and women. Grants were given to community-based youth organizations. Young men and women were equally offered training in business, trade, and life skills, and women were the focus of livelihood initiatives, including skills development. In the case of the Nam Theun (NT) 2 Hydropower Project in Lao PDR, a gender assessment and gender action plan (GAP) were the starting point for providing skills development and training opportunities that were meaningful to both men and women.

Enhancing Opportunities for Health Promotion

If designed well, the ancillary investments of energy infrastructure projects in health promotion and provision can contribute to local development efforts. Investments in health promotion, clinic construction, and supply of mobile healthcare units provide local communities greater access to health services, which can lead to better health outcomes. Maternal health, especially, may be positively enhanced if women community members have better access to pre-natal care and choose to deliver their babies in newly accessible health centers with qualified personnel. Hydropower projects in Vietnam and India demonstrate how ancillary investments in health facilities and services led to the improved well-being and greater gender equality in the health outcomes of the affected communities (Box 4.4). Conversely, projects in Nepal and Morocco show how the failure to consult with women and men in the community about their health needs prior to project development led to missed opportunities (Box 4.5).

The bus fare apart, half a day [was] required in terms of time, causing discomfort to the patient. Now with the health vans coming and holding camps and check-up of patients, we get treatment and free medicines . . . at our doorstep!

POOJA OF BAKHAN VILLAGE, KHARGA PANCHAYAT, RAMPUR, INDIA

We need a health and maternity center nearby, as deliveries often happen at home due to transport issues to get to Quarzazate.

WOMEN FGD PARTICIPANTS, TIFLIT, MOROCCO

BOX 4.4

Projects with Integrated Health Services Promote Trust and Better Outcomes

The **Trung Son Hydropower Project**—one of Vietnam's first large-scale infrastructure projects to integrate health services into its activities—has clear objectives of improving the health conditions of workers and the local community. The center is fully equipped with medical devices and medicines, an ambulance, and doctors and nurses who provide round-the-clock services. Previously, villagers had to travel 60–70 km (about 40 miles) across mountains to receive medical care. The new health center, conveniently located near their village, makes access to medical services safer and easier. To ensure sustainability of the local health system, the hydropower company works closely with local health authorities to implement health promotion plans and improve the capacity of local health clinics. The company has provided support to build or renovate community health centers and supply them with essential medicines. Annual training is also provided for health professionals at the commune and village levels.

Before India's **Rampur Hydropower Project** was constructed, villagers in the hilly state of Himachal Pradesh had to travel 8–10 km to reach the nearest medical facility, and poor transportation added to the challenge of accessing services. Early on, the project gained the trust and acceptance of the local affected communities by supplying them medical camps and mobile health vans that provided basic services and free medicine. Twice a week, a team of doctors, nurses, and attendants visited the villages (one hour per village), providing treatment and referral services. The medical camps and health vans also increased public awareness about basic hygiene and nutrition. Among the 60,000 people who benefited, slightly more than half were women. Women below the poverty line and their children were also provided financial assistance during pre- and post-natal periods.

Sources | http://blogs.worldbank.org/eastasiapacific/vietnam-brightening-people-lives-through-integrated-healthcare-in-a-hydropower-project?CID=ECR_FB_worldbank_EN_EXT; <http://documents.worldbank.org/curated/en/548631468001761453/pdf/101039-WP-P095114-PUBLIC-Box3932578-Rampur-Hydro-Report.pdf>; Reddy, Mittal, and Gaba 2015.

Opening Opportunities by Connecting to Services and Markets

Projects can also facilitate better development outcomes in local communities by building appropriately designed ancillary infrastructure in tandem with energy infrastructure. Such ancillary infrastructure as roads, bridges, ferries, and clean-water supply systems can be built or provided in areas where there was none, enabling communities to access products, labor markets, and educational and health services (Köhlin et al. 2011). For example, in Vietnam, access roads and bridges constructed for the Trung Son Hydropower Project now provide a comfortable means of travel for hundreds of households who previously used boats to cross the river.¹⁴ Also, children now go to school safely, without having to climb through the hills, and farmers and traders have better and faster access to markets to sell their products.

In Nepal, some health progress made by the KGA Hydropower Project can be attributed to the project's access road, along with better electricity access. More than half of FGD participants believed the project had contributed to increasing women's mobility thanks, in large part, to the access road and ferry. Women were able to travel to health facilities, markets, and other public places using newly implemented transportation facilities, while the larger community benefited from increased tourism activities (Box 2.2).

BOX 4.5

Lack of Inclusive Consultations Leads to Missed Opportunities

The Kali Gandaki “A” (KGA) Hydropower Project in Nepal missed an opportunity to enhance the affected communities’ development outcomes, which led to community resistance to the project. Most participants in focus group discussions (FGDs), particularly women, said the project did not directly address health issues. During the KGA hydro dam construction, few, if any, inclusive community consultations with both men and women were held, and no committees or working groups were formed to work in close collaboration with the project. This communication gap and growing frustration resulted in community resistance and demands for local support programs (e.g., drinking water, electrification, irrigation, and health facilities). The situation led to protest, roadblocks, and strikes, which delayed the project by 51 days and resulted in cost overruns.

Ghassate, a rural commune in Morocco’s Quarzazate province, suffers from poor access to healthcare services and public transport, lack of a modern sewage system, and high rates of maternal and child mortality. Although the Noor 1 Concentrated Solar Power (CSP) Project invested in an ancillary health project, results of FGDs and in-depth interviews showed that the benefits of the health project were disputed. In 2012, Moroccan Agency for Solar Energy, the solar utility company, in partnership with health associations, organized mobile health trailers to provide the Ghassate community free dental and ophthalmologic consultations over a 3-day period. Similarly, a mobile hospital with 33 doctors was made available for 3 days, receiving more than 200 patients and providing over 3,000 medical services, including surgical interventions. The FGD participants said that such services were appreciated; however, local people would have preferred a permanent health center with skilled medical staff. Women especially expressed a strong preference for constructing health and maternity centers equipped with skilled medical staff. Explaining the prohibitive cost of constructing permanent health centers as part of pre-project, inclusive consultations may have helped to lessen the community’s later disappointment.

UNDERSTANDING LONG-TERM IMPACTS ON GENDER NORMS

The empirical evidence on changes in gender norms due to an energy project are practically non-existent, but some case studies suggest potential directions and pathways of change. Recent literature has discussed the links between new access to electricity provided by an energy infrastructure project and changes in gender norms (Köhlin et al. 2011; Clancy 2013). Beyond electricity access, other project pathways most likely to indirectly influence gender norms are compensation packages (gender-sensitive or not), investments in ancillary infrastructure, and other local-area development activities. Project-initiated development activities or simply a new access road can open up opportunities in education, jobs, or entrepreneurship. If women can take advantage of such opportunities, norms and attitudes toward gender equality may become more supportive within the community.

For example, the KGA Hydropower Project in Nepal has indirectly helped to change social norms by connecting households to information and resulting economic opportunities. In a sense, infrastructure development, including the project access road and free ferry service, has connected the affected community with the rest of Nepal. Women have gained improved access to both information and economic opportunities, which, over the past decade, has moved the prevailing social dynamics toward more egalitarian standards. For those women who were able to access project benefits, a key supporting factor was the

family's expectations of future benefits. This enabled family gatekeepers, such as husbands and mothers-in-law, to permit women to access employment or entrepreneurship opportunities whenever possible.

Multiple follow-on initiatives have contributed to increasing women's social capital and empowering them to become more mobile and able to make decisions independently. Follow-on development projects have focused on irrigation, water, health, agriculture, awareness-raising and capacity-building activities, and community mobilization supported by international donors (e.g., UNDP, PAF, JICA, and USAID). Such initiatives have helped women to mobilize in groups and cooperatives, including those formed by civil society organizations and the district Women Children Office. In the village development committee of Shree Krishna Gandaki, 14 of its 19 cooperatives are all-women farmer and agriculture producer groups that collectively manage and market a collection center through a committee.

However, not all social changes in a community have the potential to alter gender norms toward more egalitarian rules or expand women's agency. Large inflows of male migrants seeking jobs may result in local women retreating further into the home, while an increased number of sex workers are put in vulnerable situations. In addition, women's expanded access to jobs and greater assets may challenge existing gender norms and male authority, leading to gender-based violence. As previously mentioned, the ways in which energy infrastructure projects can alter gender norms have not been studied thoroughly. Attitudes toward gender equality depend heavily on the context in which they operate, and even positive change can sometimes be followed by a backlash (World Bank 2013). Generally, more egalitarian gender norms set in over the medium or longer term once communities realize the benefits that accrue from the new infrastructure or development programs.

CONCLUSION

Energy infrastructure projects need to anticipate the potential risks to human and environmental health, including gender-based violence and occupational health and safety hazards, early on in the project cycle. The project design phase must include women's equal participation in all consultations and communication plans in order to foster positive health behaviors and social outcomes. If well-planned, investments in ancillary infrastructure and services can benefit the affected communities by connecting them to critical products or labor markets and services and closing important gender gaps in health and educational outcomes. Case studies suggest potential directions and pathways of change, leading to more egalitarian standards (e.g., ancillary roads that can improve women's access to information and economic opportunities). But understanding how ancillary investments, as well as local-area development activities and compensation, alter gender norms in the affected communities over the longer term depends heavily on local contextual factors and thus further research is warranted.

ENDNOTES

¹While this chapter summarizes the most often observed issues, the study team acknowledges that many other risks and negative impacts on social and human development may be associated with large energy infrastructure projects.

²The complete WBG fact sheet and management's response to the inspection panel is available at <http://www.worldbank.org/en/country/uganda/brief/uganda-transport-sector-development-project-fact-sheet>.

³The Violence Against Women and Girls (VAWG) resource guide was developed and launched by the World Bank Group in partnership with the Global Women's Institute (GWI) at George Washington University and the Inter-American Development Bank (IDB) in 2014. The International Center for Research on Women (ICRW) joined the partnership in June 2015. The resource guide is available at <http://www.vawgresourceguide.org/>.

⁴There is a paucity of gender-disaggregated data available on how women and men are differently affected by the health issues linked to large energy infrastructure projects.

⁵The billions of dollars expected to be poured into the energy sector of African countries in the coming decades underscores the urgency of addressing this health risk (<http://www.undp.org/content/undp/en/home/librarypage/hiv-aids/guidelines-for-integrating-hiv-and-gender-related-issues-into-en/>).

⁶<https://www.internationalrivers.org/blogs/258/violence-against-women-rampant-at-brazil-s-green-dams>

⁷<http://www.world-nuclear-news.org/newsarticle.aspx?id=28325>

⁸<http://www.world-nuclear.org/info/Energy-and-Environment/Environment-and-Health-in-Electricity-Generation/>

⁹<http://www.who.int/peh-emf/about/WhatIsEMF/en/index1.html>

¹⁰http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2015/11/19/090224b0831e8f1d/1_0/Rendered/PDF/Rampur0Hydropo0evelopment0practices.pdf

¹¹http://www.np.undp.org/content/dam/nepal/docs/reports/UNDP_NP_Energy%20To%20Move%20Rural%20Nepal%20Out%20Of%20Poverty.pdf

¹²Parents worry for their children's safety and, as a result, many drop out.

¹³http://www-wds.worldbank.org/external/default/WDSPContentServer/WDSP/IB/2015/11/19/090224b0831e8f1d/1_0/Rendered/PDF/Rampur0Hydropo0evelopment0practices.pdf

¹⁴<http://www.trungsonhp.vn/en/619-du-an-thuy-dien-trung-son-mang-su-doi-thay-cho-mot-vung-que.html>

REFERENCES

- ACWA Power. 2015. "Noor 1 CSP Project: Corporate Social Responsibility (CSR) Activities." Presentation for the IFIs, Quarzazate, January 19.
- ADB (Asian Development Bank). 2008. *ADB, Roads, and HIV/AIDS: A Resource Book for the Transport Sector* (<http://www.hivpolicy.org/Library/HPP001446.pdf><https://www.adb.org/sites/default/files/publication/29660/gender-hiv-infrastructure-operations.pdf>).
- . 2009. *Intersections—Gender, HIV, and Infrastructure Operations: Lessons from Selected ABD-Financed Transport Projects*. Mandaluyong City, Philippines: Asian Development Bank.
- Clancy, J. 2013. *Social and Economic Impacts of Energy Access: A Gender Perspective*. Washington, D.C.: World Bank.
- 5 Capitals (5 Capitals Environmental & Management Consulting). 2012a. "Quarzazate Solar Power Complex, Phase 1 Morocco: Specific Environmental and Social Impact Assessment," vol. 1. Rabat.
- . 2012b. "Quarzazate Solar Power Complex, Phase 1 Morocco: Specific Environmental and Social Impact Assessment," vol. 2. Rabat.
- Hurwitz, Z. 2013. "Violence against Women Rampant at Brazil's 'Green' Dams" (<https://www.internationalrivers.org/blogs/258/violence-against-women-rampant-at-brazil-s-green-dams>).
- IEG (Independent Evaluation Group). 2016. *Results and Performance of the World Bank Group 2015: An Independent Evaluation*. Washington, DC: World Bank.
- IOM (International Organization for Migration). 2010. *The Future of Migration: Building Capacities for Change*. World Migration Report 2010. Geneva: International Organization for Migration.

- Köhlin, G., E.O. Sillis, S.K. Pattanyak, and C. Wilfong. 2011. "Energy, Gender, and Development: What Are the Linkages? Where Is the Evidence?" Background paper for World Development Report. World Bank, Washington, DC (<http://elibrary.worldbank.org/doi/book/10.1596/1813-9450-5800>).
- MASEN (Moroccan Agency for Solar Energy). 2014. *Plan de Développement Social (PDS)*. Complex solaire Noor d'Ouarzazate (500 MW). Projet Noor I, Rabat, April.
- N'Goran, E. K., S. Diabaté, J. Utzinger, and B. Sellin. 1997. "Changes in Human Schistosomiasis Levels after the Construction of Two Large Hydroelectric Dams in Central Côte d'Ivoire." *Bulletin of the World Health Organization* 75 (6): 541–5.
- O'Neil, D., D. Renzi, A. McDermott, and A. Atanassova. 2015. *Building a Safer World: Toolkit for Integrating GBV Prevention and Response into USAID Energy and Infrastructure Projects*. Rockville, MD: USAID's Advancing the Agenda of Gender Equality (ADVANTAGE), Task Order 3.
- Reddy, I.U.B., R. Mittal, and K.M. Gaba. 2015. *Rampur Hydropower Project: Land Acquisition, Resettlement, and Community Development Practices*. Washington, DC: World Bank Group.
- Selvester, K., D. Cambaco, and V. Bié. 2011. *Risks and Vulnerability to HIV and AIDS: Analysis of Key Determinants on the Nacala Transport Corridor*. Maputo: International Organization for Migration.
- Tilt, B., Y. Braun, and D. He. 2008. "Social Impacts of Large Dam Projects: A Comparison of International Case Studies and Implications for Best Practice." *Journal of Environmental Management* 90: S249–57.
- UNDP (United Nations Development Programme). 2013. *Guidelines for Integrating HIV and Gender-Related Issues into Environmental Assessment in Eastern and Southern Africa*. Prepared for UNDP Regional Centre for Eastern and Southern Africa by the Southern Africa Institute for Environmental Assessment (2012). Johannesburg: United Nations Development Programme.
- USAID (United States Agency for International Development). 2015. *Building a Safer World: Toolkit for Integrating GBV Prevention and Response into USAID Energy and Infrastructure Projects*. Washington, DC: United States Agency for International Development.
- Wijesundera, Mde. S. 1988. "Malaria Outbreaks in New Foci in Sri Lanka." *Parasitol Today* 4 (5) 147–50.
- World Bank. 2013. *Inclusion Matters: The Foundations for Shared Prosperity*. Washington, DC: World Bank.
- . 2015. *World Bank Group Gender Strategy (FY16-23): Gender Equality, Poverty Reduction, and Inclusive Growth*. Washington, DC: World Bank Group.
- World Bank EAP Gender Energy Facility. forthcoming. *Rebuilding Lives: Integrating Gender Considerations into Energy Resettlement Operations in EAP Region—Experiences from Nam Theun 2, Trung Son and Upper-Cisokan Hydropower Projects*. Washington, DC: World Bank.
- Wuppertal Institute and Germanwatch. 2015. "Social CSP—Energy and Development: Exploring the Local Livelihood Dimension of the Noor I CSP Project in Southern Morocco." Final Report to the German Federal Ministry for Economic Cooperation and Development (GIZ). Wuppertal and Bonn: Wuppertal Institute for Climate, Environment, and Energy; Germanwatch (www.wupperinst.org/en/projects/details/wi/p/s/pd/449/).

THE ROLE OF ENERGY UTILITIES AND BUSINESSES

HIGHLIGHTS

- Gender is a many-sided issue for the electricity utility companies, who often play a bridging role between project developers, energy businesses, and electricity consumers.
- Initiatives to effectively address gender issues in field operations are rare; utilities often lack capacity to build gender awareness and sensitivity within all business units or develop gender policies that apply consistently across all contexts and are also aligned with country regulations.
- One key barrier to identifying gender gaps during community consultations at the project planning stage is the paucity of women representatives within the utility company who could establish direct relationships with women in the project-affected communities.
- The level of women's representation in the utilities can be explained by sociocultural and gender norms in a country or region, as well as a cascading effect; that is, as more women begin working in the sector, they act as role models and open opportunities for others.
- Promoting gender balance is good for project sustainability and the utility's business and social performance; the utilities can take various approaches to create a more gender-sensitive work environment, reduce occupational segregation by gender, and increase women's representation in management.

Electricity utility companies' predominant role in the power sector uniquely positions them to identify and address gender issues within their organizations and in the delivery of services. Energy utilities engage in the generation, transmission, and distribution of power; work with power producers and energy consumers at the commercial and residential levels; and deal with a host of energy policy issues (e.g., tariffs, reforms, and consumer engagement). In the international development context, the utility is a key stakeholder; various projects and initiatives funded by the World Bank and development partners target capacity building and improved performance of the energy utilities. These companies often play a bridging role in project development and implementation. To better understand how they approach gender issues in project implementation and within their own organizations, a background study was commissioned (Appendix H). This chapter summarizes that study's findings and insights on how the electricity utilities and businesses engage with local communities in project-affected areas, women's representation in the electricity sector, and company recruitment policies and initiatives to promote gender equality.

Within the energy utilities, gender is a many-sided issue that can be variously addressed.

Approaches might focus on potential barriers that perpetuate gender norms (e.g., entry to the workforce, skills and capacity needs, and inclusive consultations and communication). Key actions to improve gender equity within the energy utilities and businesses include targeted training, organizational gender audits, and mentoring and professional development programs for women.

On the distribution side, there is much to learn about consumers that could help improve business performance while addressing gender issues.

Ensuring energy consumers' financial literacy and ability to read electric bills and access available subsidies or programs can increase customer demand for and access to those services. In addition, encouraging women to pay household energy bills or be listed on the utility bill can help to build women's credit rating—an important personal objective and means of achieving broader economic development objectives.

Although the energy utility plays a primary role in electricity generation and distribution, the energy-sector value chain covers an array of stakeholders.

Thus, key gender recommendations and entry points for the energy utilities to consider can often be extended to many other energy businesses and stakeholders (Figure 5.1).

Energy businesses consider engaging with local communities and energy customers as essential; but initiatives to address gender issues in the project-affected areas are still rare.

The types of gender initiatives undertaken are driven by contextual needs, the utilities' identification of project impacts, and their responsiveness to international/national safeguards and Corporate Social Responsibility (CSR) standards. How gender issues are taken into account varies significantly across construction projects. A common difficulty is the lack of capacity to build gender awareness and sensitivity within all of the utilities' business units, as well as their service providers and suppliers. One contributing factor may be the small number of women that work in the sector.¹ Another factor cited by the utility companies interviewed for this study is their struggle to develop gender policies that are generally applicable across all contexts and also follow specific country regulations.

Women role models, male and female leadership in gender awareness-raising, family-friendly work policies, and women-friendly work environments all contribute to a more diverse workforce.

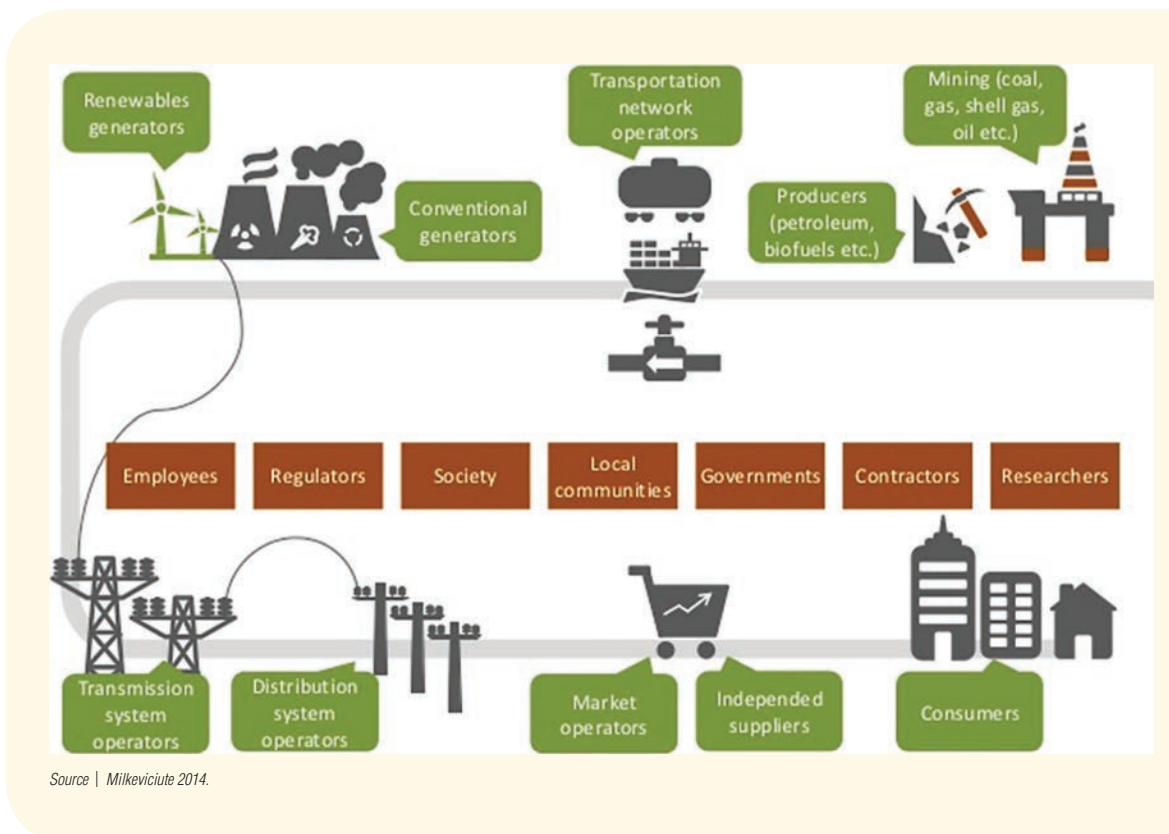
In developed countries, women constitute only one-fifth of the energy industry's total workforce, and most work in nontechnical fields, such as administration and public relations (USAID 2016); globally, only 12 percent of engineers are women (ILO 2007). That said, numerous initiatives have been mounted in recent years in both developed countries and emerging economies to attract and retain women in traditionally male-dominated fields in the energy sector (Box 5.1).

GENDER AND THE PROJECT-AFFECTED COMMUNITIES

Local initiatives that the electricity utilities focus on tend to capitalize on changes induced by electricity supply or existing opportunities, which may not benefit men and women equally.

Prior to conducting environmental and social impact assessments, consultations are held with the local community to gain knowledge about their socioeconomic concerns. At the planning stage, consultations inform the assessments and, during the operational phase, they serve to monitor impacts, plan for support, and inform

FIGURE 5.1
Stakeholders along the Energy Value Chain



project developers about communities' grievances. However, this commissioned study shows that most consultations fail to unveil gender gaps and how to address them. Interviews with utility representatives suggest that key barriers to incorporating gender issues into consultations include limited knowledge of local languages, lack of partnerships with local organizations, and a paucity of women representatives within the utility company who could establish direct relationships with women in the project-affected communities.

A common approach to engaging project communities is negotiating benefit-sharing schemes, including support for local economic development, vocational training, and employment. Although local employment is a focal area, women's recruitment in project areas is often limited by the technical nature of the energy business, which requires specific technical or professional skills. All of the utilities interviewed for this study emphasized the low supply of women professionals in the energy field, particularly in the context of low- and middle-income economies. This was also an issue in the background field work conducted in Morocco (i.e., under the Noor 1 Concentrated Solar Power [CSP] Project). Other initiatives often targeting project communities are HIV/AIDS outreach programs and women's education (Table 5.1).

BOX 5.1

Electricity Distribution Companies Working to Improve Gender Outcomes

Engendering Utilities, an innovative initiative supported by USAID's Power Africa program, seeks to increase women's professional participation in the energy distribution sector and improve women's career prospects while improving the quality and cost of electricity services. Given the scale and importance of distribution companies in an economy, increasing the number of women in the power-sector utilities represents a significant opportunity for improving gender outcomes in developing economies. The selected participating utilities are Electricity Distribution Company and Irbid District Electricity Company (Jordan), Energo-Pro (Georgia), EVN (Macedonia), Eko Electricity Distribution PLC and Ibadan Electricity Distribution Company (Nigeria), and Kenya Power and Lighting Company (Kenya).

Interventions have included a bring-your-daughter-to-work day and the utilities' commitment to pursue the UNDP Gender Equality Seal. By seeing first-hand what their parents do at work, girls have been encouraged to dream about future career possibilities without gender limitations, connect what they are learning in school with the working world, and make more informed decisions about their future lives. Earning the UNDP Gender Equality Seal is a rigorous process that demonstrates equity in all human resource processes and positive results in the workplace. The process begins with data gathering, needs analysis, process development, and revision. Following an external audit, the companies make any further corrections before earning the Seal.

The utilities have also participated in energy clubs, whereby they introduce primary and secondary school students to energy conservation and engage them, through site visits to energy plants, in thinking about future careers in the energy sector. In Nigeria, the Ibadan Electricity Distribution Company sponsored the inaugural Women in Development Conference in 2016, which provides a platform for discussing women's career advancement within and outside the utility company. Additional interventions have included women's leadership training, career mentoring, and gender-equal internships and scholarships.

Source | USAID 2016.

Communication with the local population can be improved through socially inclusive and gender-balanced outreach campaigns. As part of the transmission and distribution project in central Senegal, the national utility company, SENELEC, announced construction of the distribution line to local authorities well in advance, indicating that an impact study would be carried out. Local authorities were responsible for sharing the information with the local population. Consultations and public meetings were organized. Although local authorities claimed every project-affected person had been invited, local people's responses varied, showing that not everyone had been informed about the project on time.

Some men confirmed that, during public meetings, they had been advised not to build within five meters of the road since the distribution line would be constructed alongside it. Other men said they had seen the cadastral surveying services with their measuring tools in their neighborhood but were unaware of the types of activities planned. Still other men said they had heard about the distribution line from the municipal officers, but no consultations had been held. Repeatedly, men said that discussions should

TABLE 5.1**Initiatives Addressing Gender Issues in Project-Affected Communities**

INITIATIVE TYPE	INITIATIVES TARGETING PROJECT-AFFECTED COMMUNITIES	NUMBER OF COMPANIES	FREQUENCY OF INITIATIVES
Support related to development goals/ Female-targeted activities	HIV/AIDS outreach programs	12	Frequently
	Women's education	12	Frequently
	Health (e.g., maternal health and family planning)	8	Occasionally
	Support organizations of women's self-help groups	4	Rarely
	Outreach programs on violence and discrimination against women	4	Rarely
Capitalizing on new electricity supply	Support for development of economic activities (including capital and training)	19	Frequently
	Equitable access to energy	14	Frequently
	Women's access to microcredit	12	Frequently
	Women's consultations	12	Frequently
	Women's employment	9	Occasionally
	Vocational training targeting women	9	Occasionally
	Access to land ownership (e.g., joint titling)	2	Rarely

Source | Electricity utilities study.

have been held before the work started to properly consult with the local population. Thus, not everyone was informed about regulatory distances, and safety concerns were common. **In order to reach the entire population, a diversified set of gender-targeted means of communication and information sharing may be considered.** Depending on the local context, written/visual, audio, and video communication should be deployed to encourage broad and gender-balanced participation in consultations and public meetings.

