INDIA GENDER EQUALITY RESULTS CASE STUDY

ENHANCING ENERGY-BASED LIVELIHOODS FOR WOMEN MICRO-ENTREPRENEURS

ASIAN DEVELOPMENT BANK

ADB

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ASIAN DEVELOPMENT BANK

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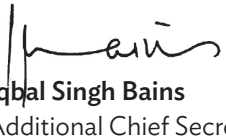
Foreword

The State of Madhya Pradesh has been providing 24 hours supply of electricity, since 2014. This transformation has touched many lives and businesses. It has contributed to agricultural growth of more than 20% in last 5 years. The electricity sector reforms have had a significant effect in boosting the local economy and improving quality of life. The rural electricity consumption has more than doubled in last 3 years. The rural income levels too have improved, which can be seen from the fact that loans to farmers by Co-op banks too have more than doubled.

Top developmental priorities for the state include empowerment of women and creation of entrepreneurs. The government's flagship schemes such as "Mukhyamantri Kaushalya Yojna", "Mukhyamantri Swarojgay Yojna" and "Mukhyamantri Yuva Udyami Yojna" are geared to provide capacity building of prospective entrepreneurs.

This report on "Gender Results Case Study on Enhancing Energy-Based Livelihoods for Women Micro Entrepreneurs" is a microcosm of these priorities. The case study builds up on the progress achieved so far and to showcase how women can be empowered by supporting energy-based enterprises and business development. The report reaffirms the faith that a reliable 24-hour electricity creates business opportunities, which in turn can promote women-led microenterprises.

The report has important learnings, which can be put to good use in other programs. We hope to use these to design programs that leverage local enterprise in general and initiatives by women in particular.



Iqbal Singh Bains
Additional Chief Secretary (Energy)
Government of Madhya Pradesh
Bhopal.

Abbreviations

ADB	Asian Development Bank
BDS	business development services
DISCOM	distribution company
IEM	integrated enterprise module
MCT	mobilizer-cum-trainer
NGO	nongovernment organization
SDG	Sustainable Development Goal
SHG	self-help group
TA	technical assistance

India: Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs

Summary

PROJECT GOALS AND RESULTS. The **Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs** is a technical assistance (TA) project that supplemented the Asian Development Bank (ADB)-financed **Madhya Pradesh Energy Efficiency Improvement Investment Program (Project 1)**. While the investment program aimed to enable power distribution companies to provide quality 24-hour power supply to rural households in Madhya Pradesh, the TA project contributed to enhance the benefits of the program for women through capacity development in the safe and efficient use of electricity, energy-based enterprises, as well as the provision of business development services (BDS). Under the TA project, a total of 20,729 women members of 2,803 self-help groups (SHGs) in program covered areas attended the integrated enterprise module (IEM) training, 506 of whom attended the gender and energy training and were BDS providers and trainers, and 1,650 attended the skills development training; 517 of the 1,650 were trained in BDS; and 63 women entrepreneurs accessed BDS through SHG assistance. The impact assessment studies showed that the improved power supply and capacity development resulted in (i) increase in the income of women entrepreneurs from low-income households, (ii) increase in the number of earning women, (iii) increase in the propensity of women to save, (iv) decrease in time spent by women on household chores, (v) reduction of women's time poverty and drudgery and men's increased willingness to share household chores, and (vi) increase in women's participation in decision-making in the household.

PROCESSES AND MANAGEMENT TOOLS. The project design included a gender action plan, which served as an important management and monitoring tool. A needs assessment at project onset enabled the designing of a demand-based approach for starting up and expanding energy-based microentrepreneurship. The customized enterprise module, which was prepared based on a needs assessment, helped in integrating gender considerations in energy-based enterprise development. Women's participation in capacity building program was closely monitored by both the nongovernment organizations (NGOs)—responsible for organizing, mobilizing, and capacity building of women entrepreneurs and SHGs—and the project staff. The project performance monitoring system, which included social and gender-related indicators, was developed. Other contributing factors were the allocation of adequate human resources as well as time resources for meaningful consultations with and mobilization of SHGs, participatory and interactive training modules, training of the project management in gender mainstreaming, partnership between the government and NGOs, and the commitment of the executing government agencies in the implementation of the gender action plan.

Introduction

The energy sector is a nontraditional area for women not only because of the stereotypical view of energy technological development as men's domain but also because of the sector's general lack of recognition of the distinct energy needs of women. This has resulted in the predominance of men in the sector and women's lack of access to energy resources for their specific needs. This problem has, however, entered the radar of concerns of the global movement for social development and gender equality as demonstrated by the inclusion in the United Nations 17 Sustainable Development Goals (SDGs) for 2016–2030, the goal of ***ensuring access to affordable, reliable, sustainable and modern energy for all*** as the seventh SDG. Moreover, unlike in the previous United Nations Millennium Development Goals (2000–2015), reporting on the progress of SDGs includes (as part of the report on SDG 7) not only the proportion of the world population with access to electricity but also the proportion with access to clean fuels and technologies for cooking.[1]

Even prior to the adoption of the 17 SDGs as the agreed framework for international development, body of knowledge and effective practices in facilitating women's claiming of space in the supply and demand chains of energy development have started to emerge. The overall goals are to reposition the energy sector as an arena providing equal participation opportunities for both women and men, and to redesign energy technological development and distribution to equitably respond to the distinct needs and interests of women and men.

To contribute to this body of knowledge and effective practices, the South Asia Department of the Asian Development Bank (ADB) has documented related exemplary programs and projects of its developing member countries. Among them is an ADB-financed technical assistance (TA) project of the Government of Madhya Pradesh in India, ***Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs***.[2] This case study report presents this TA project and its contributions to the optimization of available power supply for women's empowerment and gender equality results in Project-covered areas.

1 United Nations Economic and Social Council. 2017. *Progress towards the Sustainable Development Goals: Report of the Secretary-General.* https://unstats.un.org/sdgs/files/report/2017/secretary-general-sdg-report-2017--EN.pdf.

2 ADB. 2011. *Technical Assistance to India for Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs.* Manila (TA 7831-IND).

Project Aims and Expected Outcomes

From July 2011 to June 2017, ADB supported the implementation of the TA project, which supplemented an ADB-financed program of the Government of Madhya Pradesh, the **Madhya Pradesh Energy Efficiency Improvement Investment Program (Project 1)**. The program was approved in July 2011 and implemented in October 2011, with expected completion in February 2018 (see Box 1 for basic information on the program and project).

Box 1: Program and Project Basic Facts

Loan:	Madhya Pradesh Energy Efficiency Improvement Investment Program (Project 1)
Project number:	43467-015
Loan approval number:	2764
Loan approval:	15 July 2011
Loan signed:	17 August 2011
Loan effectiveness:	19 October 2011
Closing date (original):	28 February 2015
Closing date (revised):	28 February 2018
Executing agencies:	DISCOM-C, DISCOM-E, and DISCOM-W
Financing:	$200 million
Gender classification:	Effective Gender Mainstreaming[a]
Sector:	Energy
Supported TA:	Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs
TA approval number:	7831
TA approval date:	7 July 2011 (MFF)
TA closing date (revised):	30 June 2017
Financing:	$1.0 million

DISCOM-C = central zone distribution company, DISCOM-E = eastern zone distribution company, DISCOM-W = western zone distribution company, MFF = multitranche financing facility, TA = technical assistance.

Note: In this report, "$" refers to US dollars.

[a] ADB. 2012. Guidelines for Gender Mainstreaming Categories of ADB Projects. https://www.adb.org/sites/default/files/institutional-document/33623/files/guidelines-gender-mainstreaming-categories-adb-projects.pdf

Source: Project documents, project management unit.

The program aimed at enabling three electricity distribution companies (DISCOMs) to supply quality 24-hour power supply to rural households in the state of Madhya Pradesh. It was expected to bring better development opportunities in education, business, industry, and entertainment; and upgrade the overall quality of life of the rural population of Madhya Pradesh. It had four main components: (i) separate power supply to farmers and households through feeder separation, (ii) install high voltage distribution system, (iii) supply quality improvement and metering, and (iv) upstream 33-kilovolt network strengthening. The executing agencies for the progrman were the three electricity DISCOMs: (i) Madhya Pradesh Madhya *Kshetra Vidyut Vitaran* Company Limited (central

zone distribution company), (ii) Madhya Pradesh *Poorv Kshetra Vidyut Vitaran* Company Limited (eastern zone distribution company), and (iii) Madhya Pradesh *Paschim Kshetra Vidyut Vitaran* Company Limited (western zone distribution company). The executing agency for the technical assistance project was the Energy Department of Madhya Pradesh.

