

**Sub-Regional Conference:
Going Beyond the Meter: Inclusive Energy Solutions in South Asia**
11-12 April, 2016 – Jai Mahal Hotel, Jaipur, Rajasthan

Conference Report

23 June 2016

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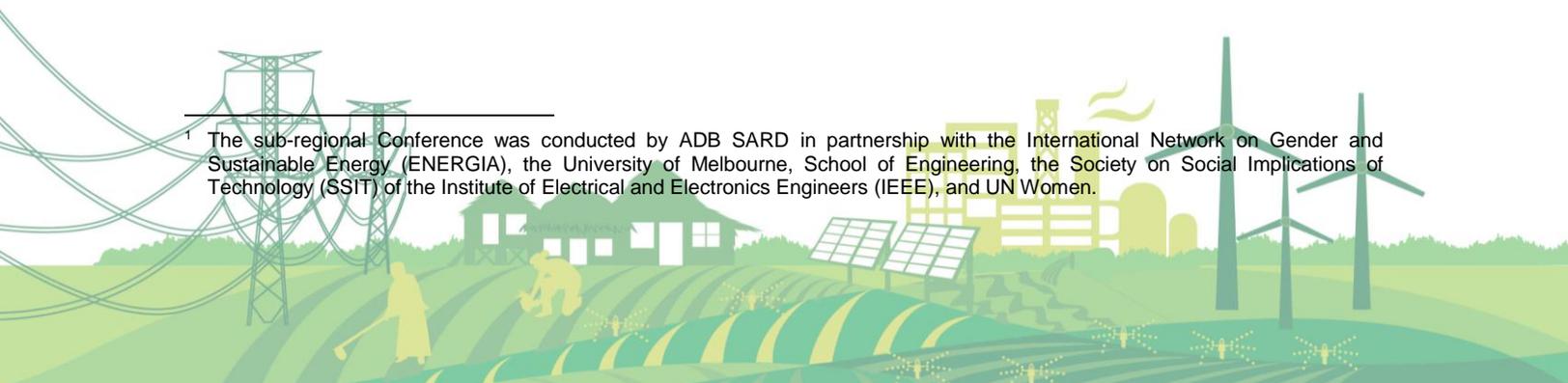
I. Introduction

1. On 11-12 April 2016, the Asian Development Bank (ADB) South Asia Department (SARD) convened 103 energy and social development practitioners and experts (65 men and 38 women) in Jaipur, Rajasthan, India at a *Sub-regional Conference on Going Beyond the Meter: Inclusive Energy Solutions in South Asia*. These practitioners and experts – representing governments, private sector, academia, and civil society organizations of six South Asian countries (Bangladesh, Bhutan, India, Maldives, Nepal, and Sri Lanka) as well as ADB energy, gender and social development specialists; and partners¹ -- exchanged gender and socially inclusive analyses of energy sector programs and energy technologies with emerging good practices, and lessons. This Conference was part of ADB's strategy in promoting **Energy for All** towards poverty reduction, gender equality and social inclusion (GESI).

A. Conference Objectives and Structure

2. The objectives of the sub-regional Conference were to enable the energy and social development practitioners and experts to:
 - a) Showcase innovative practices in pro-poor, gender and socially inclusive energy sector policy development, and program and project design and implementation;
 - b) Demonstrate how good practices and workable solutions in GESI-responsive delivery mechanisms can enhance the overall effectiveness of energy sector projects; and
 - c) Enhance capacities of executing and implementing agencies (EAs/IAs), particularly of project directors and staff of ADB supported projects, on practical approaches to integrate pro-poor and GESI considerations in energy sector policies and programs in a systematic and sustainable manner.
3. The Conference Program was structured around the following six themes:
 - Session 1: Setting the context – Delivery strategies to maximize inclusive access;
 - Session 2: GESI enabling policy, regulatory and institutional environments;
 - Session 3: Entry points for GESI mainstreaming;
 - Session 4: Skills development to create a local pool of labor;
 - Session 5: Innovative and “disruptive” technologies and processes; and
 - Session 6: Alternative financing schemes and business models.
4. Each session used a combination of video clips, feature speakers and a panel of experts representing a broad range of organizations and experiences to discuss key issues and country-specific and project-based case studies with promising practices and lessons on promoting inclusive energy solutions.

¹ The sub-regional Conference was conducted by ADB SARD in partnership with the International Network on Gender and Sustainable Energy (ENERGIA), the University of Melbourne, School of Engineering, the Society on Social Implications of Technology (SSIT) of the Institute of Electrical and Electronics Engineers (IEEE), and UN Women.



II. Conference Highlights

A. Inaugural Session

5. Teresa Kho, the Country Director of the ADB India Resident Mission (INRM) welcomed all guests and participants; provided the global and South Asian context of the Conference; and gave an overview of the Conference objectives. She described the key importance of inclusive energy access to sustainable development as one of the United Nations' 17 Sustainable Development Goals (SDGs) – *SDG #7: Ensure access to affordable, reliable, sustainable, and modern energy for all*. She brought attention to the great challenge that lies ahead as follows: More than 1 billion people around the world still have no access to electricity. In South Asia, most of these people are in rural areas with women suffering disproportionately more from this energy scarcity.
6. Sanjay Malhotra, IAS, Principal Secretary of the Energy Department, Government of Rajasthan (GOR) and His Excellency Pushpendra Singh, the Minister of State (Energy), GOR in their Opening Remarks and Keynote Address, respectively, expressed their full support for the Conference sharing GOR's highest priority is in achieving energy access for all – both renewable and commercial energy – with recognition of the importance of ensuring gender equality. At the time of the Conference, GOR had successfully provided electricity to 99% of its villages, which has been higher than the national average.
7. Anthony Jude, Director, ADB SARD Energy Division, closed the Inaugural Session by highlighting the Government of Rajasthan as a role model in achieving India's national target for solar power and in providing an example to the solar sector in the region with ADB's full support. He emphasized the importance of achieving **Electricity for All** not only for lighting but also to generate income opportunities that would lift poor families from poverty especially in the rural areas.

B. Session 1: Setting the Context—Delivery Strategies to Maximize Inclusive Access

8. The objective of the first session was to set the context of the Conference and highlight broad strategies and delivery mechanisms that maximize energy access and aim for poverty reduction, social inclusion, and gender equality.
9. The session featured a presentation entitled **Access and Beyond – Addressing Challenges in Inclusive Energy Development in India** by Anju Bhalla, Joint Secretary of the Ministry of Power, Government of India (GOI). The presentation highlighted GOI's goals, approaches and achievements in promoting *24x7 Power for All* through complete village electrification by 2019. Key strategies to achieve this goal are: (i) preparation of specific action plans, in collaboration with State governments, to ensure quality power for all; (ii) signing of the "Power for All" by 18 States; (iii) separation of feeders for supply of energy to ensure adequate power supply to farmers while ensuring uninterrupted power supply to households; and (iv) the *Pradhan Matri Ujjwala Yojana*, a landmark GOI scheme to extend the availability of cooking gas to women in below-poverty-line (BPL) households; and provide employment to rural youth in cooking gas supply chains.



10. Key GESI-related energy issues raised by the panel speakers were:²

- Need to reexamine the top-down process or **supply-driven strategy** for delivering energy technology, and consider a demand-driven approach informed by the needs and wants of the people including GESI-related concerns.
- Need to look at **energy access** (i) not as an end in itself but as a means to reach development goals such as gender equality and women's empowerment; and (ii) from a holistic (not one-size-fits-all) and multidimensional perspective, including electrification, safe cooking, and others.
- Need to revisit initiatives to promote energy access for safe cooking. Research shows while **electricity access rate** is increasing in the Asia Pacific (14% increase in Asia Pacific vs. 9% increase globally between 1990-2012), **cooking energy access rate** is decreasing with 2.06 billion people still relying primarily on traditional solid fuels.

11. Delivery strategies to maximize inclusive access shared were:

(a) Gender and Socially Inclusive Framework for Energy Development:

- Adoption of a **demand-driven, GESI-inclusive strategy** for delivering energy technology, acknowledging women and disadvantaged groups as change agents at the center of inclusive energy solution initiatives;
- Promotion of Gender Equality and Social Inclusion (GESI) as a framework for ensuring Energy Access for All initiatives (i) highlight who benefits from energy technologies; and (ii) support the economic empowerment of women and disadvantaged groups;
- Framing energy access as an enabler of inclusive economic growth and poverty reduction by linking it to other social issues such as food security, water supply, education, and health (e.g., energy access to maternal health clinics).

(b) Energy development approaches:

- Looking at **different dimensions of energy access** such as capacity building to maximize available energy resources; awareness raising on productive and sustainable use of energy; energy-based livelihood skills development (including marketing, leadership and assertive skills) for women and disadvantaged groups; and, providing an enabling environment through inclusive energy policies, alternative energy financing schemes, access to markets by women entrepreneurs, etc.);
- Attracting **private sector to finance access to and support markets for inclusive energy technologies** by framing the supply of energy for the poor as a viable commercial proposition [WB study found the poor to spend \$37 bn a year for different sources of lighting and energy (e.g., candles, batteries, etc.)];
- Provision of **alternative financing schemes** (at micro and meso levels) that can be owned and operated by the people so that the earnings from financing energy supplies could go back to them (e.g. *Grameen Shakti* approach in Bangladesh);
- Building **partnerships for GESI-inclusive energy solutions** by listening to the needs of the poor and facilitating dialogues between government and CSOs.

² The moderator of Session 1 was Sonomi Tanaka of the ADB Sustainable Development and Climate Change Department (SDCC). The panel speakers were Thiyagarajan Velumail, Global Energy Policy advisor of UNDP; Sheila Oparaocha, International Coordinator and Program Manager of ENERGIA; Sohail Ahmed, Chief Operating Officer of Grameen Shakti, Bangladesh; Arunavo Mukerjee, Vice President for Advisory Services of Tata Cleantech Capital, India; and Francesco Tornieri, Principal Social Development Specialist of ADB SARD.