A key concern of the utilities is electricity theft, which can negatively impact both the utility and its customers. Nontechnical losses resulting from illegal connections can lead to higher energy costs, loss of revenue, poor-quality power supply, and system overloading. People's safety and well-being can be put at risk from the potential outbreak of fires, which can cause serious injuries or fatalities, as well as property damage, affecting homes, hospitals and other public institutions, and private businesses. Law enforcement and parameter-setting measures, while important, are insufficient to effectively tackle this multifaceted issue. In many developing countries, a culture of electricity nonpayment is pervasive, with the widespread effect of "normalizing" electricity theft among energy users. Understanding the gender dynamics of such socially accepted attitudes and engaging energy users in specific project interventions can be indispensable to effectively addressing the issue (Box 5.2).

BOX 5.2

Taking Gender Dynamics into Account to Tackle Nontechnical Losses

Gender roles and identities are often part of the dynamics of illegal electricity connections and nonpayment of bills. For example, in the Union of the Comoros, men and boys oftentimes make illegal connections using their technical knowledge. Yet women account for 60 percent of those caught making connections illegally.^a This might be explained by women's peculiar social status in the Unions. In this matriarchal, matrilineal, and matrilocal society, women are usually the owners of houses, holders of electricity contracts, and managers of all household administrative matters.

Understanding a culture's gender dynamics is critical to framing a strategy to effectively reduce electricity theft. In the Dominican Republic, for example, communities often perceive women as more reliable and transparent in terms of bill payment and accountability, despite their possible involvement in negative behaviors related to nontechnical losses. In this country, women are usually more involved in social networks and have in-depth knowledge of the community. These characteristics put women at an advantage in working with projects' awareness-raising activities as citizen allies to promote timely bill payment and safe, legal electricity connections.

Sources | Castel 2016; consultations with Social Development Specialist, Dominican Republic Electricity Distribution and Rehabilitation Project, Energy and Citizen Engagement Brown Bag Lunch (BBL) presentation, 2016.

^aPercentage provided by the MA-MWE Director of the Fraud Office.

Organizational Gender Approaches within Energy Companies

The main factors encouraging gender policies are national regulatory frameworks with clear objectives on gender, CSR policies, gender awareness within the utility, and utilities' demand for labor and specific skills. The United Nations 2030 Sustainable Development Goals (SDGs) also provide a renewed international framework for strengthening the inclusion of men and women in economic development. International safeguards standards, such as those of the International Financial Corporation (IFC) and the World Bank, the Equator Principles, and national regulations provide frameworks and guidelines for utilities to assess the impacts of projects and develop mitigation and benefit-sharing plans. These impacts are usually discussed in the environmental and social impact assessments, the main instruments for assessing potential impacts and risks caused by infrastructure projects. These assessments can also provide the basis for further risk mitigation and resettlement plans and benefit-sharing agreements. Thus, gender issues can be addressed based on international safeguards requirements.

CSR policies can also be used to progressively tackle gender issues in the electricity utility's field operations and within the company. Results of the commissioned utilities study suggest that CSR strategies are increasingly embedded in the international development agenda and are based on the principles of sustainability, human rights, inclusion, and nondiscrimination. CSR strategies operationalize the company's values in each branch of business (Box 5.3). Most of the electricity companies researched have integrated the main development goals and/or international conventions into their CSR policies. For

BOX 5.3

EDF France's CSR Agreement with Associates

In large corporate groups like EDF France, effort is required to align CSR practices among all subsidiaries. Until recently, the social responsibility of EDF France was dispersed among its subsidiaries and associates, using various strategies and practices. To align social-responsibility practices within the business worldwide, EDF France and most of its associates have begun signing unified CSR agreements, which all associates are expected to sign. These agreements require the group to comply with the following:

- Human rights conventions signed by EDF;
- International regulations on social protection, social dialogue, and occupational health and safety;
- Discrimination prevention and responsible supply-chain principles; and
- Support of actions toward energy access and socioeconomic development in local areas (EDF 2009).

Group responsibility toward gender equity is specified as follows:

- Complying with the Universal Declaration on the Elimination of Discrimination against Women and
- Ensuring professional equality through monitoring and enhancing nondiscrimination initiatives in career opportunities, access to management positions, and remuneration (EDF 2009).^a

The CSR agreement is built on the United Nations Global Compact and principles of the International Labour Organization (ILO), as well as social-responsibility guidelines of the Organisation for Economic Co-operation and Development (OECD).^b The definition of the initial agreement was developed with the aim of improving social dialogue within the group. Labor unions and employees were invited to contribute to the discussion (ECOTEC 2007). Think tanks established within the group continue working on the main CSR principles, while CSR managers from subsidiaries must report annually to headquarters on progress in strategy implementation. Within EDF's human resources department, a dedicated 10-person team works on such issues as diversity, age management, work-life balance, and internal and external promotion of equality and diversity.

In addition, the EDF group has a diversity and inclusivity (D&I) international community, consisting of associate members committed to building a D&I policy (including gender equality) and sharing initiatives and good practices. Each associate defines its own targets and action plan for gender equality within the framework of the CSR agreement. This aligns values and channels gender sensitivity throughout the group. The gender strategies of EDF associates are regulated by the laws and regulatory framework of the country of operations and corporate strategy. Gender strategy alignment is perceived as common ground among corporate associates in Europe. While it is difficult to establish a diversity policy that each associate can strictly apply, gender plans are facilitated by the EU gender strategy.^c As a result, gender initiatives in the group are quite diverse.

The CSR principles also guide contracting conditions with service providers and suppliers. A supplier code of conduct has been developed and audits are conducted, although the scale of outsourcing does not allow for monitoring all service providers and suppliers.^d The supplier code of conduct agreement does not specifically cover gender issues at the project level; however, recognition and compliance with the 10 UN Global Compact principles is binding. Thus, the perception of gender issues at the project level is embedded in global social principles and development goals—the UN Global Compact, ILO principles, and paradigm of sustainable development—assuming they are conducive to gender-equal development. Considering the scale of outsourcing, training each supplier and service provider on UN Global Compact or gender issues is not feasible. Diffusion of social and gender responsibility must therefore be carried out by strong government regulations and international conventions.

^aProfessional equality is also a strong principle of the corporate code of conduct, which all subsidiaries have signed and must comply with.

^bAgenda 21 was also used as a framework to define the agreement with regard to sustainable development and environmental issues.

^cPersonal communication with EDF Diversity Manager, May 2015.

^dAn average of 60 audits per year are conducted among 13,000 suppliers and service providers.

example, India's national utility, Tata Power, framed its CSR strategy based on the Millennium Development Goals (MDGs) and established CSR departments in its operational units responsible for organizing social-welfare activities for communities. However, in most cases, CSR policies and strategies do not address gender issues directly. More commonly, they are integrated into human resources policies that focus on recruitment targets for women, equal employment opportunities, and professional development.

Interviews with electricity utility companies suggest that enforcement of specific social and gender principles is challenging when contracting service providers and suppliers because of diluted responsibilities and procurement policies. Values, missions, and CSR strategies are enforced through companies' codes of conduct and are transferred throughout the supply chain via contracts with service providers and suppliers, companies' involvement in industrial initiatives,² and auditing. Suppliers and contracted companies may not always have the human and financial resources to adapt to specific policies required by the head company, though global principles, such as "human rights," "respect," "nondiscrimination," and "free of harassment," are generally part of contracts (Box 5.4).

BOX 5.4

International Gender Certifications and Reporting Initiatives

International certifications and recognition can affect a company's reputation and credibility worldwide and contribute to gender equality.

Global Reporting Initiative: Focuses on economic, environmental, social, and governance issues. Gender disaggregation is included in labor, occupational, and health and safety reporting indicators.

Embedding Gender in Sustainability Reporting: Identifies practical steps on integrating gender in sustainability reporting within organizational objectives (e.g., gender equality in the workplace or supply chain).

UN Compact and Women's Empowerment Principles: Includes universally accepted principles in the areas of human rights, labor, environment, and anti-corruption. Among the 10 principles that companies report on each year, gender cuts across 2: human rights and labor. Corporations can also adhere to the Seven Women's Empowerment Principles. Since 2010, 670 companies have signed the CEO statement of support for these principles.

Gender Equity Seal (GES): Spurs companies to promote, improve on, and monitor women's position in their workforce. It has five steps: (i) organizational public commitment to GES principles, (ii) management systems self-assessment, (iii) management systems independent evaluation (iv) organizational commitment to seek GES certification, and (v) performance audit (independent verification). Both the UNDP and the World Bank have supported these efforts.

Gender Equity Model: Promotes quality standards in key areas of industrial relations. These include selection and hiring processes; training policies; professional development; family-work balance; and the prevention, handling, and follow-up of cases of sexual harassment. These certification processes have been implemented in Argentina, Chile, Egypt, and Mexico, with support from the World Bank.

Source | forthcoming.

WOMEN'S REPRESENTATION IN THE ELECTRICITY UTILITIES

Women's representation in the energy sector has been historically low, particularly in developing countries. A recent study by the United States Agency for International Development found that, among 14 electricity utilities in 4 developing regions—Eastern Europe (Georgia, Kosovo, Macedonia, and Ukraine), Middle East (Jordan), South Asia (Pakistan), and Sub-Saharan Africa (Ghana, Kenya, Nigeria, and Tanzania)—women comprise an average of 13 percent of the distribution utilities' workforce, ranging from just 1 percent in Pakistan to 30 percent in Ukraine. This low percentage can be partially explained by male dominance in technical operations (USAID 2016).³

Although the electricity utility companies in developed countries have a higher percentage of women's representation, they too face barriers to greater gender equality, as suggested by disaggregated data. In the main electricity utilities of Europe, the United States, and Canada, women comprise about 20–30 percent of the workforce. For example, in EDF France, women's representation is about 30 percent; in the EDF France group, the average is about 26 percent, ranging from 18 percent in its Italian subsidiary (Fenice) to 42 percent in Belgium (2014 figures; EDF 2015). Australia's Origin Energy has a higher ratio of women employees, at 40 percent; however, the operating environment is strongly regulated by the Australian government's gender policies and social responsibility requirements within the extractives industries.⁴

Interestingly, the range of women's representation is higher in East Asia and the Pacific, at 9–40 percent, which is explained by differences in socioeconomic contexts and regulations. In Indonesia, women represent only 3 percent of Indonesia Power's operations, maintenance, and engineering workforce; however, they account for 36 percent of its human resources, finance, and administrative staff. In April 2015, representatives of the PLN Persero group (Indonesia) revealed that their office has no specific gender policies. All of those interviewed said the human resources vision is to provide “equal opportunity of employment and salary for equal competences.” Employee recruitment practices are based on the principle of competencies, and human resources apply a performance-based system for wage and career promotions. An interview with the group's operations manager said that the number of female employees has tripled in 10 years.

Further research is needed to better understand the dynamics of this process. It can be explained, in part, by social and cultural norms and changes within the country, as well as a cascading effect; that is, as more women begin working in the electricity sector, they act as role models, opening opportunities for many more women to follow. The PLN Persero group (Indonesia) now employs more than 63,000 people; 15 percent are women, which is higher than the average rate of women's participation in the country's electricity sector.⁵ In India, women comprise only 9 percent of Tata Power's employees. This low women's ratio may be explained by such country characteristics as rural women's low literacy rates and low rates of labor force participation, as well as a heavily male-dominated work environment.

PROMOTING GENDER EQUALITY IN THE ENERGY UTILITIES

Women's low level of employment in the energy sector remains a challenge; this study identified key areas where initiatives are needed to attract more women to the sector. These include long-term capacity building through education in science, technology, engineering, and math (STEM); creating a

gender-sensitive work environment; designing innovative approaches to reduce occupational segregation by gender; and increasing women's representation in management of the utilities (Table 5.2).

Girls' education in STEM fields is critical to building a future talent pool of professional women engineers. To achieve this long-term goal, a growing number of electricity utilities are forming partnerships with high schools and universities. Women employees of the utilities act as role models to promote girls' interest in STEM education and introduce them to potential future employment opportunities (Chapter 4).

The electricity utility companies need to build a more gender-sensitive work environment that ensures safe working conditions for women and encourages their professional advancement.

A primary issue is preventing and addressing sexual harassment. Also, to ensure work-life balance, flexible leave and work policies are needed. In addition, women should receive coaching in career

TABLE 5.2
Initiatives for Gender Equality within Utilities

INITIATIVE TYPE	DESCRIPTION	NUMBER OF COMPANIES	FREQUENCY OF INITIATIVES
Creating working conditions attractive for women	Social protection addressing women's specific needs (e.g., maternity leave)	19	Frequently
	Partnerships for fostering vocations	16	Frequently
	Work-life balance	16	Frequently
	Vocational training	15	Frequently
	Childcare arrangements	12	Frequently
	Quotas/targets to increase number of women employees	10	Occasionally
	Training and sensitization of human resource managers	9	Occasionally
Reducing occupational segregation and pay gap	Equal-pay-for-equal-work policy clause	19	Frequently
	Career development programs	15	Frequently
	Feminization of technical positions	15	Frequently
	Women's groups/networks	12	Frequently
	Feminization of management	11	Occasionally
	Women's mentoring/coaching	11	Occasionally
	Quotas/targets for increased representation of women in management	10	Occasionally
	Monitoring pay gap	10	Occasionally

Source | Electricity utilities study.

advancement within the company. For example, at ENGIE, France's multinational electric utility company, mentoring and coaching form an essential part of building women's leadership skills and positioning them as future managers. Those women already in leadership positions act as role models to provide personalized career development support for others, including confidence-building and negotiation skills.

Innovative recruitment and training approaches that move women into better-paying employment opportunities can also be more cost-effective for the utility (Box 5.5). Increasingly, the operational units of large-scale infrastructure companies, mainly in developed countries, are taking the social and environmental impacts of their business practices into account in order to promote sustainable development in the project-affected communities (Box 5.6). Some companies have experimented with training women in nontraditional technical jobs to meet their business objectives (Box 5.7).

Finally, the electricity utility companies require greater representation of women in management, as well as on their corporate boards. ENGIE offers a useful example of efforts to achieve gender-balanced management (Box 5.8). Women's increased representation as company executives or board members serves not only to increase their overall well-being and share within the enterprise; research finds it can also be tied to stronger company profits (PIIE 2016).⁶

We need to reflect the society in which we operate and its diversity. It goes beyond gender, and is more about fostering diversity in the company. It brings more skills and facilitates exchange and knowledge transfer within the company and between the company and its environment. You need diversity if you expect to reach all components of a society.

DIRECTOR, P.T. PAITON ENERGY (ENGIE SUBSIDIARY)

Beyond the electricity utilities, further research is needed on how companies in related sectors, such as mining and transport, are promoting gender equality within their organizations and in their field operations. In terms of public-private partnership (PPP) projects, discourse and evidence on gender are limited at present (IFC 2012).⁷ A World Bank review of PPPs and infrastructure found that their design has been weak in addressing poverty. It also found an absence of any consideration of the impact of such investments on various groups of men and women. A recent World Bank review of transport case studies showed that strong and explicit commitment to gender in national frameworks did not translate into policy and practice in the sector; in addition, there was bias toward capital expenditures with insufficient follow-up on beneficiaries.⁸

BOX 5.5

Cost Effectiveness of Investing in Workforce Diversification

Electricity utility companies should be encouraged to invest extra efforts in diversifying their workforce, based on the data collected by individual companies on the positive aspects of employing women. In Jordan, for example, the Electricity Distribution Company (EDCO) found that women engineers are more likely to remain longer with the company, compared to their male counterparts, who usually move on to jobs outside the country after just 2–3 years (USAID 2016). In the mining sector of Australia, women have overcome their “bad-luck” stigma to become valuable truck drivers. Compared to men, women drivers have helped to reduce maintenance costs due to their careful driving (Reuters 2008).

Lessons from large-scale mining infrastructure projects suggest innovative approaches that the energy sector can take to recruit and benefit women. For example, the mining companies of LKAB and Boliden have implemented ambitious gender initiatives both within their companies and in collaboration with local communities. These have included wage mapping systems, women’s networks, and gender-aware trainee programs. Particular efforts have been dedicated to recruiting women for higher positions and as technology experts.

BOX 5.6

New Zealand Takes Initiative to Recruit Women in Electricity Supply Industry

In New Zealand, the Women in Power Project works with the Electricity Supply Industry Training Organization (ESITO) to recruit and train women as line mechanics and cable jointers—two technical jobs traditionally performed by male workers. In addition to monitoring the women trainees’ progress in technical qualifications, ESITO analyzes gender-related challenges of the company’s work environment, including issues of work-life balance, health and safety, and social barriers to women’s job effectiveness (e.g., protective attitudes of male colleagues or reluctance of supervisors to include women trainees in particularly difficult jobs).

BOX 5.7

Women in Remote Areas of Brazil Recruited to Address Skills Shortage

Acreditar, a gender-inclusive, pre-hire skills training program, established under the US\$7 billion Santo Antônio Hydro-power Project in Porto Velho, Brazil, successfully recruited and trained both men and women for important gateway jobs. Implemented by Odebrecht, one of Brazil’s leading engineering, procurement, and construction companies, the Santo Antônio project faced a critical shortage of skilled labor from the outset. To meet this challenge, Odebrecht launched the Acreditar program to recruit and train local men and women, which proved many times more cost-effective than bringing in skilled workers from outside areas. The high levels of local employment that resulted created a positive relationship with the affected community, allowing the project to proceed smoothly. As the on-site human resources manager noted, “Acreditar was never intended to be a social program, but was part of a significant business operation.” Based on its success in Porto Velho, the program has been rolled out in other sites of Latin America and beyond.

Source | IFC 2013.

BOX 5.8

Working Toward Gender-Balanced Management at ENGIE

ENGIE was motivated to adopt gender-balanced management as a main objective of its diversity policy for three main reasons. First, the company considers that women's increased representation in executive and management positions enhances the company's business and social performance. Human resources managers referred to studies demonstrating that a diverse workforce brings about more innovation; and diversity of opinions, which reflects respect for people and communities, anchors the company in its operating environment.

Citing a study by Zenger Folkman, ENGIE Asia's human resources manager described how women foster positive changes in a company by outperforming men in the following competencies: developing others, inspiring and motivating others, building relationships, championing changes, and solving problems and analyzing issues. Enhancing these competencies among leadership and management can accelerate changes and foster gender awareness and responsiveness at the group level. The human resources manager emphasized that linking gender equality to compliance with business value has produced a real change.

A second driver is ENGIE's positioning itself as a benchmark employer. As part of its CSR strategy, it recognizes the challenge of building an equitable society. ENGIE envisions its actions as enabling global social change by "promoting equal opportunities and treatment in practice through all of the group's entities in order to change management and trade union culture to promote diversity" (GDF Suez 2013).

Finally, ENGIE considers that the push for change requires targets. Specifically, it states that women should comprise one-third of newly appointed executives, 35 percent of high-potential managers, 25 percent of managerial staff, and 30 percent of new hires.

Source | Electricity utilities study.

CONCLUSION

The electricity utility companies are well positioned to address gender issues in both their field operations and within their organizations. Innovative project approaches suggest how overcoming barriers to women's recruitment and training in the project-affected areas and engagement in outreach campaigns can resolve key concerns of the utility companies while, at the same time, improving the lives of women and their families. Within the utilities, adopting a policy of gender-balanced management can enhance business and social performance. Women role models and their cascading effect, male and female leadership in gender awareness-raising, family-friendly work policies, and women-friendly work environments all contribute to a more diverse workforce that fosters innovation.

Summing up, promoting gender balance is good for project sustainability and the utility's business and social performance. At the sector level, long-term capacity building in STEM education is critical to building a future talent pool of professional women engineers. Along the way, the utilities can work to close the gender-equality gap by creating a more gender-sensitive work environment that encourages women's professional advancement, designing innovative approaches to reduce occupational segregation by gender, and increasing women's representation in leadership and management roles.

ENDNOTES

¹The search to find supporting evidence for this hypothesis—an intricate (and possibly contested) task—was beyond the scope of this study.

²Such as the Better Coal Initiative and the International Hydropower Association.

³The Engendering Utilities Program is designed to improve labor market opportunities for women in the energy sector.

⁴Australian energy and mining industries are required to apply for a social license, and targets for gender equality are established by the Australian government.

⁵In Indonesia, women represent 5 percent of the total workforce in the electricity, fuel, and drinking-water sectors (GOI-KPP 2013).

⁶<http://www.iie.com/publications/print.cfm?ResearchID=2913&doc=int>

⁷<http://www.pidg.org/resource-library/results-monitoring/pidg-ifc-gender-impact-of-private-public.pdf>

⁸http://wedc.lboro.ac.uk/docs/research/WEJR7/Guest_-_PPPI_Gender_and_Poverty_-_abridged_paper.pdf

REFERENCES

- Castel, Paulette. 2016. "Projet de Redressement du Secteur Electrique: Analyse de l'impact économique et social." Poverty and Social Impact Assessment. Unpublished, internal document. World Bank, Washington, DC.
- ECOTEC. 2007. "Drivers for Changes: Corporate Social Responsibility—A Report to the Sectoral Social Partners. Describing Development in European Electricity Sector." Report for EUELC-EPSU and EMCEF, Birmingham, U.K. (http://www.epsu.org/IMG/pdf/EN_CSR_European_electricity_sector_FINAL_REPORT.pdf).
- EDF (Électricité de France). 2009. "Corporate Social Responsibility Agreement" (http://strategie.edf.com/fichiers/fckeditor/Commun/RH/Publications/Annee/2009/EDF_Accord_RSE09_vf.pdf). In French.
- . 2015. Interview with EDF Diversity Manager, May.
- GDF Suez. 2013. "Registration Document Including Annual Report" (<https://www.gdfsuez.com/wp-content/uploads/2014/03/gdf-suez-registration-document-2013-including-annual-financial-report-pdf.pdf>).
- GOI-KPP (Government of Indonesia—Kementerian Pemberdayaan Perempuan). 2013. *Indonesia Gender Equality Policy Brief* (http://www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2013/04/10/000356161_20130410152909/Rendered/PDF/758440REVISED00C00GenderObrief010en.pdf).
- IFC (International Finance Corporation). 2012. *Gender Impact of Public Private Partnerships: Literature Review and Synthesis Report*. Washington, DC: International Finance Corporation (<http://www.pidg.org/resource-library/results-monitoring/pidg-ifc-gender-impact-of-private-public.pdf>).
- . 2013. "Investing in Women's Employment" (http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/publication_report_investinginwomensemployment).
- ILO (International Labour Organization). 2007. "Global Employment Trends for Women, Brief" (March). Geneva: International Labour Organization.
- Milkeviciute, Gintare. 2014. "Energy Industry in Lithuania." Lithuanian Electricity Distribution Company (LESTO). PowerPoint presentation, ISM, University of Leicester, U.K., October 6 (www.slideshare.net/GintarMilkeviciute/energy-industry-in-lithuania-2014).
- PIIE (Peterson Institute for International Economics). 2016. "Is Gender Diversity Profitable? Evidence from a Global Survey." Working Paper 16–3 (February). Washington, DC: Peterson Institute for International Economics.
- Reuters. 2008. "Women Drivers Better Than Men in the Mining Monster Trucks" (<http://blogs.reuters.com/commodity-corner/2008/04/10women-drivers-better-than-men-in-the-mining-monster-trucks/>).
- USAID (United States Agency for International Development). 2016. *Engendering Utilities: Improving Gender Diversity in Power Sector Utilities*. Washington, DC: United States Agency for International Development.



CONCLUSION AND RECOMMENDATIONS

This study provided a unique opportunity to reflect on progress that large electricity infrastructure projects have made to improve gender responsiveness and social inclusion while identifying key challenges and opportunities to reduce gender disparities and improve overall development outcomes. The study identified key pathways of impact, pressing knowledge and data gaps, best practices from successful projects, and potential gender entry points that projects can take to avoid missed opportunities. This chapter summarizes the study's key findings, lessons learned, and policy implications for each of the topics covered in this report. It then suggests practical steps that project teams can take to move the gender-energy agenda forward.

EMPLOYMENT

Key Findings

Historically, women's direct employment by large-scale energy infrastructure projects has been constrained mainly by a country's pre-existing gender roles and social norms that discourage women's labor force participation. More immediate factors include women's lack of appropriate technical and professional skills, occupational segregation by gender (typical in areas with low economic development), and gender-insensitive work environments (including employer bias, gender stereotyping, and unsafe working conditions).

Projects are more likely to induce women's economic activity indirectly. Such opportunities can provide a sustainable income source with important gains in household welfare (e.g., more nutritional food for families). In Senegal, the influx of workers into communities affected by the Energy Sector Support Project allowed women entrepreneurs to benefit by providing hospitality services (e.g., accommodations, catering, and laundry). Women can also benefit directly from a project's training and skills development activities. In Morocco, for example, women in communities affected by the Noor 1 Concentrated Solar Power (CSP) Project, requested training in traditional home-based activities (e.g., weaving, knitting, and embroidery). Also, ancillary project investments (e.g., access roads and ferries) can increase women's mobility and ability to access new economic opportunities. Finally, where inclusive financing is available, women can utilize electricity to set up their own businesses (e.g., bakeries).

Lessons Learned

Projects that anticipate exogenous factors that affect women's labor force participation (e.g., occupational segregation by gender) can better contribute to long-term project sustainability and indirectly advance gender equality. Interestingly, in Morocco, the Noor 1 CSP Project was able to employ some women directly and engage others indirectly through entrepreneurship training activities, despite social and gender norms and women's lack of technical skills. Contributing success factors were the project's

sensitivity to creating a positive and safe work environment for women and developing training programs that promoted women's participation.

Projects that connect communities to well-designed ancillary infrastructure can harness long-term benefits for all. In Nepal, the ferry service provided by the dam reservoir under the Kali Gandaki “A” (KGA) Hydropower Project is making it possible for women and men to realize benefits from tourism and other economic opportunities in the services sector.

Policy Implications

To increase women's employment in nontraditional occupations in energy infrastructure, pro-active, gender-sensitive efforts are required. On the supply side, these include setting quotas for women in construction and maintenance jobs, encouraging the establishment of women's recruitment bureaus, ensuring separate washroom and toilet facilities for women and men at work sites, and enhancing women's safety. Such low-cost interventions can yield high returns and potentially attract more women to energy infrastructure construction jobs and project operations. On the demand side, addressing women's needs for training and skills development requires an understanding of the gender differentials in educational attainment and gender roles in the affected communities and households. A systematic assessment of gender in the World Bank's energy projects portfolio for years 2000–14, for example, concluded that one major avenue for including gender considerations in projects is through the design and provision of vocational training in the community.

LAND-RELATED IMPACTS

Key Findings

The land-use changes that accompany large-scale infrastructure projects, including loss of agricultural land, disproportionately affect women, who often depend on community and public lands for small-scale cultivation. Women are hit harder than men from the loss of fertile land, forests, and water resources, as well as kinship and social networks on which they depend for support. Where involuntary displacement and resettlement are required, women often suffer disproportionately from the induced social, economic, and environmental risks. In addition, because of inheritance laws or sociocultural norms, women tend to have less access to land ownership or experience legal and practical barriers to land registration and titling; as a result, women and girls are likely to face greater risks during the resettlement process and are less likely to reap the benefits. Furthermore, the compensation decision process tends to ignore the value of women's property rights and important roles in traditional agriculture. Thus, depending on the context in which the project operates, existing gender inequalities may be aggravated.

Project-level mitigation measures can help to minimize these adverse impacts. To ensure that women's inputs are sufficient to meaningfully influence project design, meetings need to be arranged at a time convenient for women to attend and in venues where they feel comfortable and free to engage in discussion (e.g., women-only focus groups). During the land-acquisition/resettlement process, granting property titles to both men and women, either separately or jointly, can ensure that underrepresented rights-holder

groups, including women, are not excluded from the land-title registration process. Property titles can contribute to empowering vulnerable communities and individuals. Formalization can free individuals from constraining social relations and dependency on stakeholders who benefit from the perpetuation of informality and insecurity.