To optimize the impacts of the program for women beneficiaries, the Government of Madhya Pradesh and ADB agreed to attach the project, which specifically targeted self-help groups (SHGs) of women in program covered areas. The project aimed at enhancing women's knowledge of the productive and efficient use of electricity both for household and economic activities. It also sought to encourage women entrepreneurs to engage in energy-based enterprises by providing them with skills training and business development services (BDS). Hand in Hand India in joint venture with the Frankfurt School of Finance and Management implemented the project in 2013–2015 with guidance from DISCOMs.

The expected gender equality and women's empowerment results of the program and project were the following:

- increased access of women to modern energy services and the accompanying economic opportunities, which would result in (i) decreased time spent on household chores; (ii) reduced drudgery; (iii) increased income-generating activities, (iv) increased sense of safety and personal empowerment, and (v) improved quality of life; and
- development of the energy sector with strengthened and expanded women-managed energy enterprises as well as improved capacity of women to produce and supply energy products and services.

Gender Equality Issues in Energy Development

Madhya Pradesh has taken many steps in the past for women empowerment. Many women empowerment schemes launched by Madhya Pradesh were emulated by other states. Madhya Pradesh is keen on improving its human development index. Its literacy rate is also improving. Looking at the keenness of Government of Madhya Pradesh to take up women empowerment as an agenda, a project to enhance energy-based livelihoods for women entrepreneurs was proposed.

Low access of women of low-income households to key resources such as energy and land can adversely impact the other measures taken to ensure gender equality. Household responsibilities of women also make them most vulnerable to inadequate power supply and load shedding. Furthermore, the following gender issues underscore the importance of specifically targeting women in the optimization of the benefits of improved power supply:

a. **Social and Political Norms and Practices Affecting Women's Access to Energy**
    - **Social and cultural constraints on women's participation in productive and community endeavors.** Women's participation in decision-making and ability to seize development opportunities are often restricted by traditional gender norms. Household chores and reproductive roles provide them little space to take part in activities outside their homes, including training in the management of energy projects and in energy-related livelihood skills. Because

of these, women benefit less from networking opportunities for energy-related enterprises. They also often lack voice to make their energy needs and priorities heard. For instance, they do not have control over the types of fuels to use and types of equipment to purchase. In most cases, they are not involved in planning house ventilation and lighting.

- **Limited institutional capacity on gender equality and women empowerment issues.** Institutions working in energy sector projects often lack both the understanding of gender issues and capacity to take affirmative actions. Allocating resources and building institutional awareness to promote gender equality remain a challenge.

b. Limited Economic Opportunities

- **Limited access to productive assets.** Gender inequality in access to productive assets, labor saving technology, and affordable credit impedes the development of micro- and small enterprises, where women predominate.
- **Unequal wages of women and men.** Women are often offered lower wages for work. The perception that women are secondary earners continues to be used as a justification for their lower wage rates.

c. Lack or Inadequate Access to Energy Resources

- **Reliance on traditional biomass for household energy.** About 87.2% of rural households in India (95.8% households in Madhya Pradesh) use conventional fuel such as firewood, crop residue, cow dung, and coal and/or charcoal for cooking; while only 11.5% in India (3.9% in Madhya Pradesh) use liquefied petroleum gas, piped natural gas, or biogas. About 43% of India's rural households still use kerosene as a major source of lighting.[3] These traditional fuels are inefficient, often unreliable, and pose health risks; and their collection falls disproportionately on women and girls.
- **Unrecognized gender issues.** Gender issues in energy use patterns are not recognized in energy access policies and energy investments. Policies and programs on energy access generally do not provide sufficient consideration of women's needs and priorities. In general, engineers and other technical persons in energy projects often consider the energy sector as "gender neutral" and, in the process, overlook the fact that energy impacts men and women differently.

d. Lack or Limited Access to Energy-Related Services

- **Lack of adequate basic services.** Household basic services, such as water supply, sanitation, and electricity, are lacking. This increases women's drudgery and consumes most of women's time and energy with no or very little time for rest, recreation, skills enhancement, and income-generating activities.
- **Limited access to information.** In general, women have limited access to information, and hence may not be able to gain an equitable share of new opportunities.

3 Government of India, Office of the Registrar General and Census Commissioner, India. 2011. *Census of India*. Houses, Household Amenities and Assets Data 2001–11. Delhi. http://censusindia.gov.in/2011census/hlo/Data_sheet/India/Source_Lighting.pdf (accessed 8 June 2017)

- **Inadequate public transport facilities.** This further restricts the mobility of women outside their community and creates a perception of lack of safety and security.

Approaches to Address Gender Equality Issues

Key interventions that helped address gender issues and meet project goals were the following:

a. **Mainstreaming Gender in Program and Project Design and Approaches**
   - **Gender action plan.** An inclusive gender action plan was prepared based on the gender analysis undertaken during the project preparatory technical assistance. It focused on building user awareness on safe and efficient use of electricity, building capacities of women microentrepreneurs and women SHGs, and developing microenterprises headed by women.
   - **Gender action plan as loan covenant.** The loan agreement included the implementation of the gender action plan with adequate allocation of resources not only for its implementation, but also for monitoring and reporting key gender outputs and outcomes. The loan agreement states:

> *The Borrower, the State and the DISCOMs shall comply with and implement the Gender Action Plan in accordance with its terms, allocate adequate resources for such implementation, and shall monitor and report to ADB on key gender outcome and output targets in accordance with the project performance and monitoring system developed for the Project, including, without limitation, (i) improving energy-based business opportunities for women-headed micro-enterprises; (ii) capacity development of women self-help groups to deliver micro-enterprise development services; and (iii) gender-sensitive user awareness programs and energy conservation.*

   - **Evidence-based gender assessment.** A needs assessment survey was undertaken to identify the needs of and constraints faced by women microentrepreneurs in expanding or starting up microenterprises. This helped in preparing a customized project strategy.
   - **Convergence with existing poverty reduction and social and gender inclusion scheme and program.** The project liaised with existing poverty alleviation scheme and programs of the state and central government—the District Poverty Initiatives Project, now implemented with the National Rural Livelihoods Mission.[4, 5] A joint action plan was formulated with District Poverty Initiatives

4 The DPIP is a poverty alleviation project of the Panchayat and Rural Development Department of the Government of Madhya Pradesh. It focuses on economic and social development of the groups from low-income households with similar needs, economic statues, and social background. It aims to improve the capacity and opportunities for the targeted low-income rural households to achieve sustainable livelihoods.

5 The *Swarnjayanti Gram Swarozgar Yojana*, a flagship program of the Ministry of Rural Development implemented in 1999, has been restructured as National Rural Livelihoods Mission since fiscal year 2010–2011. It aims to provide sustainable income to rural below poverty line households through income-generating assets and economic activities. It also aims to reach out to all the rural poor families (below poverty line families) and link them to sustainable livelihood opportunities. It intends to nurture them till they come out of poverty and enjoy a decent quality of life.

Project to facilitate better coverage under the project and to supplement government efforts toward poverty reduction and social and gender inclusion in rural areas.