C. Session 2: GESI Enabling Policy, Regulatory and Institutional Environments

12. The objective of the second session was to present promising or emerging practices in pro-poor, socially and gender inclusive government energy policies, legal and regulatory frameworks, tariff regulations, and institutional capacity development. Key issues highlighted by the feature and panel speakers were:³

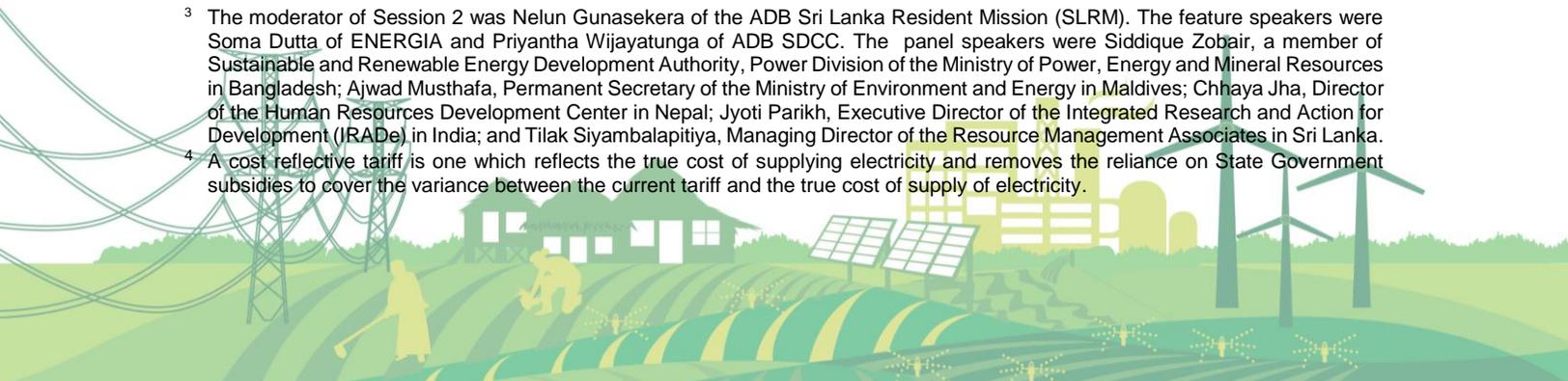
- **Gender gaps persist in South Asia** despite the (i) presence of national policies promoting gender equality and women's rights, and the commitments set out in the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and national Constitutions; (ii) inclusion of gender equality in national planning documents; (iii) assigning of gender-related responsibilities to specific ministries and agencies; (iv) designation of gender focal points in sector/line agencies; and (v) engagement in gender-responsive budgeting across all sectors.
- **Gender issues related to the energy sector** include: (i) silence of energy sector policies and programs on gender differentiated impacts of energy access with generic focus on people (except for a range of women-targeted interventions); (ii) women's limited access to productive resources and financial services making them less able to benefit from energy investments; (iii) women's 'unrecognized' involvement in the non-commercial (and non-monetized) energy sector; (iv) low representation of women in decision-making bodies in the energy sector and in the formal system of governance; and (v) electricity services not always responsive to women's specific needs such as for low-cost domestic appliances, powering wells, labor-saving technologies for agricultural production, post-production and household chores.
- In general, about **300 million people in South Asia lack access to electricity due to absence of a centralized grid or decentralized solutions and affordability problems.**
- Limited access is exacerbated by **issues in tariff regulations** including the lack of complete independence of tariff regulators in tariff regulation; absence of cost reflective tariffs⁴ because of gross subsidies due to poor targeting; and unclear exact subsidies to each consumer category. Surveys show that those who don't have access to energy pay at least twice as much than those who have energy access.
- In energy development projects, studies tend to be very technical and done without adequate community consultations or participation to understand gender differentiated needs and impacts of energy access. Opportunities for stakeholder consultations are during the environmental and social impact assessments; however by its completion the project has already moved forward. If a project provides households compensation, this comes to the family without considering the gender inequalities within households. There are project teams that assume that a project can address gender issues, but this is difficult to achieve if project teams do not ensure gender expertise before project implementation.

13. The feature and panel speakers mentioned the following measures to address these issues:

- To promote inclusive energy access: (i) **cover underprivileged areas in service provision**; (ii) address the issue of **affordability of house wiring, connection costs**

³ The moderator of Session 2 was Nelun Gunasekera of the ADB Sri Lanka Resident Mission (SLRM). The feature speakers were Soma Dutta of ENERGIA and Priyantha Wijayatunga of ADB SDCC. The panel speakers were Siddique Zobair, a member of Sustainable and Renewable Energy Development Authority, Power Division of the Ministry of Power, Energy and Mineral Resources in Bangladesh; Ajwad Musthafa, Permanent Secretary of the Ministry of Environment and Energy in Maldives; Chhaya Jha, Director of the Human Resources Development Center in Nepal; Jyoti Parikh, Executive Director of the Integrated Research and Action for Development (IRADe) in India; and Tilak Siyambalapitiya, Managing Director of the Resource Management Associates in Sri Lanka.

⁴ A cost reflective tariff is one which reflects the true cost of supplying electricity and removes the reliance on State Government subsidies to cover the variance between the current tariff and the true cost of supply of electricity.

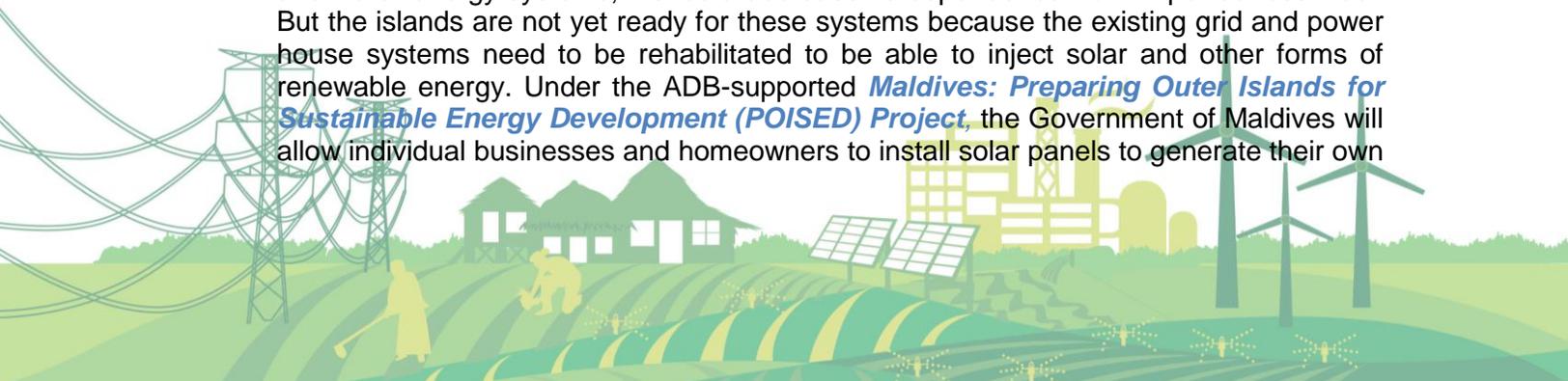


and **recurrent costs** by supporting initial costs and providing tariff subsidies for recurrent costs to poor households, including poor women-headed households; (iii) promote and support the use of electricity for livelihood development; (iv) introduce energy solutions that ease women's work burden and improve their access to health services and education; (v) provide energy-related information and training to women; (vi) ensure women's participation in energy planning, decision-making, and implementation; (vii) strengthen the capacity of regulators in tariff structures, tariff levels, and targeting sectors that need subsidies; (viii) ensure energy development project teams have expertise in GESI mainstreaming and demand-driven energy technology development; and (ix) integrate gender considerations in the development and implementation of programs at national and local government levels.

- One way to reach the last mile –or provide electricity services to underprivileged areas and generate power for all– is to support **cross-border power trade**.
- To address the issue of **2.9 billion people lack access to clean cooking energy**, a multi stakeholder program is needed to bring together NGOs, financiers, governments, and producers of induction stoves, rice cookers, etc. to thresh out problems and develop workable solutions.
- Providing **subsidies for energy access is an entry point for mainstreaming gender in the energy sector**, but this needs to be carefully studied. Questions that need to be answered are: (i) What is our definition of subsidies? (ii) Who will finance these subsidies and what is the subsidy recovery mechanism, without which utility agencies will resist this policy? How will we target or identify the beneficiaries? The current approach of governments is to base targeting of subsidies on consumption. Hence, low user is considered low income customer. But a high user household –with ten members- may still be a low income customer. Other options are to define subsidies on per capita basis or by output. But this requires a lot of administrative work. The challenge is to strike a balance between better targeting and administrative requirements.

14. Good practices shared were the following:

- In Bangladesh, off-grid electrification is mainly provided through solar energy by the government in collaboration with the private sector. One example is the **Bangladesh: Infrastructure Development Company Limited (IDCOL) Program**, which engages women in selecting the sites for solar home systems (SHSs) and the location of street lights. There are participating organizations, like *Grameen Shakti*, that have specific programs to train women in maintaining SHSs, and repairing electrical devices, such as mobile phones and solar lanterns. With these support initiatives, women involved in SHS have increased their income and have become more involved in decision-making at the household and –broadly- societal level.
- In Maldives, power generation was initially community-driven due to the inability of the central government to reach out to all island communities. But in the course of time, government-owned utility companies took over, electricity commercialized, leading to the loss of community-driven initiatives. Moreover, the Maldives being an ideal site for solar and water energy systems, it should decrease its dependence from imported fossil fuel. But the islands are not yet ready for these systems because the existing grid and power house systems need to be rehabilitated to be able to inject solar and other forms of renewable energy. Under the ADB-supported **Maldives: Preparing Outer Islands for Sustainable Energy Development (POISED) Project**, the Government of Maldives will allow individual businesses and homeowners to install solar panels to generate their own