Lessons Learned

In terms of dam construction projects, the comprehensive environmental and social mitigation design of the Nam Theun (NT) 2 Hydropower Project in Lao PDR can serve as a global model. Addressing gender issues was an integral part of the project design. The gender assessment identified disadvantaged groups that would face greater risks during and after the resettlement process, including women and girls in marginalized ethnic groups. The power company hired gender specialists to support and work closely with local government agencies led by the Lao Women's Union, which resulted in more effective implementation of the gender-sensitive Social Development Plan and Resettlement Action Plan, which are legally enforced. Women's participation was facilitated at all stages of the project cycle, which ensured their adequate compensation.

In Sierra Leone, the Bumbuna Hydroelectric Power Project designed several gender-targeted compensation mechanisms that enhanced women's social and economic empowerment and welfare. These included requiring women to set up savings groups so they could access a revolving loan facility; facilitating women's access to credit by granting joint titles for land, houses, and assets; and ensuring women's equal representation in village resettlement committees. In terms of transmission projects, Nepal currently employs some of the world's most progressive practices regarding rights-of-way for transmission lines, cash compensation for a portion of the land value under the lines, and livelihoods/skills and enterprise training for women as part of resettlement plans.

Policy Implications

To ensure that the project will not lead to unintended negative gender impacts, gender-equal public consultations are needed during the design phase. This means ensuring that (i) barriers to women's meaningful participation are overcome (e.g., selecting culturally appropriate venues; providing childcare services to relieve women's time burden; and making provisions for language, illiteracy, and awareness issues) and (ii) the results of women's consultations are reflected in project implementation. A gender focus needs to be introduced into social assessments to ensure sustainable and gender-equal project outcomes. In the early stages of project development, gender assessments should be undertaken in conjunction with feasibility studies. However, as this study's World Bank portfolio review confirms, gender-disaggregated monitoring and evaluation (M&E) of implementation is also required.

To reduce gender disparities and improve overall development outcomes, land titles should be granted to women or jointly to couples to protect women's access to assets and land use, as well as increase women's voice and agency (e.g., bargaining power in family decisions), which, in turn, can affect women's choices regarding labor force participation or fertility.

SOCIAL EFFECTS: HEALTH AND EDUCATION

Key Findings

The design phase of large energy infrastructure projects tends to overlook their related health risks and gendered impacts. The most immediate such risks are transmission of HIV/AIDs and associated gender-based violence, water-borne illnesses, and occupational safety. Concentrated investments in large energy infrastructure involving the presence of male migrant workers can result in serious health risks, particularly for women, which may involve gender-based violence. The large amounts of funding expected to be poured into the energy sector of African countries over the next few decades underscores the urgent need for energy projects to address this risk.

Increasingly, projects are investing in benefit-sharing schemes and local development activities (e.g., setting up educational and health facilities and offering training, skills-building, and livelihood support) to build project acceptability and ownership while improving social and development outcomes. If such investments are sensitive to the gender context of the project-affected community, they can contribute to a project's long-term sustainability and indirectly advance gender equality. Conversely, those that ignore gender considerations lead to missed opportunities. How ancillary investments and local-area development activities alter gender norms in the affected communities over time (both positively and negatively) are not well understood and thus warrant further research.

Best Practices

Projects with well-designed ancillary investments and local development activities whose implementation integrates the results of gender-inclusive community consultations and gender strategies can produce important co-benefits. In Indonesia, for example, the gender strategy included in the land acquisition and resettlement plan developed under the Upper Cisokan Pumped Storage Hydro-Electrical Power Project ensured gender-equal consultations and negotiations, as well as shared access to grievance redress, employment benefits, and asset replacement. The gender strategy also supported implementation of a HIV/AIDS prevention component. Vietnam's Trung Son Hydropower Project and India's Rampur Hydropower Project were more sustainable because their integrated health services included consultations with women and men about their health needs (e.g., easily accessible, good-quality pre-natal care for women) prior to project implementation. By gaining people's trust early on and considering the community as a legitimate partner, the project had positive social outcomes.

Social prevention campaigns could also be implemented in the project area. An important aspect of such campaigns is to engage communities and civil society in raising awareness about violence and its prevention. Participatory processes to design and evaluate violence prevention programs and mechanisms can result in more effective solutions overall. Women can propose strategies for improving their safety in the project area and can influence program design.

An initial step in preventing gender-based violence in large-scale energy infrastructure projects is establishing codes of conduct for energy employees and contractors. Signed and agreed to being upheld by all

staff involved in construction, these codes of conduct should outline unacceptable behavior and consequences for harassment and gender-based violence.

Lessons from large infrastructure projects in transport and other related sectors can also provide useful guidelines on how to prevent gender-based violence in energy projects. Situational prevention of gender-based violence, including improved lighting in public spaces, safe access to restrooms, and moving around large areas in groups, can be effective and also provide a better work environment.

Policy Implications

The direct negative health risks of projects signal the need to integrate physical safety and prevention of health risks, including gender considerations, into project design. To protect families and promote health risk management, extra efforts are needed to ensure the equal participation of women in all consultations and communication plans. Furthermore, the results of these consultations need to be incorporated into project implementation and evaluation. Targeting the design of ancillary investments, such as schools and health facilities, to address pressing gender gaps in the project-affected community can promote gender equity and reduce social exclusion. But to be meaningful to both women and men, such investments must be well-designed, reflecting the gender differentials in educational attainment and gender roles in the household and community. A gender assessment and gender action plan (GAP) could be the starting point for developing appropriate skills development and training opportunities.

ROLE OF THE UTILITIES

Key Findings

The electricity utility companies consider engagement with the project-affected communities as essential; but initiatives aimed at addressing gender issues are still rare. Most consultations with the affected communities do not unveil gender gaps or how to address them. Key constraints include limited knowledge of local languages, lack of partnerships with local organizations, and lack of women representatives within the power company who could establish direct relationships with the affected communities. Women's low level of direct employment by the project is mainly limited by a lack of technical and professional expertise, as well as a country's sociocultural and gender norms that discourage women from working in the sector.

Lessons Learned

In some projects, the utilities have been quite effective in engaging with the project-affected communities; among the notable exceptions is the Nam Theun (NT) 2 Hydropower Project in Lao PDR. In this case, the power company hired gender specialists to support and work closely with government agencies led by the Lao Women's Union. This partnership ensured that the project's gender-sensitive social development plan and resettlement action plans were implemented and that women participated in all

stages of the project cycle. Projects that take gender dynamics into account may also be able to promote citizen engagement, leading to better business performance.

Policy Implications

Promoting gender balance in the energy sector—both in field operations and within the utility company—is a multifaceted issue. Utility consultations in project-affected communities that ensure women's equal participation can improve energy delivery, citizen engagement, and business performance, as well as indirectly advance gender equality. Socially-inclusive and gender-balanced outreach campaigns can improve communication and thus build trust with the local population. Innovative initiatives can also be taken to identify social and cultural barriers that prevent women from being hired directly by the project. Successful projects have engaged gender specialists and formed partnerships with local organizations to ensure women's participation at each stage of the project cycle.

Women's greater representation within the utility companies themselves, particularly in management positions, can perhaps facilitate a stronger push for change at the operational field level.¹ Leveling the playing field in the recruitment and hiring of women in the energy sector requires longer-term centralized strategies and policy initiatives (e.g., promoting girls' education in the STEM fields and creating partnerships between utility companies and schools).

MOVING THE GENDER-ENERGY AGENDA FORWARD

The meaningful integration of gender throughout the project cycle can both enhance project sustainability and promote gender-equal development outcomes, in turn, contributing to poverty reduction and shared prosperity. To ensure gender-equal outcomes, projects involving resettlement or changes in land use must take gender differences into account during the consultation process and the design and implementation of compensation plans to ensure that women and men benefit from (and are not harmed by) the new infrastructure. Women's control over land assets can enhance household welfare, women's cash incomes and spending on food, and children's health and educational outcomes. Women-headed households, who represent a significant share of the poor, can benefit enormously from the security, status, and income-earning opportunities that secure rights to even a small plot of land can provide. Projects can also incorporate context-appropriate ancillary design features, which can produce important co-benefits, such as access to information, markets, and economic opportunities. The types of features selected, to a large extent, will depend on client demand and readiness.

WHAT SHOULD PROJECTS DO?

Past energy infrastructure projects have often acknowledged gender-inclusive participation and gender-disaggregated M&E, but few have really pushed for it. Gender may have been mechanically included during the project design phase, with little or no formal follow-up required. In many projects that

included women-only consultations, it is not apparent how women's views were taken into account or influenced project design and implementation.

Based on the background work conducted for this report, including in-country data gathering, field interviews, and research, the study team has developed an Operational Companion Guide on Gender and Electricity Infrastructure for practitioners and policy makers. This guide includes examples of surveys, terms of reference (TORs), and how-to guidance based on a variety of project experiences. To avoid negative impacts and promote positive ones, gender must be incorporated throughout the project cycle: preparation, implementation, and evaluation (including the collection of gender-disaggregated data on project impacts). Below are practical steps and considerations that project teams can take to avoid missed opportunities. More information on potential indicators, fieldwork guides, sample TORs, toolkits, and other resources can be found in the companion piece guides (www.esmap.org).

Preparation: Gender Assessments

By taking gender roles, social norms, and power relations into consideration, gender assessments ensure that project activities do not disadvantage one gender over the other and enhance gender equality. Disregarding gender issues during the assessment and preparation process can aggravate existing imbalances in the affected communities' gender relations, leading to women bearing a disproportionate share of the project's social costs (WCD 2000). Not only is it important to do a thorough assessment (i.e., access/control profiles) using gender-disaggregated data collection. It is also critical to ensure that the findings are used to inform the project design. Gender assessments should strive to understand who has access to and control of the household energy and how the project will impact men and women's gender dynamics. These are related not only to resettlement and construction activities, but also to the potential impacts of socioeconomic changes induced by the project (e.g., owing to an influx of migrant workers, regional inflation, or construction of ancillary infrastructure). For example, construction of an access road, which can result in the loss of natural resources for gardening or forests for firewood gathering, may encourage trade in markets and the use of alternative cooking fuels (e.g., LPG or biogas). A hydro project reservoir that is leveraged by community development initiatives (e.g., hand or electric water pumps) can improve women's time use and health through agriculture and year-round water and sanitation benefits.

The first most important step is to hire a gender-energy expert to do the initial gender screening and inputs for the poverty and social impact analysis (PSIA) and environmental and social impact assessment since being a social development specialist does not guarantee that one is a gender expert. Conducting gender-inclusive consultations in the local dialect through female facilitators and women-only discussion groups will give local women a platform to voice their opinions. Local women leaders, user/working groups, and nongovernmental organizations (NGOs) can be engaged to assist in the process. Common challenges to overcome include restrictive gender norms, lack of female participation, and unequal property rights (i.e., who owns and uses the land and compensation options). It is important to note that women are not a homogenous group, and extra effort is needed to reach out to the vulnerable peoples of various socioeconomic and ethnic groups. Holding consultations in the local language at a

location and time convenient for women's daily schedules will ensure the best possible response and attendance during the assessments.

Implementation: Gender Action Plans

A well-informed Gender Action Plan (GAP) can serve to reduce exclusion and maximize project benefits for both men and women. It can also help to soothe any community resentment or backlash toward the project, which could increase the risk of delays. Ideally, a GAP is a stand-alone document—not merely a document section on community development or resettlement action—that outlines longer-term engagement with the community applicable to all project-affected peoples and includes a sufficient budget and implementation time frame. The GAP should require follow-up on capacity building and farmer-training exercises to ensure they are effectively implemented, serving as a catalyst for social change.

Designing programs and activities with inputs from local women will ensure that the GAP reflects the separate wants and needs of women so they can make use of likely project benefits (e.g., productive uses of electricity or harnessing water from reservoirs for fisheries or even promoting tourism). Some effective activities have included helping to form women's self-help groups and providing microfinance, employment, and educational opportunities. The project can encourage women's employment by providing a women-friendly work environment (e.g., separate toilet facilities for women and men, day care facilities, and flexible schedules). In the context of a migratory construction environment, ethnic and gender sensitization of contractors and health and safety awareness among workers and the local community are especially important. Mobile clinics and vans are especially successful in reaching women to provide health care (e.g., Rampur Hydropower Project in India).

Having a gender-inclusive grievance redressal mechanism can encourage women to voice their concerns via women officers who are available during times that are convenient for local women. To ensure that project benefits reach women, as well as men—particularly in socially conservative areas where implementing agencies lack gender capacity—engaging gender-sensitive NGOs and local groups as partners during consultations, outreach, and implementation can be especially valuable.

Evaluation: Tracking Gender Indicators to Improve Results

Progress, lessons learned, and intermediate results, as well as gender-based outcomes, should be documented. The lessons of gender mainstreaming can be integrated into other energy operations within the country and thus feed into ongoing dialogue with the government and utilities. The most important step is to integrate gender under the environmental and social impact assessment framework for baseline and impact analysis (e.g., gender-differentiated impact analysis, including gender-based violence) and agree on the M&E framework with gender-sensitive indicators. Migration plans should include gender targets and the M&E framework to measure women's participation and benefits in project activities. The Gender and Social Exclusion Analysis framework can help in determining indicators and outcomes for the three domains of change: (i) access to services, (ii) changing gender norms, and (iii) increasing women's agency. Potential indicators can be included for time-energy use, access to information (e.g., health)

via television and radio, external income and businesses, educational gains, or jobs in nontraditional sectors. Enacting concessionaire agreements on gender plans and monitoring, along with an effective gender monitoring unit that keeps track of gender-disaggregated data (e.g., the Nakai Plateau resettlement program under the Nam Theun [NT] 2 Hydropower Project in Lao PDR), can help to ensure follow-through of long-term M&E commitments.

LOOKING AHEAD

There is a pressing need for more rigorous and documented data, including empirical evidence on how projects can change gender norms and the role of the energy utility. In the past, energy-sector policy and planning seldom acknowledged the differential gender impacts of energy-sector decisions and implementation.² Beyond the impacts of electricity access, energy infrastructure projects can influence gender norms through gender-sensitive compensation packages, investments in well-designed ancillary infrastructure, and other local area development activities. There has been significant progress toward including gender considerations in electricity infrastructure projects. But not all social changes in a community have the potential to alter gender norms toward more egalitarian rules or expand women's agency. The road ahead demands more rigorous analysis and systematic collection and sharing of data to inform projects and country strategies to avoid the potential for backlash that could potentially deprive women's voice and agency. In addition, a more in-depth understanding is needed of the utility's role in engaging women in the energy workforce and along the value chain. The redoubled efforts of the World Bank and other multilateral development banks, governments, and the private sector, together with NGOs and other local partner organizations, are showing that the gender-energy agenda is moving in a positive direction.

ENDNOTES

¹Providing evidence to support this hypothesis was beyond the scope of this study, and further research is warranted.

²For this study, it was particularly challenging to obtain meaningful data from project documents related to gender considerations in World Bank energy operations; the Independent Evaluation Group (IEG) confirms the difficulty of tracking gender results during project implementation and completion (IEG 2016).

REFERENCES

- IEG (Independent Evaluation Group). 2016. *Results and Performance of the World Bank Group 2015: An Independent Evaluation*. Washington, DC: World Bank.
- WCD (World Commission on Dams). 2000. *Dams and Development: A New Framework for Decision-Making*. Report of the World Commission on Dams. London and Sterling, VA: Earthscan Publications, Ltd.

APPENDIX A | LAND AND RESOURCE REQUIREMENTS OF ENERGY INFRASTRUCTURE PROJECTS

Large energy infrastructure projects invariably require the transformation of land and the use of natural resources, which can lead to negative environmental impacts. The land footprint varies by type of project and energy source used. This appendix describes the infrastructure components and processes of power generation, transmission, and distribution projects; distinguishes the land intensiveness and resource requirements by project type; and suggests factors that may contribute to a project's disturbance of ecological, socioeconomic, and cultural resources.

GENERATION

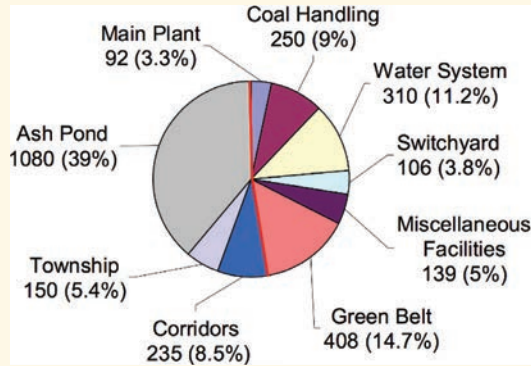
Energy generation infrastructure refers to power plants and associated facilities across all energy sources. Generating about 80 percent of the world's energy (IEA 2013), thermal power plants (e.g., fossil fuel,¹ biomass, nuclear, geothermal, and concentrated solar power [CSP]) comprise the power system (i.e., power-source turbine and generator) and associated facilities, which may include the cooling system, stack gas cleaning equipment, fuel storage and handling areas, fuel delivery systems (e.g., pipelines), solid waste storage areas, worker colonies, maintenance facilities, and electrical grid interconnection equipment (World Bank 1999).

The type and size of associated facilities are determined by the plant type and capacity, as well as location. Associated facilities may occupy the largest share of land (Figure A.1). In the case of geothermal power, generation facilities also include wells to access steam and superheated groundwater, ponds to support drilling and well testing, and facilities for treatment and reinjection of wastewater and gases (IFC 2007a). For CSP, as well as solar photovoltaics (PV), the type of technology deployed will determine the size of the area required (Ong et al. 2013). In addition to solar PV, nonthermal energy sources include hydropower and wind power. Hydropower components include dams, reservoirs, canals, penstocks, powerhouses, and switchyards for electricity generation. Solar PV and wind farms consist of many solar panels or wind turbines, which are connected to the electric power transmission network.

The land footprint of energy generation infrastructure varies by energy source. The land footprint of energy generation projects can be measured as the ratio of area to capacity (km² per MW) or in terms of land intensity of the energy source developed (km² per TWh per year). Based on land intensiveness, three categories of energy sources have been identified. Category I, which refers to those that are not land intensive, includes three conventional sources (nuclear power, coal, and natural gas) and two renewable ones (geothermal and solar thermal). Category II, which requires large tracts of land when implemented on a large scale, includes one conventional source (petroleum) and three renewable

FIGURE A.1

Distribution of Land Requirements for a Thermal Power Plant (5 × 800 MW)
Based on Indigenous Coal in India



Source | CEA 2010.

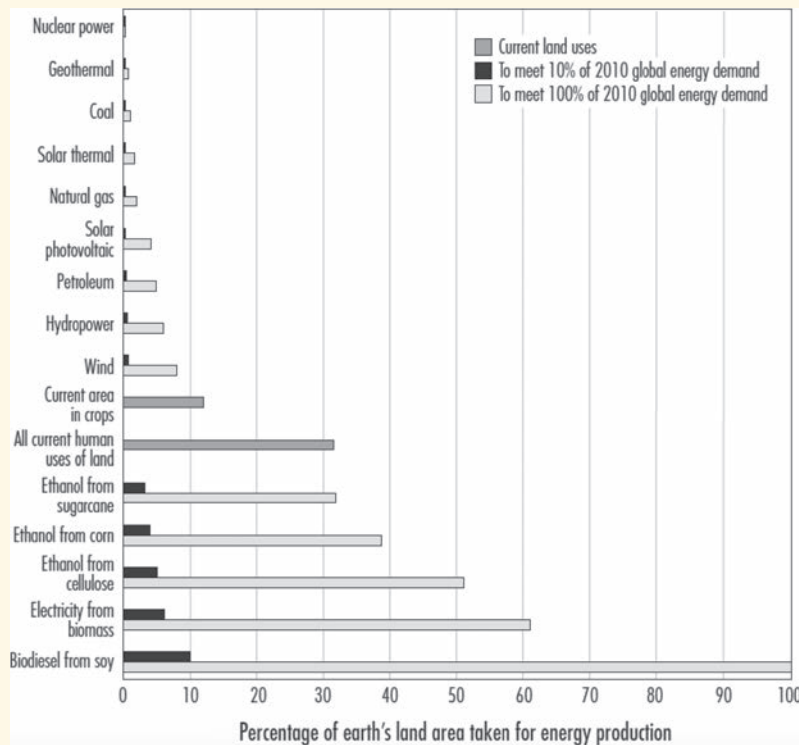
sources (solar PV, hydropower, and wind). Category III refers to the most land-intensive sources, including all types of biofuels (Figure A.2) (Andrews et al. 2011).

Energy generation and water resources are inextricably linked. Nearly all energy generation projects require large amounts of water. Extraction of energy resources (e.g., oil, coal, and gas) requires water for acquiring, transporting, processing, and refining. Thermal power plants (e.g., fossil fuel, nuclear, and CSP), which mainly require water for cooling, are often placed near a river, lake, ocean, or other water source. Solar power also requires water for washing collectors and panels. Hydropower can only be generated if water is available in reservoirs or rivers. Finally, feedstock production for biofuels may depend on irrigation (IEA and World Bank 2015).

Construction of energy-generation facilities requires land transformation. For most energy facilities, construction activities typically include land clearing for site preparation and access routes; excavation, blasting, and filling; transport of supply materials and fuels; building foundations involving excavation and placement of concrete; operating cranes for equipment unloading and installation; building and installing associated infrastructure; and installing overhead conductors or cable routes. Such activities invariably lead to land transformation and environmental impacts (World Bank 1999; IFC 2007a, 2008, 2015).

Construction and operation of energy-generation facilities lead to negative environmental impacts. Site preparation and construction activities—from clearing, excavation, earth moving, dewatering, dredging, and/or impounding streams and other water bodies to establishing laydown areas and developing borrow and fill areas—can lead to increased erosion, soil compaction, increased run-off, and sedimentation

FIGURE A.2
Land Requirements by Energy Source



Source | Andrews et al. 2011.

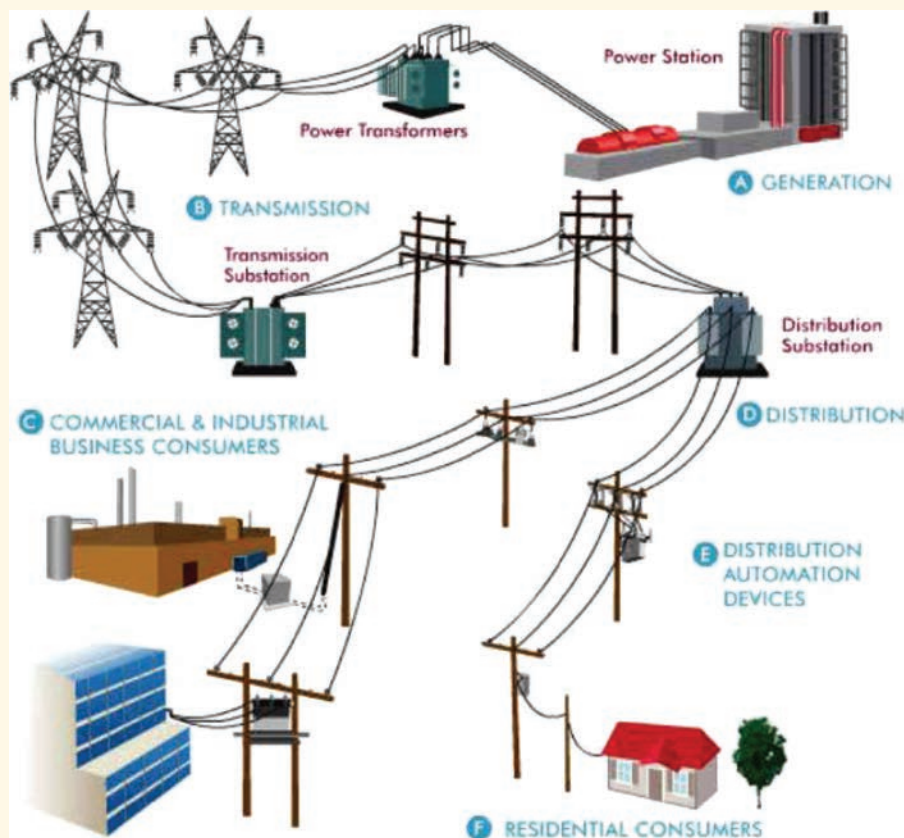
of surface waters (IFC 2008, 2015). Thermal power plants burning fossil fuels are major sources of air emissions, affecting local and regional air quality. The amounts of each depend on the facility type and size and the fuel type, quality, and manner in which it is burned. Wastewater streams from thermal plants can impact ambient water temperature and radically alter aquatic plant and animal communities. Other effluents can also significantly affect water quality (IFC 2008). Hydropower plants directly impact soils, vegetation, wildlife and wild lands, fisheries, and climate and human populations in the area. Large dam projects cause irreversible environmental changes, resulting mainly from the impoundment of water, flooding of land to form the reservoir, and alteration of downstream water flow. The area of influence of a dam and its reservoir extends from the upper limits of the reservoir to as far downstream as the estuarine, coastal, and offshore zones, and includes the reservoir, dam, and river valley below the dam (World Bank 1999). The negative environmental impacts of geothermal development projects, unlike fossil fuel-based power generation, are usually highly localized and rarely irreversible (ESMAP 2012).

TRANSMISSION AND DISTRIBUTION

The electric power network is an essential part of the energy system as it connects energy sources, often remotely located, to demand centers and end-users. The electric power network transports large amounts of electricity produced at power plants over long distances for eventual use by consumers (Figure A.3). The transmission network ships electricity at high voltage (usually above 110 kV) to a substation near a populated area. At the substation, the high-voltage electricity is converted to lower voltages suitable for consumer use. The low-voltage electricity is then shipped to end-users through distribution lines (Box A.1).

Construction of transmission and distribution networks involves land transformation activities. Project development and construction activities typically include site preparation and development;

FIGURE A.3
Electric Power Network



Source | Engineering Tutorial 2016.

BOX A.1

Components of the Electric Power Network

Transmission towers are the most visible component of the power transmission system. The structure is usually steel lattice, and towers come in a variety of shapes and sizes. Typically, their height is in a range of 15–55 m, with cross arms width reaching several meters. **Distribution poles**, which are shorter, are usually made of wood or concrete.

Power lines carry the electricity to and through the grid over long distances to consumers. Strung on towers, they are made of twisted metal strands, but may incorporate ceramic fibers in a matrix of aluminum for added strength with lighter weight.

Substations vary in size and configuration and may cover several hectares. They include a variety of structures—principally one or more transformers, along with switching, control, and protection equipment; as well as power lines; fencing; and lighting. Substations are cleared of vegetation, typically surfaced with gravel, and reachable via a permanent access road.

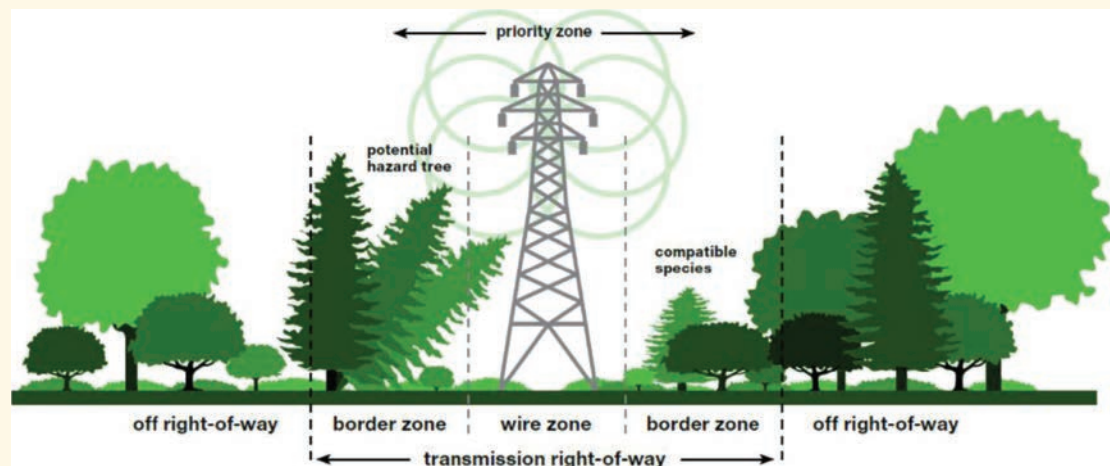
Access routes to transmission line structures for both line construction and maintenance are usually required, and may be paved or gravel. Vegetation clearing and/or re-contouring of land may be required for access road construction. Additional temporary roads may also be needed during the construction and decommissioning phases of a transmission line project.

land clearing and removal of selected vegetation; grading and excavation of soils for the installation of structural foundations, as well as site utilities; and access road construction or upgrade (IFC 2007b).