- **Engaging technology providers in empowering women entrepreneurs.** Women entrepreneurs were oriented and educated about the available resources in their area so that they are better informed and could utilize the available opportunities to expand their enterprises. The project introduced women to technology providers such as the Central Institute of Agricultural Engineering.
- **Partnership with nongovernment organizations.** Hand in Hand India in joint venture with the Frankfurt School of Finance and Management were engaged to organize, mobilize, and build capacities of women entrepreneurs and SHGs. The vast experience of Hand in Hand India in microfinance SHGs, rural livelihood development, and in-depth community outreach facilitated smooth implementation of gender activities. The Frankfurt School of Finance and Management provided technical support in designing project plans, survey instruments, training modules, capacity building initiatives, and project performance monitoring system, which facilitated better monitoring and reporting of gender equality results.
- **Mobilization of women self-help groups.** The women trainees were selected from the existing pool of SHGs in the project districts to complement the existing women groups and strengthen their capacities. The SHGs served as a channel for introducing project inputs and interventions to community women. Selection of women SHGs was based on specific criteria such as regularity of meetings, practice of savings, proper record keeping, and compliance with identity requirements in accordance with the "Know Your Customer" form.
- **Comprehensive training design and strategy.** An inclusive training design and strategy was developed. Training modules and instructional materials were prepared (based on the findings of the needs assessment survey) to ensure the relevance and cultural appropriateness of the capacity building program. The integrated enterprise module (IEM) included knowledge inputs on the efficient and effective use of energy, enterprise development using electricity, and gender concerns linked to the use of energy in the household and business activities. These trainings enabled women to enhance their understanding of energy conservation, financial literacy, and enterprise development.
- **Inclusion of gender indicators in project monitoring system.** The project performance monitoring system, which included gender equality and social inclusion results, was developed.

b. Key Activities during Project Implementation

- **Needs assessment survey.** A needs assessment survey was undertaken to identify and understand business needs, constraints, and opportunities. Women survey respondents were selected from eight sample districts in consultation with the DISCOMs. An assessment of women SHG members was also undertaken during the IEM training to assess their suitability as providers of BDS to women and as trainers for the gender and energy training, specifically on the safe and effective use of electricity, and for the BDS training. Women in BDS training were assessed based on their active participation, regularity, and response; entrepreneurship

skills; willingness and ability to devote time to help other women entrepreneurs; and confidence and leadership skills shown during the IEM training.

- **Capacity development of women entrepreneurs belonging to self-help groups.** The Enterprise Development Program and BDS were made available to women entrepreneurs of SHGs in project-covered areas. The Enterprise Development Program was a composite program consisting of four training modules (Table 1).
- **Monitoring and reporting.** The project mobilizers-cum-trainers (MCTs) reported the progress of project activities monthly. Data on women's business support needs were collected through a BDS form. Actions on women enterprises were recorded in the SHG logbooks. MCTs reviewed the SHG record books during their regular meetings with the women entrepreneurs. The progress of the trainings and business development activities was reported regularly. The gender equality and social inclusion results were included in the project performance monitoring system. The specific indicators included were the number of women adopting energy-based improvements or starting energy-based enterprises, number of women entrepreneurs having access to business services through SHG assistance, and number of motivation and skills training given to women.

Table 1: Training Modules Provided to Self-Help Groups of Women

Training Modules	Details
1. **Integrated enterprise module (IEM)**	This is an integrated training on gender sensitivity, safe and efficient use of electricity to reduce women's drudgery, energy conservation, and enterprise development opportunities from improved power supply.
2. **Gender and energy**	After the IEM training, the project mobilizers-cum-trainers selected women—who were willing to become resource persons, manifested rapport with other women, and communicated effectively—and trained them as trainers in business development services. This gender and energy training also harnessed the participants' skills in leadership, effective communication, and gender analysis of energy management.
3. **Skills development training**	This is a skills training in energy-based livelihood (e.g., tailoring, pottery, bangle making, *dona pattal* [disposable plates made of dried leaves with plastic lining], paper cup making, assembly of bulbs, and others). This was provided to participants of the IEM training who demonstrated entrepreneurial capabilities and interest in skills training.
4. **Business development services**	This is a training on business development services, e.g., access to credit and other financial services, financial literacy, selection of energy-based enterprise, product and design development, packaging, marketing strategies, market linkages, business management, and other services that women entrepreneurs requested to start their enterprises. This was provided to participants of the skills development training who applied their learned skills and demonstrated leadership qualities and business acumen.

Source: ADB. 2015. *Completion Report: Hand in Hand India.* Manila.

Gender Equality Results: Project Achievements

Under the TA project, a total of 20,729 women members of 2,803 SHGs in program covered areas attended the IEM training, 506 of whom attended the gender and energy training and were trained as BDS providers and trainers, and 1,650 of whom attended the skills development training; 517 of the 1,650 were trained in BDS; and 63 women entrepreneurs accessed BDS through SHG assistance. To determine the outcomes and impacts of these four training modules, two studies were undertaken. The first study employed a qualitative method, which involved a review of project reports (i.e., gender action plan progress reports, project quarterly progress reports, and final reports submitted by Hand in Hand India), field observations, and informal interviews with women beneficiaries. The second study employed a quasi-experimental research design, which involved the use of statistical methods in comparing seven categories of randomly selected households in program covered areas against a select set of economic and social variables (Box 2).

Box 2: Impact Assessment Using a Quasi-Experimental Research Design

The Asian Development Bank (ADB) South Asia Department commissioned PricewaterhouseCoopers to conduct two studies, one of which was an assessment of the impacts of the four training modules—given under Technical Assistance (TA) 7831—on women entrepreneurs of self-help groups (SHGs). The households of these women entrepreneurs were covered by the Madhya Pradesh Energy Efficiency Improvement Investment Program (Project 1). The assessment employed a quasi-experimental research design in which a treatment group, representing those households with women who attended any of the four training modules, was compared with a control group, representing those households whose women did not attend any of the training modules. To determine which of the four training modules created impacts, the assessment analyzed the significance of the differences of the following seven categories of households (the number of sample households per category is indicated):

1. Households whose women members were not members of any SHG, and hence were not able to attend any of the training modules (290 household);
2. Households whose women members were members of SHGs that were not covered or trained by the TA project (291 households);
3. Households whose women members were members of SHGs covered by the TA project but were not trained;
4. Households with women members trained in integrated energy module (IEM) (485 households);
5. Households with women members trained in IEM and gender and energy (304 households);
6. Households with women members trained in IEM and skills development (324 households); and
7. Households with women members trained in IEM, skills development, and BDS (325 households).

The first three categories served as the control group, whereas the last four categories served as the treatment group. The comparison was on a set of economic variables (women's income, number of income-earning women, demand for capital, savings behavior, fuel consumption, and use of electrical appliances) and social variables (women's time use, time poverty, participation in decision-making, and sense of safety; men's participation in household chores; and family health). To ensure that the differences of the treatment and control groups on these sets of variables were attributable to the four training modules, a propensity score matching was undertaken. This ensured the equivalence of the groups on key variables (e.g., household size, number of women, access to electricity, literacy of household heads, etc.) except for the training interventions. To guarantee the generalizability of the results, the assessment selected a representative

continued on next page

Box 2 *continued*

sample of households for each group through random sampling method. The differences of the average scores of the treatment and control groups, specifically of the seven categories of households, on the predetermined economic and social variables were statistically analyzed to determine if significant. The results were used to assess the economic and social impacts of the four training modules on women entrepreneurs.

The other study done by PricewaterhouseCoopers was a baseline survey that will be used to evaluate the impact of feeder separation on rural households provided under the Madhya Pradesh Energy Efficiency Improvement Investment Program (Tranche 1, Loan 2764) after its completion in February 2018. To be included in the impact evaluation are the economic and social impacts of feeder separation on women. The methodology used for the baseline study was a randomized control trial.

Sources: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished; ADB. Setting up of Baseline for the Project, "Madhya Pradesh Energy Efficiency Improvement Investment Program." Unpublished.

Both studies conjectured that improved power supply with capacity development (specifically the training modules of the project) brings positive results to women entrepreneurs, as presented in the figure. The extent of the actual impacts as found by the two studies are presented below in two areas: economic impacts and social impacts.

Figure: Expected Impacts of Technical Assistance Project Training Modules

Training Modules	Key Interventions	Expected Impact Areas
• Integrated enterprise module • Gender and energy	• Awareness of gender rights • Awareness of use of electricity for enterprises	• Time use • Participation in decision-making • Use of appliances • Correct use of electricity
• Skills development training • Business development services	• Training in awareness of gender rights • Training in use of electricity for enterprise • Training in energy-based livelihood skills	• Time use • Participation in decision-making • Income • Loans for productive purpose

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

a. Economic Impacts

According to the project reports, field observations, and informal interviews with women who were trained under the project (the first study), the training modules

- raised women's awareness of energy-based technologies;
- improved their business skills;
- informed them of available BDS and income-earning opportunities from improved power supply; and
- made them better equipped to operate electric machines (e.g., motorized wheels for pottery, motorized sewing machine for garment stitching, paper molding machines for disposable utensils, grinders and deep freezers, etc.) that improved their productivity and the efficiency of their enterprises.