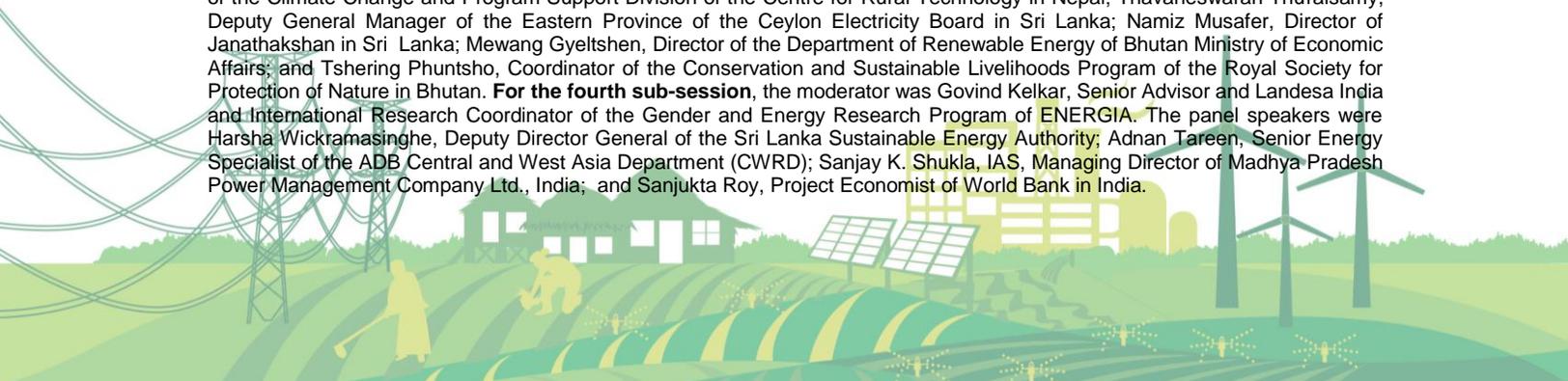
energy; hence reviving community initiatives. Under a public sector investment program, the Government will also install solar panels on rooftops of public buildings, and the generated electricity will be fed directly into the grid. Money saved from this shift to renewable energy will be used to support start-up businesses in communities, including those of women entrepreneurs. Women will also be given employment opportunities by the 20-30% allocation of jobs under the POISED Project.

D. Session 3: Entry Points for GESI Mainstreaming

15. The objective of the third session was to facilitate an exchange of concrete strategies and approaches that promote women's productive energy use through energy-based microenterprise development, improved service delivery, skills training, and end-user demand side management. The session was divided into four sub-sessions featuring ADB supported projects:⁵
- (i) **Large Energy Infrastructure** -- Community Development Strategies in Risk Mitigation in India and Nepal;
 - (ii) **Enhancing Women's Productive Energy** — Case Study of India: Madhya Pradesh Energy Efficiency Improvement Investment Program;
 - (iii) **Improving Service Delivery and Women's Livelihoods** — Case Study of Improving Gender Inclusive Access to Clean and Renewable Energy in Bhutan, Nepal and Sri Lanka; and,
 - (iv) **End-User Demand-Side-Management.**
16. The GESI mainstreaming entry points and approaches highlighted during these four sub-sessions were the following:
- **Policies and practices of government agencies as entry points:** This approach was featured in two ADB-supported projects in India and Nepal.

In the ADB-supported **India: Himachal Pradesh Clean Energy Development Investment Program**, entry points for mainstreaming gender equality and social inclusion, include: (i) a government policy that requires a project owner (whether government or private business) to allocate 1.5% of total project cost for local area development fund to be administered by local stakeholders and 1% of annual electricity sales to be contributed to the local communities for income generation and welfare schemes; (ii) rehabilitation and resettlement (R&R) plans that include social welfare

⁵ For the first sub-session, the moderator was Jyotirmoy Banerjee, Senior Project Officer (Energy) of ADB INRM; and the speakers were Andrew Jeffries, Energy Head at ADB INRM and Suman Subba, Senior Social Development Officer (Gender) of ADB Nepal Resident Mission (NRM). For the second sub-session, the moderator was Prabhjot R. Khan, the Associate Social Development Officer (Gender) of ADB INRM; and the speakers were I.C.P. Keshari, IAS, Principal Secretary, Energy Department, Government of Madhya Pradesh, India; Natalie Chun, Economist of the ADB Economics Research and Regional Cooperation Department (ERD); Sumeet Patil, Research Director of NEERMAN, India; and Ranen Banerjee, a partner of the Price Waterhouse Coopers in India. For the third sub-session, the moderator was Soma Dutta of ENERGIA; and the speakers were Surendra Rajbhandari, Deputy Managing Director of the Project Management Directorate of the Nepal Electricity Authority; Purushottam Shrestha, Director of the Climate Change and Program Support Division of the Centre for Rural Technology in Nepal; Thavaneswaran Thuraisamy, Deputy General Manager of the Eastern Province of the Ceylon Electricity Board in Sri Lanka; Namiz Musafar, Director of Janathakshana in Sri Lanka; Mewang Gyeltshen, Director of the Department of Renewable Energy of Bhutan Ministry of Economic Affairs; and Tshering Phuntsho, Coordinator of the Conservation and Sustainable Livelihoods Program of the Royal Society for Protection of Nature in Bhutan. For the fourth sub-session, the moderator was Govind Kelkar, Senior Advisor and Landesa India and International Research Coordinator of the Gender and Energy Research Program of ENERGIA. The panel speakers were Harsha Wickramasinghe, Deputy Director General of the Sri Lanka Sustainable Energy Authority; Adnan Tareen, Senior Energy Specialist of the ADB Central and West Asia Department (CWRD); Sanjay K. Shukla, IAS, Managing Director of Madhya Pradesh Power Management Company Ltd., India; and Sanjukta Roy, Project Economist of World Bank in India.



measures benefitting women and other marginalized groups; (iii) engaging existing community-based organizations, including women's organizations, in raising public awareness, organizing project affected families, and implementing R&R plans; and (iv) supporting self-employment schemes for project affected families.

Under the *JFPR Grant 9158: Improving Gender-inclusive Access to Clean and Renewable Energy in Bhutan, Nepal and Sri Lanka*, the Nepal Electricity Authority (NEA), state-owned electricity utility company responsible for the generation, transmission and distribution of power in Nepal, followed the procedures set in the Community Rural Electrification Program (CREP), which it initiated in 2005, to provide electricity connections to project covered areas. The CREP is part of a government policy to encourage public participation in rural electrification. Under this Program, an electricity user cooperative (EUC), which should be registered under the Company Act, Association Registration Act, Social Welfare Act, and Cooperative Act, submits an electricity application before the Community Rural Electrification Department (CRED) of NEA through a local distribution company carrying with them a demarcation of distribution area, and information on their technical and managerial capacities as well as financial resources. Upon receiving the application, the CRED verifies the information and issues a letter of intent of support. Then, the government shoulders 90% of the cost of electrification and the community provides 10% counterpart. There are now 297 EUCs providing electricity to 400,000 households. The JFPR 9158 provides support to 10 EUCs. The Grant shouldered 50% of the 10% community counterpart (hence 5% of the total electricity costs for ten EUCs) and supported the technical and managerial training of the members of these ten EUCs. At present, six EUCs are now operating. Distribution facilities have just been provided to two EUCs. On the whole, the program ensured the participation of women in the training.

- **Project risk mitigation and social safeguard policies of the ADB and Governments as entry points:** Entry point for mainstreaming GESI in ADB-supported large energy infrastructure projects is in risk mitigation or safeguard-related activities.

For instance, in the *Nepal: Tanahu Hydropower Project*, which is still at its initial implementation stage, GESI features are integrated in the community development strategy (CDS) for risk mitigation to address resettlement, environment and other negative social impacts. These GESI features include (i) conducting participatory consultations with women and socially excluded which include a discussion of women's rights;(ii) providing employment opportunities to women in project sites and ensuring that work environment is women-friendly; (iii) restoring livelihoods through giving life skills and financial management training to women and men of displaced households, targeting 100% of female headed households (FHHs) and those below the poverty line (BPL); vocational training on new skills to displaced and affected households (60% women) with potential employment and market; (iv) FHHs in target beneficiaries of rural electrification and providing access to microfinance for enterprise development, with 60% women beneficiaries; (v) promotion of self-help groups (SHG) for credit and savings activities, health, safety, income generation targeting 40 SHGs with 100% women members; (vi) microenterprise development training and financial support; and (viii) adoption of comprehensive GESI inclusive corporate policies by the Tanahu Hydropower Limited.

- **ADB Gender and Development (GAD) policy and practices as facilitating factors:** In ADB operations, during project preparation, a *gender analysis* is undertaken to identify project-related issues and socio-cultural barriers to women's participation, and *GESI*



action plan is formulated to respond to these issues and ensure equitable benefits of women and men in the project.

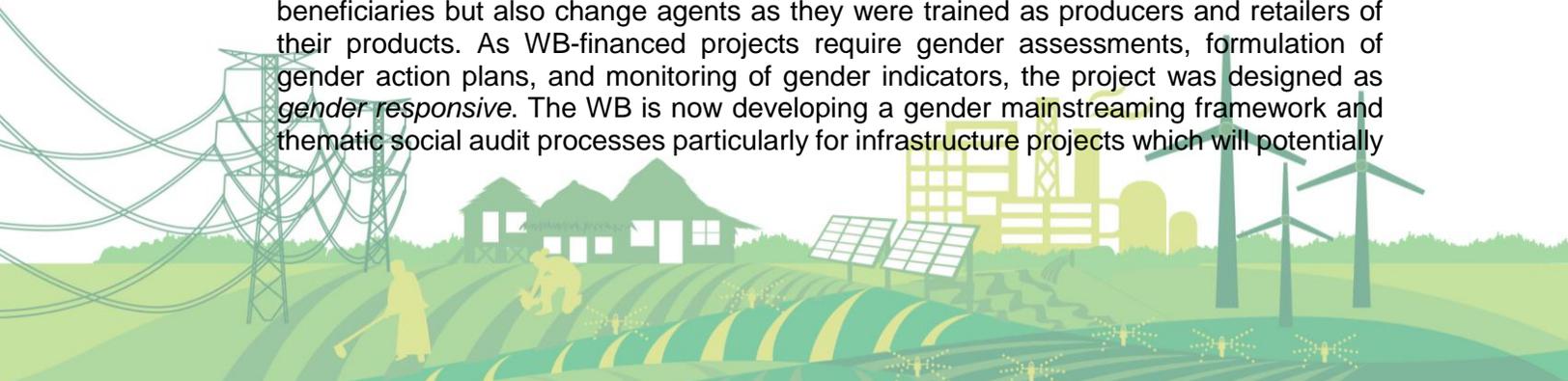
- **Engaging non-governmental organizations (NGOs) and community-based organizations (CBOs) to mobilize community (including women's) participation was highlighted through projects in Bhutan, Nepal, Sri Lanka and India.**