The network of electric power lines benefits from a right-of-way and should comply with safety regulations. A right-of-way is a non-possessory right to use and/or enter onto the real property of another without possessing it. The permitted types of uses usually include transportation purposes (e.g., a highway, public footpath, or railway), as well as electrical transmission lines and oil and gas pipelines. Right-of-way may also describe the strip of land on which infrastructure is built; in this context, the term refers to the land itself, not the right of passage over it (Figure A.4). A right-of-way is also reserved for the purposes of maintenance, with access roads providing convenient access for repair and inspection vehicles. In the case of the electric power network, it provides a safety margin between the high-voltage lines and the surrounding structures and vegetation. Some vegetation clearing may thus be needed for reasons of safety and/or access.² The width of a right-of-way varies by the voltage rating of the line, ranging from 15 m to approximately 50 m or more for 500 kV lines. In the case of the distribution network, typically stretching into populated areas, poles are spaced no further than 60 m apart and are at least 12 m in height (IFC 2007b). Safety distances are required between the lines and human dwellings.

Transmission and distribution projects are not land intensive and are typically located in conjunction with other rights-of-way. The type and magnitude of the impacts associated with transmission

FIGURE A.4
Transmission Line Right-of-Way



Source | ConEdison 2016.

line construction, operation, and decommissioning vary, depending on the line type and size, length of the transmission line, and a variety of site-specific factors. Land is required for the tower bases, and restricted land use applies to the right-of-way. Transmission lines are not land intensive; about 5 ha per transmission km are needed (Andrews et al. 2011). Electric power transmission and distribution systems are often located in conjunction with other rights-of way (e.g., highways or roads) to minimize both costs and disturbance to ecological, socioeconomic, and cultural resources.

Power transmission and distribution projects may result in negative environmental impacts. The construction and maintenance of transmission line rights-of way, especially those aligned through forested areas or crossing aquatic habitats, may result in alteration and disruption to habitats, including impacts on avian species, watercourses, and wetlands, as well as an increased risk of forest fires if underlying growth is left unchecked.³ Right-of way construction activities may transform habitats, depending on the characteristics of existing vegetation, topographic features, and installed height of the transmission lines. As linear facilities, the impacts of transmission lines occur primarily inside or in the immediate vicinity of the right-of-way (IFC 2007b).

ENDNOTES

¹Fossil fuel-based thermal power plants include gas-, oil-, and coal-fired steam; combined cycles; gas turbine; and diesel.

²For land within the right-of-way that is not required for towers and access routes, vegetation is usually kept at a height under 3 m.

³Regular maintenance of rights-of-way to control vegetation may involve the use of mechanical methods (e.g., mowing or pruning machinery) that may disrupt wildlife and their habitats, in addition to manual hand clearing and herbicide use.

REFERENCES

- Andrews, C. J., L. Dewey-Mattia, J. M. Schechtman, and M. Mayr. 2011. "Alternative Energy Sources and Land Use." In *Climate Change and Land Policies*, edited by Gregory K. Ingram and Yu-Hung Hong. Cambridge, MA: Lincoln Institute of Land Policy.
- CEA (Central Electricity Authority). 2010. *Review of Land Requirement for Thermal Power Stations*. New Delhi: Central Electricity Authority.
- ConEdison (Consolidated Edition). 2016. *Transmission Line Right-of-Way*. Vegetation Management. Public Issues (http://www.coned.com/publicissues/vm_transmission_row.asp).
- Engineering Tutorial. 2016. *Electric Power Distribution*. Electrical Engineering (<http://engineeringtutorial.com/electrical-power-distribution/>).
- ESMAP (Energy Sector Management Assistance Program). 2012. *Geothermal Handbook: Planning and Financing Power Generation*. Technical Report 001/12. Washington, DC: World Bank.
- IEA (International Energy Agency). 2013. *World Energy Outlook 2013*. Paris: Organisation for Economic Cooperation and Development (OECD)/International Energy Agency.
- IEA (International Energy Agency) and World Bank. 2015. *Sustainable Energy for All 2015: Progress Toward Sustainable Energy*. June. Washington, DC: World Bank.
- IFC (International Finance Corporation). 2007a. *Environmental, Health, and Safety Guidelines for Geothermal Power Generation*. April 30. Washington, DC: International Finance Corporation.
- . 2007b. *Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution*. April 30. Washington, DC: International Finance Corporation.
- . 2008. *Environmental, Health, and Safety Guidelines for Thermal Power Plants*. December 19. Washington, DC: International Finance Corporation.
- . 2015. *Environmental, Health, and Safety Guidelines for Wind Energy*. August 7. Washington, DC: International Finance Corporation.
- Ong, S., C. Campbell, P. Denholm, R. Margolis, and G. Heath. 2013. *Land-Use Requirements for Solar Power Plants in the United States*. Technical Report NREL/TP-6A20-56290. June. Washington, DC: National Renewable Energy Laboratory.
- World Bank. 1999. "Energy and Industry." In *Environmental Assessment Sourcebook*, chapter 10. Washington, DC: World Bank.

APPENDIX B | GENDER INEQUALITIES IN ACCESS TO LAND AND NATURAL RESOURCES

Land is a critical asset in most developing countries, especially for the poor. In developing countries, access to land by the rural poor is essential for food security and economic development. Most of the world's undernourished people live in rural areas, and most depend on agriculture, including livestock, for their livelihoods. Secure land rights confer economic benefits as an input for agricultural production, a source of income from rental or sale, and collateral for credit that can be used for either consumption or investment purposes (Scalise 2009). **Gender inequalities in access to and control of land and economic and natural resources persists**, particularly in Asia and Africa, and gender norms and power structures are often detrimental to women.

LAND TENURE, RIGHTS, AND RESTRICTIONS

Land tenure is the relationship of people (individuals or groups) with respect to land. It refers to a complex set of rules defining how property rights to land are allocated within societies; that is, how access is granted for rights to use, control, and transfer land, along with associated responsibilities and restraints. Thus, land tenure determines who can use what resources for how long and under what conditions. While some users may have access to the entire bundle of rights, with full use and transfer rights, others may have limited use of land resources. The level of rights can be altered by a series of factors, including use restrictions, since land use must conform to planning rules, as well as development and construction norms and standards (Durand-Lasserve and Selod 2009). Land tenure may be legally or customarily defined and enforced in a formal court of law or through customary structures. But it can also be poorly defined with ambiguities open to exploitation (FAO 2002).

Land tenure implies intersecting interests, which may be overriding, overlapping, or complementary. Overriding interests refer to a situation where a sovereign power, such as a nation or community, has the right to allocate or reallocate land through expropriation. Overlapping interests emerge when various parties are allocated different rights to the same parcel of land (e.g., one party may have lease rights, while another may have a right-of-way). Finally, complementary interests occur when various parties share the same interest in the same parcel of land (e.g., members of a community share common rights to grazing land) (FAO 2002).

Aside from formal tenure, many rural dwellers in developing countries have only informal or no access to land. Formal tenure is the exception rather than the rule among smallholders in developing countries (Gerstter et al. 2011) (Box B.1). For example, in Africa, it is estimated that formal tenure covers only 2–10 percent of agricultural land (Deininger 2003). Informal land access is sometimes directly illegal, as when groups occupy a private or state-owned property and “squat” on it regardless of an

BOX B.1

Categories of Land Tenure

Formal categories of land tenure include state-owned and communal land and private tenure.

State-owned land is characterized by the assignment of property rights to a public authority, such as a central or decentralized level of government. In some cases, the state holds more land than it can use and therefore leases the land to communities or private entities. In other cases, the state is the official landowner because of property arrangements dating back to colonial times, but it also recognizes the usage rights of the communities that have cultivated the land for several generations. The state extends long-term usage rights to these rural communities, who, in turn, grant long-term use rights to their members (Gerstter et al. 2011).

Communal land is shared within a community, and each member has a right to use the land independently. For example, members of a community may have the right to graze cattle on a common pasture (FAO 2002). The rights to the land that each family enjoys are usually regulated and enforced through community authorities, such as elders or local chiefs. This form of communal land organization is quite common in the developing world, especially in rural Africa and parts of Latin America (Gerstter et al. 2011).

Private tenure refers to the assignment of rights to a private party (an individual, married couple, group of people, corporate body, or nonprofit organization). For example, within a community, individual families may have exclusive rights to residential parcels, agricultural parcels, and certain trees. Other members of the community can be excluded from using these resources without the consent of those who hold the rights (FAO 2002).

eviction notice. However, informal access also includes extra-legal rights based on customary law of practice, meaning that groups are neither in violation of nor officially recognized by the law (e.g., people who cultivate publicly-owned lands without any formal recognition of their usage rights) (Gerstter et al. 2011).

GENDER DISCRIMINATION IN LAND ACCESS

In many parts of the world, women have unequal access to land and property and are often dependent on male relatives. Traditionally, women own less property than men and their property rights are less secure. National legislations give women fewer or less secure rights compared to those provided to men, and discriminatory attitudes and practices undermine women's access rights. Generally, women gain access to land through male relatives (e.g., father, brother or husband) and exercise only subordinate rights, which are vulnerable to breakdowns in relationships, divorce, and the changing priorities of male landowners (UN-Habitat 2008). Thus, many women depend nearly entirely on male relatives for basic economic survival and remain vulnerable to violence, poverty, and food insecurity, particularly if widowed, divorced, single, or in marriages not formally recognized (Open Society Foundations n.d.).

Unequal gender access to land and assets is the result of gender discriminatory inheritance rights and marital property regimes. Inheritance often offers the surest opportunity for both men and women to own land or housing. However, unequal inheritance rights lead to gaps between women's and men's

ownership of assets. For example, in countries where inheritance matters are governed by Islamic law, the share attributed to a female heir is half that of a male heir. The structure of marital property regimes can also cause gender imbalances in access to land and assets.¹ Marital property regimes differ in the consequences of allocating property within households. Joint property regimes,² for example, offer equal access to property (including land) for both spouses during and after marriage. Such regimes are thus beneficial to women as long as the effects of the marital property regimes are not negated by other laws. However, only 79 countries out of 179 have joint-property marital regimes (WBG 2015).

Numerous international human rights standards prescribe equal rights for men and women to access land and property ownership. Numerous international human rights standards and instruments, including the International Covenant on Economic, Social, and Cultural Rights and the International Covenant on Civil and Political Rights, enshrine the equal rights of women to land and property. The United Nations Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), ratified by 189 countries, requires signatories to “take all appropriate measures to eliminate discrimination against women in all matters relating to marriage and family relations and in particular to ensure, on a basis of equality of men and women, the same rights for both spouses in respect of the ownership, acquisition, management, administration, enjoyment, and disposition of property.” In 1998, the United Nations Commission on the Status of Women noted that land rights discrimination against women is a violation of human rights, and urged states to design and revise laws to ensure that women are accorded full and equal rights to own land and other property, including through the right to inheritance (FAO 2002).

Important progress has been made in national legislations promoting equal gender access to land and property ownership. Legal land reforms and titling and registration efforts often disregard the rights of women. Land titles tend to be vested in men on the assumption that women and children would automatically benefit as dependents. Women's low literacy levels further impede their ability to deal with bureaucratic requirements of formal legal ownership (FAO 2002). But increased gender sensitivity has resulted in various countries enacting legislation that provides for women to hold legal rights to land. According to UN Women, at least 115 countries specifically recognize women's property rights on equal terms with men (UN Women and OHCHR 2013). A legal title may be issued in the woman's name, either individually or jointly with her spouse.

Despite adequate legislation, weak implementation and enforcement resulting from sociocultural norms and lack of women's awareness undermine women's access to land and property. In many parts of the world, even where governments have signed and ratified international agreements and passed laws granting equal property rights, property ownership is exclusively under male control and women frequently do not enjoy their rights to access and control productive resources. Implementation is too often hindered by sociocultural norms and women's lack of knowledge of their entitlements (UN Women and OHCHR 2013). Customary law can exist in parallel with formal legal regimes. Where such legal systems exist together, customary law can determine a woman's rights in marriage or to property and inheritance, often granting women rights differing from those they would receive under the statutory legal system (World Bank and IFC 2013). Beyond policy and legislation, promoting gender

equity in land ownership also requires changes in cultural norms and practices and a fundamental shift in existing power structures (FAO 2002).

Providing secure land rights for women makes economic sense and is important for poverty reduction. Women have key roles as food producers in rural and peri-urban areas, and are often responsible for feeding family members and managing the household. Therefore, women's control over land assets enhances household welfare, women's cash incomes, and spending on food and children's health and education. There is a strong positive correlation between women's land rights and poverty reduction. Moreover, female-headed households, who represent a significant share of the poor, can benefit enormously from the security, status, and income-earning opportunities that secure rights to even a small plot of land can provide. Secure land rights for female farmers and businesswomen can improve investment, access to sources of credit, and better land use and productivity, with women frequently regarded as having a lower risk of credit default than men (UN-Habitat 2008). Women's access to and control over land provides income and reinforces their bargaining power and agency. The United Nations CEDAW specifically recognizes that "the right to own, manage, enjoy, and dispose of property is central to a woman's right to enjoy financial independence, and in many countries will be critical to her ability to earn a livelihood and to provide adequate housing and nutrition for herself and for her family."³

ENDNOTES

¹A marital property regime determines the system of property ownership and management between spouses during the course of a marriage and at its dissolution through death or divorce (World Bank and IFC 2014).

²Including full and partial default community/joint property regimes.

³United Nations CEDAW General Recommendation 21, Equality in Marriage and Family Relations (Thirteenth Session, 1992), U.N. Doc. A/49/38 at 1, 1994, para. 26.

REFERENCES

- Deininger, K. 2003. *Land Policies for Growth and Poverty Reduction*. Washington, DC: World Bank.
- Durand-Lasserve, A., and H. Selod. 2009. "The Formalization of Urban Land Tenure in Developing Countries." In *Urban Land Markets: Improving Land Management for Successful Urbanization*, edited by S.V. Lall, M. Freire, B. Yuen, R. Rajack, and J. Helluin, chapter 5. Dordrecht, The Netherlands: Springer.
- FAO (Food and Agriculture Organization of the United Nations). 2002. *Land Tenure and Rural Development*. Land Tenure Studies. Rome: Food and Agriculture Organization of the United Nations.
- Gerstter, C., T. Kaphengst, D. Knoblauch, and K. Timeus. 2011. "An Assessment of the Effects of Land Ownership and Land Grab on Development, with a Particular Focus on Small Holdings and Rural Areas." Ad-hoc briefing. Directorate-General for External Policies of the Union, Policy Department, European Parliament.
- Open Society Foundations. n.d. *Securing Women's Land and Property Rights. A Critical Step to Address HIV, Violence, and Food Security*. New York: Open Society Foundations.
- Scalise, E. 2009. *Women's Inheritance Rights to Land and Property in South Asia: A Study of Afghanistan, Bangladesh, India, Nepal, Pakistan, and Sri Lanka*. A report of the Rural Development Institute (RDI) for the World Justice Project. December. Seattle: Landesa Rural Development Institute.

- UN-Habitat (United Nations Human Settlements Programme). 2008. *Secure Land Rights for All*. Global Land Tool Network. Nairobi: United Nations Human Settlements Programme (<https://unhabitat.org/books/secure-land-rights-for-all/>).
- UN Women and OHCHR (United Nations Entity for Gender Equality and the Empowerment of Women and Office of the United Nations High Commissioner for Human Rights). 2013. *Realizing Women's Rights to Land and Other Productive Resources*. New York and Geneva: United Nations.
- WBG (World Bank Group). 2015. *Business, Women and the Law 2016: Getting to Equal*. Washington, DC: World Bank.
- World Bank and IFC (International Finance Corporation). 2013. *Business, Women and the Law 2014: Removing Restrictions to Enhance Gender Equality*. Washington, DC: World Bank.

APPENDIX C | WORLD BANK PORTFOLIO REVIEW: SELECTED PROJECTS

As part of the due diligence for this research, an in-depth review of the World Bank Group's energy lending portfolio was conducted. Operations documents were reviewed for 327 approved projects during FY2000–14 and consultations were held with World Bank energy and gender specialists. The findings showed that gender was not being addressed systematically overall, although much improvement had been made since FY2012 to acknowledge potential gender impacts. Eventually, 21 projects were selected as having above-average gender considerations (table C.1).

TABLE C.1
Selected Projects for the World Bank Portfolio Review

PROJECT NAME	COUNTRY	PROJECT TYPE	COMMENTS
3A-Nile Equatorial Lakes Subsidiary Action Program (NELSAP), Rusumo Falls Hydroelectricity and Multipurpose SIL	Africa Regional (Burundi, Rwanda, and Tanzania)	Hydropower dam	Gender-specific engagement/capacity building in resettlement action plan (RAP).
Rampur Hydropower Project	India	Hydropower	Prominent benefit-sharing component (annual cash income and free electricity for project-affected families) and vocational training for women (but gender not specifically targeted).
Upper Cisokan Pumped Storage Hydro-Electrical Power Project (1,040 MW)	Indonesia	Hydropower	Gender considered in land acquisition and resettlement action plan (LARAP) and integrated into Integrated Catchment Management (ICM) program (to be examined in further depth); gender reviewed in RAP.
NamTheun (NT) 2 Hydro-electric Project: Social and Environment Project	LAO PDR	Hydropower	Frequently referenced.
Dasu Hydropower Stage I Project	Pakistan	Hydropower dam	Fairly comprehensive gender action plan (GAP), but challenging to implement.
Trung Son Hydropower Project	Vietnam	Hydropower	Women-focused, capacity-building component in environmental and social impact assessment (ESIA); gender included in resettlement review.

(continued)

TABLE C.1 continued**Selected Projects for the World Bank Portfolio Review**

PROJECT NAME	COUNTRY	PROJECT TYPE	COMMENTS
PNG Energy Sector Development Project	Papua New Guinea	Hydropower development	Strong consultation with women for preliminary social assessment; East Asia and Pacific (EAP) gender facility helped write terms of reference (TOR) for gender specialist to conduct assessment.
Energy Sector Development Project ^a	Tuvalu		Technical assistance focused on household energy; has GAP.
Geothermal Sector Development Project	Ethiopia	Geothermal generation	Added to diversity of project types. Outlined community development plan; follow-up on gender considerations on hold.
Geothermal Power Generation Project	Djibouti	Geothermal generation	Revolving fund for priority action plan (PAP); no gender targeting.
Philippines Renewable Energy Development Project	Philippines	Renewable energy	Support via gender facility; TOR recently completed for gender expert to complete assessment.
System Efficiency Improvement, Equitization, and Renewables Project ^a	Vietnam	Power and energy conversion	No gender impact assessment, but various capacity-building initiatives for women.
Electricity Supply Reliability Project ^a	Armenia	Transmission	Zero tolerance for sexual harassment. Cash compensation and legal support for women; grievance redress mechanism (GRM) team included gender specialist.
Powergrid System Development Project	India	Transmission	Women's groups: welfare camp, vocational training, and minimizing forest damage.
Electricity Expansion Project ^a	Kenya	Transmission	Gender-disaggregated monitoring and evaluation (M&E) indicators under RAP.
Electricity Distribution and Transmission Improvement Project	Pakistan	Transmission and distribution	Gender considered during construction phase.
Rural Electrification and Renewable Energy Development Project	Bangladesh	Access	Well-documented; related mainly to solar energy.
Access and Renewable Energy Project ^a	Bolivia	Access	Outline of intended comprehensive gender/energy study included in project appraisal document (PAD).
Rural Electrification Phase I Project	LAO PDR	Access	Gender considered little in program document (PD) review.
Household Energy and Universal Access Project	Mali	Access	Microfinancing to support equipment start-up costs.
Rural Electrification Project	Peru	Access	Benefits of technical assistance: active involvement of women entrepreneurs in productive uses of electricity.

^aUnable to reach task team leaders.

APPENDIX D | INDIA'S POWERGRID SYSTEM DEVELOPMENT PROJECT: ANALYSIS OF GENDER-DIFFERENTIATED LABOR OUTCOMES

The Power System Development Project (PSDP) III is the third phase in a series of World Bank-supported projects designed to strengthen India's transmission system in order to increase reliable power exchange between Indian regions and states. A US\$400 million World Bank loan was provided to the state-owned electric utility, Power Grid Corporation of India Limited (POWERGRID), to strengthen and expand the physical infrastructure of the transmission system and build the institution's technical and financial capacity. Facilitating the timely transfer of power from surplus to deficit regions has enhanced the national grid by optimizing energy resource utilization. Although the utility network does not link directly to end-use customers, they benefit from greater availability and access to reliable electricity. PSDP III became effective in December 2006 and was closed in July 2011.

TRANSMISSION INFRASTRUCTURE WORKS

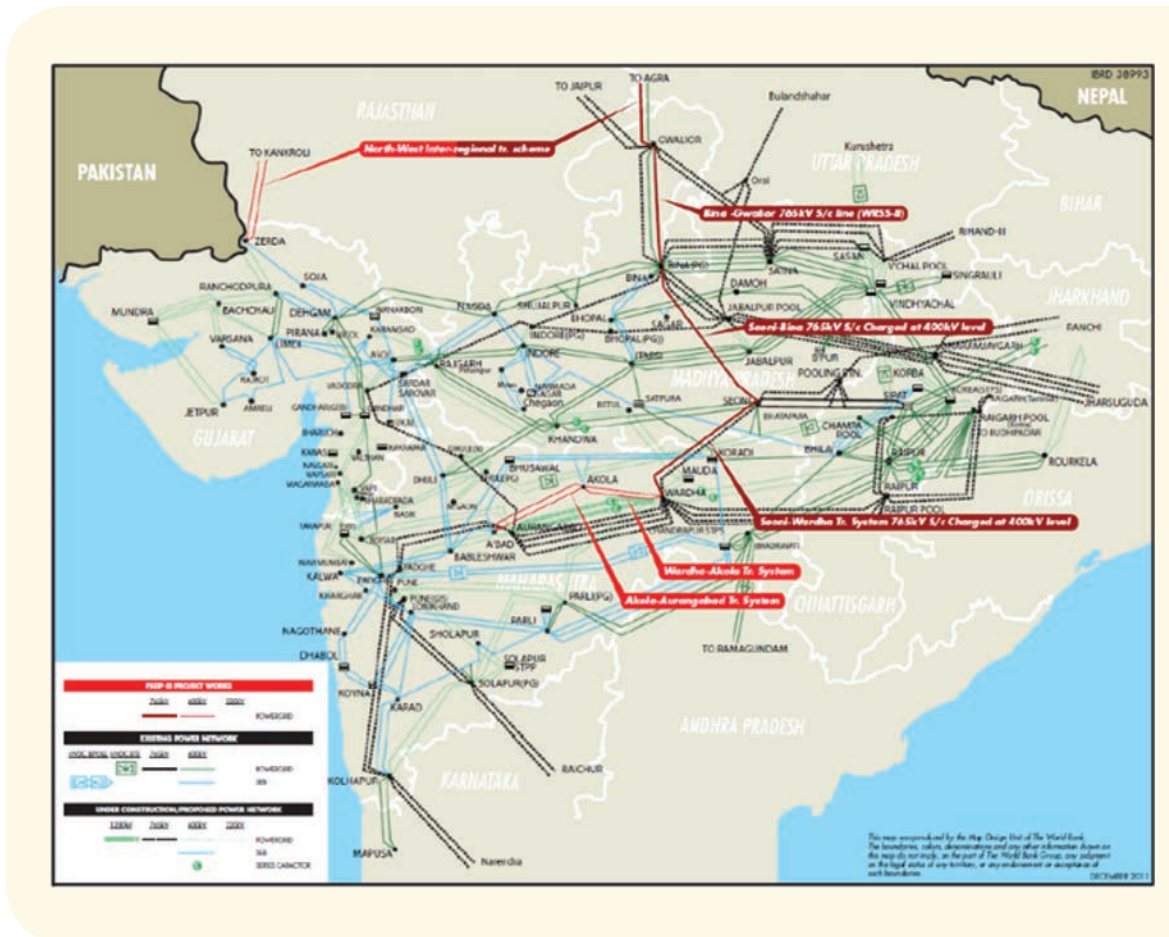
Strengthening of the national grid's transmission infrastructure under the PSDP III, which covered both interregional and intraregional capacity building, focused on five components: (i) the Seoni-Wardha-Akola-Aurangabad system, including construction of a substation in Wardha; (ii) a ± 500 kV, 2,500 MW high-voltage, direct current (HVDC) system between Ballia and Bhiwadi; (iii) a 765 kV, single-circuit link between Seoni and Bina; (iv) the North-West Transmission Corridor Strengthening Scheme, including a 765 kV second-circuit line between Agra and Gwalior and a 400 kV double-circuit line between Kankroli and Zerda; and (v) the Western Region System Strengthening Scheme-II, including the second 765 kV single-circuit line between Bina and Gwalior (Figure D.1).

Our study focused on analyzing the land-use and labor-related impacts on project-affected communities for four of these five areas (i, iii-v) in two states: Madhya Pradesh and Maharashtra (Box D.1). Both states have suffered from severe power shortages. The decision to invest in their transmission systems was based on POWERGRID's long-term plans to upgrade and expand the power network and redistribute power from surplus to deficit regions. The World Bank chose to invest in the project based on its principles and timeline, as well as its overall partnership goals with the Indian government.

The Seoni-Bina scheme, located in Madhya Pradesh, will export surplus power from India's eastern region to its western and northern regions and strengthen the transmission system within its western region to achieve secure and reliable power supply. With adequate transmission arrangements, Maharashtra will be able to reliably draw power from the central part of the western region, where power imported from the eastern region and other sources will be pooled.

FIGURE D.1

Map of Infrastructure Works Areas Funded under PSDP III



The Wardha substation, located in Maharashtra, will pool power from upcoming generation projects in eastern and western regions of the country for further dispersal to beneficiaries in the west. Unlike extension of existing substations under other project components, development of the Wardha substation required resettlement and rehabilitation plans.

SAFEGUARDS ISSUES

Transmission system investments under PSDP III are justified when they satisfy least-cost, as well as optimal technical and economic criteria, and include guidelines for ensuring adequate social and environmental safeguards.¹ POWERGRID's route selection aims to minimize adverse social impacts by avoiding human displacement and ensuring that routes neither threaten community survival (with particular reference to tribal groups) nor adversely affect public utility services.

BOX D.1

Madhya Pradesh and Maharashtra at a Glance

Madhya Pradesh, India's second largest and sixth most populous state, has 72.5 million people (2011 figure), with an average population density of 236 persons per km². For all districts, populations grew at least 12 percent between 2001 and 2011. Urbanization has increased steadily with growth of industrial clusters (e.g., Indore, Bhopal, and Gwalior), while 70 percent of people continue to live in rural areas. The state's literacy rate is 70.6 percent, with male and female rates averaging 80.5 percent and 60 percent, respectively. The poverty headcount is about 45 percent. Between 2004/05 and 2009/10, the state GDP grew 12.7 percent per year. A poor infrastructure base was identified as a major drag on development.

Maharashtra is India's richest state, contributing more than any other to the country's gross domestic product (GDP). Nearly half (45.2 percent) of its 112 million people live in urban areas. Mumbai, the state's capital city, is also the country's financial center. Maharashtra's average population density of 365 persons per km² (close to the national average of 382 persons per km²) is far lower than the average for Mumbai districts (20,038 persons per km²). The state's poverty headcount is 33.9 percent. Its overall literacy rate, at 82.9 percent, is about 9 percentage points above the national average of 74 percent. Sex-wise literacy rates are 89.8 percent for males and 75.5 percent for females.