More than two-thirds of the trained women started to practice energy-saving measures (such as switching off lights when not in use, buying ISI[6] and star-rated[7] electric equipment, fixing wires properly, and using energy efficient bulbs instead of incandescent bulbs). The project enabled 590 women to upgrade their existing businesses using energy-based technologies or start new nonconventional trades such as bulb assembling, bangle making, disposable utensils making (cup, plate, and bowl), *atta chakki* (flour mill), grain and pulses grinding, refrigeration services, etc. See Box 3 for a sample story.

Box 3: Reflections of a Woman Bangle Maker

Sheela Bai Verma, an agricultural laborer in Amilya Haat Village, Rajgarh District, shared:

> *The trainings and interactions with the trainers were very helpful. I learned to use an electrically powered bangle making machine. I felt confident and wanted to purchase it. The project connected me to the DPIP officer, who helped get me a financial assistance to purchase the machine under the DPIP scheme. My work became very smooth and fast, and my income increased significantly. I have cash in hand which I spend on my own terms. The project also exposed and linked me to the market. I go to the city to purchase the raw materials and negotiate good prices for wholesale purchases for other women in the trade. I sell the bangles in the market; people also approach me during fairs, festivals, college events to put up a stall. I put a stall at the Block Development Office premises where I was provided space free of cost. It's a new experience and I am enjoying it. My present work has earned me a good reputation in the community. It's a nice feeling.*

DPIP = District Poverty Initiatives Project.
Source: Interview for this case study.

6 "ISI mark is a certification mark for industrial products in India. The mark certifies that a product conforms to the Indian Standard, mentioned as IS:xxxx on top of the mark, developed by the Bureau of Indian Standards, the national standards body of India." Wikipedia, The Free Encyclopedia, s.v. "ISI mark," (accessed 10 August 2017), https://en.wikipedia.org/wiki/ISI_mark

7 The Bureau of Energy Efficiency under Ministry of Power of the Government of India developed minimum Energy Performance Standards and Labeling for equipment and appliances and buildings to standardize the energy efficiency ratings and to indicate energy consumption under standard test conditions. It grades equipment and buildings on their energy efficiency, from one star for the least energy efficient to five stars for the most energy efficient.

The results of the statistical comparison of the treatment group (households with women who attended the training modules of the project) and control group (households whose women did not attend any of the training), and of the seven categories of households under the second study corroborated some of the abovementioned economic gains of the project. Specifically, the statistical analysis of the differences of the treatment and controls groups shows the following positive results:

- Overall, while the average monthly income of women in the treatment group (Categories 4–7 lumped together) (Rs2,203.60) was higher than the income of women in the control group (Categories 1–3 lumped together) (Rs2,142.70), the statistical analysis found this difference to be insignificant. However, when the incomes of women in the seven categories were compared with each other separately (rather than lumping Categories 1–3 together and Categories 4–7 together), the results showed that the average income of women in Category 7 (households with women who attended three training modules (IEM, skills development, and BDS) was significantly higher than the incomes of women in Categories 1–3 (see Table 2 below, and Table A1.1 of Appendix 1 for details). When the sample households were further stratified according to income levels (quartiles 3 to 9; no households were classified under the poorest quartiles 1 and 2), a significant difference was found at the middle levels (quartiles 4 and 5), with the average monthly income (Rs1,227.80) of women in the treatment group (of these two quartiles) statistically higher than the income (Rs1,207.10) of the women in the control group (of same two quartiles) (see Table A1.2 of Appendix 1 for statistical analysis results).[8] These findings suggest that attendance in the three training modules encouraged women, especially those from lower income households, to engage in energy-based enterprises that augmented their incomes.

Table 2: Comparison of Incomes of Women in Category 7 and Categories 1–3

Category 7 versus Categories 1–3	Category 7 Women's Mean Income (Rs)	Control Group Women's Mean Income (Rs)	Average Treatment Effect (Rs)	Standard Error	z	p-value
Category 7 (IEM+SD+BDS) vs. Category 1 (No SHG))	1,464.15	1,167.23	296.93	132.20	2.25	0.03*
Category 7 (IEM+SD+BDS) vs. Category 2 (Non-TA SHG)	1,464.15	1,212.12	252.03	122.64	2.05	0.04*
Category 7 (IEM+SD+BDS) vs. Category 3 (TA-SHG)	1,464.15	1,004.72	459.43	112.78	4.07	0.00*

* = significant at $p < .05$, BDS = business development services, GE = gender and energy, IEM = integrated energy module, SD = skills development, SHG = self-help group, TA = technical assistance.
Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

8 It is important to note that all households in the treatment and control groups are at subsistence income levels. This means that women in all nine quartiles belong to low-income households and women at the lower quartiles are deemed to be poorer.

- The proportion of households with at least one woman earning was higher in the treatment group (76%) than in the control group (71%). The statistical significance of the difference of these percentages seems to indicate that the attendance in any of the four training modules encouraged women to engage in income-earning activities (see Tables A.3, A.4, and A.5 of Appendix 1 for the statistical analysis results).
- Category 7 (with women who attended the training in IEM, skills development, and BDS) had more women (69%) who saved money in the past 1 month compared to Category 1 (52%), Category 2 (62%), and Category 3 (60%) (see Table A1.6 of Appendix 1 for statistical analysis results).

The same statistical analysis, however, also found a lack of significant effect of the training modules on other areas:

- The higher demand for loans or capital and propensity to save among women of households in the treatment group (except for Category 7) were attributed to their membership in SHGs rather than to their attendance in the training modules.
- Attendance in the training modules did not increase women's use of household labor-saving electric appliances. The study found few households (in both treatment and control groups) to have these appliances. However, households with women who attended both IEM and skills development training tended to use electric fans, television sets, and mobile phones more. As these were women who demonstrated greater interest in energy-based livelihood skills training and have increased their income with their use of motorized machines, this difference could be attributed to affordability rather than to attendance in the training modules.
- Attendance in the training modules did not also change the fuel consumption practices of the households. Many of the households (in both treatment and control groups) still used firewood for cooking. This suggests that the improved power supply and capability development are not enough to drive the women to adopt labor-saving household appliances and safe cooking technologies.

b. Social Impacts

The project reports and field observations showed that the 24-hour power supply

- reduced women's drudgery and provided women with time for rest and recreation as well as for community work;
- increased the study time of children, especially girls who used to have less time for studies because of household chores; and
- improved women's mobility as women and girls began to feel safer walking outside of their homes at night with the lighted village roads.

Moreover, the training modules

- improved women's skills in communication, negotiation and management, and public speaking, further boosted their confidence—for example, positive changes were observed in the potter's village of Nowgaon, Chhattarpur District (Box 4);

- improved their confidence and role in decision-making in the family with their better knowledge of electric machines and increased contribution to their household income due to their new energy-based businesses;
- facilitated the appreciation of and support for the work of women entrepreneurs by the villagers, especially men and elderly women who were initially averse to women working on pottery wheels and traveling outside the village, resulting to their husbands becoming more supportive and willing to share household work; and
- led to community recognition of women's skills and products, which encouraged women to come out of the traditional social web and to adopt empowering practices such as removing their veils, going out of their houses to take part in productive endeavors of their SHGs, and speaking in public (see Boxes 5–7 for sample stories).

The improved power supply and the training modules generally enhanced women's quality of life and fostered their households' efficient use of electricity and energy conservation practices.

The findings of the second study generally support the abovementioned social impacts of improved power supply-cum-capacity development, specifically the following:

- The statistical analysis found the time spent by women in the treatment group for cleaning the house; washing clothes and dishes; and fetching fodder, agricultural waste, dung, etc. to be significantly lower than the time spent for the same household chores by women in the control group (Table A1.7 of Appendix 1). The non-adoption of electric labor-saving household appliances by both groups (as stated earlier) pointed to other reasons for this significant difference. Indeed, the study also found men in treatment group households to spend more time for cleaning and/or washing; cooking; fetching water, fuelwood, and fodder; grinding; milling; and hulling (Table A1.8 of Appendix 1). It could be surmised that the gender awareness (from the training modules) enabled women to assert for shared household chores with men, and their increased income contribution to the family afforded them the recognition to be heard.
- Women in Category 6 (who participated in both IEM and skills development training) and in Category 7 (attended the training in IEM, skills development, and BDS) experienced increased participation in decision-making pertaining to investments and savings, and health care of women and family (Table A1.9 of Appendix 1).
- A statistical regression analysis of "very safe" responses of the seven categories of women suggests a higher proportion of women in the treatment group feeling "very safe" outside of their houses after sunset as compared to the women in the control group (Tables A1.10 and A1.11 of Appendix 1). As all respondents were from communities with improved power supply, this appears to indicate that the training modules made women more conscious of the benefits of the lighted roads, which increased their sense of safety.