This was a special feature of *JFPR 9158: Improving Gender-inclusive Access to Clean and Renewable Energy in Bhutan, Nepal and Sri Lanka Project and the India: Madhya Pradesh Enhancing Energy Based Livelihoods for Women Micro-Entrepreneurs Project*. NGOs have wider outreach, better access to villages, and better awareness of the situation in the communities. Under the JFPR 9158 project, all engaged NGOs (Practical Action in Sri Lanka, Royal Society for Protection of Nature in Bhutan, and Centre for Rural Technology in Nepal) tapped existing government structures and the presence of other NGOs in reaching remote villages. Furthermore, in Sri Lanka, Practical Action conducted baseline studies and case studies to understand the motivations of villagers in using electricity by understanding how they thought electricity could help them; and linked with government mainstreamed programs for wider outreach. The Center for Rural Technology in Nepal (CRTN) assigned field facilitators to support the project-assisted electricity user cooperatives (EUCs) in selecting and motivating women entrepreneurs to engage in energy-based income generating activities. All three NGOs facilitated community awareness sessions on safe and efficient use of electricity, and trained women in the productive use of electricity, specifically in electricity-based micro-enterprises and in how to repair electrical appliances so they would not need to call technicians from town centers.

- **Promoting demand-side management to energy development was highlighted through three general approaches: (i) media campaign for more efficient and prudent use of electricity by the Sri Lanka Sustainable Energy Authority; (ii) training of women on more efficient cooking through production and sale of efficient cook stoves in Cambodia; and (iii) smart meter reading in an ADB-supported project in Pakistan.**

The media campaign for more efficient use of electricity in Sri Lanka was designed as television commercials which subtly use the rivalry between the sexes with men as worthless loafers and women as thoughtless wasters; and creatively use cultural negativism by portraying energy waste in a bad light. This campaign (i) contributed to the decoupling of GDP growth from electricity demand growth; (ii) lowered demand growth trajectory; and (iii) drove compact fluorescent light (CFL) bulb sales up by 30%, making CFL the main source of lighting. The challenges, however, are on the sustainability of the media campaign with the exorbitant cost of media space time and fatigue effect, and on ways to advance change which requires many other actions outside of the communication sphere.

In the World Bank's (WB) Cook Stove Project in Cambodia (2008), women were not only beneficiaries but also change agents as they were trained as producers and retailers of their products. As WB-financed projects require gender assessments, formulation of gender action plans, and monitoring of gender indicators, the project was designed as *gender responsive*. The WB is now developing a gender mainstreaming framework and thematic social audit processes particularly for infrastructure projects which will potentially

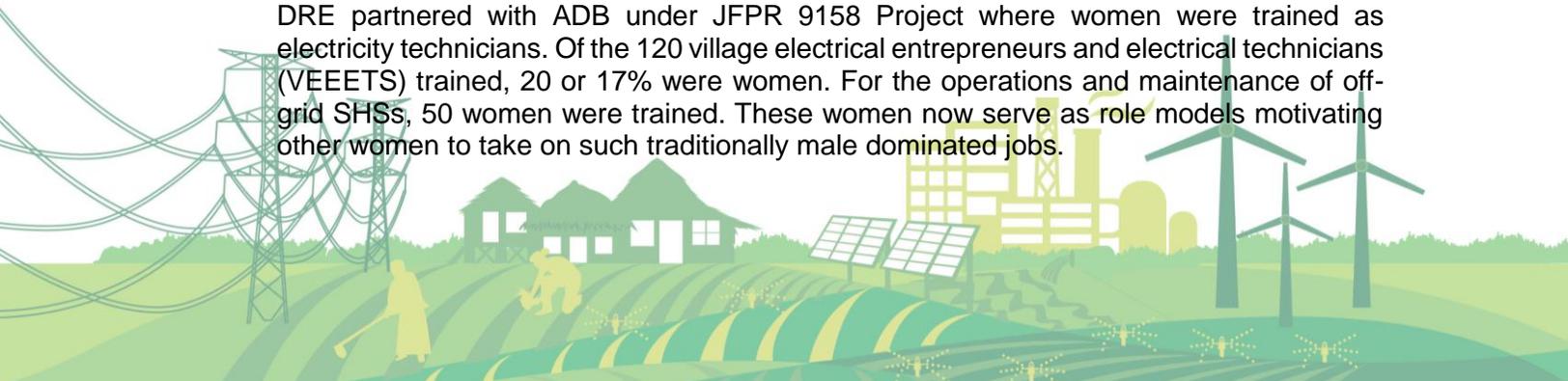


lead to infrastructure projects shifting from being gender-neutral to gender-specific, and energy projects shifting from being supply-driven to demand-driven.

In Pakistan, to address the problem of 5,000 MW gap, an ADB-supported project adopted two measures. First, instead of shutting down electricity in some areas, the project opted to limit load (a method called load shedding or load reduction) through **smart meter reading**. This provided a utility company real time data to plan and operate electricity services more efficiently. This method is financially and technically more sustainable. Another measure is the **separation of feeders**, where electricity can be shut down in, for example, commercial areas or residential areas without affecting the electricity in schools and hospitals. In smart meter reading, a mobile device is installed inside a house. This device provides information on how much electricity has been used and when electricity will be shut down; and hence enables house managers (who are usually women) to better plan their use of electricity. The benefits of smart meter reading are loss reduction, increase in revenue collection, and availability of real time data on electricity use. This does not need meter readers. The project also incorporated three measures to mitigate negative effects, particularly on women: (i) training women meter readers in new skills; (ii) providing job opportunities for women in computer data management and, computer service centers associated with smart meter reading; and (iii) community awareness-raising through focus group discussions on the benefits and effective use of smart meter reading.

17. Other good practices shared during the panel discussions were the following:

- The **India: Madhya Pradesh (MP) Energy Efficiency Improvement Program** separated the power supply to agriculture from the power supply to households in 28 districts in MP through 11 KV feeder with upgraded distribution system. Indeed, a study found significant differences between villages with separated and mixed feeders. Villages with separated feeders have: (i) more observed functioning meters in households; (ii) less expenditure on kerosene; (iii) more soybean yields; and (iv) more irrigation in summers. Through the Program's associated technical assistance project, TA 7831 *Madhya Pradesh Enhancing Energy based Livelihoods for Women Micro-Entrepreneurs*, training was provided to: (i) 20,729 women to gain access to energy-based income-generating business opportunities; (ii) 517 women in self-help groups (SHGs) on business development services; and (iii) 506 SHG women-members on gender and energy. The project aims (impact targets) for all 28 districts covered by the Program to receive 24-hour quality supply of electricity, for women to save 20% of their time spent for household tasks, and for children's study time to increase by 25%.
- In Bhutan, a small country with 700,000 population and very good hydropower resources, the energy sector is confronted with many challenges, but especially with the remoteness of some settlements, including some villages with only one household, and with the lack of road access to these villages. As a result, the Government of Bhutan, Department of Renewable Energy (DRE) built local capacities to inculcate a sense of ownership and responsibility for electricity maintenance and sustainability. To build this local capacity, the DRE partnered with ADB under JFPR 9158 Project where women were trained as electricity technicians. Of the 120 village electrical entrepreneurs and electrical technicians (VEEETS) trained, 20 or 17% were women. For the operations and maintenance of off-grid SHGs, 50 women were trained. These women now serve as role models motivating other women to take on such traditionally male dominated jobs.



- In Sri Lanka, the challenge was in motivating people to get household electricity connections because of the high installation costs and monthly bills. So the Ceylon Electricity Board (CEB) put up a mobile service program where staff went to villages to pay for the wiring and connections up to 50 meters. Beyond 50 meters, the households paid the balance. Affordable, easy-to-pay loans were also provided. With ADB support, CEB was able to provide 4,025 connections which more than doubled its targeted 2,000 connections.

E. Session 4: Skills Development to Create a Local Pool of Labor

18. The objective of the fourth session was to facilitate (i) an *exchange of experiences in energy sector initiatives that have created skilled and semi-skilled employment in project areas*, and (ii) a *sharing of analysis of the opportunities and impediments to women entering the skilled work force of new and emerging energy industries*.
19. The challenges of skills development in the energy sector were expressed as follows:⁶
 - With the surge of per capita electricity consumption, while a large population still does not have access to electricity and are dependent on traditional biomass mainly for cooking and heating, there is a *need to sustain the expansion, effective management, and impact on economic opportunities of renewable energy sources*. This can be done through *strategic investment in human capital*.
 - Utility companies are already providing a range of *training*, but training frameworks and overall coverage need to be clarified. ADB supports training opportunities, but limited to project life. There is need for a *continuous systematic training process* – given the changing technologies – especially for the 50% of the workforce who are poor and illiterate. There are many training institutions. The question is on how to interface these different training initiatives along *common standards* so that training certificates are recognized and those with experience but with no training certificates can also be recognized.
20. Key approaches shared to enhance employment and training opportunities for women were the following:
 - Conduct skills-gap analyses or employability and entrepreneurship potential assessments to ascertain emerging skill gaps in energy and complementary sectors. A research study in Bhutan for example showed that females did not perform well in mathematics and science. A competency development program should be formed to address this;
 - Mobilize a marketing campaign to showcase emerging opportunities and success stories;
 - Incentivize/catalyze partnerships between utility companies and training providers;
 - Expand and improve training facilities including centers of excellence in partnership with training institutions and employers/industry;
 - Promote integrated training packages – focusing on entrepreneurship; value chain analysis; ICT and connectivity; and access to credit– in partnership with successful catalyst institutions;