In accordance with the social assessment and rehabilitation action plan, the Wardha substation was constructed on government-owned land in Deoli village; thus, no new land acquisitions were required. According to the plan, no adverse impacts on the 21 project-affected families were observed. The families received rehabilitation assistance in the form of either vocational training offered by the Mahatma Gandhi Institute for Rural Industrialization or cash.²

POWERGRID's projects typically have few job opportunities available for local residents; however, they are entitled to preference if they meet job specifications. According to project documents and interviews with task team leaders, contracts may be given to people living in the project-affected areas (e.g., unskilled labor for initial construction work on POWERGRID premises). POWERGRID usually contracts out such work to other companies, which are responsible for hiring. The contractors engaged by POWERGRID are bound by the general terms of the contract, which stipulate that local laborers must be given hiring preference for unskilled and semi-skilled jobs. Also, work in the informal sector (e.g., horticulture or maintenance) is allotted to project-affected families on a preferential basis (Box D.2).

STUDY METHOD AND DATA COLLECTION

This study analyzed the potential impacts of constructing the PSDP III transmission lines and Wardha substation on labor outcomes for women and men in the affected communities. The analysis drew on nationally representative data from the India National Sample Survey (NSS), using a large sample size covering some 400,000–600,000 individuals. Two survey rounds were used: The 2004/05 survey was taken as the

BOX D.2

Growth-Oriented Impacts of PSDP III's Infrastructure Investments

The PSDP III's Social Assessment and Rehabilitation Action Plan summarizes the growth-oriented impacts of the transmission infrastructure investments, as follows:

- Increase in secondary infrastructure investments;
- Further investments in the vicinity of the infrastructure facilities, boosting demand for locally available resources;
- Creation of secondary employment in the services sector;
- Spillover effects from the induced growth;
- Growth in demand for services in the informal sector (e.g., cleaning, fetching water, washing clothes, vending of vegetables, and cooking);
- Induced in-migration into the local economy, providing impetus to employment-oriented growth; and
- Economic transformation with sectoral shifts, lessening dependence on agriculture.

baseline, while 2009/10 survey data was used to analyze post-project labor impacts. Since the project's transmission infrastructure was built mainly in Madhya Pradesh and Maharashtra, the analysis was limited to those two states for purposes of comparability. The two datasets were pooled, and the sample was truncated at the lower end (below age 15) and higher end (above age 59), given that most labor-force analyses in India rely on estimates in the 15–59 age group. This resulted in 84,805 observations (19,966 affected individuals and 64,839 non-affected individuals). The project-affect districts (totaling 22) were compared with non-affected ones (totaling 57).³

The labor outcomes of interest were (i) labor force participation rate (LFPR); (ii) employment in regular salaried jobs; (iii) casual labor employment; (iv) construction industry employment; and (v) employment in primary, secondary, or tertiary sectors. Individual-level information over district averages was used to capture heterogeneity across individuals. Based on the literature review and analytical framework, several hypotheses were put forward about the potential effects of the project on the LFPR of women and men (Box D.3).

Empirical Strategy

A difference-in-differences (DD) framework was used to obtain the project's effects on the affected population. The key assumption was that the time trend, in the absence of construction, would have been the same for both district groups.

The model used to identify the project's impact is expressed as follows:

$$Y_{idt} = \beta_0 + \beta_1 SY_t + \beta_2 PRYEAR_{idt} + \beta_3 X_{idt} + \mu_d + \epsilon_{idt}$$

BOX D.3

Hypotheses on Impacts of Project Investment on Labor Force Participation

Hypothesis 1. *New jobs brought in by energy infrastructure investment in the area can offer market wages that are higher than women's reservation wage; therefore female labor force participation will increase, other things being equal.*

According to neoclassical labor-supply theory, a reservation wage makes a woman indifferent to working or not working (Ashenfelter and Card 2010). The reservation wage depends on the individual's preferences or values attached to non-labor activities and responsibilities assumed in the household. Women compare their reservation wage with that of the market. For example, married women with young children usually have high reservation wages because they assume greater responsibilities within the home (Jarvis and Vera-Toscano 2004). A woman will enter the labor market only if the market wage exceeds the reservation wage, all other things being equal. Over the 1995–2000 period, the labor force participation of young women in the 20–24 year age group increased nearly two-and-a-half times, owing to growth in the garment industry, health services, and social work (World Bank 2011).

Hypothesis 2. *Women's LFPR will remain constant if the new infrastructure investment does not generate new employment opportunities for women, other things being equal.*

The new infrastructure investment would be more likely to increase men's labor force participation, owing to jobs created in traditionally male-dominated sectors (e.g., construction) and occupations (World Bank 2011). When industrialization replaces agriculture-based production in low-income emerging economies, newly created jobs with higher remuneration will often go to men first, without significant changes in female labor force participation (Boserup 1970; Oppenheimer 1970). Women's LFPR is also determined by secular trends in fertility, family size, patriarchal family structure, and household division of labor (Pampel and Tanaka 1986).

Hypothesis 3. *Women's labor force participation will decrease if male wages and labor force participation increase, thereby increasing household income, all other things being equal.*

Here, the change in women's LFPR is associated with income effects. A married woman's reservation wage tends to be positively related to her husband's (or family) income, household assets, her education level, and number of children, while negatively related to the ages of her children (Shapiro and Shaw 1983). Both household income and women's wages determine a woman's decision to work outside the home. Thus, in low-income rural settings, higher family income or husband's wages could lead to a higher reservation wage for women, resulting in their withdrawal from the labor market (Rangarajan, Kaul, and Seema 2011).^a Furthermore, women's time-allocation decisions often depend on the impact of their work on the social status of their family. The social stigma against wives working outside the home as paid labor is often strong, whether in male-intensive (e.g., mining and construction), female-intensive (e.g., clothing and textiles), or mixed-gender (e.g., food processing) industries (Goldin 1995). Studies on women's labor force participation in India have found that a family's improved social status is associated with women's withdrawal from the labor force (Das and Desai 2003; Das 2006). Educated women in India within the higher socioeconomic strata are likely to opt out of the labor force rather than accept low-status jobs (Das 2006).

^aWhen low-income countries grow richer and household incomes rise, women's participation in the labor force tends to decline. Over time, however, if women's education levels increase and they can thus access higher-wage jobs, they may return to the labor force, having achieved a new relationship between expected market wages and their reservation wage. Data from 130 countries at various income levels in 1980 and 2008 both show a clear U-shaped relationship between economic development and female labor force participation (World Bank 2011).

Y_{idt} is the dependent variable, representing the outcome of interest for individual i in district d at time t ($t = 2004/05, 2009/10$). $PRYEAR_{idt}$ is an interaction between affected and non-affected districts (having a value of 1 when district d is affected by the project and zero otherwise) with year having a value of 1 when the project ended and zero otherwise. β_2 is a parameter of interest that identifies DD estimates for the project's effects on the outcomes of interest. SY_t is an interaction between state and year (capturing state- and year-specific effects). X_{idt} is a matrix of individual-level characteristics (e.g., age, square of age, social group, education-level dummies, and gender), μ_d represents unique district effects, and ε_{idt} is an error term capturing all other unobserved variables across individuals and districts and over time. Ordinary least squares (OLS) are used to derive the DD estimates.

Descriptive Statistics

The number of project-affected districts totaled 22 (15 in Madhya Pradesh and 7 in Maharashtra), while the non-affected districts totaled 57 (30 in Madhya Pradesh and 27 in Maharashtra), affecting one-third and one-fifth of the respective territories of Madhya Pradesh and Maharashtra. Excluding Mumbai, the population density was about the same for both affected and not-affected districts before and after the project. The within-state difference in population density was not significantly large. In fact, in Madhya Pradesh, the average population density in affected districts was higher both before and after the project. In Maharashtra (with or without Mumbai), non-affected districts had a larger population density and saw a slight increase between 2001 and 2011 (Table D.1).

TABLE D.1
Population Density in Project-Affected and Non-Affected Districts, by State

DISTRICT TYPE	MADHYA PRADESH (PERSONS/KM ²)	MAHARASHTRA (PERSONS/KM ²)	MAHARASHTRA (EXCLUDING MUMBAI) (PERSONS/KM ²)
2001			
Project non-affected	209.73	983.03	275.72
Project affected	227.13	262.01	262.01
Total	215.53	834.59	272.81
2011			
Project non-affected	253.53	1,086.04	323.00
Project affected	276.07	303.00	303.00
Total	261.04	924.82	318.76

Source | Census of India, 2011.

The descriptive statistics calculated from the NSS were examined to determine how large the differences in demographic and socioeconomic characteristics were between the project-affected and non-affected districts and how they changed over the project period analyzed (2004–09). The statistics included the LFPR, employment status, employment shares by sector, and employment in construction. Figure D.2 shows that the affected districts are less urbanized, have younger populations, and have higher populations of historically disadvantaged groups. Also, the average household size and number of children under 5 years old are higher in project-affected districts.

Men's LFPR was only marginally lower in the project-affected districts, and the decline over the project period examined was quite similar for both district types. Women's LFPR in 2004 was 6.8 percentage points lower in the project-affected districts. Over the project period, it declined for both district types. Yet, the decline was much smaller in the project-affected districts (8.6 percentage points), compared to non-affected ones (13.2 percentage points) (Figure D.3). Women's LFPR in India has been on the decline for more than two decades, especially in rural areas (except for 2004, when it spiked temporarily); thus, the decline observed in this analysis was not unexpected.

Both states were analyzed separately to see whether the results were driven by state-specific events or cultural factors. The pattern seen in the aggregate districts' groups is corroborated by the fact that the female LFPR declined systematically in both states, yet by a much lower percentage in the affected districts.⁴ The decline observed in the male LFPR over the project period was higher for project-affected versus non-affected districts in Madhya Pradesh but lower for those in Maharashtra (Figure D.4).

The initial employment-status composition between project-affected and non-affected districts was quite similar. In 2004, the affected districts had higher shares of men in casual and farm self-employment,

FIGURE D.2

Comparison of Demographic Characteristics in Project-Affected and Non-Affected Districts, 2004

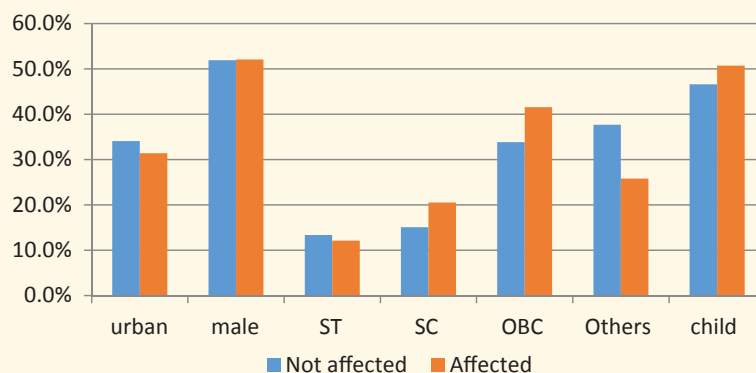
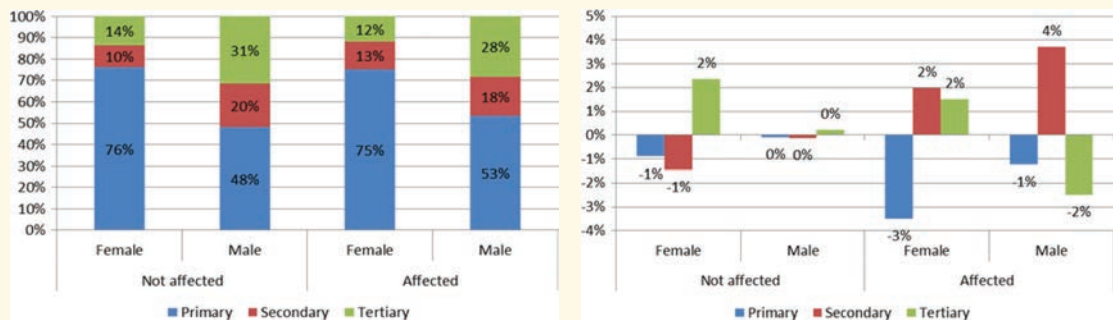


FIGURE D.3

Shift in Sectoral Distribution in Project- and Nonproject-Affected Districts



Source | Authors estimates, based on NSS data.

while non-affected districts had higher shares of men in regular and non-farm self-employment. The share of women in regular, casual, and non-farm self-employment was similar for both district types; however, non-affected districts had more women that worked as self-employed farmers. Figure D.5 shows changes in the employment composition during the period analyzed. For men, only marginal changes in employment status occurred, except for the share of men in casual employment, which increased by 4 percentage points in project-affected districts and 1 percentage point in non-affected districts. For both district types, women's share in farm and non-farm self-employment fell; however, in

FIGURE D.4

Women's and Men's LFPR in Project-Affected and Non-Affected Districts

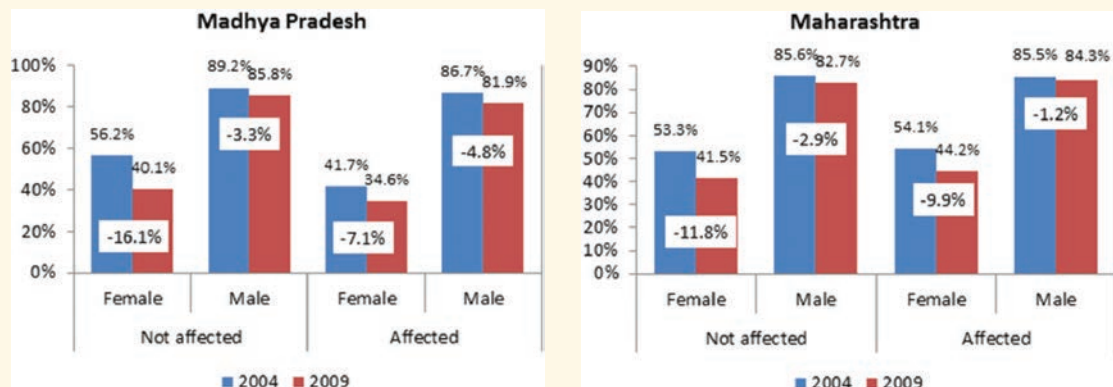
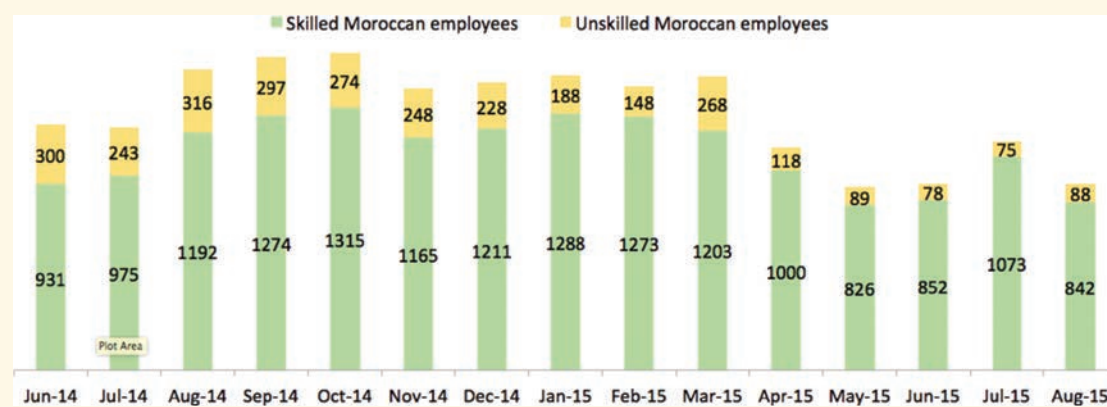


FIGURE D.5

Proportion of Skilled and Unskilled Moroccan Employees, Noor 1 CSP Project



Source | MASEN 2015a.

the project-affected districts, women's non-farm self-employment increased by 1 percentage point. For women in both district types, casual and regular employment declined.

For the project-affected districts, men's increase in casual labor was much higher in Madhya Pradesh, at 6 percentage points, compared to Maharashtra, at just 2 percentage points. In the project-affected districts of Madhya Pradesh, women engaged in non-farm self-employment saw a 3 percent increase; however, the state's non-affected districts, as well as both affected and non-affected districts in Maharashtra, saw a withdrawal of women from the labor force and increased unemployment.

In 2005, the Indian government launched the National Rural Employment Guarantee Act (NREGA), which entitles every rural household to a minimum of 100 days of paid work each year. The program's primary objective is to augment wage employment; thus, some of this study's observed employment for unskilled labor might have been generated through this scheme since people hired through NREGA usually work for small infrastructure projects related to and counted as construction. The NREGA also mandates that one-third of workers must be women and ensures equal wages for men and women with gender-specific productivity norms in the rates schedule. According to estimates by Dutta et al. (2014), the share of rural households participating in NREGA was significantly higher in Madhya Pradesh than Maharashtra, at 40.6 percent versus 4.4 percent. These figures are correlated with the demand rate; that is, 64.6 percent of households in Madhya Pradesh wanted to participate in NREGA, versus just 27.7 percent in Maharashtra.⁵ Women's share of employment (percentage of total person days) through NREGA was also higher in Madhya Pradesh than Maharashtra, at 44.3 percent versus 39.8 percent.

Sectoral distribution between project-affected and non-affected districts is also quite similar. About half of working-age men work in agriculture, while one-fifth work in the secondary sector and one-third in the

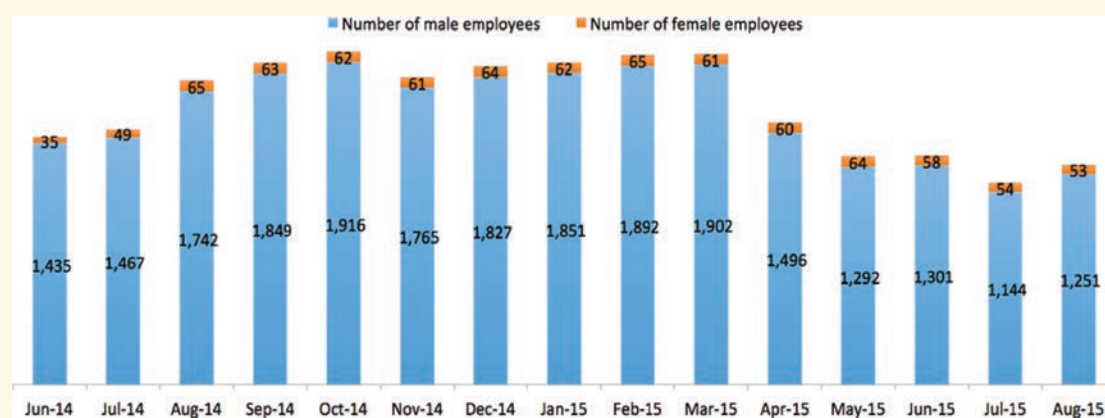
tertiary sector (Figure D.6). Women's share in agricultural work is comparatively much higher, at about 75 percent. In project-affected districts, more women work in the secondary sector; in non-affected districts, more women work in the tertiary sector.

Over the project period, the affected districts saw a 4 percentage point shift of men away from tertiary and primary sectors to the secondary sector, including construction; by contrast, the non-affected districts saw no changes in sectoral distribution. Women in the project-affected districts moved from the primary sector to the secondary and tertiary sectors; in non-affected districts, women's share increased only in the tertiary sector.

Interestingly, the increase of men in the secondary sector is entirely accounted for by such increase in Madhya Pradesh. For males in Maharashtra, there was only a shift from agriculture to the tertiary sector and no change in the secondary sector for both project-affected and non-affected districts. A greater share of women in the project-affected districts of Madhya Pradesh also moved to the secondary sector (and marginally to the tertiary sector), while no such change was observed for non-affected districts (Figure D.7).

In terms of construction industry employment, males have a 2.7 percentage point increase in this sector in the project-affected districts, compared to a 1.4 percentage point increase in the non-affected districts. Women's share in this sector also increased, but by less than 1 percentage point for both district types. The rise in construction industry employment is attributed mainly to Madhya Pradesh, where the increase for men was 5.2 percentage points in the project-affected districts and 2.4 percentage points in non-affected districts. Women's share of employment in the construction industry also rose in that

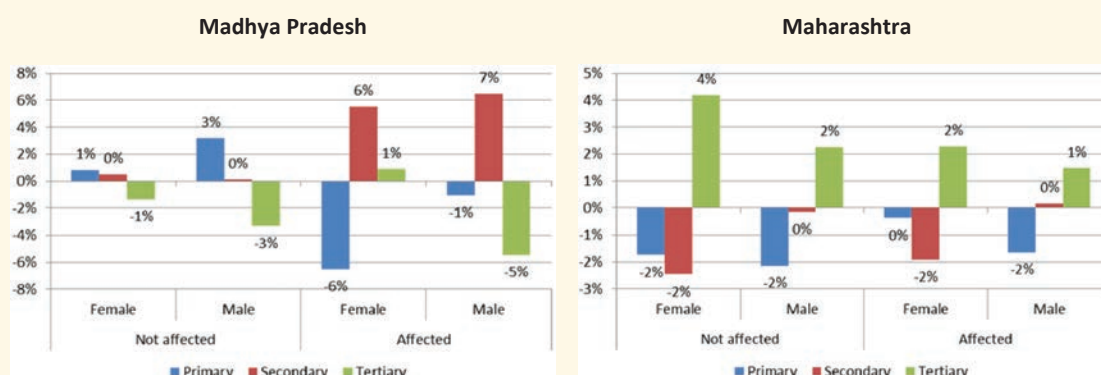
FIGURE D.6
Noor 1 CSP Project Employees, by Gender



Source | MASEN 2015a.

FIGURE D.7

Change in Sectoral Distribution for the Two States, 2004–09



state (by 3.3 percentage points in non-affected districts versus 2.5 percentage points in project-affected districts). By contrast, Maharashtra saw a slight decline (less than 1 percentage point) in construction industry employment for both males and females, with the exception of males in non-affected districts, who saw a 0.8 percentage point increase (Figure D.8).

During 2004–09, employment in the construction sector grew from 4.8 percent to 8.1 percent in Madhya Pradesh; however, Maharashtra saw less than a 0.5 percentage point increase over the same period. By disaggregating employment into 3-digit level sectors of NIC-98 and NIC-04, one sees that the largest employment increases in Madhya Pradesh over the period were in construction and maintenance of roads, rail-beds, bridges, tunnels, pipelines, ports, harbors, and runways (National Industrial Classification [NIC] code 45203). This increase was especially significant for women's share of employment: In 2004, only 5.6 percent of women were employed in this sector, compared to 34.3 percent in 2009. However, this increase represented a redeployment of women away from constructing residential and non-residential buildings, where their share of employment declined equivalently. The same trend applied to men's employment, but on a smaller scale.

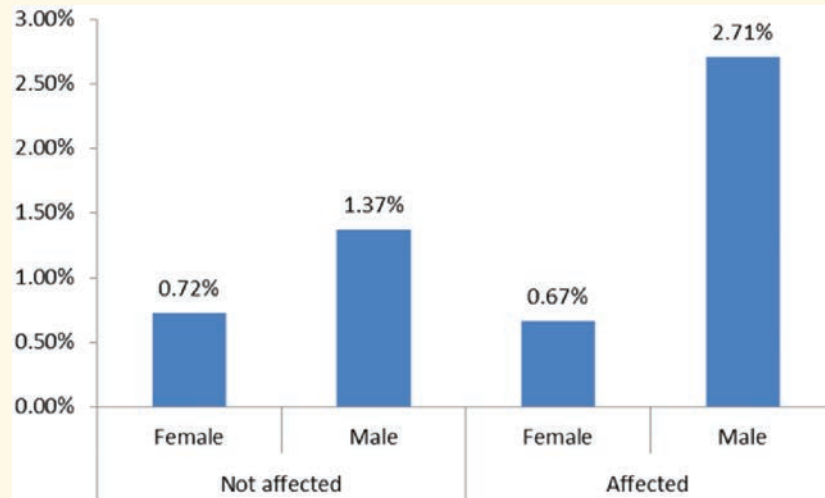
Econometric Results

The DD estimates of OLS weighted regressions for women and men between 15 and 59 years old did not show an effect of project-related construction on labor force participation for men or women, and the variable of interest (project year) was not statistically significant (Table D.2).

Unfortunately, we did not have a good indicator variable to capture effects directly related to the project. We do not know whether or how many people were employed in jobs directly related to the project. In

FIGURE D.8

Change in Construction Industry Employment, 2004–09



addition, the project was implemented sequentially, meaning that the same construction workers may have been moving from one area to another to build the transmission lines instead of new workers being hired. Furthermore, since project areas are less likely to be densely populated, spillover effects for labor were minimal, nonexistent, or simply hard to capture using NSS data.

The results also show that being a married Muslim woman living in an urban area decreases the chances of labor force participation. Education also has a negative effect on employment. However, such characteristics as poverty, belonging to historically disadvantaged groups, and residing in a rural area increase the chances of women's labor force participation, mainly because women are driven to work for reasons of survival. By contrast, women with some level of education and higher household incomes are more likely to stay at home. Results for men were not surprising since there was little variability in their LFPR in the descriptive statistics.⁶

CONCLUDING REMARKS

During the 2004–09 period, the project-affected districts in both Madhya Pradesh and Maharashtra witnessed better outcomes for female labor force participation, meaning they had a smaller decline in the female LFPR, compared to the states' non-affected districts. In the project-affected districts, men's casual labor increased 4 percent in Madhya Pradesh and 1 percent in Maharashtra. Women's share in non-farm self-employment increased in the project-affected districts of Madhya Pradesh, while all other

TABLE D.2

Project Effects on Labor Force Participation

EXPLANATORY VARIABLE	FEMALES		MALES	
	COEFFICIENT	STANDARD ERROR	COEFFICIENT	STANDARD ERROR
State year	0.003***	0.001	0.001	0.000
Project year	0.037	0.033	0.005	0.016
Lfp dist.	0.793***	0.198	0.146**	0.068
Urban	−0.260***	0.015	−0.034***	0.007
Scheduled tribe	0.125***	0.024	0.029***	0.010
Scheduled caste	0.051**	0.021	0.008	0.009
Other backward caste	0.039***	0.015	0.009	0.006
Muslim	−0.132***	0.023	0.017	0.012
Other religion	−0.021	0.017	−0.014	0.010
Age	0.048***	0.004	0.078***	0.004
Age_sq	−0.001***	0.000	−0.001***	0.000
Married	−0.019	0.028	0.071***	0.017
Household size	−0.009***	0.003	−0.008***	0.001
1, if at least one child under 5 years of age	−0.010	0.010	0.061***	0.005
Household head	0.168***	0.028	−0.052***	0.010
Spouse	−0.021	0.017	−0.333***	0.105
B primary education	−0.059***	0.019	0.035***	0.008
Primary_education	−0.100***	0.015	0.044***	0.008
Secondary_education	−0.196***	0.015	−0.026***	0.009
P secondary_education	−0.141***	0.026	−0.076***	0.010
Poor	0.091***	0.013	0.016***	0.006
1, if not landless	0.009	0.017	0.007	0.012
Sex ratio	0.001	0.001	0.000	0.000
Density	−0.000	0.000	0.000	0.000
_Cons	−152.94***	47.811	−26.922	16.56
No. of observations	38,564	41,434		
R ²	0.287	0.384		

Significance level: * = 10 percent, ** = 5 percent, *** = 1 percent.

districts in both states witnessed a withdrawal of women from the labor force and a decline in women's share in other types of employment.

Broadly speaking, the project-affected districts saw men's employment shift away from the primary and tertiary sectors to the secondary sector, including construction. Men's secondary-sector employment increased by 4 percent in project-affected districts, but remained unchanged in non-affected districts. At the same time, the project-affected districts of Madhya Pradesh accounted for the entire increase in the share of men and women in the secondary sector.

Employment in the construction industry increased markedly for men and women in both the project-affected and non-affected districts. Also, the share of men employed in the construction industry jumped more in the project-affected districts. However, we cannot attribute this increase to the project's effects since we could not control for such unobserved factors as construction activities for other projects or other economic activities and programs that increase employment in this sector in the two states.