Box 4: Breeze of Social Change, Breaking Cultural Barriers

The gender division of work is marked in pottery making. Traditionally, the males bring clay from outside the village, make pots, and sell the finished products, while women played the difficult subordinate role of powdering, filtering, and processing the mud. Women were not allowed to use the manually operated wheel due to cultural restriction. The project trained the women members of self-help groups (SHGs) on how to use motorized pottery wheel. They could not, however, apply their learned skills because of family and community objections, as working on pottery wheels was perceived to be a man's work. This led the women to seek the support of the district mobilizer-cum-trainer (MCT) who talked to the community men and convinced them to allow the women to operate the wheel. The women were also informed about the poverty alleviation scheme of the government, which provides financial support to those in need. With the joint efforts of the MCT and District Poverty Initiatives Project (DPIP) local team, women were linked to the scheme as well as with the producers of motorized wheel. Women negotiated with the dealers directly and placed their orders. To encourage women and their SHGs, only women SHG members could order the motorized pottery wheels, and the machines were paid through their respective SHGs.

One of these women is Suman Prajapati, an active member of an SHG in Nowgaon Village, District Chhattarpur and head of a microenterprise. She is financially independent and supports her family expenses. With the skills development training provided by the project, she started to venture into multiple income-generating activities to augment her family income. The project also helped her to link with the DPIP, where she became a beneficiary. She became a potter using a motorized pottery wheel, and works as a midday meal cook in the village school and as a bookkeeper in SHGs under the DPIP program. She underwent the training on business development services, which gave her the confidence to mentor other women entrepreneurs. Her mobility has increased and she now travels to other districts as a pottery trainer. She shared that now she is well informed about the other schemes and programs of the government. For example, she recently attended a training program of the Madhya Pradesh Forest Department and learned to make earthen water filters. She now makes and sells earthen water filters during summer for extra income. Operating the motorized wheel has reduced her drudgery and the time spent at work, and increased productivity. It helped her gain a sense of power and confidence. Her progress has improved her position and status in the household and community. Her family supported her decision to stop observing the traditional practice of using veil. She now feels equal to her husband. Suman supported and mentored about 35 women who wanted to start the same enterprise and helped them in procuring the motorized wheel. She has become a role model in her community.

Source: Interview for this case study.

Box 5: Mala and Her Group Gains Community Recognition

Mala Dehayriya, a self-help group (SHG) member in Panchayat Rohankala, Chhindwara District, started to be recognized by her community when she became a bulb assembler. She even became more known than her husband in the community. People started to call her husband, "husband of Mala who repairs bulbs." Within a short period of setting up her new enterprise, she started receiving more requests for bulb repair work which is cheaper than purchasing new bulbs. To expand the business, she involved other interested SHG women and approached local offices, hotels, and tent and light houses to take bulb repair work services on contract basis. This enhanced her income and provided income-generating opportunities to other SHG women. The chief executive officer of the village council (Zilla Panchayat) noticed Mala's positive and progressive outlook toward business and supported her to get a shop in the town. Because of this, her income and savings increased significantly; and she has gained better understanding of efficient use of electricity, energy efficiency techniques, and business processes. She is happy to enjoy 24-hour electricity and has more time for herself.

Source: Interview for this case study.

Box 6: Life from Paucity to Sufficiency: Experience of a Leather Bag Maker

Sugan Bai of Nagda Village, Dewas District was a daily wage laborer who worked in farms and sometimes in a nearby leather factory to make ends meet. While working in a factory she learned how to make leather bags. She was motivated to join a self-help group of women and started saving money with which she purchased a hand stitching machine and started making cloth and leather bags at home. She received the integrated enterprise module training under the technical assistance Project Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs, and was encouraged to use motorized machine. She realized its merits and soon, with improved productivity and income, purchased another motorized machine. She thus expanded her leather bag making enterprise, and now her husband is assisting her.

She shared that with the electric machine, she is able to complete the orders on time. It has increased her goodwill and helped her in expanding the sales. As a registered artisan, she has an identity card that enables her to participate and avail of a sales counter or stall in the trade fairs organized by the government at the district, state, and central levels. She further shared that her success cannot be expressed in words and that her life has changed from poverty and deprivation to self-reliance and prosperity. She feels blessed and content.

Source: Interview for this case study.

Box 7: Reflections of a Business Development Service Provider

Babita Sisodiya of Betma Village, Indore District shared, "I am now economically independent and feel more confident in interacting with other people in public spaces. Establishing my own small tailoring unit and employing others have changed my outlook towards business."

Babita was a part-time tailor and used to make clothes through manual sewing machine. She attended the integrated enterprise module and skills development training in 2014, and was guided on linking with the market. She purchased a motor to mechanize her sewing machine. She said her work became physically less stressful. Her productivity increased significantly. Enhanced sales and income encouraged her to purchase two motorized sewing machines. Recognizing her hard work and willingness to train other community women, the technical assistance Project Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs trained her as a business development services provider and trainer. She trained 26 women. Now her husband assists her by bringing contract work from garment factories, which she further sublets on contract basis to other community women.

Source: Interview for this case study.

Apart from the cited economic and social impacts of the project, other project benefits experienced by the executing agencies and the implementing nongovernment organization (NGO) were the following:

- Partnerships between the government and NGOs were established and considered crucial in sustaining the gender mainstreaming initiatives. These linkages also helped in strengthening women's capacities by improving women's access to information, developing their skills, and enhancing their livelihood and income. These partnerships are important for the larger goal of poverty reduction and gender equity.
- The project contributed to increased understanding of gender equality issues in the energy sector among the project staff and service providers. It helped in drawing their attention to household energy needs, energy use patterns, and women's contributions to energy efficiency as consumers and entrepreneurs.
- The project successfully connected the three areas of energy, gender, and finance and/or entrepreneurship. As there are no established ready-made models for gender mainstreaming in the energy sector, this project serves as a good example of how gender can be mainstreamed in an energy project in a rural area and how gender mainstreaming can contribute to rural poverty reduction and addressing gender equality issues.

In sum, the women's testimonies (first study) and the results of the quantitative study (second study) serve as evidence that the training modules of the project improved women's abilities in their respective trades or enterprises, increased their earnings, expanded their buyers and markets, and reduced drudgery and the time spent for domestic chores. There are also initial signs of the gradual removal of gender stereotypes and discrimination and the emergence of gender equality within the household as men share domestic chores to enable women to engage in their enterprises.

Project Features that Contributed to the Achievement of Gender Equality Results

In addition to the project design elements (listed in section 3 of this case study report), other strategies and elements that helped the project achieve gender equality results were the following:

> *I felt very proud when the district collector came to meet us and congratulated us for our accomplishments. He appreciated that we were able to understand complex electricity connections and assemble bulbs so efficiently.*
>
> *Sharmila Dehayriya*
> *Woman microentrepreneur*
> *(Bulb assembler)*
> *Damoh District*

- **Adequate allocation of human resources in project area.** The project's human resources were positioned optimally to cover the vast project area—the team leader for overall technical support and guidance; operations manager for coordination; state coordinator for field supervision, coordination, and liaising; three regional coordinators stationed in DISCOM regional offices (Bhopal, Indore, and Jabalpur); and MCTs coordinating the district-level operations, facilitating regular interaction with SHG members, and mobilizing women. Additionally, three enterprise development executives and one management information system coordinator were also part of the team along with other support staff (e.g., drivers and accountants).
- **Adequate time and resources for meaningful consultations and mobilization.** MCTs and project staff ensured that participation targets were met and women actively participated in all project activities including in needs assessment.
- **Customized, participatory, and interactive training modules.** The training approaches effectively enhanced women's understanding of energy conservation, efficient and effective use of energy, financial literacy, enterprise development using electricity, and gender concerns linked to the use of energy in the households and businesses activities.
- **Women self-help groups as project entry point.** The project built on existing social organizations, specifically the SHGs, whose primary purpose and interest are engaging in economic activities including savings mobilization and loan administration. The SHGs served as channels for introducing the project and providing support to women.