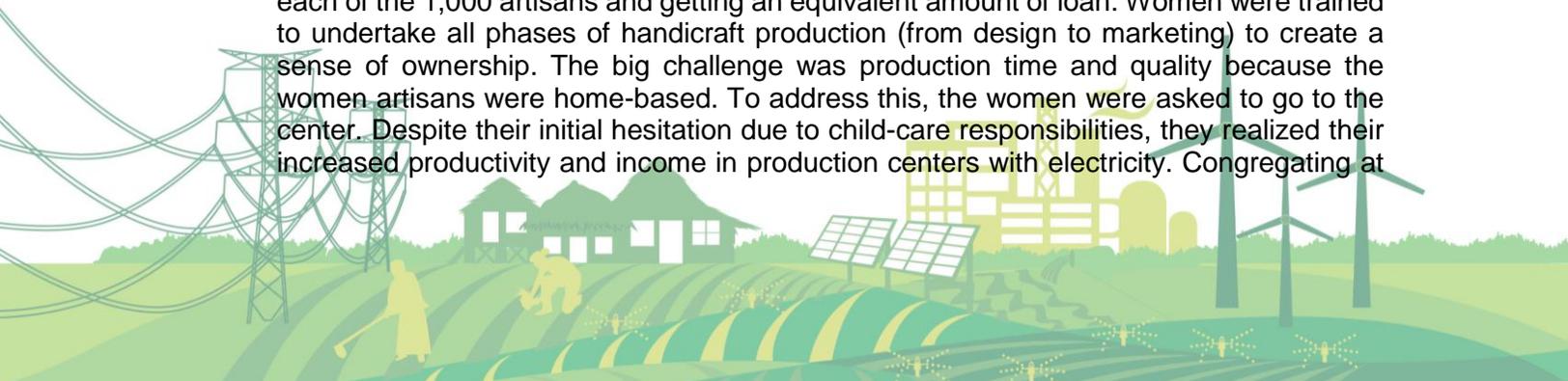
⁶ The moderator of the fourth session was Shanti Jagannathan, Senior Education Specialist of the Human and Social Development Division (SAHS) of ADB SARD. The feature speaker was Brajesh Panth, Technical Advisor for Education of the ADB SDCC; and the panel speakers were Anurag Bhatnagar, CEO Grassroots Trading Network for Women (GTNfW) - SEWA (Hariyali) India; Selima Ahmad, president, Bangladesh Women's Chamber of Commerce and Industry; Aishwarya Mahajan, Regional Head of the Livelihood Education Unit of Aide et Action International - South Asia, India; Sumita Ghose, Managing Director of Rangsutra Crafts, India; and Heruka Zangpo, Senior Manager of the Central Maintenance and Training Division of Bhutan Power Corporation Limited.



- Document success stories that can serve as models;
- Emphasize the 3 As: (i) **A**wareness raising; (ii) **A**ffordability; and (iii) **A**bility to produce and market good quality products;
- Develop energy-related enterprise programs that target women; and
- Provide an enabling environment for women entrepreneurs (e.g., supportive policies, skills development, access to finance, etc.).

21. Good practices shared among panelists included the following:

- **SEWA** – a trade union of self-employed women working in agriculture, handicrafts, and animal husbandry which is organized into 118 trade groups – has an energy-related project entitled *Hariyali* (translation: green livelihood) since 2010 which aims to (i) reduce women’s dependence on rain-fed agriculture where they spend a considerable amount of time, money and effort accessing energy, and (ii) change members energy sources from traditional fuels to renewable energy and machines to improve productivity and efficiency. The four project components correspond to four needs for energy: lighting, cooking, pumping, and running small businesses such as food processing. Women receive holistic training on how to use energy in their respective trades. Trainers are trained so that the training is constant, continuous, and peer-to-peer. The training starts with an assessment of women’s energy-related expenditures and their estimated savings if they shift to solar energy or a clean cooking device. The awareness raised under the project has driven women to buy and use solar lanterns, solar pumps, and clean cooking devices.
- **The Bangladesh Women’s Chamber of Commerce and Industry (BWCCI)** trained women micro-entrepreneurs to become producers, retailers and wholesalers of cook stoves; to deal with banks for accessing loan capital; and to be part of the value chain of cook stove industry. This has increased women’s income which enabled them to access energy, provide food to their families, education for their children, and give livelihood opportunities to other women.
- **The Aide et Action** established an *Initiative for Livelihood Education* for out-of-school youth based on an understanding of market demand and aspirations of the youth. The program design started with an employability potential assessment with a market perspective. The assessment included growing industries and their growth trends; skills sets needed by these industries; skills sets available locally; and an appropriate curriculum. In the last 10 years, about 38 vocations have been identified, on which 3-month training activities and 1 month on-the-job training were provided. More than 200,000 youth (39% women) were trained, 75% of whom have been employed and 13% have started their own enterprises. The trainees have become role models who can motivate the youth to aspire better lives and attend the livelihood education programs.
- **Rangstru Crafts** was formed as a response to stark inequality between rural and urban areas in India. While the urban areas benefitted from globalization, the rural areas were left out. The start-up capital of Rangstru was put up by collecting 1,000 rupees from each of the 1,000 artisans and getting an equivalent amount of loan. Women were trained to undertake all phases of handicraft production (from design to marketing) to create a sense of ownership. The big challenge was production time and quality because the women artisans were home-based. To address this, the women were asked to go to the center. Despite their initial hesitation due to child-care responsibilities, they realized their increased productivity and income in production centers with electricity. Congregating at



production centers has also increased women's self-confidence because they felt they belonged to a group with common problems and aspirations beyond their families.

- **The Bhutan Power Corporation (BPC)** is a government entity that is responsible for providing electricity to all villages in Bhutan. A challenge that it has faced in extending electricity lines to remote villages is the maintenance and sustainability of the operations. Establishing BPC service centers in the villages is not an option because of its very high cost. As an alternative, BPC trained village electrical entrepreneurs and electrical technicians (VEEETs). A total of 120 VEETs, of whom 20 or 17% women, were trained, and are now assisting the BPC in the villages.

F. Session 5: Innovative and “Disruptive” Technologies and Processes

22. The objective of the fifth session was to share information and knowledge on the **latest developments in clean energy technologies and processes** including emerging and disruptive technologies, “frugal” low-cost innovations, and end-user innovations that maximize access, sustainability, and social equity. Key issues drawn from the presentations of the feature and panel speakers were the following:⁷

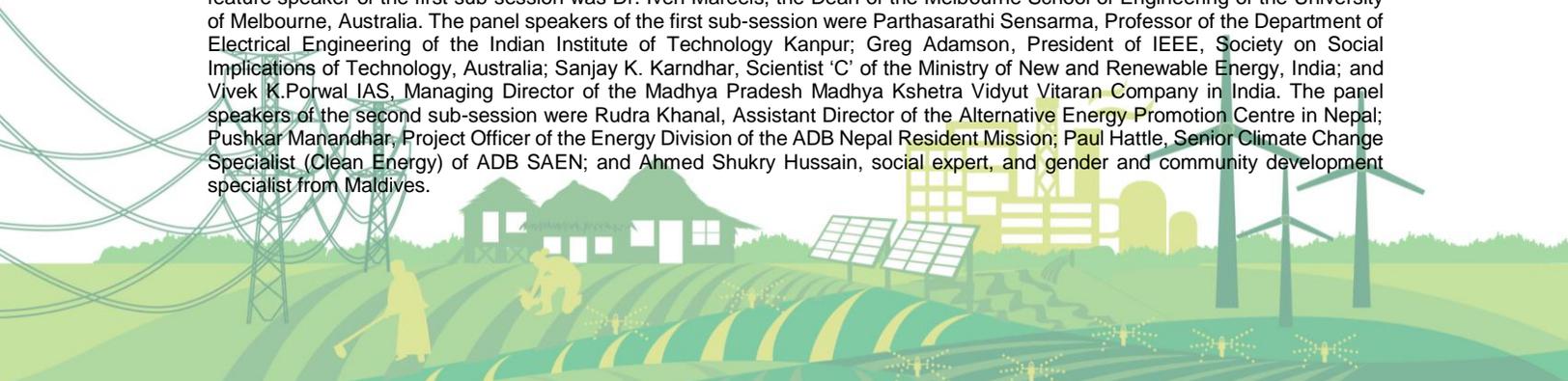
Gender issues related to energy:

- In Nepal, around 77% of the primary energy sources are from fuel. With the increasing out-migration of men for work, women are left to meet these 77% energy needs. Hence, energy technologies should be made women-friendly, and energy development should involve women;
- Reihana Mohideen's research found the maternal mortality ratios in several countries to be inversely correlated with per capita energy consumption. Countries with low per capita energy consumption had high MMRs while those with high per capita energy consumption had low MMRs. The challenge is on two fronts: (i) how to reduce MMRs with low per capita energy consumption; and (ii) how to reduce per capita consumption without increasing MMRs. It is important to note that while we understand little energy has great impact, we are also aiming for conserving energy.

Challenges of adopting solar energy technology:

- Solar energy requires a very strong grid, which in its current form is very weak.
- The diversity of electricity consumption and demand patterns – urban, rural, commercial, industrial which are very different environments with different patterns of energy use – poses some difficulty in the designing of solar energy technologies.
- Monsoons provide complexity in time and spatial distribution of energy for both energy use and energy production which need to be matched.
- To move to solar energy, demand side management (DSM) is essential because supply is not reliable. However, in the way the present grid is built, demand is not regulated or

⁷ The two sub-sessions of the fifth session were moderated by Dr. Reihana Mohideen, an energy infrastructure and gender consultant of ADB and Assistant Dean for Diversity and Inclusion of the School of Engineering of the University of Melbourne, Australia. The feature speaker of the first sub-session was Dr. Iven Mareels, the Dean of the Melbourne School of Engineering of the University of Melbourne, Australia. The panel speakers of the first sub-session were Parthasarathi Sensarma, Professor of the Department of Electrical Engineering of the Indian Institute of Technology Kanpur; Greg Adamson, President of IEEE, Society on Social Implications of Technology, Australia; Sanjay K. Karndhar, Scientist 'C' of the Ministry of New and Renewable Energy, India; and Vivek K. Porwal IAS, Managing Director of the Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company in India. The panel speakers of the second sub-session were Rudra Khanal, Assistant Director of the Alternative Energy Promotion Centre in Nepal; Pushkar Manandhar, Project Officer of the Energy Division of the ADB Nepal Resident Mission; Paul Hattle, Senior Climate Change Specialist (Clean Energy) of ADB SAEN; and Ahmed Shukry Hussain, social expert, and gender and community development specialist from Maldives.