Despite observations from the descriptive statistics, the econometric results show that the project effects on women's and men's labor force participation were not statistically significant. Project-related construction was likely implemented on relatively small land plots required by transmission line construction in more sparsely-populated rural areas in compliance with social and environmental safeguards. These factors suggest a minimal spillover effect on job creation. Finally, since the NSS data was not collected for the purpose of evaluating project impacts, we did not have variables that could have directly captured project effects. Although we were able to disaggregate employment industry by a detailed sector (3-digit level), the sample size was not large enough to estimate and compare gender differences in labor outcomes before and after the project.

ENDNOTES

¹PSDP III was rated "Category A" in terms of environmental safeguards management.

²The project-affected families each received INR 3.62 lakh.

³During the period between the 2004/05 and 2009/10 surveys, some districts were split; thus, the study merged them in order to have a more balanced panel of districts for both survey years.

⁴Regardless of the LFPR measure used, the results show a smaller decline in the project-affected districts compared to non-affected districts for both states.

⁵The figures are also correlated with the poverty headcount for the two states (45.9 percent in Madhya Pradesh versus 33.9 percent in Maharashtra).

⁶Estimates replicated for other dependent variables (e.g., employment as regular and casual labor, working in the secondary sector and construction industry) found that the coefficient of interest was not statistically significant in all cases.

REFERENCES

Ashenfelter, O. and D. Card, eds. 2010. *Handbook of Labor Economics*, Vol. 4A (<https://www.elsevier.com/books/handbook-of-labor-economics/ashenfelter/978-0-444-53450-7>).

- Boserup, E. 1970. *Women's Role in Economic Development*. London: Allen & Unwin.
- Das, M. B. 2006. "Do Traditional Axes of Exclusion Affect Labor Market Outcomes in India?" *South Asia Series*, Paper No. 97. Washington, DC: World Bank.
- Das, M. B., and S. Desai. 2003. "Are Educated Women Less Likely to Be Employed in India?" *Social Protection Discussion Paper Series*, No. 313. Washington, DC: World Bank.
- Dutta, P., R. Murgai, M. Ravallion, and D. van de Walle. 2014. *Right to Work? Assessing India's Employment Guarantee Scheme in Bihar*. Equity and Development Series. Washington, DC: World Bank (<https://openknowledge.worldbank.org/handle/10986/17195>).
- Goldin, C. 1995. "The U-Shaped Female Labor Force Function in Economic Development and Economic History." In *Investment in Women's Human Capital*, edited by T. Paul Schultz, chapter 3. Chicago: University of Chicago Press.
- Jarvis, L. and E. Vera-Toscano. 2004. "Seasonal Adjustment in a Market for Female Agricultural Workers." *American Journal of Agricultural Economics* 86 (1): 254–66.
- Oppenheimer, V. K. 1970. *The Female Labor Force in the United States*. Berkeley, CA: Institute for International Studies, University of California.
- Pampel, F. C., and K. Tanaka. 1986. "Economic Development and Female Labor Force Participation: A Reconsideration." *Social Forces* 64 (3): 599–619.
- Rangarajan, C., P. I. Kaul, and Seema. 2011. "Where Is the Missing Labour Force?" *Economic Political Weekly* Vol. 29, No. 39 (www.epw.in/journal/2011/39/special-articles/where-missing-labour-force.html).
- Shapiro, D., and L. B. Shaw. 1983. "Growth in the Labor Force Attachment of Married Women: Accounting for Changes in the 1970s." *Southern Economic Journal* 50 (2): 461–73.
- World Bank. 2011. *World Development Report 2012: Gender Equality and Development*. Washington, DC: World Bank.

APPENDIX E | NEPAL KALI GANDAKI “A” HYDROPOWER PROJECT: GENDER POLICY CONTEXT AND LESSONS LEARNED

The gendered impacts of large infrastructure is not well understood or researched in Nepal’s operational context, despite the large number of hydroelectricity projects in the pipeline. Nepal has immense electricity-generation potential using hydropower resources, yet only 40 percent of the country’s population has access to grid-based electricity.

Nepal has a strong national policy and legal framework for gender equality and social inclusion. Provisions are stipulated in the Interim Constitution, parliamentary declarations, and national development plans. However, a review of relevant energy-sector policies and national mandates—Electricity Act (1992), Hydropower Development Policy (2001), Land Acquisition Act (1977), and Environment Protection Act (1997)—shows that they are inadequately reflected as gender-responsive, energy-sector policies.

Construction of the Kali Gandaki “A” (KGA) Hydropower Project’s transmission line had a significant impact on the local community. In all, 409 households—29 percent of the 1,468 affected households—were impacted by the construction of two transmission lines and accompanying substations. Nearly half of the 263 families that were seriously affected by the project were impacted by the transmission lines alone (KGEMU 2002). About 126 families lost their homes and 100 families lost their cowsheds.

Between 1996, when the project’s Environmental Impact Assessment was conducted, and 2011, the project-affected area’s population grew by 20 percent. By 2011, the population had reached 53,175, representing 12,051 households. Over the 1996–2011 period, the average household size fell from 5.4 to 4.4 persons. Ethnicity in the area is highly diverse, consisting mainly of “high-caste” Brahman/Chhetri (57 percent), indigenous Janajati groups (33 percent), and “low-caste” Dalits (10 percent).

According to the 2011 census, females account for more than 55 percent of the population; however, men hold key decision-making positions while women shoulder the burden of household work. Human development indicators reveal gender bias in the project-affected communities (Table E.1). For example, literacy rates are comparatively much higher for males, and there are low rates of female and joint land ownership. Approximately 14 percent of households in Syangja and 30 percent households in Gulmi—two of the four districts in western Nepal where the main component of the KGA Hydropower Project is located—still lack electricity access. Approximately 25 households per Village Development Committee (VDC) do not have electricity.

Utilizing the gender-energy conceptual framework, the fieldwork team developed guides and questionnaires, which were administered in 15 villages/hamlets in the four project-affected districts. The

TABLE E.1**Gender Analysis Data for Three Village Development Committee Profiles**

RESEARCH QUESTION	ARBENI, GULMI DISTRICT		HARMICHAUR, GULMI DISTRICT		SHREE KRISHNA GANDAKI, SYANGJA DISTRICT	
	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN
Decision-making authority	130	436	171	331	567	819
Participation in household work	510	77	448	117	1,137	222
Having a bank account	70	95	74	156	—	—
Participation in users group	9	82	96	133	303	271
Participation in School Management Committee (SMC)	10	95	49	151	86	222
Participation in business or enterprise	36	36	44	76	10	54

Source | Fieldwork team 2014.

Human Resource Development Centre (HURDEC),¹ a Nepali consulting firm, conducted the fieldwork from May 27 to June 6, 2014. Open-ended focus group discussions (FGDs) were held, using participatory rural appraisal (PRA) tools with visual profiles to enable more interactive discussions. Key informant interviews (KIIs) were held with relevant officials, women's groups, and community members and leaders. Finally, a workshop/consultation meeting was organized with representative organizations and local community-based organizations (CBOs) and nongovernmental organizations (NGOs) (Table E.2).

TABLE E.2**Overview of Group Meetings**

QUALITATIVE RESEARCH TYPE	TOTAL NUMBER	TOTAL PARTICIPANTS	SEX DISAGGREGATION	SOCIAL GROUP	SETTING
Key informant interview (KII)	39	1–3 (approximate number)	10 women, 29 men	Brahman/Chhetri, Janajatis, (1 Dalit)	Office/workplace
Focus group discussion (FGD)	10	10 (approximate number) per FGD	3 male, 5 female, 2 mixed	4 Brahmin/Chhetri (1 woman), 4 Janajati (3 women), 2 Dalit (1 woman)	Convenient location (e.g., fields/near home)
Workshop	1	20	18 women, 2 men	Mixed	DDC Hall, Syangja

Source | Fieldwork team 2014.

SHIFTS IN GENDER NORMS AND POLICIES

At the time the project was initiated, many national gender-equality and social-inclusion mandates for the energy sector did not exist. In the mid-1990s, social mitigation activities were implemented on an ad-hoc, project-by-project basis in a reactive and situation-based manner. Much depended on the commitment of project donors (including contractors), available financial resources, and demands (protests/strikes) by local communities. Amid these shortcomings, the pioneering work of the KGA Hydropower Project ensured that environmental and social assessments were mandated in subsequent hydropower policy. Indeed, since 2010, local government policies have ensured budgeting for targeted programs to help women, the poor, and excluded groups.

From the outset, the KGA Hydropower Project was designed as an energy project without integrated benefit-sharing facets that could help shift gendered “rules of the game.” A majority of community-level informants stated that every phase of the project made only minimal or no efforts to implement existing gender-relevant policies or address those policies and social practices that discriminated against women and excluded groups. Some women living in proximity to construction sites with more available opportunities were able to challenge the existing social traditions and demand employment opportunities or access more resources. But this was hardly a result of any proactive effort from the project side.

That said, the project has indirectly helped to shift gender norms by connecting the country with the rest of Nepal. Better access to information and economic opportunities has rapidly changed Nepal's social dynamics over the last decade (Table E.3). A key factor that supported those women who were able to access project benefits was their families' expectation of future benefits. This enabled family gatekeepers (e.g., husbands and mothers-in-law) to permit women to access employment opportunities, where possible, or engage in microenterprise activities.

Local women are now working in groups and cooperatives formed by civil society groups or the district Women Children Office, and have greater mobility and access to information. Since the KGA Hydropower Project was implemented, many development projects have followed. An array of projects focused on a range of topics (e.g., irrigation, water, health, agriculture, awareness-raising and capacity building, and community mobilization) has been supported by various international donor agencies, including the United Nations Development Programme (UNDP), Japan International Cooperation Agency (JICA), and United States Agency for International Development (USAID). This funding has helped locals, especially women, to mobilize in groups and cooperatives. For example, in the VDC of Shree Krishna Gandaki (Syangja District), 14 of its total 19 cooperatives are all-women farmers and agriculture producer groups, which collectively manage marketing of produce and run a collection center through a committee.

LESSONS LEARNED

Energy infrastructure projects like the KGA Hydropower Project can have immense gendered impacts—both positive and negative—across socioeconomic profiles, whether or not by project design. The impression during fieldwork was that the project-affected communities appreciated the

TABLE E.3**Impacts of the KGA Hydropower Project: FGD Results**

PROJECT IMPACT	MIXED (2)	FEMALES (5)	MALES (3)	TOTAL (10)
Positive				
Road, ferry: ease of access to market/other places	2	4	3	9
Continuous electricity supply	1	4	3	8
Increased access to information	—	2	1	3
Enterprise/employment/skills development	1	1	2	4
Better health, sanitation, and education opportunities	—	—	2	2
Reduced gender-based discrimination	1	—	1	2
Compensation money/housing	1	3	2	6
Negative				
Insufficient employment/training opportunities	2	5	3	10
No water for drinking/irrigation	2	4	2	8
Low electricity capacity	—	2	1	3
No decrease in gender/cultural constraints	—	2	2	4
High cost resulting in non-use of electricity	1	1	2	4
Health issues not addressed	1	1	—	2
No consultation/information dissemination	1	3	2	6
Insufficient compensation	2	—	1	3
Loss of traditional occupation	1	2	—	3
Poor house design		1	—	1
No land ownership certificate	—	1	—	1
Other	—	2	1	3

Source | Fieldwork team 2014.

transformative impacts brought about by the KGA Hydropower Project. At the same time, they had many grievances that could have been minimized had there been deeper consultations and a feedback process. Groups from more marginalized communities, especially women, enjoyed a smaller share of project benefits compared to those from more dominant groups (Table E.4). This was a missed opportunity, serving to illustrate the need for careful gender impact analysis and consultations in order for project benefits to be more equitably shared.

TABLE E.4

Project Benefits Enjoyed by Women and Men:
Community-Level Responses (percent)

BENEFIT	FEMALES (10)	MALES (29)	TOTAL (39)
Electricity	12.5	30	25
Road	37.5	15	21.4
Community infrastructure	0	10	7.1
Enterprise/employment	75	85	82.1
Skills development	0	15	10.7
Access to market/various opportunities	0	15	10.7
No benefit/insufficient employment	12.5	10	10.7
Increase in women's literacy	0	5	3.6
Housing	12.5	35	28.6
Other	0	15	10.7

Source | Fieldwork team 2014.

The absence of a gender and social relations analysis and minimal engagement with community women and men resulted in a lack of recognition and understanding of the differential impact of the project on women, the poor, and excluded groups. There was no systematic mainstreaming of gender in any phase of the project. As a result, the project failed to benefit from local knowledge and skills, and inadequately understood the issues that would impact the project and these communities.

Insufficient attention was paid to empowering community women (and men) to access project benefits and changing policies and gender norms. During the pre-construction period, no efforts were made to identify the necessary job skills required to benefit from the construction boom period and operational phase of the project. This lack of planning resulted in ad-hoc training events that were ineffective in building capacity of the local community. Moreover, no specific activities were implemented to address social barriers (e.g., women's mobility and employment constraints).

The skills and systems for monitoring and mainstreaming gender and social inclusion in the energy sector were inadequate. Gender-differentiated results were not regularly monitored, resulting in lack of informed strategic decisions to address gaps or build on strengths. Review of the functions and responsibilities of the Nepal Electricity Authority (NEA), the country's public entity responsible for power supply, indicates inadequate institutional capacity to implement projects sensitive to gender and social inclusion. Even for projects that required environmental and social impact assessments (or VDC plans), gender aspects were poorly integrated due to funding agency rules.

The project had a lack of ownership by the community. Lack of community consultations, compounded by the absence of other incentives, such as equity or benefit-sharing schemes, resulted in a lack of community ownership. Initially, groups representing local leaders of the VDC were formed; however, these were nearly entirely male-dominated. With no clear initiatives to keep local women and men engaged, these locally representative groups gradually lost relevance and became fragmented.

Systematic mainstreaming of gender and social inclusion is needed during all project phases and steps to ensure gender-equal outcomes. Such systematic mainstreaming, including the removal of discriminatory practices through advocacy at family, community, and project levels, would ensure that women and men benefit more equitably from the energy infrastructure development. In the past, the majority of energy projects considered gender and social inclusion issues as marginal to the main technical tasks. Without addressing these dimensions, however, the effectiveness and sustainability of such projects will always be questioned.

ENDNOTE

¹HURDEC's core four-member team had extensive expertise in gender and inclusion, social issues in energy infrastructure, community development, and use of PRA tools.

REFERENCES

KGEMU (Kali Gandaki Environmental Management Unit). 2002. *Impoverishment Risks Monitoring and Management in Kali Gandaki "A" Hydroelectric Project: A Social Synthesis Report*. Beltari, Syangja District, Nepal: Kali Gandaki Environmental Management Unit and Morrison Knudsen International.

APPENDIX F | MOROCCO'S NOOR 1 CONCENTRATED SOLAR POWER PROJECT: QUALITATIVE ANALYSIS

The Noor 1 Concentrated Solar Power (CSP) Project is the initial phase of North Africa's first stand-alone CSP plant, a four-phase project located in Quarzazate Province, Morocco. Inaugurated by Morocco's King Mohammed IV in 2013, Noor 1 consists of a 160 MW parabolic trough CSP plant, with a three-hour molten salt, thermal-energy storage capacity and wet cooling. Noor 2 will consist of a 200 MW parabolic trough CSP plant, while Noor 3 will provide a 150 MW CSP tower with seven hours of storage and dry cooling. Finally, Noor 4 will consist of 50–70 MW of photovoltaic (PV) technology.

The CSP plant site, covering 3,043 ha of green field, is located in the rural commune of Ghassate, which is easily accessible from the city of Quarzazate. The CSP plant is located on the Tamzaghten Izerki site, which belongs to the rural community of Ait Oukroun Toundout, falling within the Ghassate Commune administration. The project covers 3,043 ha of a green field site with no permanent settlements or prior industrial use. Only nomad herders cross the plateau, despite the land's poor value for grazing. Located just 10 km northeast of the city of Quarzazate and 6 km north of the Mansour Eddahbi Dam, the CSP plant is easily accessible via national paved roads, as well as unpaved access roads (Figure F.1). The 225/60 kV electricity evacuation substation is located 4 km away. Noor 1 occupies a 450 ha plot, while the upcoming Noor 2 and Noor 3 phases will occupy 680 ha and 750 ha, respectively.

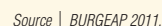
Commissioning of the Noor 1 CSP Project—including the CSP plant, transmission line and substation, water pipeline, and access road—was planned for late 2015. Final commercial operations were to start a year later, following optimization and demonstration of performance guarantees. Beyond the 160 MW CSP plant, a 225 kV transmission line and a 60 kV transformer have been built, along with a 25 km water pipeline connecting the Noor 1 plant to the Mansour Eddahbi dam. In addition, an access road was built along the eastern side of the site, connecting it to the village of Tasselmant.

Facilities and services for workers participating in construction of the Noor 1 CSP plant have been installed. Canteens and various sanitary facilities (e.g., restrooms, water tanks, and drinking water) are being provided on-site. In addition, collection systems for solid and liquid waste have been established. Contractors also provide staff daily transportation services between a central location and the project site; buses, vans, pick-up trucks, and cars are all used for staff commuting and equipment transport.

INSTITUTIONAL ARRANGEMENTS

A public-private partnership between the Moroccan Agency for Solar Energy (MASEN) and ACWA Power has created Solar Power Company, a special-purpose company to develop Noor 1 on a turn-key contract. In 2012, a consortium led by ACWA Power, a Saudi Arabian energy and water company,

Spatial Distribution of Settlements in the Vicinity of the Noor CSP Plant Complex



MASEN and ACWA signed a power purchase agreement (PPA) for the entire electricity output of Noor 1 over 25 years. Under a PPA signed by MASEN and ACWA, MASEN is to purchase electricity from ACWA Power at the generated cost of power over 25 years. Under a separate PPA signed by MASEN and ONEE,¹ the state-owned grid operator, ONEE is to buy the electricity generated from MASEN at the grid price. Given that the generation cost is higher than the grid price, the

Government of Morocco agrees to subsidize the net financial deficit (Wuppertal Institute and Germanwatch 2015).

SAFEGUARDS POLICIES

The Noor 1 CSP Project, classified as “Category A,” triggered two World Bank safeguards policies.

The World Bank classified the Noor 1 CSP Project as Category A, triggering the Operational Policies on Environmental Assessment (OP 4.01) and Involuntary Resettlement (OP 4.12)² safeguards policies. To comply with conventional safeguards policies, a specific environmental and social impact assessment (SESIA) and a land acquisition plan (LAP) were prepared (5 Capitals 2012a, b).³

An environmental and social management plan (ESMP) was implemented in accordance with lending institution requirements. MASEN conducted a framework environmental and social impact assessment (FESIA) for the Noor 1 CSP Project in 2011,⁴ and a SESIA conducted by ACWA Power followed in 2012. The FESIA and SESIA led to the adoption of an environmental and social management plan (ESMP), which outlines the actions required to implement and monitor mitigation and risk-management measures.

As a prerequisite of the SESIA, public consultations were conducted and developers were required to incorporate community concerns in line with Category A project requirements. Consultations are critical to understanding land uses and identifying community grievances, as well as mitigation measures. Three public-consultation meetings, which invited identified stakeholders and were advertised in two national newspapers, were held in November 2010, March 2012, and November 2012 (5 Capitals 2012a, b; Wuppertal Institute and Germanwatch 2015).

In 2010, MASEN developed a LAP for 3,041 ha out of a total 64,000 ha area belonging to the Ait Ougrou tribe. The LAP for the 3,041 ha required for the 500 MW Noor solar complex included the following documents: (i) copy of the land price committee determination of the price of the land, (ii) copy of the written agreement by the community of Ait Oukrouir Toundout on the sale and conditions of transfer of the land, (iii) copy of the authorization of the supervisory board about the transaction, and (iv) the ONEE-MASEN-Community tripartite agreement on land acquisition (Wuppertal Institute and Germanwatch 2015).

The land was acquired in 2011 in line with Moroccan and international standard procedures applied for similar land transactions. The process complied with Article 6 of the Dahir, dated April 27, 1919, requiring the involvement of public administration experts to determine a price for properties (Reyes 2012). According to this Moroccan law, the expert commission comprised (i) the Pacha or Caïd president, (ii) one representative from the Ministry of Finance; (iii) two representatives from the Ministry of Agriculture, Trade, and High Commission for Water and Forests; and (iv) Ministry of Public Works representatives (Wuppertal Institute and Germanwatch 2015). The acquisition process strictly followed official regulations. Six representatives of local tribes from the rural Commune of Ghassate (Ait Ougrouir) and eight governmental/private authorities (including the Directorate for Rural Affairs, ONEE, and MASEN) gave formal approval in a “friendly settlement” for the land transfer in accordance with the proposed LAP. The price was set at MAD 1 per m², for a total of MAD 30.5 million (Wuppertal Institute and Germanwatch 2015).

WOMEN'S STATUS AND MOROCCO'S GENDER EQUALITY-RELATED LAWS

Morocco has made considerable reforms to its legal frameworks, aiming to improve women's social, economic, and political development. In terms of gender equality, Morocco has one of the most progressive legal frameworks in the Middle East and North Africa (MENA) region. Over the last 15 years, various key reforms have been implemented. In 2004, the Family Code was revised to expand women's rights in such areas as guardianship, marriage, access to divorce, and child custody. Gender equality was enshrined in the Labor Code (2003) and Law on Nationality (2008). The 2008 Community Charter stipulates the need to adopt a gender-sensitive participatory approach to implementing local development plans (Article 36) and establishes community-level consultative commissions on "parity and equality of opportunities."⁵ A quota was introduced to raise the level of women's representation in local elections in 2009. Then, in 2011, Morocco withdrew its reservations on the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and revised its Constitution, guaranteeing equality between women and men and forcing public bodies to promote equal participation of men and women in political, economic, social, and cultural life. The next year, Morocco launched the Governmental Plan for Equality 2012–16, known as ICRAM, which aims to ensure women's rights and gender equality in all policies and development programs. The result of these reforms is that, *de jure*, women enjoy more freedom of travel, access to employment and education, and ability to negotiate marriage and divorce. Such institutions as the Family Solidarity Fund and an enhanced family court system have been established to implement the reforms (World Bank 2015).

Despite these critical reforms, important gaps persist in the legal framework. Most of the gap areas are related to family and personal matters, including women's access to inheritance, marriage to non-Muslims, and gender inequalities in obtaining divorce and passing on citizenship to children. Moreover, domestic violence is not covered by comprehensive legislation (World Bank 2015).

Poor implementation of the legislation, due to weak institutional capacity, negatively impacts women's social, economic, and political development. In addition to gaps in the legal framework, limited implementation of legislation constrains women's rights and social, economic, and political participation. Weak institutional capacity, combined with selective enforcement of legislation by public officials influenced by social norms, restricts women's exercise of newly acquired rights, particularly when they conflict with societal norms (World Bank 2015).

Women's Access to Land and Property

Moroccan women and men have equal land and property ownership rights; however, in practice, those rights are limited by tradition and social norms. Under the Constitution (Article 15), Moroccan women have the right to own and make full and independent use of their land and property. Furthermore, various articles of the 2004 Family Code protect women's property rights within marriage. In practice, however, social norms and women's financial dependence on men restrict women's property rights. As a result, few women own land; for those that do, the land is often managed by male relatives (Sadiqi 2010).

Gender inequalities remain within inheritance rules. Although progressive changes have been made to the 2004 Family Code, women are still disadvantaged as daughters; typically, women's inheritance is half the amount set aside for sons. In rural areas, women often give up their already unequal share of inheritance to male relatives (Sadiqi 2010).

In the case of collective land, some women do not benefit from inheritance or land sale. About 42 percent of Morocco's land is held collectively by tribes and governed by customary norms. The state is the trustee of the collective land, administered through Trusteeship Councils. Traditionally, these lands have been used collectively. They may be distributed to men as heads of households or sold, as in the case of the Noor-Quarzazate complex. When collective land is sold, unmarried or widowed women (*Soulaliyates*) do not share in the proceeds of the sale, and they lose access to the land. The proceeds are usually directed to the men of the tribe (World Bank 2015). In an effort to protect women's rights related to the inheritance and sale of tribal lands, the Ministry of Interior issued a series of guidelines; the most recent of these, issued in 2012, grants men and women equal rights in terms of benefits from income and profits derived from such lands.

Women's Access to Labor

The 2003 amendment to Morocco's Labor Code prohibits gender discrimination in employment, salaries, and promotion and increases the protection of women in the formal labor market. The Moroccan Labor Code mandates gender-based nondiscrimination in hiring and requires equal remuneration for work of equal value. The 2003 amendment raised the minimum employment age to 15 years old, reduced the work week to 44 hours, and increased the minimum wage by 10 percent (World Bank 2015). Moreover, restrictions on work hours apply to female employees. For example, where public transport is not available, transport must be available from home to the workplace in order for women to work at night. Restrictions also exist on the types of jobs women can perform (e.g., hazardous, morally inappropriate, arduous, and mining-related) (World Bank 2015; WBG 2015).

Maternity protections are ensured through gender-specific employer mandates. The Labor Code includes 14 weeks of maternity leave with full pay and three days of paternity leave. Dismissal of pregnant workers is prohibited, and mothers are guaranteed an equivalent position after maternity leave. Mothers are also entitled to an additional year of unpaid leave, if so desired. Pregnant women are entitled to a reduced workload and nursing mothers to nursing breaks. Childcare requirements are based on the number of female employees. However, parents are not entitled to flexible or part-time schedules (WBG 2015).

While the Labor Code provides greater protection for women, it may constrain their employment opportunities as it raises costs for firms. Ensuring minimum working conditions and providing greater protection for women raise costs for the firms that hire women and thus may constrain women's employment opportunities. Firms are required to add extra shifts to comply with restrictions on women's working hours and job types. Firms may also bear additional costs for childcare requirements, mandatory leave, and rest days, as well as breast-feeding allowances (World Bank 2015).

ENDNOTES

¹Office National de l'Electricité et de l'Eau Potable.

²Although land acquisition was a voluntary process.

³The LAP describes the land acquisition process and monitoring of how proceeds are to be used to benefit the local population

⁴The FESIA was updated in June 2014.

⁵See <http://www.fec.org.ma/Textes/Loi17-08.pdf>

REFERENCES

- AfDB (African Development Bank Group). 2012. "Project Appraisal Report: Quarzazate Solar Power Station, Phase 1." Tunis: African Development Bank Group.
- BURGEAP. 2011. "Etude d'Impact Environnementale et Sociale cadre du Projet de Complexe Solaire d'Ouarzazate (Maroc)." Rabat: BURGEAP.
- 5 Capitals (5 Capitals Environmental & Management Consulting). 2012a. "Quarzazate Solar Power Complex, Phase 1 Morocco: Specific Environmental and Social Impact Assessment," vol. 1. Rabat.
- . 2012b. "Quarzazate Solar Power Complex, Phase 1 Morocco: Specific Environmental and Social Impact Assessment," vol. 2. Rabat.
- Reyes, O. 2012. *Power to the People: Moroccan Solar Power and the EU Energy Grab*. London: World Development Movement.
- Sadiqi, F. 2010. "Morocco." In *Women's Rights in the Middle East and North Africa: Progress and Resistance*, edited by S. Kelly and J. Breslin. New York and Lanham: Freedom House and Rowman and Littlefield Publishers, Ltd.
- WBG (World Bank Group). 2015. *Business, Women and the Law 2016: Getting to Equal*. Washington, DC: World Bank.
- World Bank. 2015. *Morocco: Mind the Gap—Empowering Women for a More Open, Inclusive, and Prosperous Society*. Washington, DC: World Bank.
- Wuppertal Institute and Germanwatch. 2015. "Social CSP—Energy and Development: Exploring the Local Livelihood Dimension of the Noor I CSP Project in Southern Morocco." Final Report to the German Federal Ministry for Economic Cooperation and Development (GIZ). Wuppertal and Bonn: Wuppertal Institute for Climate, Environment, and Energy; Germanwatch (www.wupperinst.org/en/projects/details/wi/p/s/pd/449/).

APPENDIX G | IMPACTS OF ELECTRICITY DISTRIBUTION INFRASTRUCTURE ON MEN AND WOMEN IN CENTRAL SENEGAL

SOCIOECONOMIC AND GENDER CONTEXT

Senegal is a lower middle-income country located in the westernmost part of Africa's Sahel region.