- **Partnerships between the government and nongovernment organizations.** Both the government and NGOs played key roles in achieving and sustaining the gender equality results. These linkages also facilitated the enhancement of women's access to existing schemes and programs for skills development, and livelihood and income enhancement.
- **Training of the project management team in gender mainstreaming.** Senior project team members attended gender mainstreaming lateral learning events organized by ADB. These sessions provided opportunities to present the gender equality and women's empowerment achievements of the project as well as to learn from other similar initiatives.
- **Commitment of the executing agencies in the implementation of the gender action plan.** The gender sensitivity of the senior officials of the DISCOMs was instrumental to achieving gender equality results. They attended the project specific trainings and visited project beneficiaries. Other senior officials of the government also recognized women's efforts. For example, the district collector of Damoh in Jabalpur and the district collector of Chhindwara visited the training workshop. This commitment of the executing agencies in the implementation of the gender action plan facilitated smooth implementation of project activities as well as motivated and encouraged women microentrepreneurs.

Challenges Encountered

Despite the many facilitating or helping factors, several challenges were met:

- The high rate of violence against women and women's fear of violence restricted their mobility and made them miss available economic opportunities.
- The deeply rooted social and cultural gender stereotypes and practices affected the community mobilization activities. These were very striking and visible all throughout the project. The project, however, gained some breakthroughs such as the removal of veil by the women in potters' community, which demonstrated women's remarkable courage and dedication.
- Human resources with combined knowledge and understanding of enterprise development in the energy sector and the underlying gender dynamics were not readily available locally.
- Inadequate and unreliable public transport restricted the mobility of women. This hindered the women entrepreneurs from going to markets and other places. There were instances when the MCTs had to accompany women to markets to purchase raw materials or meet the buyers. It also made traveling to remote rural locations difficult, more so for women team members owing to perceived safety threat. Thus, maintaining gender balance within the project team, which was crucial for mobilization of women, was challenging.

Lessons Learned and Ways Forward

The following lessons can be drawn from the project experiences (and from these lessons, ways forward can be designed):

a. **On gender analysis of energy development programs and projects**
   - The gender and social issues are interlinked and intersectional. Hence, caste, age, social status, marital status, and different abilities need to be considered in gender analysis before planning the project design.

b. **On mobilizing women's and community participation**
   - Informed and participatory approach in selecting beneficiaries is an effective strategy in promoting people's sense of project ownership and sustainability of program initiatives.
   - Illiteracy is not a barrier to building rural women's capacities. Participatory approaches and adult learning modules can be used to enhance rural women's capacities.
   - Involving women from the communities as BDS providers is a good strategy for fostering sustainability of external initiatives and addressing challenges related to women's mobility.
   - The prevailing myth that women, specifically rural women, are not entrepreneurial and do not have risk-taking behavior can be challenged and changed. With hand-holding, mentoring, and BDS support, they can be economically active.

c. **On optimizing the opportunities of improved power supply for women's economic empowerment through training in energy-based enterprises and business development services**
   - Increased access of women to quality energy resources and services, if combined with gender awareness and capacity development in safe and efficient use of electricity and in energy-based enterprises, can increase the income of women entrepreneurs from low-income households, increase the number of earning women, increase the propensity of women to save, decrease time spent by women on household chores, reduce women's time poverty and drudgery (with men's willingness to share household chores), increase women's participation in decision-making in the household, and reduce the incidence of illnesses.
   - With appropriate enabling conditions and support (including access to finance, markets, and technologies), women can make significant contributions to the energy sector and use energy as an instrument for enhancing their livelihoods, and can demonstrate their capacity as producers and suppliers of energy products and as service providers.
   - The energy efficiency training packages were very comprehensive and could be used as a standard for basic technical skills trainings.
   - Similarly, the integrated IEM as a standard feature in livelihood training is worth replicating.

d. On the key role of the government and nongovernment organizations

- Developing the gender mainstreaming capacities of service providers including DISCOMs and energy sector officials and promoting continuous dialogues can facilitate the integration of gender equality and social inclusion principles in the building of energy infrastructures and designing of energy technologies.
- Partnership between the government and NGOs can help optimize existing assets and resources of the government, civil society sector, and private sector for women's economic empowerment.
- A gender-responsive approach to rural electrification is effective in unleashing power-based entrepreneurship attitude among the stakeholders including the service providers. The senior officials from the DISCOMs appreciated this approach and acknowledged its contribution to addressing gender equality issues in the energy sector and promoting women's empowerment. Thus, this approach could be scaled up and replicated in the remaining districts of Madhya Pradesh and could be adopted in other programs involving energy distribution and rural electrification. The lessons drawn from this innovative initiative to strengthen women's energy entrepreneurship also have the potential to guide future energy investments.

e. On the need for expanded and sustained interventions

- Ensuring women's meaningful involvement to energy efficiency as entrepreneurs is a long-term process. Additional efforts toward capacity building are crucial to ensure the sustainability of these initiatives.
- The transformation of deep-rooted social and cultural constraints requires long-term and focused interventions.
- Improving power supply and providing training on the safe and efficient use of electricity are not enough to move low-income households to adopt labor-saving household appliances and safe cooking technologies. Targeted interventions are needed to create positive results in these areas.

Appendix 1: Results of the Impact Assessment of Technical Assistance 7831

(Excerpts from the TA 7831 Impact Assessment Report of PricewaterhouseCoopers)

Appendix 1 highlights the results of the statistical analyses of the differences between the treatment group and control group, which show the positive contributions of the training modules (under TA 7831) to women's economic and social empowerment.

Average Monthly Income of Women

The comparison of the incomes of women in treatment group categories (Categories 4–7) and in control group categories (Categories 1–3) indicates that the incomes of those who attended all three training modules—integrated energy module (IEM), skills development, and business development services (BDS)—were significantly higher than the incomes of those who did not attend any of the training modules (Table A1.1).

Table A1.1: Incomes of Women in Treatment Group Categories and Control Group Categories

Category 7 versus Categories 1–3	Treatment Group Women's Mean Income (Rs)	Control Group Women's Mean Income (Rs)	Average Treatment Effect (Rs)	Standard Error	z	p-value
Comparisons Involving Training in IEM						
Category 4 (IEM) vs. Category 1 (No SHG)	1,312.59	1,169.82	142.78	115.51	1.24	0.22
Category 4 (IEM) vs. Category 2 (Non-TA SHG)	1,312.59	1,202.27	110.32	105.50	1.05	0.30
Category 4 (IEM) vs. Category 3 (TA-SHG)	1,312.59	1,000.63	311.96	195.73	1.59	0.11
Comparisons Involving Training in IEM+GE						
Category 5 (IEM+GE) vs. Category 1 (No SHG)	1,148.93	1,155.38	−6.45	118.13	−0.05	0.96
Category 5 (IEM+GE) vs. Category 2 (Non-TA SHG)	1,148.93	1,178.07	−29.14	111.73	−0.26	0.79
Category 5 (IEM+GE) vs. Category 3 (TA-SHG)	1,148.93	987.75	161.19	101.91	1.58	0.11
Comparisons Involving Training in IEM+SD						
Category 6 (IEM+SD) vs. Category 1 (No SHG)	1,036.06	1,160.81	−124.76	127.26	−0.98	0.33
Category 6 (IEM+SD) vs. Category2 (Non-TA SHG)	1,036.06	1,187.73	−151.68	122.16	−1.24	0.21
Category 6 (IEM+SD) vs. Category3 (TA-SHG)	1,036.06	975.73	60.32	108.16	0.56	0.58
Comparisons Involving Training in IEM+SD+BDS						
Category 7 (IEM+SD+BDS) vs. Category 1 (No SHG)	1,464.15	1,167.23	296.93	132.20	2.25	0.03*
Category 7 (IEM+SD+BDS) vs. Category2 (Non-TA SHG)	1,464.15	1,212.12	252.03	122.64	2.05	0.04*
Category 7 (IEM+SD+BDS) vs. Category3 (TA-SHG)	1,464.15	1,004.72	459.43	112.78	4.07	0.00*

* = significant at $p < .05$, BDS = business development services, GE = gender and energy, IEM = integrated energy module, SD = skills development, SHG = self-help group, TA = technical assistance.