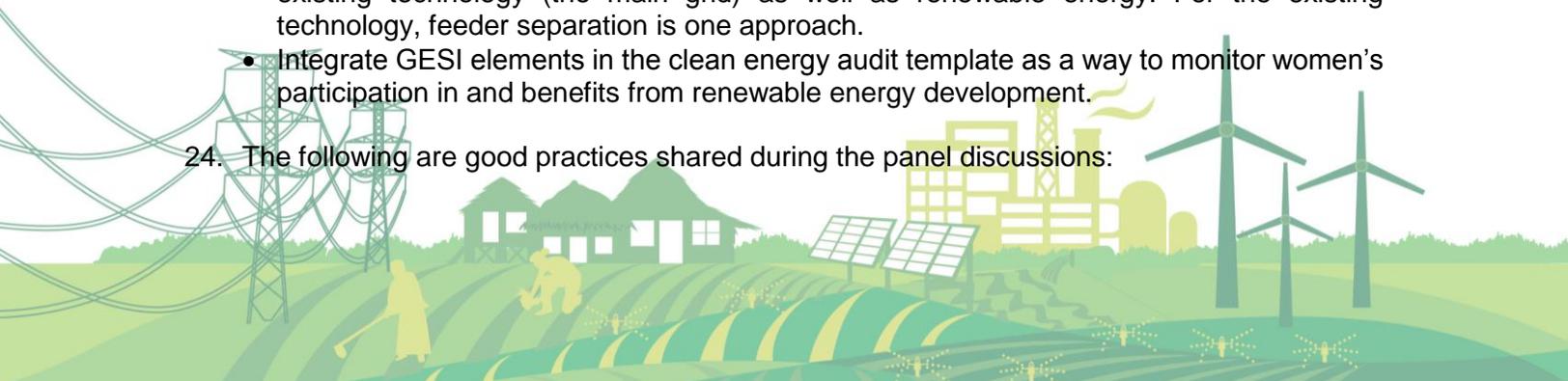
DSM does not exist because “demand is king”. So the biggest challenge is how to make solar energy reliable in a market that has demand.

- Electrical engineers do two things: (i) deliver the service; and (ii) ensure that electricity service is safe for people and equipment. That protection part is forgotten during fast electricity installation. Ensuring safety when the line breaks is very difficult. Normally, safety concerns is where electrical engineers spend most of their time.
- Who will shoulder the cost when the customers turn off their solar power because they don't need energy, or for example when it is raining and cloudy? A distribution company pays two types of costs: the fixed cost and the variable cost. Whether the solar power is used or not, the company will pay for the fixed cost, which the customers are not willing to pay when they are not using the energy. The differential cost (cost of buying solar power versus payments of the customers) is borne as a loss by the distribution company. In promoting renewable energy for rural electrification, it is important to resolve this differential cost problem to make it a viable solution.

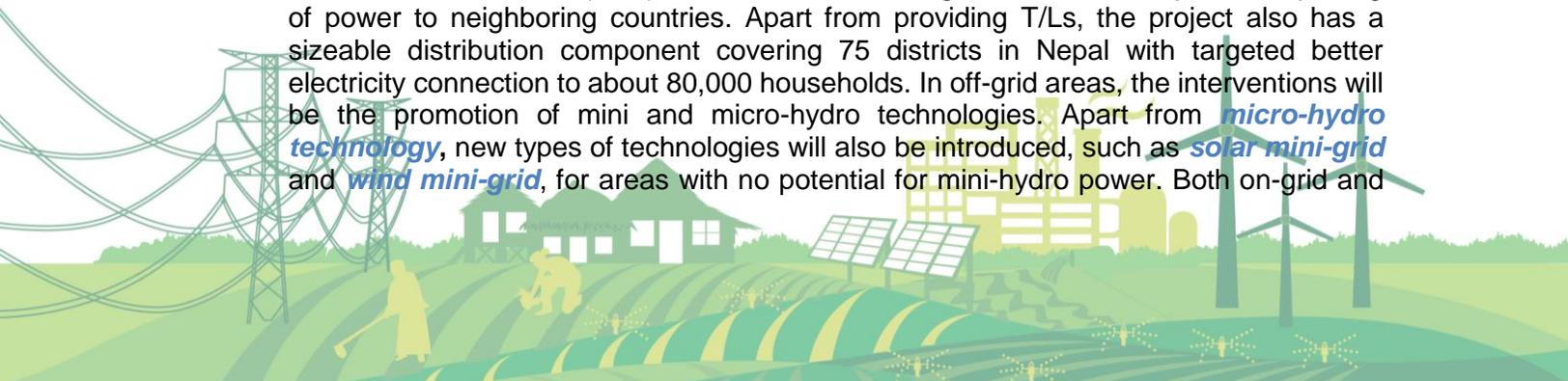
23. Measures put forward by the speakers to respond to these challenges were:

- To do DSM, we need a much **smarter grid**, **smart meter reading**, and **smart switches up to the last mile**. This is the difference between solar energy and the present grid. Normally, the last mile is the least concern of utility companies because it is very small, not profitable and therefore does not matter. In a smart grid, it is in the last mile that DSM is most important. This means that we need to invest a lot in the last mile.
- **Micro grids (stand-alone systems) do not have a transmission network**, which is an insurance policy that people rely on when there is a problem with the energy source. Micro grids are also not designed in alternative current (AC) mode. They run in direct current (DC) mode, which has 30% less copper, much higher transfer efficiency, and an easier demand management control. So if we want to be on micro-grid, then DC is the way to go. If we want a transmission network (insurance policy), then we need to have a precise phasor measurement unit (PMU), and to develop a novel protection methodology. Predictive management of the grid is also important because wind energy and solar energy change over time, and they change dramatically.
- To influence the design of an energy technology and ensure that it is gender friendly, it is important to **participate in the earlier stages of the development of (new) technologies**. The advantage of leading or participating in the beginning stages is that technology to a large extent is developed by the early users. It is difficult to adjust the design of a technology later after it has been developed for a different country with different circumstances. So with the current discussion about DSM, there is a tremendous opportunity for women to be part of the development of new energy technologies and make them gender friendly.
- The increase in energy demand due to economic growth and population expansion has led to the need for **innovative research and development (R&D) solutions** to provide affordable energy security with environmental protection. R&D should be viewed from a holistic perspective, including providing a supportive policy framework so that R&D efforts could reach energy producers and users with new technologies.
- As we cannot do away with the main grid, it is important to provide equal focus on the existing technology (the main grid) as well as renewable energy. For the existing technology, feeder separation is one approach.
- Integrate GESI elements in the clean energy audit template as a way to monitor women's participation in and benefits from renewable energy development.