Senegal's national territory spans 196,722 km², with an estimated population of 14.7 million (2014 figure), 44 percent of whom are under the age of 14 (World Bank 2015). The country's predominant religion is Islam (94 percent Muslim); Wolof comprises the largest ethnic group (43 percent), followed by Pular (24 percent) (CIA 2015). The urban population has reached 43 percent, half of whom live in Dakar (3.4 million) (World Bank 2015). The slow annual growth rates witnessed over last decade—averaging 3.8 percent in GDP and 2.4 percent in GDP per capita—are well below those necessary for significant poverty reduction. As a result, the poverty rate remains high, affecting 47 percent of the population (2011 estimate) (World Bank 2015). Services account for 59 percent of Senegal's GDP, industry for 24 percent, and agriculture for 17 percent. The Human Development Index of the United Nations Development Programme (UNDP) ranks Senegal 163 out of 187 countries (UNDP 2014).

Senegal has made advances in terms of gender equality, driven by women's political empowerment.

In 2014, the Global Gender Gap Report ranked the country 77 out of 142 (WEF 2014), up from 102 out of 134 five years earlier (WEF 2009). This improvement is largely attributable to the political empowerment component, including adoption of the gender parity law in 2010. Between 2012 and 2014, the proportion of seats held by women in the national parliament increased by 20 percentage points (from 23 percent to 43 percent) (World Bank 2015).

However, gender disparities and discriminatory practices persist in many domains of the country, disadvantaging women.

In most ethnic groups, women are dependent on men (husbands, fathers, brothers, and uncles), who have rights over them and what they produce. Women are confined to traditional roles, particularly in rural areas, where religious and traditional customs (such as polygyny and Islamic rules of inheritance) are strong. About half of all women in Senegal live in polygamous marriages (USAID 2010a). Men are legally considered heads of households, limiting women's agency. Married women cannot perform some action in the same way as married men. The report *Women, Business, and the Law 2016: Getting to Equal* finds that Senegal has more than 10 legal differences (out of 21 areas) for men and women with the same marital status (WBG 2015). Also, women pay higher taxes, and employers pay child allowances to men but not to women. Senegal has succeeded in putting a legal framework in place that, de jure, does much to protect women's bodily integrity, and laws protecting women are generally respected in urban areas; however, in rural areas, few women are aware of their legal rights (OECD 2014).

Women in Senegal have high rates of illiteracy. Sixty percent of Senegal's women are illiterate, compared to 34 percent of men. The gap also persists amid the younger population aged 15–24 years,

with female illiteracy at 41 percent, compared to 26 percent for men. While primary school enrollment is higher for girls than boys (76 percent versus 71 percent) (2012 estimate), boys outnumber girls in secondary school enrollment (24 percent versus 18 percent) (2006 estimate) (World Bank 2015). In poor families, girls often leave school earlier so that their brothers can continue their education (OECD 2014). In 2014, only 7 percent of the female population aged 25 and above had at least some secondary education, compared to 15 percent for men (UNDP 2015).

Although Women constitute 51 percent of the population and 45 percent of the workforce, their contribution to the national economy remains a struggle. Sixty-six percent of women aged 15–64 years participate in the labor force, compared to 90 percent of men (World Bank 2015). Men and women are nearly equal contributors to the Senegalese economy, but in different sectors. In 2006, it was estimated that 33 percent of women's employment was directed to agriculture (compared to 34 percent for men), 5 percent to industry (compared to 20 percent for men) and 42 percent to services (compared to 33 percent for men). Only 14 percent of employed women were in paid employment (compared to 29 percent for men), of which 27 percent were in non-agricultural sectors. The vast majority of employed women (68 percent) were self-employed, compared to 51 percent for men. Among Senegal's firms, only 23 percent have female participation in ownership and just 14 percent are managed by women. Sixty-eight percent of employed women are considered vulnerable employees (compared to 51 percent for men) (2011 estimates). Women also have higher unemployment rates than men (World Bank 2015). The UNDP estimates that employed women's wages are typically less than half that of men (USAID 2010a).

Gender roles are being transformed as changes occur in people's lifestyles. Relationships between men and women are being reshaped as the need to generate income becomes more pressing due to escalating poverty and worsening living conditions. Women benefit by forming women's organizations and selling produce in local markets. They are heavily involved in post-harvest processing and small-scale marketing of agricultural produce across the country (USAID 2010a). Senegalese women aspire to balance the development of their own interests with their dependence on men and the expectations assigned to gender roles in public life (Gueye 2008).

POLICY AND ORGANIZATIONAL CONTEXT

Energy and Gender

Senegal has a relatively gender-equitable legislative and policy environment. Senegal has ratified multiple international agreements on human rights and gender equality, including the Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW) in 1985, the Optional Protocol on violence against women in 2000, and the African Charter on Human and Peoples' Rights on the Rights of Women in Africa (Maputo Protocol) in 2005. At the national level, Senegal's 2001 Constitution (Article 7) guarantees equality between women and men. Following two gender action plans developed in 1982 and 1997, the Ministry of Family and Women's Entrepreneurship developed the National Strategy for Gender Equality and Equity (SNEEG), to run from 2005 to 2015. In 2010, the Government of Senegal enacted a gender parity law to ensure equal representation in local and national elections.

However, the country maintains several discriminatory laws and fails to respect conventions. Discrimination against women may be found in the Family Code (including succession procedures), Nationality Code, Social Security Code, and Labor Code. It gives a husband sole power to decide where a family resides, to act as parent of children, and to practice polygamy (if decided at the time of his first marriage) (USAID 2010a). The country's highly restrictive abortion law fails to comply with the Maputo Protocol. Also, Senegal has not reported to the CEDAW committee since 1994 (OECD 2014).

Gender disparities persist as customary law is still strong and widely implemented, particularly in rural areas. Cultural and religious beliefs typically support the dominance of men, expecting women to be good wives and mothers. As a result, women face significantly greater domestic responsibilities and suffer a lack of access to productive assets, education, and health, which compromises their empowerment and contribution to the economy (USAID 2010a).

Land Legislation

Relevant Senegalese laws—the 1964 National Domain Law and the 2004 Agro-Sylvo-Pastoral Development Law—appear to foster gender-neutral access to land. The National Domain Law classified about 97 percent of land as state-owned,¹ intending to facilitate mass access to land by breaking the grip of traditional ethnic and religious hierarchies. To this end, it also decentralized control over land to local governance bodies (USAID 2010a). Land in the national domain cannot be sold. The Agro-Sylvo-Pastoral Law aimed to address gender and social inequalities by providing equal rights to men, women, and the young and committing to facilitate women's access to land and credit (GAFSP 2012).

Despite formal laws aiming to control land tenure, customary law continues to govern land rights and land transfer across the country. Senegal has established a decentralized model of governance, granting additional powers to elected local bodies. Rural councils have the authority to allocate long-term, heritable rural land-use rights to natural persons and legal entities as long as the land is used productively (USAID 2010b).² However, customary practices tend to favor elites (i.e., elders or religious and political figures). In many communities, rural hierarchies based on family lineage, religion, and political party membership dominate rural councils. Democratically elected rural council members are often elite landholders and village chiefs, who may engage in self-serving tactics, approve tacit land sales and leases, and circumvent legislation. Also, local elites may use authority to allocate valuable land (e.g., irrigated parcels) to powerful outsiders (USAID 2010b). Although land in the national domain cannot be sold, an active informal market has been developed for valuable land, and the available unexploited land for rainfed agriculture, which is allocated by the rural councils, lacks market value. As a result, it is more difficult for women and the young to access and use agricultural land (Kaag, Gaye, and Kruis 2011).

Although formal law fosters equitable land access, social and religious norms continue to dictate women's land rights. Most women access land through their husbands, and the security of their rights depends on their relationship. Inheritance laws do not treat men and women equally. Despite formal legislation entitling women to inherit land, they are not allowed to inherit property directly; according to

customary law among most ethnic groups, a man must act as an intermediary. Widows can either marry their husband's brother (levirate marriage) to maintain custody of their land or return to their family of origin and be given land by their fathers or brothers (USAID 2010a). Under Islamic law, women systematically inherit half of what their male counterparts are given (Fishbayn and Neil 2013).

Female representation on rural councils is rare, exacerbating gender discrimination. Rural councils are comprised of male members primarily. Councils assume that males are responsible for planning and organizing productive land use and thus determine land-use rights with a gender bias. The weak capacity of rural councils often hinders them from being responsive to socioeconomic changes. Moreover, rural councils have not recognized women's land rights and their access to land (USAID 2010b). As a result, land allocated to women is smaller in size and less productive than parcels given to men. In addition, women are more likely to be evicted from the lands they farm—usually planting vegetables and non-staple crops—when men claim a need for space to grow staples. Furthermore, the land made available to divorced or abandoned women and widows is usually of poor quality (USAID 2010b). Women also tend to be poorly informed of their legal rights (USAID 2010b).

Women's Access to Agricultural Assets and Activities

Gender disparities are common in agriculture, where access to and control over key productive assets is unequal. Although women have the authority to determine what crops they plant, their male relatives assert overall rights to the land (USAID 2010b). Only 11 percent of women are agricultural landowners (sole or joint), compared to 28 percent of men (2010/11) (FAO 2015). These shares drop to 5 percent for women and 22 percent for men in terms of sole ownership. According to Senegal's last agricultural census (1998/99), just 9 percent of agricultural holders are women (FAO 2015). According to a 2007 gender audit, women own only 13 percent of land, even though more than 70 percent of them are active in the agriculture sector (ENDA-ENERGIA 2007). Women farm family lots and are responsible for agricultural processing; however, women face additional challenges in accessing key inputs (e.g., improved seeds, fertilizers, and equipment) (USAID 2010a). For example, women's rights to use animals for plowing or planting are secondary to the needs of the household head, who typically owns farming equipment; thus, women are allowed to access it after the husband's field has been tended to (Rubin n.d.).

Husbands have the right to call on the labor of their wives and children for cultivation and harvesting. Conjugal contract requires men to allocate plots and supply equipment to family members—women and youth—so that they can raise their own crops. Husbands should also provide the family with food from their own fields. In exchange, men have the ability to draw on the labor of women and youth in the household. “When [household heads] fulfill these obligations, women are compelled to follow their dictate” (Perry 2005). However, cereals grown on these plots are increasingly oriented toward the market under control of the household head. Women and youth are also allowed to sell the products from their own fields and keep the income (Rubin n.d.).

Women's Access to Labor

Although the traditional division of labor by gender places women within the household, women are entering the labor market. Women in Senegal are responsible for household chores, including cooking, cleaning, and child rearing. Also, the Family Code includes conditions that limit women's integration into businesses. In rural areas, however, women have increasingly taken over responsibility for managing forestry resources and operating grain mills as a result of the growing rural exodus of young men. In urban areas, women have entered the labor market as secretaries, typists, sales clerks, maids, and unskilled workers in textile mills and tuna-canning factories (Everyculture 2015).

Gender discrimination is not explicitly prohibited. Senegal's labor law does not mandate gender-based nondiscrimination in hiring or equal remuneration for work of equal value for men and women. Furthermore, prospective employers are not prohibited from asking about family status.

Senegalese law mandates maternity leave and protects women in the workplace. The law mandates maternity leave of 98 days with wages paid at 100 percent by the government, while the duration of paternity leave is one day. The dismissal of pregnant workers is prohibited, and mothers are guaranteed an equivalent position after maternity leave. Also, nursing mothers are entitled to nursing breaks. Parents are not entitled to flexible or part-time work.

Some industry restrictions for women persist. Although women and men can work the same night hours, they cannot do the same jobs. The law states that women cannot be employed in such areas as mining, factories, and construction and cannot undertake such tasks as metalwork and heavy lifting. The law also mentions that women can participate in hazardous and arduous work, but not in morally and socially inappropriate jobs. Women and children also need a medical certificate stating that the work tasks to be performed are within their physical capacities (Camara 2010).

ELECTRICITY SECTOR SUPPORT PROJECT: DESIGN AND IMPLEMENTATION EXPERIENCE

Grid extension work that has taken place in central Senegal aims to improve electricity service reliability and reduce SENELEC's technical and commercial losses. The Electricity Sector Support Project (ESSP) (Component 1) aims to upgrade and modernize the transmission and distribution network, including extending the distribution network to reach isolated loads in secondary centers and connecting them to the interconnected network. In a number of localities far from the interconnected grid, electricity was previously provided using expensive, diesel-powered gen sets. In line with the project's main development objectives—namely, to contribute to reducing SENELEC's technical and commercial losses and improving the reliability of electricity services in selected areas—medium-voltage (MV) lines have been constructed connecting Nganda, Koungeul, and Koumpentoum to the interconnected electricity network.

The city of Koumpentoum switched to grid power in April 2015, following a five-month construction period of the new MV distribution line extending over 28 km from Koungeul. Located in the Tambacounda region of central Senegal, Koumpentoum has a population of some 12,000 inhabitants. The city is situated between Kaolack (170 km to the west) and Tambacounda (100 km to the east) along

the national road leading to Mali. Previously, the city's electricity supply was provided by four diesel generators, with a total installed capacity of 950 kW running constantly; however, only two of the generators were functional. Seven out of ten neighborhoods were connected to the mini-grid, and SENELEC had about 880 customers. Since arrival of the grid, connection requests have soared. However, connection delays have been reported due to a lack of "last-mile" infrastructure and related funding. Construction of the distribution line, which started in January 2015, follows the road layout, and work was completed in April 2015. The diesel generator was stopped on April 10 and was to be relocated shortly thereafter. At the time of the field research, the population had been receiving power from the new source for about two months.

The rural community of Nganda switched to grid power in January 2015, following a five-month construction period of the new MV distribution line over 17 km from the village of Kataké. Located in the Kaffrine region, the rural community of Nganda is located along a dirt road close to the Gambian border, about 40 km from the city of Kaffrine. Previously, electricity supply in Nganda was provided by two diesel generators of 250 kW each, which ran for 12 hours (7 pm–7 am) daily. However, only one generator was functional and broke down frequently. Like Koumpentoum, Nganda has reported connection delays and lack of last-mile infrastructure. Construction of the distribution line started in August 2014, following the road layout; work was completed in January 2015, and the diesel generator was subsequently relocated. At the time of the field research, the population had been receiving power from the new source for about four months.

KEY FINDINGS

Community Involvement

In Koumpentoum, SENELEC announced the construction of the distribution line to local authorities, who, in turn, informed the local population. SENELEC approached the municipality two years earlier to announce the arrival of the electricity line and that an impact evaluation study would be carried out. The mayor organized an awareness-raising seminar with municipality officials, the regional environmental officer based in Tambacounda, project experts, and the population to share information on the advantages and disadvantages of the line.³ The mayor confirmed that all residents in all neighborhoods that could be impacted by the line were invited to the seminar.

Not all men were informed about the project prior to arrival of the workers, and regretted that a formal discussion had not taken place prior to construction. Some men confirmed that a meeting on reinforcement of the electricity and phone networks had been held a year earlier with the municipality; the men were advised to construct beyond a certain distance from the road as the electricity line would be constructed alongside it. However, others stated that they saw the cadastral surveying services in their neighborhood with their measuring tools, but were not aware of the type of activities to come. Still others mentioned that they had heard about the line from municipal officers, but there had been no consultations on the matter. Apparently, a formal communication campaign did not reach the entire population. Men have repeatedly stated that such a discussion should have been organized before the work started in order to properly consult the population. Their sentiment was that, now that the line had been completed, they were facing a situation they could not change.

In Nganda, the municipality was not informed about the project prior to the subcontractor's arrival; county officials, who were aware of it, shared the information with farmers. SENELEC does not appear to have approached the municipality. The subcontractor arrived in Nganda without notice, contacting the mayor by phone on the spot. Following the first visit, the municipal advisors were informed. However, the municipality had no means of informing the population as radios are not common in Nganda. On the other hand, the prefecture claimed that farmers had been informed about the upcoming construction of electric utility poles on their land and that they would be compensated.

Both men and women claimed they had not been informed about construction of the distribution line before work started. As confirmed by the mayor, most people had not been informed about the upcoming work. However, some men mentioned that they had previously been approached by the project team, which advised them not to cultivate on the measured plots. Nonetheless, not everyone received such visits, and regulatory distances and maintenance procedures were not widely known.

Despite the lack of information, the distribution line was well received by the local population. According to the mayor, the local community was eager to receive grid power as it had long suffered from intermittent power supply. The population was also aware that compensation based on impacts would follow shortly.

Impacts on Land and Assets

Although no severe complaints have been recorded, cases of electric utility poles being placed inside or close to houses have been reported in both Koumpentoum and Nganda, and safety concerns have been raised. Some complaints have been received regarding poles being set up within houses and lines being laid close to, or even above, houses. For example, one woman reported that a line that had been placed 2m away from her house caused construction work to be halted. Despite reassurances by authorities that there were no safety issues, the construction worker was afraid to continue. Thus, the 5m distance from the line, as required by regulations, has not always been respected. However, the exact number of such cases was difficult to obtain. Information on safety may not have been widely shared as the population appeared concerned about safety. One woman mentioned that she had heard on the radio that a woman got electrocuted while hanging out her laundry. It appears that complaints have usually been reported to the authorities by men, who have been reassured that a detailed assessment of such issues would be carried out.

Illegal housing settlements may discourage residents from expressing complaints or requesting compensation. Informal settlements comprise 25 percent of urban land in Senegal (USAID 2016). Housing in certain neighborhoods does not conform to norms, and illegal settlements exist in certain areas. Owners of illegal settlements impacted by distribution lines may be discouraged from making complaints or asking for compensation.

In Koumpentoum, the distribution line passes by agricultural land owned mainly by male farmers; however, it has followed the road layout to minimize impacts. A male farmer reported that the line passes by his agricultural land and nearby his storehouse. Nonetheless, he has not reached out to

discuss the issue with anyone. Women interviewed stated that their agricultural land is located 3 km away from the city and is not impacted by the line. The distribution line has been designed to follow the road layout to minimize impacts on cultures.⁴ Impacted farmers have been asked to avoid cultivating within 5 m of the line and to keep clear of corridors that lead to the electric utility poles in order to facilitate maintenance. However, at the time of the field research, the impacts on agricultural activities were not yet known since the rainy season (winter) had not arrived.

Local authorities are particularly worried about safety. They claim that farmers are not aware of the danger posed by electric utility poles. Thus, awareness-raising campaigns are crucial for their safety. Also, there is a deep concern that the poles may fall following heavy rainfall, putting farmers and livestock at risk.

In Nganda, damage to agricultural output was minimal as work occurred after the end of the agricultural season. Local officials stated that work took place after the agricultural season was over. Both women and men confirmed this information; however, some claimed that their production had been damaged by construction of the utility poles. The impacts on agriculture were to be accurately assessed during the next season.

Compensation Process

Land is owned by the state and used by the population, often without official lease. Land in Koumpentoum and Nganda is state-owned and managed by the municipality. The municipal council is the entity responsible for land-use changes. In addition to ownership rights, the Senegalese law recognizes leasehold, occupancy rights, and land-use allocations as formal tenure types. The population uses the land for their activities (e.g., agriculture); however, official lease and land titles are not common practice.

In Koumpentoum, the evaluation process had not yet started and compensation had not been finalized. At the time of this field research, local authorities confirmed they were planning to compensate farmers by directing them toward other pieces of agricultural land. Agreements on land replacements had been reached following negotiations between farmers and the municipality.

In Nganda, local officials confirmed that an evaluation commission visited the line layout to evaluate impacts on land and assign compensation. The commission—including SENELEC, the prefecture, and environmental experts—followed the line and met with land users after completion of the work. Every affected landowner was identified and contacted by the commission. However, at the time of the field research, the decision on compensation had not yet been shared with the population. A public consultation should be held after validation of the compensation scheme.

Impacts on Employment

Local officials claimed that the law mandates infrastructure projects to prioritize the employment of local manpower whenever possible. Particularly for tasks that do not require formal qualifications, the hiring of local workers should be prioritized, while skilled manpower may come from outside.

In Koumpentoum, the municipality informed the population of employment opportunities and gathered job applications. The municipality was asked by the subcontractor to inform the population about the opportunity for employment and encourage candidates to apply. Although data were not shared, the number of applications appears to have far exceeded the employment potential.

Local authorities and SENELEC stated that some unskilled local workers were employed for construction of the line and paid by the day. According to local authorities and SENELEC, local youth were employed mainly to dig holes for the utility poles and, to a lesser extent, for the line installation. Although the exact number of positions was not revealed, the number of four or five people was mentioned. The subcontractor's team, consisting of a few dozen people, included qualified workers from outside. There were no positions that could be offered to women.

However, several local men and women claimed they had not seen or heard about local youth being employed by the project. Although people had heard about advertised jobs, which were also broadcasted on the radio, the majority categorically claimed they did not know of anyone from their community being employed for construction of the line.

In Nganda, none of the local manpower was finally employed by the project, despite the initial intention to do so. The subcontractor had initially expressed an interest in employing unskilled local workers. Local authorities informed the youth and gathered their applications. The price was set at CFA 2,000 per hole opened. However, the enterprise arrived with its own materials and workers and offered no jobs to the local community. Both men and women participants confirmed that they had not seen any local young men working on the distribution line, and no jobs or training were available to women.

Impacts on the Economy

In Koumpentoum, restaurants exclusively run by women benefited from the arrival of external workers. Throughout the construction period, workers ate in local restaurants. One female restaurant owner mentioned that, over that period, about a dozen workers ate in her restaurant each day. Another woman confirmed that she sold food products to restaurants that served project workers.

Accommodations for external workers appears to have been another source of revenue for the local communities. However, workers were used to spending the night in the city of Koungheul, which is double the size of Koumpentoum. No integration issues were mentioned by any of the respondents.

In Nganda, the local economy—and women in particular—benefited during the six-month stay of external workers by providing accommodations, meals, and laundry services. The construction team, consisting of 8–10 workers, lived for about five or six months among the local community. A small number of women benefited the most. One woman living in a large house rented out rooms to the workers; a second woman was in charge of their meals, while a third was responsible for laundry services. Women also sold food and ice on a daily basis.

Local hardware shops, mainly owned by men, did not benefit significantly from the construction work. Most materials were brought in from outside by the subcontractor. Local hardware shop owners reported that workers occasionally bought some basic tools and inputs (e.g., cement and iron).

LESSONS LEARNED

Local authorities should inform the entire population in advance of upcoming activities through written and audio communication. In order to minimize complaints and frustration, detailed information should be shared with the entire population. It is recommended that the municipality, together with the utility and subcontractor, inform the population about the modalities of the projects. Given that public meetings fail to reach the majority of the population, and men in particular, other forms of communication, including radio or television, are recommended. It is also crucial that the owners of the houses and land impacted by the line receive written information on the modalities and safety guidelines. The municipality should be prepared to explain such guidelines to raise awareness, particularly among illiterate residents.

The evaluation and compensation process should be completed before the start of the works to respect regulation and minimize safety issues. In cases where the line layout cannot avoid impacting houses, it is recommended that fences be displaced before arrival of the line to avoid having electric poles on private property. Displacement cost may be financed through the compensation scheme, and residents' undertaking of related works should be enforced. Also, housing and parceling regulations should be clarified and illegal settlements discouraged. The commission should comprise both men and women to ensure that women's interests are taken into account.

Construction of the transmission and distribution network may have low impact on direct employment of the local population, mainly involving men, and has the potential to offer indirect work to local women. Transmission and distribution infrastructure tend to require low levels of employment, compared to hydropower and other generation projects. The local population, often unskilled, benefits little from direct employment as most skilled workers are brought in from outside the community. In addition, duration of the works is fairly short term, with teams moving quickly from one location to another. Although construction tasks are assigned mainly to men, women could be employed in procurement and support jobs; however, physical and cultural barriers would have to be overcome. Bid contract clauses with targets and incentives are proposed as one means of encouraging local employment of both women and men (ENERGIA 2015).

The recruitment process should be transparent, and the recruitment outcome should be publicly shared. Infrastructure projects impacting local communities should support local employment. Considering that the supply of unskilled workers exceeds demand, the selection process should be transparent. Public information concerning the types and number of positions taken by local and external workers may satisfy the population and motivate local youth. Subcontractors should be held accountable for providing such information, and the municipality should be responsible for disseminating the

information. Additional incentives, such as training allowances, may be required to encourage subcontractors to employ local workers.

ENDNOTES

¹Senegal's land is categorized into two main domains (national and private) and four zones (urban, classified, territorial lands [including agricultural land], and pioneer [controlled by the central government]).

²Senegal's formal law recognized four land tenure types, including ownership, leasehold, occupancy rights and land-use allocations under customary practices.

³For example, the population was told that bedrooms closer than 5 m from the line presented safety issues.

⁴The most common agricultural activities are peanut, millet, rice (recently cultivated by women), black-eyed pea ("niébé"), and women-managed horticulture (*maraichage*).

REFERENCES

- Camara, F.K. 2010. "Les Droits de la Femmes en Droit Senegalais." Masters Course 2009/2010. Institute of Human Rights and Peace (IDHP), Faculty of Law and Political Science (FSJP), University of Dakar (UCAD) (<http://fsjp.ucad.sn/files/power3.pdf>)
- CIA (Central Intelligence Agency). 2015. *The World Factbook* (<https://www.cia.gov/library/publications/>).
- ENDA-ENERGIA. 2007. "Case Study: Gender, Human Security, and Climate Change in Senegal" (www.wedo.org/wp-content/uploads/Senegal-case-study.pdf).
- ENERGIA 2015. "Gender Mainstreaming in Rural Electrification Programmes" (http://energia.org/wp-content/uploads/2015/02/03.-GENDER_MAINSTREAMING_IN_RURAL_ELECTRIFICATION_PROGRAMMES1.pdf).
- Everyculture 2015 (www.everyculture.com/Sa-Th/Senegal.html).
- FAO (Food and Agriculture Organization of the United Nations). 2015. *Gender and Land Statistics: Recent Developments in FAO's Gender and Land Rights Database*. Rome: Food and Agriculture Organization of the United Nations.
- Fishbayn, J. and S. Neil, eds. 2013. *Gender, Religion, and Family Law: Theorizing Conflicts between Women's Rights and Cultural Traditions*. Waltham, MA: Brandeis University Press.
- Global Agriculture and Food Security Program (GAFSP) 2012. "Food Security Support Project in the Louga, Matam, and Kaffrine Regions." Request from the Government of Senegal, Dakar.
- Gueye, Y. D. 2008. "Case Study: Gender, Human Security and Climate Change in Senegal." In *WEDO Study: Gender, Climate Change and Human Security*. New York: Women's Environment & Development Organization (<http://www.wedo.org/wp-content/uploads/senegal-casestudy.pdf>).
- Kaag, M., Y. Gaye, and M. Kruis. 2011. *Accountability in Land Governance: A Study into the Stakes in Senegal*. LANDac Research Report. Utrecht, the Netherlands: IS Academy on Land Governance (www.landgovernance.org/assets/Senegal-Research-Report-edited.pdf).
- OECD (Organisation for Economic Co-operation and Development). 2014. *Social Institutions & Gender Index*. Paris: OECD Publishing (<http://genderindex.org/country/senegal>).
- Perry, D. 2005. "Wolof Women, Economic Liberalization, and the Crisis of Masculinity in Rural Senegal." *Ethnology* 44 (3): 207–26.
- Rubin, D. n.d. "Gender Issues and Agriculture in Senegal." Report prepared for review by the United States Agency for International Development (USAID), Washington, DC.