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

A closer look at the patterns of impact at different levels of income distribution—the samples were divided into 10 equal groupings (each known as a quantile) based on income—showed that women in the middle most (quantile 5) and the quantile immediately below (quantile 4) seemed to have experienced an increase in income. The coefficients are highly significant (p-values are close to zero), which suggests that the attendance in the training modules drove women from poor households to earn more (Table A1.2).

Table A1.2: Unconditional Quantile Regression under Propensity Score Matching: Women's Monthly Per Capita Income

Quantiles	Coefficients	Standard Error	z	p-values
Quantile 4	250	96.25	2.60	0.01*
Quantile 5	500	132.17	3.78	0.00*

* = significant at p < .01.

Note: PricewaterhouseCoopers used self-help group participation as an instrument variable, and estimated the unconditional quantile treatment effects using the method advocated by M. Frölich and B. Melly. 2008. Unconditional Quantile Treatment Effects under Endogeneity. Discussion Paper Series. No. 3288. Bonn, Germany: Institute for the Study of Labor (IZA). http://ideas.repec.org/p/iza/izadps/dp3288.html

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Number of Income-Earning Women

Overall, 76% of the households in the treatment group and 69% of the households in the control group had at least one woman earning an income (Table A1.3). The statistical test showed that this difference is significant at p = 0.00 (Table A1.4).

Table A1.3: Percentages of Households with Women Who Earn and Save

Categories of Samples	Total No. of Sample Households	Households with at Least One Woman Earning (%)	Households with Women Who Saved in the Last 1 Month (%)
Category 1	290	68.6	50.7
Category 2	291	74.5	61.4
Category 3	290	70.0	58.3
Control Group	**871**	**71.0**	**56.8**
Category 4	485	78.8	68.3
Category 5	304	76.2	56.4
Category 6	324	78.0	47.4
Category 7	300	75.3	69.3
Treatment Group	**1413**	**76.0**	**61.0**

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Table A1.4: Descriptive Statistics of Households with Women Earners (%)

Category	Average	Standard Error	Difference	z	p-value
Control group	0.7	0.02	−0.07	−3.58	0.00*
Treatment group	0.77	0.01			

* = significant at p = .01.
Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

To determine the specific training modules that created the most impact, each treatment group category was statistically compared with each control group. The results suggest that all the training modules induced women to earn (Table A1.5).

Table A1.5: Impact of the Training Modules on the Number of Women Earners

Comparison	ATE	Standard Error	z	p-value
Treated (IEM) vs. Control (No SHG)	0.12	0.03	3.54	0.00*
Treated (IEM) vs. Control (Non-TA SHG)	0.07	0.03	2.12	0.03*
Treated (IEM) vs. Control (TA-SHG)	0.12	0.03	3.44	0.00**
Treated (IEM+GE) vs. Control (No SHG)	0.08	0.04	2.18	0.03*
Treated (IEM+GE) vs. Control (Non-TA SHG)	0.03	0.04	0.74	0.46
Treated (IEM+GE) vs. Control (TA-SHG)	0.08	0.04	2.12	0.03*
Treated (IEM+SD) vs. Control (No SHG)	0.12	0.04	3.11	0.00**
Treated (IEM+SD) vs. Control (Non-TA SHG)	0.05	0.04	1.42	0.16
Treated (IEM+SD) vs. Control (TA-SHG)	0.11	0.04	2.86	0.00**
Treated (IEM+SD+BDS) vs. Control (No SHG)	0.09	0.02	2.35	0.02*
Treated (IEM+SD+BDS) vs. Control (Non-TA SHG)	0.04	0.29	1.05	0.29
Treated (IEM+SD+BDS) vs. Control (TA-SHG)	0.10	0.02	2.41	0.02*

* = significant at p < .05, ** = significant at p < .01, ATE = average treatment effect, BDS = business development services, GE = gender and energy, IEM = integrated energy module, SD = skills development, SHG = self-help group, TA = technical assistance.
Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Propensity to Save

Table A1.6 suggests that women in the treatment group developed the propensity to save money. A confirming statistical analysis, however, showed that, except for women in Category 7, this was mainly because of their membership in self-help groups (SHGs) rather than their attendance in the training.

Table A1.6: Impact of Training Modules on Women's Propensity to Save

Comparison	ATE	Standard Error	z	p-value
Treated (IEM) vs. Control (No SHG)	0.16	0.04	4.45	0.00**
Treated (IEM) vs. Control (Non-TA SHG)	0.06	0.04	1.62	0.11
Treated (IEM) vs. Control (TA-SHG)	0.07	0.04	2.12	0.03*
Treated (IEM+GE) vs. Control (No SHG)	0.09	0.04	2.20	0.03*
Treated (IEM+GE) vs. Control (Non-TA SHG)	0.01	0.04	0.14	0.89
Treated (IEM+GE) vs. Control (TA-SHG)	0.02	0.04	0.41	0.68
Treated (IEM+SD) vs. Control (No SHG)	0.00	0.04	0.06	0.96
Treated (IEM+SD) vs. Control (Non-TA SHG)	–0.09	0.04	–2.19	0.03*
Treated (IEM+SD) vs. Control (TA-SHG)	–0.07	0.04	–1.82	0.07
Treated (IEM+SD+BDS) vs. Control (No SHG)	0.20	0.04	5.23	0.00**
Treated (IEM+SD+BDS) vs. Control (Non-TA SHG)	0.10	0.04	2.72	0.01**
Treated (IEM+SD+BDS) vs. Control (TA-SHG)	0.12	0.04	3.17	0.00**

* = significant at p < .05, ** = significant at p < .01, ATE = average treatment effect, BDS = business development services, GE = gender and energy, IEM = integrated energy module, SD = skills development, SHG = self-help group, TA = technical assistance.

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Time Spent by Women in Treatment and Control Groups for Household Chores

The p-values below .05 in Table A1.7 suggest that women in the treatment group spent significantly less time for (i) cleaning and/or washing; (ii) fetching fodder, agricultural waste, dung, etc.; and spent more time for (iii) reading than the women in the control group.

Table A1.7: Time Use per Day of Women in the Control and Treatment Groups

Time-Use Categories	Control Group	Treatment Group	t-value	p-value
Cleaning/Washing	1.04	1.00	2.30	0.02*
Cooking	1.16	1.12	1.84	0.06
Fetching water	1.00	1.01	–0.21	0.83
Fetching fuelwood	1.15	1.12	0.55	0.58
Fetching fodder, agricultural waste, dung, etc.	0.75	0.64	4.31	0.00*
Watching TV (information/news)	0.21	0.20	0.44	0.66
Watching TV (others)	0.50	0.46	1.09	0.27

continued on next page

Table A1.7 *continued*

Time-Use Categories	Control Group	Treatment Group	t-value	p-value
Reading	0.53	0.63	–2.04	0.04*
Doing/Helping school homework	0.20	0.23	–1.67	0.09
Grinding	0.28	0.31	–1.77	0.07
Milling	0.31	0.33	–0.67	0.50
Hulling	0.28	0.30	–1.08	0.28
Irrigation	0.46	0.49	–0.48	0.63
Childcare	0.65	0.74	–1.13	0.26
Other leisure activities	0.98	0.92	0.99	0.31
Working in home enterprise	1.00	3.24	–1.24	0.23
Working elsewhere for wage or salary	2.41	2.28	1.03	0.30
Working elsewhere (not for wage or salary)	0.03	0.03	0.23	0.80

* = significant at $p < .05$.

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Men's Participation in Household Chores

A comparison of the treatment and control households showed that the households with women who attended the training modules started receiving help from their men for most of the household activities like (i) cooking, (ii) cleaning, (iii) fetching fuelwood, (iv) fetching fodder, (iv) grinding, (v) milling, (vi) hulling, and (viii) irrigation (Table A1.8).