24. The following are good practices shared during the panel discussions:

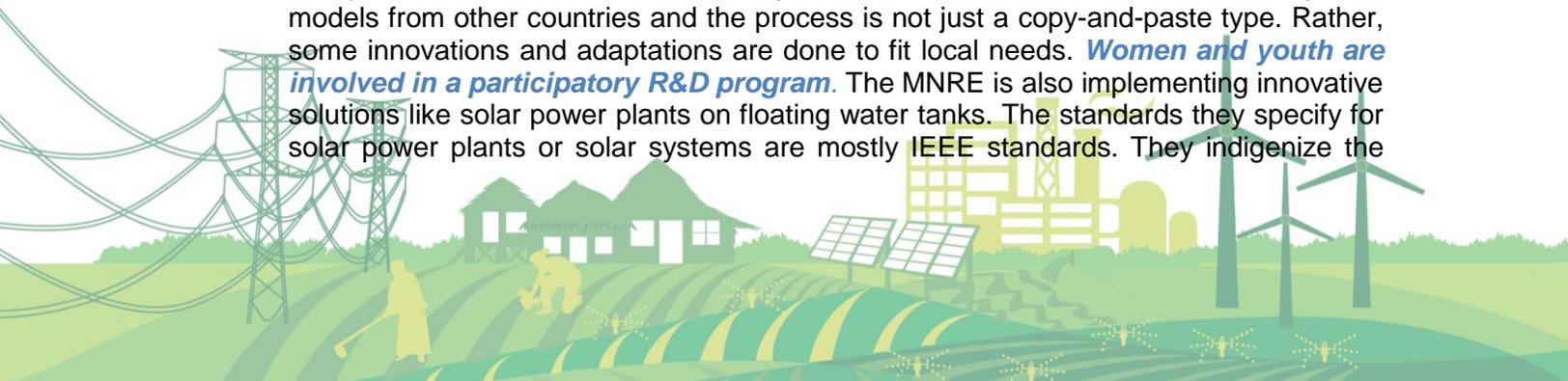


- Parthasarathi Sensarma (Professor of the Department of Electrical Engineering of the Indian Institute of Technology, Kanpur) presented a project which aimed at (i) **integrating renewable energy sources, such as solar, wind, biomass, and hydropower; and pooling them together into a network or grid**; and (ii) designing a device through which the small grid with diverse energy sources could be interfaced with the main grid. For the first objective, the project looked for renewable sources of energy (e.g., solar, wind, biomass, etc.) in remote locations in India; and found at least two sources anywhere. He said that what was lacking was not the solution for integrating these renewable energy sources into the grid, but a unified solution. They thought of solar lanterns and solar heaters, but these are micro solutions that would benefit only a single or just a couple of individuals. Hence, they sought for ways to pool together the diverse energy sources into a grid so that more people would benefit. The first unit that was commissioned in 2010 has solar PV, which can work to interface solar energy and wind energy, and bring them in the same grid. Thus, if people have solar installations, they could directly feed the power into the grid. And if many other sources of energy, apart from solar – some of these sources are plenty in the Indian subcontinent – can be integrated then the problem of storage can be cut down to a significant extent. (See slide presentation for photos of the units)
- Rudra Khanal (Assistant Director of the Alternative Energy Promotion Centre in Nepal) shared how they mainstreamed gender equality and social inclusion (GESI) in the National Rural and Renewable Energy Program (NRREP) in Nepal through: (i) ensuring at least 33% of **women and marginalized groups participate in the electricity user groups**, and allocating one of the major positions (chairperson, treasurer, secretary) of the project management committee to women; (ii) building capacities, such as in project management training, operator training, and enterprise creation training; (iii) providing up to 70% of subsidy in micro-hydro mini-grids for remote areas to ensure that the last mile are not left out, and another subsidy for women and disadvantaged groups who are starting their enterprises or income generating activities; and (iv) promoting enterprises in the catchment area of the micro hydro mini grid. Approaches used were (i) developing a GESI mainstreaming plan; (ii) collaborating with rights-based NGOs to reach the poorest segments or the last mile; (iii) designation of GESI unit with dedicated budget; and (iv) collection of GESI disaggregated data. To date, the program has established 1,100 enterprises and 2,000 income generating activities in which 53% are owned and operated by women and disadvantaged groups; and 1.7 million people have access to electricity through the micro-hydro mini-grid, of which 1 million are women and disadvantaged groups. Challenges faced were on how to effectively manage the diverse end users (women and disadvantaged groups), and how to ensure the equitable distribution of benefits to them.
- Pushkar Manandhar (Project Officer, Energy Division, ADB Nepal Resident Mission) described the SASEC Power System Expansion Project as designed to benefit the poor through increased economic and knowledge opportunities. As such, the project is considered to have strong gender implications. In on-grid areas, the project provides new transmission lines (T/Ls). There will be access generation, and expected exporting of power to neighboring countries. Apart from providing T/Ls, the project also has a sizeable distribution component covering 75 districts in Nepal with targeted better electricity connection to about 80,000 households. In off-grid areas, the interventions will be the promotion of mini and micro-hydro technologies. Apart from **micro-hydro technology**, new types of technologies will also be introduced, such as **solar mini-grid** and **wind mini-grid**, for areas with no potential for mini-hydro power. Both on-grid and



off-grid components of the project have a GESI Action Plan which will be implemented by the Nepal Electricity Authority (NEA) GESI unit.

- Paul Hattle (Senior Climate Change Specialist [Clean Energy] of ADB South Asia Energy Division [SAEN]) shared the ADB technical assistance project in Bangladesh, *Enabling Poor Women's Benefits from Enhanced Access to Energy in Hatiya Island*, which focuses on the nexus of gender, energy and livelihoods. The gender aspect focuses on FHHs and women living BPL; while the energy aspect focuses on innovative technologies that are socially sensitive and tailor-made to provide multi-range possibilities for services, including livelihood opportunities. The nexus is providing and **locating an e-Cluster in a neutral and socially adoptive environment** where everybody goes for different social activities – i.e. a social center. The e-Cluster is container-based autarkic solar PV-battery, which integrates indoor and outdoor LED lighting; DC/AC ventilation; PV water pumping/filtration; cold storage (freezers) for preserving fish catch; and internet facility. When located in a social center, it can provide electricity-based services to women's cooperatives – they can put up restaurants, handicraft shops, and connect to the internet. It is a pragmatic example of how to create possibilities and go the extra mile in engineering for social services. It can also address the intermittency of renewable energy that is the mismatch between availability of solar energy during daytime when we don't need it and its non-availability during night-time when we need it.
- Ahmed Shukry Hussain (social expert, and gender and community development specialist from Maldives) shared the experience of Maldives in promoting renewable energy. He said that in the Maldives – with 188 scattered tiny islands and 2 cities with a total population of 350,000-400,000 people; where the average population in 50% of the islands is 1,500-5,000 while some islands have less than 500 people – the source of energy (100%) is diesel with **powerhouses based on each island**. There are around 186 powerhouses in these tiny communities. Each of the 111 resorts also has its own powerhouse. The POISED Project is focused only on the 186 powerhouses, and is targeting to provide at least **30% solar and 70% diesel energy sources**. As solar power is a new technology in Maldives, a critical part of the project is community awareness raising and building the capacity of households in installing solar panels on their roof tops. The Project also provides ice plants which are handed over to the community council to be sold to the fishermen to raise income. The people are motivated to shift to solar energy because of the significant decrease in electricity bills -- from 16,000 rufiyaa to 4,000 rufiyaa – of one of the island councils when they installed LED lights. Also, one of the islands has a desalination plant, which spends 60,000 rufiyaa a month for electricity. In their estimation, they can generate around 20,000 kW if they install solar panels on the roof of the plant. As they only need 17,000 kW, the installation of solar panels means less electricity cost and excess electricity supply which they could sell through net metering. It is important to note that this desalination plant was established with the contribution of women and the island development committee.
- Sanjay K. Karndhar (Scientist 'C' of the Ministry of New and Renewable Energy (MNRE), India) shared that the MNRE has replicated successful research and development models from other countries and the process is not just a copy-and-paste type. Rather, some innovations and adaptations are done to fit local needs. **Women and youth are involved in a participatory R&D program**. The MNRE is also implementing innovative solutions like solar power plants on floating water tanks. The standards they specify for solar power plants or solar systems are mostly IEEE standards. They indigenize the



standards as far as possible because the IEEE standards do not recognize some factors that are indigenous to the Indian environment such as high gas and moisture content.

G. Session 6: Alternative Financing Schemes and Business Models

- The objective of the sixth session was to present existing *alternative financing mechanisms and business models*, including *private sector partnerships*, which have maximized access to energy services and facilities by poor consumers, and have improved productive energy use by women and disadvantaged groups.

25. The following are the alternative financing schemes and business models presented:⁸

- **Public-private business model** used by the IDCOL, a stated-owned government company, in promoting SHSs in Bangladesh. This model was considered the key to the successful implementation of the SHS program in the country. It involves engaging participating organizations (POs), which are mostly NGOs and micro-finance institutes (MFIs) with broad reach to poor households, as implementers of the program. They were selected by a selection committee based on a list of criteria, including the ability to operate the SHS program according to program directives. These POs are responsible for selling and installing the SHS products (e.g., solar panels, LED bulbs, etc.) to customer households by cash or credit; training the customers on how to use the SHS correctly; providing after sales services; and collecting payments on a monthly basis. IDCOL provides funding and capacity building support to the POs. There is a standards committee which has representatives from prominent engineering universities, local government institutions, Ministry of Power, and others, that is responsible for checking the quality of products of eligible suppliers. There is also a dedicated pool of technical inspectors who visit households to check the installation and services provided. An operations committee which is headed by the chief executive officer of IDCOL meets monthly to review the installation progress and efficiency of the collection by the POs; to discuss day-to-day operational and strategic issues encountered; and to develop solutions binding to the POs. Regularly, IDCOL conducts technical and financial audits to ensure the maintenance of program quality. They maintain a call center where households lodge their complaints directly. IDCOL responds to complaints filed.

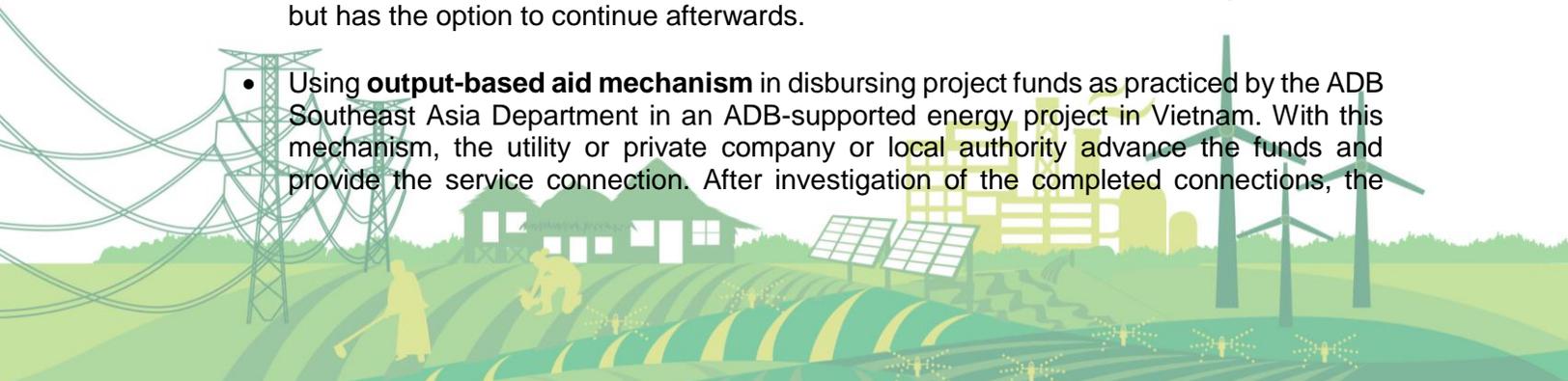
Highlighted success factors were the following: (i) innovative financing structure - results based financing; (ii) financial contribution of all parties and the ownership model which motivates households to maintain the system properly because of guaranteed ownership after full loan payment; (iii) sustainable business model with phased out subsidy scheme toward commercialization; (iv) cost-efficient standardized technical design; (v) quality control, after sales service and strong monitoring; (vi) development of local support industries largely contributing to the low system cost; (viii) Bangladesh's micro-finance experience; and (ix) support from the Government and multiple development partners,

⁸ The sixth session had two sub-sessions. The moderator of the **first sub-session** was Ranishka Wimalasena, Senior Project Officer of the Energy Division of the ADB Sri Lanka Resident Mission (SLRM). The feature speaker was Farzana Rahman, Vice President and Unit head of the Renewable Energy, Bangladesh Infrastructure Development Company; and the panel speakers were Upali Daranagama, former Additional Secretary of the Ministry of Power and Renewable Energy of Sri Lanka; Debajit Palit, Associate Director of The Energy and Resources Institute (TERI) in India; Aniruddha Patil, Principal Investment Specialist of the Infrastructure Finance Division 1 (PSIF1) of the Private Sector Operations Department (PSOD) of ADB; Aruna Kumuduni Wannachchi, Senior Energy Specialist, of the ADB Southeast Asia Department; and Ajaita Shah, Chief Executive Officer of Frontier Markets in India. The panel speakers of the **second sub-session** were Len George, Energy Specialist of the ADB South Asia Energy Division; R.K. Bhandari, Director (Technical) of the Rajasthan Renewable Energy Corporation, India; Chandrashekariyer, Consultant; and Aneesh Vijayan, Consultant.



ensuring a steady funding support for the program.