- UNDP (United Nations Development Programme). 2014. *Human Development Report 2014: Sustaining Human Progress—Reducing Vulnerabilities and Building Resilience*. New York: United Nations Development Programme.
- . 2015. *Human Development Report 2015: Work for Human Development*. Statistical Appendix. New York: United Nations Development Programme (hdr.undp.org/sites/default/files/hdr_2015_statistical_annex.pdf).
- USAID (United States Agency for International Development). 2010a. *Gender Assessment: USAID/Senegal*. Prepared by DevTech Systems, Inc. Washington, DC: United States Agency for International Development (https://www.k-state.edu/smil/docs/gender/Senegal_/Gender_Assessment_Jun-2010.pdf).
- . 2010b. *USAID Country Profile: Senegal—Property Rights and Resource Governance*. Washington, DC: United States Agency for International Development.
- . 2016. *USAID Country Profile: Senegal—Property Rights and Resource Governance*. Washington, DC: United States Agency for International Development.
- WBG (World Bank Group). 2015. *Business, Women and the Law 2016: Getting to Equal*. Washington, DC: World Bank.
- WEF (World Economic Forum). 2009. *The Global Gender Gap Report 2009*. Geneva: World Economic Forum.
- . 2014. *The Global Gender Gap Report 2014*. Geneva: World Economic Forum.
- World Bank. 2015. *World Development Indicators*. Washington, DC: World Bank.

APPENDIX H | SUMMARY OF ELECTRICITY UTILITIES STUDY

The electricity utilities study aimed to explore how utilities address social and gender impacts of energy infrastructure development and how gender equality is addressed within the organization. Specific objectives were to document how corporate social policies and practices are developed to address gender issues and how they promote greater gender awareness and responsiveness throughout the chain of business operations. Three cases were examined, illustrating specific practices and links between corporate policies and initiatives.¹

KEY MESSAGES

Electricity utilities are generally positioning themselves as actors of economic development and partners for social changes. Economic growth is perceived as being stimulated by the supply of energy, which, in return, enables the development of economic activities. Employment and energy access by the poor are perceived as bringing equity and inclusion within the societies in which the utilities operate.

However, in most cases, gender issues are not systematically approached at the project level. The diversity of business operations and contexts make it challenging for the utility companies to develop a general gender policy that would consistently apply to each context and follow specific country regulations. A second project-level challenge for the utility is a lack of capacity for building gender awareness and sensitivity within all business units, including service providers and suppliers.

Corporate social responsibility (CSR) is the primary area that potentially addresses social and gender issues in both the utility's operations and organization, including their systematic integration throughout the business. CSR strategies reflect the utility company's values and are operationalized in each branch of the business. This review suggests that CSR strategies and policies are based on principles of sustainability, human rights, inclusion, and nondiscrimination and are usually embedded in the company's development agenda. In most cases, they address gender issues indirectly through the lens of global developmental goals and international frameworks on social responsibility. For most of the companies researched, their main development goals and/or international conventions are integrated into their CSR strategies. In India, Tata Power framed its CSR strategy based on the Millennium Development Goals (MDGs) and established CSR departments in its operational units responsible for organizing community social-welfare activities. For most electricity utilities, gender issues are addressed mainly as a human resources question, and are limited to equal employment and professional development opportunities. CSR principles are usually operationalized through various commitments, ranging from charity and outreach programs to comprehensive CSR programs and strategies.

Global CSR initiatives and country regulations are necessary but insufficient conditions for aligning practices. Some companies have deployed management strategies as a way to address social and gender issues throughout the chain of business operations. However, these management strategies may still be undermined by the challenges of operating in a variety of contexts and having a multiplicity of operations.

Companies' values and the way they define their role within the energy-society nexus are also essential factors for understanding how they address gender equity. Employment is perceived as one of the main benefits of electricity infrastructure development. As a result, most gender-equality initiatives are directed toward enhancing gender equality within the company.

Diversity and inclusion are the focus of most human resource management policies. Such policies aim to attract new profiles into the sector, while enhancing cohesion and building a sense of corporate culture among a diverse range of employees. However, this study shows that, without a specific gender approach, it may not be enough to move toward gender equality within the utility. Gender policies appear to provide a stronger framework for addressing occupational segregation, employee recruitment and professional development, and monitoring of gender equality.

Other gender-differentiated impacts, such as women's access to land at the project level, appear to be absent in the utilities' social responsibility frameworks. Although the development community acknowledges such issues, few initiatives have been implemented within the framework of lenders' safeguards standards. Thus, it is important to consider how the findings of the ESW study can be operationalized (i.e., how to raise awareness about gendered land issues within the electricity utilities and incorporate them into the safeguards standards).

This study showed that gender or gender-sensitive policies emerge from the following: a strong regulatory framework, the international development agenda, strong social dialogue, and pre-existing sensitivity to gender issues, as well as business needs, awareness of social changes, and strong social values.

STUDY METHOD

The electricity utilities study was based on a desk review of secondary literature and in-depth interviews with selected utility representatives (Table H.1). The secondary sources on gender dimensions of the utilities provided an overview of CSR policies, existing regulations worldwide, and international safeguards and reporting standards, as well as social and gender initiatives. This literature review made it possible to establish criteria for identifying potential utilities for in-depth case studies.

A web search was conducted to identify electricity utilities that met some of the following criteria related to social and gender awareness and responsiveness:

- use of tools to assess and monitor social and gender impacts,
- stakeholder consultations with project-affected communities,
- addressing gender issues when mitigating social impacts,
- specific organizational settings to address social and gender impacts,

TABLE H.1**Interviewees for the Electricity Utilities Study**

NAME	OPERATIONS	POSITION	CONTACT DETAILS	LOCATION
PT PLN Persero				
Mr. Antonio R. Artono	Indonesia Power Generation	Director, Business Development Department	antonius.artono@indonesiapower.co.id	Indonesia (Jakarta)
Mr. Agung Siswanto		Head, Development of Human Resources and Talent Management	agung.siswanto@indonesiapower.co.id	
Mr. Imam Adi		Manager, Development of Human Resources and Talent Management	imam.adi@indonesiapower.co.id	
Ms. Fanina Andini		Head, Corporate Communication	fanina.andini@indonesiapower.co.id	
Ms. Inten Cahyani		Director, Finance Department	inten.cahyani@indonesiapower.co.id	
Ms. Sumber Utami	Java-Bali Control Center and System Operation Transmission	Head of Public Relations	dhini.utami@gmail.com	Indonesia (Cinere)
Mr. Warsono		System Planning Manager	warsono_pln@pln.co.id	
Ms. Desti Wijayanti		CSR Officer	destiwij@gmail.com	
ENGIE				
Ms. Laure Vincotte	Corporate Investment	Manager, GDF Suez Rassembleurs d'Energies (GSRE)	laure.vincotte@gdfsuez.com	France (Paris)
Ms. Paola Vezzaro	Human Resources	Human Resources Manager for Asia	paola.vezzaro@gdfsuezasia.com	Thailand (Bangkok)
Mr. David Cullerier	Business Development, PT Paiton Energy (IPP)	Director	david.cullerier@paitonenergy.com	Indonesia (Jakarta)
Ms. Muriel Morin	Corporate Affairs	Director of Human Resources	muriel.morin@gdfsuez.com	France (Paris)
EDF				
Mr. Pierre Mazeau	Corporate Affairs	CSR Manager, Sustainable Development Department	pierre.mazeau@edf.fr	France (Paris)
Ms. Caroline Carre	Human Resources	Manager, Diversity and Social Responsibility	caroline.carre@edf.fr	

(continued)

TABLE H.1 continued**Interviewees for the Electricity Utilities Study**

NAME	OPERATIONS	POSITION	CONTACT DETAILS	LOCATION
AEP				
Ms. Sandy Nessing	Corporate Affairs	Managing Director, Sustainability and ESH Strategy	smnessing@aep.com	United States (Columbus)
Ms. Melissa Tominack		Coordinator, Sustainability and ESH Strategy	matominack@aep.com	
Hydro-Quebec				
Ms. Carine Durocher	Production	Social and Environmental Advisor	durocher.caribe@hydro.qc.ca	Canada (Montreal)

- signed conventions and international CSR standards and compliance with industrial code of conduct, and
- defined set of corporate values and policies on gender equality.

The final roster contained 19 electricity utilities based and/or operating in East Asia and the Pacific, Europe, the United States, and Canada.² The screening questionnaire invited these companies to participate in the study; yet only five responded. The broad study scope required communication with human resources managers, corporate leadership, project managers,³ and communications and CSR managers. However, this was not always possible, and sufficient information was gathered only for three companies: PT PLN Persero, EDF, and ENGIE. All three utility companies represent large groups involved in electricity generation, production, and transmission. PT PLN Persero is an Indonesian group that operates only in Indonesia. EDF (*Électricité de France*) is a French transnational company with 33 subsidiaries and associate companies around the world.⁴ Group operations include energy production from nuclear, coal, gas, and hydropower, as well as worldwide transmission and distribution of electricity. For both PLN Persero and EDF, the head company is a state-owned enterprise. ENGIE, formerly GDF Suez, is a private French group in which the French government owns shares. It resulted from the merger of various businesses, which, according to interviewees, has fostered ideal conditions for building capacity in managing diversity. The group consists of ENGIE and its international branches, along with associate companies involved in integrated activities within the energy sector (e.g., environment, energy services, and infrastructure).

The PT PLN Persero case study focused on how the PLN group is positioned as a development agent and how it adapts to social changes and an increasing share of women in the labor market. For this case study, interviews were held with representatives of (i) the PLN Java Bali Transmission and Load Dispatch Center, which is responsible for electricity transmission, high- and medium-voltage network extension and maintenance and (ii) Indonesia Power, a subsidiary company engaged in coal-fired electricity production, which is responsible for planning increased production capacity and maintenance of power

plants. The EDF case study focused on the modalities of social responsibility management within the group and how the group is building a corporate culture of social responsibility. The ENGIE case study focused on the strategy of gender-balanced management to build a gender-sensitive corporate culture throughout the group and better position the group in its operating environment.

The objective of the semi-structured interviews was to understand whether and how CSR strategies and principles influence the utilities' position and policies on social and gender issues when implementing projects, with a focus on labor and land issues. The secondary objective was to understand how gender equality is addressed within the organizations. The main guiding questions were as follows:

- What are the CSR principles? To what extent do they address gender issues?
- What are the initiatives to address gender issues?
- What are the barriers to and drivers of women's employment?
- Does the utility have policies to support women's employment?

How are corporate values formed? What influences the utility's CSR strategy?

Corporate values are an essential driver of CSR both within the utility organization and at the project level. They are applied throughout business operations using various policies. The terminology used to define CSR principles and objectives shows that companies usually position themselves as actors of economic development and partners in fostering socioeconomic change. International certifications and reporting standards are used to define the CSR strategy and serve as broad guidelines for implementing initiatives at the project level. The government usually requires state-owned enterprises to fulfill and report on social responsibility.

How responsive are CSR strategies to gender issues?

Every company considers engagement with the project-affected communities and customers more generally as essential; customer satisfaction and good community relations are an integral part of good corporate governance values. Community satisfaction and customer perceptions of the company may also be used as indicators to evaluate the utility's performance.

Despite the general development framework in which CSR is embedded and the overall principles of diversity and inclusion in human resources management, gender initiatives at the project level are not systematic. They depend on contextual needs, the utility's identification of project impacts, and responsiveness to international and national safeguards standards. They generally vary, based on the utility's capacity to identify and address gender issues.

For most companies' CSR, the scope of gender equality is limited to the utility and does not extend to the project-affected communities. Only a handful of companies have defined specific gender policies and plans, which are often embedded in strong national and regional regulatory frameworks and international standards of social responsibility. The main factors encouraging gender policies are clear

national regulatory frameworks detailing specific objectives on gender, greater gender awareness within the company, strong social dialogue, and companies' labor needs.

In most cases, the CSR approach to gender equality centers on equal opportunities of employment and professional development. At present, companies—mainly those in developed countries—frequently set targets for women's representation in the traditionally male-dominated energy sector. Other common CSR principles are respect for human rights, nondiscrimination and prevention of harassment, and support to local development. These principles are operationalized through various utility commitments, ranging from charity and outreach programs to comprehensive CSR programs and strategies.

However, the minimalist approach of equal opportunities and nondiscrimination appears insufficient if we want to see equality of outcomes. As the *World Development Report 2012: Gender Equality and Development* argues, gender equality matters both intrinsically in its own right and instrumentally since greater gender equality contributes to economic efficiency and key development outcomes (World Bank 2011). The report focuses on three key dimensions of gender equality: (i) the accumulation of endowments (education, health, and physical assets); (ii) the use of those endowments to take up economic opportunities and generate incomes; and (iii) the application of those endowments to take actions, or agency, affecting individual and household well-being. These are aspects of equality where lack of choice is reflected in shortfalls of welfare. They matter in and of themselves and are closely interlinked. Agency allows women to build their endowments, which shape access to economic opportunities and incomes. Women's ability to access economic opportunities and earn income can, in turn, influence their agency. Such reasoning naturally leads to questions of measurement; that is, whether equality of opportunity is enough to achieve equality of outcomes and whether we want to see equality of outcomes.

We argue that men and women can have systematically different preferences, attitudes, needs, and constraints that are biological but largely “learned” social behaviors (World Bank 2011). Culture and environment have a strong influence on behavior, leading men and women to internalize specific social norms and expectations. Furthermore, persistent differences in power and status between men and women can become internalized in aspirations, behaviors, and preferences that perpetuate the inequalities. To that end, one cannot define equality of opportunity without also considering how actual outcomes are distributed. Only by trying to equalize outcomes can one break the vicious circle of low aspirations and low opportunity.

Applying theory to practice, we can view the energy sector as an example where equality of opportunity has not managed to produce equality of outcomes, even in some of the most advanced countries. Many energy companies do not have an equal share of men and women in their workforce. That companies are setting explicit targets for women's representation proves that providing equal opportunity is not enough, and some type of affirmative action is necessary to reach the desired level of outcomes.

Analysis of the main utilities in Europe, the United States, and Canada shows that women's representation is in a range of 20–30 percent. For example, in the EDF France group, it ranges from 18 percent to 42 percent; the main explanation for this variation is occupational segregation, meaning that women tend to be concentrated in supporting sector positions (e.g., administration and finance) rather than in technical operations. In its push for change, the French government now requires companies to publish

an exhaustive annual gender equality report, collective bargaining plans on gender equality every three years, and implementation of quotas so that women will comprise 40 percent of the boards of publicly listed companies by 2017.

Is gender addressed by suppliers and contractors?

Corporate values, missions, and CSR strategies are enforced through the companies' code of conduct and transferred throughout the supply chain via contracts with service providers and suppliers, companies' involvement in industrial initiatives,⁵ and audits. The case studies highlight the challenge of enforcing specific social and gender principles when contracting service providers and suppliers because of such factors as diluted responsibilities and procurement policies, among others. Suppliers and contracted companies may not always have the human and financial resources needed to adapt to specific policies required by the head company. However, global principles (e.g., human rights, respect, nondiscrimination, and free of harassment) are generally part of the contracts.

Project planning: Is gender part of the conversation?

During the planning phase, local stakeholders and communities are introduced to the project and its potential impacts. Consultations are used to gain knowledge on social issues in the project area, which informs the environmental and socioeconomic impact assessment (ESIA).⁶ Review of company CSR profiles does not allow for defining the level of gender awareness and sensitivity during the consultations. According to interviews with utility representatives, local language skills and partnerships with local organizations and women representatives of CSR units who can directly contact communities are essential elements for incorporating gender issues into the consultations.

The ESIA is the most standard method for assessing project impacts and risks, often representing the first in-depth analysis of communities' livelihoods and potential project impacts. Because it is developed by an independent party contracted by the company, the methodology used can vary greatly. The analysis of communities' livelihoods is often conducted at the household level, with gender-disaggregated data reduced to communities' demography. However, some recent initiatives have incorporated gender impact assessments and gender action plans into the project design; but such cases are the exception. Gender-disaggregated data on livelihoods produced by these analyses have acknowledged the gendered experience of resettlement and access to land ownership, women's specific vulnerability in terms of loss of natural resources, and specific barriers to initiatives targeting women.

Implementation initiatives: How is gender addressed in the project areas?

International safeguards standards (e.g., those of the IFC and WBG), the Equator Principles, and national regulations usually frame how utilities assess a project's impacts and develop mitigation and benefit-sharing plans. In general, initiatives remain embedded in an overall development framework of increased business opportunities and access to universal health and education. HIV/AIDS outreach

programs and women's education are the most common support provided to project-affected communities, and initiatives addressing specific gender issues related to land impacts are rare.

Most initiatives capitalize directly on changes induced by electricity supply and existing industry opportunities (e.g., support to development of local economic activities, vocational training, and employment). While employment is one of the focal areas of the utilities' CSR strategies, recruitment of women in the project-affected communities is often limited by the technical nature of the energy business, which requires specific and/or high-level skills.⁷ Generally, women's employment in electricity companies remains a challenge; in the best cases, women's representation is in a range of 9 to 30 percent.

Overall, initiatives specifically addressing gender issues in the project-affected communities are derived from the contextual needs in which the company operates, development goals that drive the CSR strategies, and international safeguards standards. As a result, gender initiatives within the communities are most often not systematic, depending instead on the project framework.

What are the drivers of actions addressing gender? What is the business case for women's employment in the energy sector?

Beyond their role as electricity suppliers, the electricity utilities examined in this study are positioning themselves more as agents of development. Gender issues are rarely addressed directly; rather, they are integrated utilizing the lens of development goals and international CSR frameworks. Policies and actions aimed at addressing gender equality within communities, although part of some companies' CSR, are rare; the main focus is on women's representation and gender equality within the utility. Furthermore, development of gender policies and plans is often embedded in strong national and regional regulatory frameworks, as well as international standards of social responsibility.

Most of the companies selected for the study are members of the United Nations Global Compact and other international organizations and initiatives regulating social responsibility;⁸ these address gender equality in (i) human rights conventions, which declare the equal rights of men and women and prohibit discrimination and violence toward women and (ii) international CSR frameworks promoting non-discrimination, women's education and training, women's empowerment, gender equality within its environment, and gender-equality monitoring reporting. Thus, international community and development agendas, which incorporate gender equality as one of their goals, are among the strongest drivers for addressing gender issues in energy companies. Various government regulations and policies that explicitly impose rules and quotas for women's employment in the sector are another factor promoting gender equality.

According to the *World Development Report 2012: Gender Equality and Development* (World Bank 2011), the fast-changing global economy has increased private-sector demand for greater skills and talent pools. Businesses are looking to attract and recruit female talent and have increasingly tried to retain women employees through policies improving work-life balance. Firms acknowledge that a diversity of opinions can enrich decision making and stimulate ingenuity. In most industrialized countries, utilities have already developed policies and initiatives to address gender equality issues.

Gender equality is usually addressed through the companies' internal human resources and CSR policies. Diversity and inclusion, the most common policies, primarily target equal opportunity of employment, remuneration, and career development. Gender is the most common aspect of various diversity markers (e.g., age, ethnicity, religion, race, and sexual orientation). These diversity and inclusion policies essentially target employment; as such, they are mainly a tool for human resources management.

The three case studies are testimonial that diversity and inclusion policies are used to attract new profiles and talent and enhance social cohesion within the utility and as a driver of increased performance. Building on their experience in merging various entities and business lines, ENGIE managers recognize that "a diverse workforce opens the path to discussion of diverse opinions and brings innovation." In ENGIE and EDF groups, both men and women managers referred to studies on women as a positive factor for better performance (McKinsey & Company 2010, 2012; Zenger/Folkman 2012). Diversity and inclusion are also motivated by the need to represent and communicate with the diverse environment in which the companies operate.

Interviewees from Europe and the United States mentioned the importance of adapting to labor market changes to attract new candidates. Historically, electricity utilities have not experienced a high turnover of their workforce. However, expansion and innovation in energy production, combined with the needs of an aging labor force, are creating an important case for a diversified workforce. The energy sector is booming and is recruiting. For example, EDF "has recruited and is still planning to recruit 5,000–6,000 employees per year" (EDF 2015). In this context, recruiting and integrating new employees at a fast pace require new strategies. According to human resources managers, women in Europe represent "an important pool of candidates. Women have established themselves in the labor market. It is not only about recruiting them, we have to be able to propose interesting and rewarding careers" (EDF 2015).

What is the degree of occupational segregation in the energy sector?

Gender issues within the utilities, such as women's low rate of participation and occupational segregation, are well acknowledged, and utilities have developed initiatives to improve the situation. However, such initiatives are limited in emerging economies, where technical and specialized skills are especially scarce. In Europe, gender policies and mainstreaming explain that the ratio of women employees does not vary greatly from one company to another. However, disaggregated data within the utilities testifies to barriers that companies have to deal with in order to foster greater gender equality. In the EDF France group, women's representation in 2014 ranged from 18 percent for an Italian subsidiary to 42 percent in Belgium. EDF France has a women's ratio of about 30 percent, while that at the group level is about 26 percent (2014 figures). The main explanation for these differences is occupational segregation (EDF 2015). Disaggregated data shows that occupational segregation by gender is also significant for the United States and Canada. For example, BC Hydro records a ratio of women employees in administration and business management offices as high as 51 percent.

In East Asia and the Pacific, the range is higher (9–40 percent), which is explained by the difference in socioeconomic contexts and regulations. Origin Energy, an Australian-based company, reports the

highest ratio of women employees, at 40 percent, but the operating environment is strongly regulated by the Australian government's gender policies and requirements for social responsibility within the extractives industry. In Indonesia, PT PLN Persero has no specific gender policies. The human resources vision is to provide "equal opportunity of employment and salary for equal competences."⁹ Recruitment practices follow the principle of employment based on competencies, and human resources apply a performance-based system for wage and career promotions. Yet, the group has tripled the number of women employees within 10 years.¹⁰ Apparently, this process is related to general social changes in the society. However, it may also be explained by a cascading effect; that is, as women start to work in the electricity sector, they lower some barriers and open greater opportunities for increasing women's employment. The group now employs more than 63,000 people, 15 percent of whom are women. This rate of women's participation is higher than the national average for the electricity sector; however, occupational segregation is significant, suggesting the need for further research to better understand this process.

In South Asia, India's Tata Power has a low level of women's representation among employees, at only 9 percent. This low women's ratio may be explained by India's low literacy rates among rural women, the country's low rates of female labor force participation, and its male-dominated work environment.

The French government requires companies to publish an exhaustive gender equality report each year, develop collective bargaining plans on gender equality every three years, and implement quotas to reach 40 percent of women on the boards of publicly listed companies by 2017. In 2006, the government required sectors to reach collective agreements to redress the gender pay gap. Finally, an equality label was created in 2004 to encourage firms to implement gender equality plans.

Furthermore, the European Work Council has engaged in mainstreaming gender equality and mandated unions to enforce its gender strategy. In this context, EDF and ENGIE have established collective agreements on gender-equality targeting: gender-balanced management and technical positions, women's empowerment and agency, professional equality, combating gender stereotypes and sexism, reporting gender-equity achievements, and fostering vocations (EDF 2012; GDF Suez 2012). The identified targets are considered instrumental in pushing for change.¹¹

What initiatives can increase women's representation in the energy sector?

Four major initiatives were identified to overcome barriers to women's employment in the energy sector:¹² (i) building a pool of women candidates in science, technology, engineering, and math (STEM) fields, (ii) achieving gender-balanced management, (iii) sensitizing staff and providing coaching for women, and (iv) addressing harassment.

Building a pool of women candidates in STEM fields. The utilities interviewed are addressing the lack of women in STEM vocations through partnerships with high schools and universities. Women from electricity utilities visit schools to introduce professional opportunities in their field, and also act as role models. In France, EDF is tracking the ratio of girls in STEM fields in order to achieve a representation of women within the company at least equal to that of men.¹³ However, women vocations may also be

limited by the nature of work, which is not conducive to family life. Positive discrimination through quotas and targets are exclusively used in contexts where national governments have promulgated gender-equity laws. During interviews, men presented this as a sensitive issue; however, women interviewees highlighted the need for quotas to push for and accelerate change.

Achieving gender-balanced management. Driven by its strategy of being a benchmark employer, ENGIE has developed a strong management position to address gender issues within its group. In 1998, the group's president personally engaged himself in gender equality. ENGIE's attention is given to achieving gender-balanced management to foster change. As a result, women's employment ratio is relatively high, although it varies by business activity. As observed in the other companies examined, women's employment in technical positions at ENGIE is still limited, as indicated by the low percentage of women employees in the highly technical area of energy services, at just 16 percent.

Sensitizing staff and providing coaching for women. Gender stereotypes are addressed through a set of measures, including sensitization of managers, women's coaching and mentoring, and setting up women's networks as platforms for discussion and creating visibility. To understand these challenges and adapt its actions, ENGIE has developed academic and university partnerships to support research and company understanding of social and gender issues. Women in Networking (WIN) has been organized to raise awareness on women's experiences in their working environment. WIN provides a space for dialogue and group reflection on professional challenges and group strategies. It also offers support for developing women's capacities and empowerment. Ambassadors promote the network to the CEO of other group entities to stimulate a cascading effect and increase participation. Currently, the network of more than 1,200 members is active in five countries.

In ENGIE, mentoring and coaching are an essential part of building women's leadership skills and positioning them as future managers. Women already in leadership positions act as role models and provide personalized support for women's career development, including confidence-building and negotiation skills.

Addressing harassment. Interviews with a representative of PT PLN Persero indicated that prevention of harassment is an important principle of its human resources management policy. In 2006, the labor union organized an awareness-raising campaign on harassment, which provides women an arena for discussion and information sharing; however, no information was provided on how harassment prevention is communicated within the company. The interviewee emphasized that social networks and social media are the most convenient platforms for raising awareness on gender issues and sharing ideas among women.¹⁴

ENDNOTES

¹These three cases do not present the entire range of practices within each company and thus cannot be considered an exhaustive representation of how these companies are addressing social issues.

²An initial list of some 30 worldwide companies was established and pared down to companies reporting according to the Global Reporting Initiative (GRI) standards. In fact, some companies on the initial list demonstrated original initiatives that may have provided additional understanding on gender issues. However, the level of corporate

information was insufficient and/or it was not possible to reach out to company representatives. Also, the regions selected were based on initial terms of reference and consultant locations.

³Because it was not possible to interview project managers, the study findings on gender initiatives at the project level may have been biased. Only general information was available; thus, some specific gender issues may have been omitted.

⁴Companies are considered subsidiaries when EDF is the major shareholder; other companies, such as independent power producers (IPPs) are considered associates (e.g., Nam Theun 2 Power Company).

⁵For example, the Better Coal Initiative and International Hydropower Association.

⁶During the operational phase, consultations are used to help monitor impacts and plan mitigation measures.

⁷This constraint was emphasized by all of the companies interviewed, particularly in the context of low- and middle-income economies.

⁸Such as OECD Guidelines, ISO 2600, which is a standard certification providing CSR guidance.

⁹Personal communication with all interviewees, April 2015.

¹⁰Interview with system operations manager, PLN control center, April 2015.

¹¹Interview with ENGIE Asia Region human resources manager, May 2015.

¹²Illustrative barriers include gender stereotyping, sexism, lack of women vocations, and cultural differences that hinder equal recruitment and professional development of women.

¹³Interview with EDF France CSR manager.

¹⁴Generally, initiatives aim to increase the number of women within the company and reduce occupational segregation through (i) vocational training to build a talent pool of women candidates; (ii) career development programs to attract and retain talent; and (iii) providing suitable working conditions for women, good parental-leave policies, and work-life balance.

REFERENCES

- EDF (Électricité de France). 2012. *Collective Agreement on Gender Equality (2012–2014)*. In French (<http://www.wk-rh.fr/actualites/upload/Accord-egalite-EDF-21-12-2012.pdf>).
- . 2015. Interview with EDF Diversity Manager, May.
- GDF Suez. 2012. *Agreement on Gender Equality*. Press release (<http://www.gdfsuez.com/wp-content/uploads/2012/06/CP-GDF-SUEZ-accord-europ-percentC3percentA9en-mixit-percentC3percentA9-VA.pdf>).
- McKinsey & Company. 2010. *Women at the Top of Corporations: Making It Happen*. Women Matter 2010 (<http://www.mckinsey.com/global-themes/women-matter>).
- . 2012. *Making the Breakthrough*. Women Matter 2012 (<http://www.mckinsey.com/global-themes/women-matter>).
- World Bank. 2011. *World Development Report 2012: Gender Equality and Development*. Washington, DC: World Bank.
- Zenger/Folkman. 2012. *Women Do It Better Than Men: A Study in Leadership*. Orem, UT: Zenger/Folkman (<http://www.zengerfolkman.com/media/articles/ZFCo.WP.WomenBetterThanMen.033012.pdf>).



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