Table A1.8: Household Chores of Men in the Treatment and Control Groups

Activities	Treatment	Control	Difference	t-Value	p-value
Cleaning/Washing	0.3	0.2	0.1	3.1	0.01*
Cooking	0.3	0.2	0.1	4.0	0.00*
Fetching water	0.4	0.4	0.1	1.9	0.02*
Fetching fuelwood	0.3	0.2	0.1	2.6	0.01*
Fetching fodder	0.3	0.2	0.1	3.2	0.01*
Conducting schoolwork	0.4	0.4	0	0.8	0.21
Grinding	0.3	0.2	0.1	3.0	0.01*
Milling	0.3	0.2	0.1	3.2	0.01*
Hulling	0.3	0.2	0.1	3.3	0.01*
Irrigation	0.5	0.4	0	1.1	0.13

* = significant at $p < .05$.

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Women's Participation in Decision-Making

As shown in Table A1.9, areas of decision-making where women in Categories 6 and 7 participated more compared with the women in control group were on investments and savings, and family health care.

Table A1.9: Proportion of Decisions Made Jointly by Women and Men or by Women Only

Decision Matters	Treatment Group (Categories 6–7)	Control Group (Categories 1–3)	t-value	p-value
Household food expenditure	0.85	0.85	-0.03	0.51
Education of children	0.79	0.79	0.20	0.42
Family planning	0.67	0.65	0.40	0.35
Purchases of durable assets	0.67	0.62	1.40	0.08
Investments and savings	0.69	0.61	1.90	0.03*
Own health care	0.73	0.68	1.26	0.10
Family health care	0.72	0.63	2.33	0.01*

* = significant at $p < .05$.

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Women's Perception of Safety

As shown in Table A1.10, most of the women in the surveyed villages reported that they felt safe going out of the house at night. However, a regression analysis of "very safe" responses of the seven categories of samples suggests a higher proportion of women in the treatment group feeling "very safe" while going out of their houses after sunset as compared with the women in the control group (Table A1.11).

Table A1.10: Perception of Safety of Women in Seven Categories of Samples

	Safety Perception Scale					
Categories	Very Safe	Safe	Moderately Safe	Moderately Unsafe	Unsafe	Total
Category-1	2.1	65.2	18.3	6.9	7.6	100
Category-2	2.1	70.7	14.5	4.1	8.6	100
Category-3	2.1	67.6	17.6	6.9	5.9	100
Category-4	2.9	69.8	15.5	3.4	8.4	100
Category-5	2.7	67.1	22.1	3.4	4.7	100
Category-6	3.4	48.9	31.0	8.7	8.0	100
Category-7	7.8	63.9	17.2	6.1	5.1	100

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Table A1.11: Statistical Analysis of the "Very Safe" Perception of Women

Estimate	Standard Error	t-value	p-value	Number of Observations
0.02	0.01	2.49	0.01*	2284

* = significant at p = .01.

Source: ADB. Impact Assessment of TA 7831 IND Enhancing Energy-Based Livelihoods for Women Micro-Entrepreneurs. Unpublished.

Appendix 2: Achievements in Project Reports

Table A2.1: Project Achievements

Result Parameters	Project Achievements
Human capacity development	Notwithstanding their literacy or low level of education handicap, the women developed appreciation of energy use in their households and livelihoods, and enhanced their skills and income-earning opportunities. • Women (20,729) from 2,803 self-help groups (SHGs) trained to gain access to energy-based income-generating business opportunities • Women (506) trained as gender and energy trainers • Women (517) trained as business development services (BDS) providers; • Enhanced awareness of women on effective and efficient use of energy/ electricity in their household and in livelihoods • Improved skills in their respective trades • Enhanced existing skills and acquired new skills for economic enhancement • Better access to information • Improved self-confidence and ability to speak in public • Enhanced mobility and freedom of movement outside their community/ village • Improved negotiation skills in business dealings
Economic empowerment or income enhancement	• Improved employment and income-earning opportunities for women trained in nontraditional skills • Improved access to productive assets (motorized pottery wheel, sewing machines, and other mechanized tools for their trades) and financial services (credit, savings, and insurance) • Women (590) have upgraded their existing enterprises into energy-based enterprises or started new enterprises • Women (63) accessed BDS through SHG assistance • New skills in nontraditional trade, such as bulb assembling, mechanized bangle making, disposable utensils making, and pottery • Developed professional attitude or approach toward work in general and energy-based business in particular • Shift from subsistence attitude for their enterprise to aptitude for expansion and profit enhancement • Wider market contacts and enhanced negotiating skills • Gradual increments in sales, earnings, and savings for women trained as business providers through their enterprises as well as BDS
Reduction of time poverty	• Reduced work load from household chores, reduced drudgery • Saved time and efforts during their enterprises • More time at their disposal for rest, recreation, and family bonding • Increased productivity and efficiency
Voice and rights	• Positive changes in the society like lifting of veil, freedom to express opinion in public forums • Enhanced capacities of the women beneficiaries to take informed decisions both in household and in their enterprises • Influenced household dynamics: men more receptive and supportive, and shared household work • Enhanced participation and contribution in community activities
Establishment of linkages	• Linkages with existing government schemes and programs, and technology providers developed and enhanced with implicit benefits to women

Sources: Based on the project quarterly progress reports; Hand in Hand India. Technical Assistance Completion Report. Unpublished; and field interviews conducted for this case study.

Table A2.2: Key Project Benefits

Practical Benefits	Strategic Benefits
• Improved access to electricity connections or new meters • Reduced work load from household chores, reduced drudgery • More time for rest, recreation, and family bonding; and for skills development and/or income generation • Increased awareness on energy conservation, and effective and efficient use of energy/electricity • Skills development in respective trades • Increase in number of existing or new energy-based enterprises headed by women • Increased productivity and efficiency • Diversification to nonconventional business such as bulb assembling, pottery, and leather bag making • Increased income-earning opportunities • Enhanced productivity and increased income of women entrepreneurs • Better access to information • Increased awareness and education about existing government schemes and programs • Improved access to government schemes and programs; linkages with select schemes such as District Poverty Initiatives Project and National Rural Livelihoods Mission	• Reduced drudgery of household chores • Extension of study hours for students with regular availability of electricity • Improved access to productive assets (motorized pottery wheel, sewing machines, and other mechanized tools for their trades) and financial services (credit, savings, and insurance) • Increased self-reliance owing to economic independence • Gender division of labor reduced with support of husband and other family members in household chores • Men's recognition of rights of women and girls • Improved participation of women in family decision-making, specifically in purchasing assets, especially electricity-based equipment, gadgets, and other household assets • Enhanced capacities to take informed decisions in both household and their enterprises • Greater control over household assets • Enhanced self-confidence to take up larger role in family as well as community • Improved socio-cultural dynamics, with greater gender balance, removal of veil, confidence to share opinion in public forums • Enhanced participation and contribution in community activities and interaction in public spaces or platforms • More flexibility to move outside community/village • Increased mobility and overall comfort, especially for women, have enhanced safe spaces • Greater self-confidence, overall better quality of life

Sources: Based on the project quarterly progress reports; Hand in Hand India. Technical Assistance Completion Report. Unpublished; and field interviews conducted for this case study.

Table A2.3: Distribution of Project Districts

(Central Region: Bhopal)	(Western Region: Indore)	(Eastern Region: Jabalpur)
DISCOM Central	DISCOM West	DISCOM East
Ashok Nagar	Alirajpur	Chhattarpur
Bhind	Dewas	Chhindwara
Datia	Indore	Damoh
Guna	Jhabua	Narsinghpur
Gwalior	Neemuch	Panna
Morena	Mandsour	Sagar
Rajgarh	Shajapur and Agar	Seoni
Sheopur	Ujjain	Tikamgarh
Shivpuri		

DISCOM = distribution company.
Source: Hand in Hand India. Technical Assistance Completion Report. Unpublished.

India Gender Equality Results Case Study
Enhancing Energy-Based Livelihoods For Women Micro-Entrepreneurs

Reliable supply of 24-hour electricity in the State of Madhya Pradesh since 2014 has transformed the lives of many, including women from low-income households. An Asian Development Bank project validates how women can be empowered through capacity development in efficient use of electricity and energy-based enterprises, and provision of business development services. The case study builds up on the project progress so far, showcasing women who, along with their sense of personal empowerment, have increased their incomes and savings through microenterprises. The case study reaffirms that a steady supply of electricity, coupled with capacity development, helps create an arena where men and women are accorded equal participation in business opportunities.

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ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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