- **Establishment of a rural electrification fund** in Sri Lanka to provide credit facilities to low income households for electricity connection and meeting the cost of internal wiring. CEB manages the fund offering a maximum loan amount per household amounting to 4,000 rupees or USD 285 with an interest rate of 7% and a loan period of 6 years. To make the fund management easier, the government has introduced the web-based monitoring and evaluation system. Under this system, a household goes to the nearest consumer service center to submit an application for electricity connection. The area engineering department receives the application from the service center and just clicks the button (computer program) to approve the application. Then the approved application goes to the project implementation unit for the release of funds. Then, they go back to their respective areas for the service connection. Once service connection is provided, they inform the concerned section to start the recovery of the loan. There is minimum paper work; and generally, the CEB can process the loan application and provide the service connection within a week. At present, 98.5% of the households in the country have been connected. A positive impact on women has been the reduction of deaths and accidents due to unsafe kerosene lamps since most of those affected were women.
- Adoption of a **fee-for-service model** – instead of the product sale model – in reaching the poorest population by TERI's "Lighting of the Billion Lights" Program. This Program started in 2007-08 to provide lighting to 1 million people in 5 years (2013). Under this model, solar charging stations were established and people could come to charge their solar lanterns for a fee. For those without solar lanterns, 50 lanterns for rent were put up in every village with around 150 households. There were also lanterns provided to self-help groups of women on a grant-equity-loan mixed financing arrangement. Depending on the socio-economic conditions of SHGs in a given area, the arrangement could be 70% grant – 20% equity – 10% loan or 50% loan – 20% equity – 30% grant. TERI also launched with women self-help groups (SHGs), the Bihar Livelihood Development Society, which provided 50,000 solar home lights. In the business model employed, 40% of the project cost was provided as grant and 60% was financed by the women themselves. The Program provided the energy security fund which the women could use for any energy-related purposes. TERI provided the 40% grant and technical support and linked the SHGs with the suppliers. Through this arrangement, the program has made 50,000 solar systems up and running in the last two years.
- Selling of SHSs on a **pay-as-you-go basis** by the Simpa Networks, a private company in India. Under this arrangement, a customer pays 10% to 20% of the SHS cost upfront to have the SHS installed in their homes; and pays the remaining cost using his/her mobile phone. He/she buys the credit for a month and receives a code through a call or SMS from his/her mobile phone. Then she/he enters the code into the system and the system unlocks. If she/he does not pay the system, it gets locked because there is a system controller which prevents the battery from discharging. Normally after 24 to 36 months, the SHS gets fully paid. What is unique about this system is its flexibility and affordability. If a customer does not have money, she/he can suspend using the system but has the option to continue afterwards.
- Using **output-based aid mechanism** in disbursing project funds as practiced by the ADB Southeast Asia Department in an ADB-supported energy project in Vietnam. With this mechanism, the utility or private company or local authority advance the funds and provide the service connection. After investigation of the completed connections, the



project disburses the grant. The project has several tools to ensure that the utility is doing its job and the connections are sustainable.

- **Designing and marketing energy products from both social and smart business perspectives** by the Frontier Markets in India. In both perspectives, rural households are viewed not as BPL households or rural poor but as customers. From a social perspective, the approach is to make sure that the product is within the reach of the customers and can be accessed properly, and will last long for optimized impact; and from a business perspective, the need is to ensure that the customers will buy the product because it responds to their needs and is of good quality, and they will buy again and recommend others to buy too. In their business model, women play a crucial role for three reasons: (i) women represent 50% of their customer base so it is important to bring in products that are relevant to them; otherwise, the business would be missing a massive opportunity; (ii) women are better in communicating empathy, emotions and awareness so it would help to engage them in awareness campaigns; and (iii) women and men complain more to women because women do not only listen to complaints but also work effectively to solve the problem. Hence, from both social and business perspectives, it makes sense to bring women as part of the business model. This model has been working well in Rajasthan for 5 years.
- **Government-private sector partnership** as a model for the development of solar parks by the Rajasthan Renewable Energy Corporation (RREC). Individual projects are awarded to private project developers through competitive bidding. The responsibilities of the state government are: (i) provide as state equity a suitable government land for social parks; (ii) create an evacuation network; and (iii) facilitate the issuance of statutory clearances for the development of parks. The responsibilities of the private sector (joint venture) partners are to develop: (i) the solar park within the timeframe; and (ii) other needed facilities, such as water arrangements, approach roads, street lights, and internal transmission system. The government also ensures the joint venture partner does not treat the projects merely for profit generation, and sets the IRR at a maximum of 16%. To make the project inclusive, other elements are integrated. These are: (i) socio-economic surveys to identify specific community development interventions; (ii) electrification for the poor such as solar home lighting and mini grids; and (iii) livelihood development.

III. Conclusions of the Sub-regional Conference

- The role of energy services in poverty reduction is clear. However, access to affordable modern energy services is still out of reach for a large segment of poor population. The poverty reduction outcomes of energy access can be multiplied through strategies that focus on the demand side and on communities in addition to a purely supply side approach.
- Energy is an enabler for education, health and women's empowerment. Access to energy is necessary to achieve SDG 5 and 7 goals which aim for gender equality and women's empowerment and access to affordable, reliable, sustainable and modern energy for all by 2030.
- Large scale infrastructure projects provide a good opportunity to improve the lives of the poor, the marginalized and women, through actions in two areas, those to mitigate the negative impacts of infrastructure projects, and those focused on enhancing the

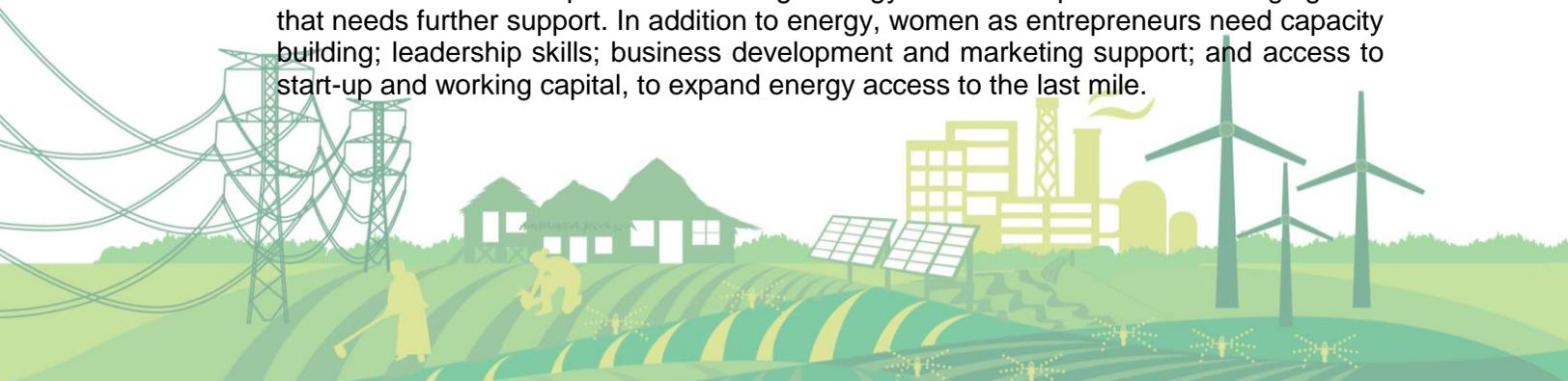


capabilities and quality of life of the local community. Skill building of local communities including women is emerging as a good entry point.

- Women and their networks are increasingly playing a role in promotion, sale, servicing, and financing of household energy devices. As end users, they know more about everyday cooking needs and are in a position to drive demand and catalyze more consistent and sustained adoption and use. Their input contributes greatly to the design and manufacturing of cook-stoves that are more appropriate for the target market. Women can leverage their networks to promote the adoption of new technologies and use their firsthand experience to market clean energy solutions effectively. They can serve as spokespersons for the use of clean energy, endorsing marketing messages and taking advantage of women-to-women communication strategies. This area needs further support.
- Clean cooking is an area that deserves urgent attention. While there have been notable advances in electrification, access to clean cooking energy continues to fall behind leading to negligible progress overall, with annual growth in access to non-solid fuels during the tracking period at negative 0.1 percent, short of the 1.7 percent target growth rate required to reach universal access by 2030. This is an area that will have disproportionate impacts for women and girls. Women's health is disproportionately affected by heavy dependence on biomass for cooking as women are the primary collectors, producers, and users of agricultural waste, animal dung and fuelwood. Exposure to household air pollution from using solid fuels causes premature deaths.

IV. Ways forward

- To build on and deepen the knowledge and commitments set out in this Conference, institutional capacity building of executing agencies and implementing agencies (EAs/IAs) of ADB-supported projects as well as of ADB staff is needed.
- Demand-driven energy delivery strategies that involve communities are necessary in reaching the "last mile". Local micro and small enterprises, communities are increasingly playing a role in sale, servicing and financing of modern lighting and cooking devices, off-grid electrification solutions, and, to a smaller degree, grid extension services to the poor.
- Partnerships between government, utilities, and communities are key to ensure energy access for all. ADB is in a unique position to facilitate dialogue and partnerships among energy sector stakeholders.
- Baseline tariffs, targeted subsidies, conditional cash transfers, and revolving funds providing cheap credit to connect are employed to expand energy access for the poor, however these financial and policy instruments must be adapted to better target the poor, women, and disadvantaged consumers.
- Skills development is necessary to create a pool of local skilled labor for new energy-intensive industries providing opportunities for women to be trained in basic systems operation and maintenance.
- Women's economic empowerment through energy-based enterprises is an emerging area that needs further support. In addition to energy, women as entrepreneurs need capacity building; leadership skills; business development and marketing support; and access to start-up and working capital, to expand energy access to the last mile.



- Given the limited experience in the area of GESI mainstreaming in energy projects, it is necessary to ensure that the ground level strategies, and their results feed into and guide policy making, both at national and at sub-national levels.

