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**INTERACTIVE EXPERT PANEL**

**Key policy initiatives and capacity-building on gender  
mainstreaming: focus on science and technology**

**WOMEN BAREFOOT SOLAR ENGINEERS  
A COMMUNITY SOLUTION\***

by

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\*The views expressed in this paper are those of the author and do not necessarily represent those of the United Nations.



### **The Barefoot Approach: Women Barefoot Solar Engineers of Africa**

The Women Barefoot Solar Engineers of Africa aim to improve the lives of the rural poor living on less than \$1 a day in remote inaccessible villages off the energy grids in the 21 least developed countries in Africa, supplying their communities with clean, low-cost household lighting from solar energy.

Since 2005 more than 140 women from Africa, many of them grandmothers, almost all of them illiterate, have trained at the Barefoot College in India. In six months, these women learned how to fabricate, install and maintain solar-powered household lighting systems, and have become Barefoot Solar Engineers transforming the lives of over 2,000 families in the first self-sufficient and self-reliant, solar-electrified villages in Africa.

The Barefoot Approach has reached remote, poor, rural villages in 25 countries in Africa, Asia and Latin America. Illiterate rural mothers and grandmothers who have never left their villages before training in India have solar electrified their own villages.

## **A Pressing Need for Affordable Clean Energy in Developing Countries**

A rural family in Africa burns around 60 liters of kerosene a year to light their home. The average kerosene lamp in Africa spews a ton of CO<sub>2</sub> in less than 10 years. Solar lighting can replace kerosene and wood, and improve the health of the people and the environment.

## **Training Illiterate & Semi-Literate Grandmothers from Africa**

The College believes the very poor have every right to control, manage and own the most sophisticated of technologies to improve their own lives. Just because they cannot read and write, there is no reason that very poor women cannot be water and solar engineers, designers, communicators, midwives, architects and rural social entrepreneurs.

Illiterate grandmothers have shown they are capable of fabricating, installing and maintaining solar lighting systems after six months of hands-on training, tutored by unschooled Indian women who have learned to train others in the skills they have acquired through “learning by doing.”

More than 140 rural grandmothers have solar electrified 9,118 remote rural houses in 21 African countries. It is an extraordinary story because grandmothers are considered useless in rural African society and after their return they have become role models for their communities.

As a result of solar electrifying their communities, they have managed to save 30,000 liters of kerosene per month from polluting the atmosphere all over Africa.

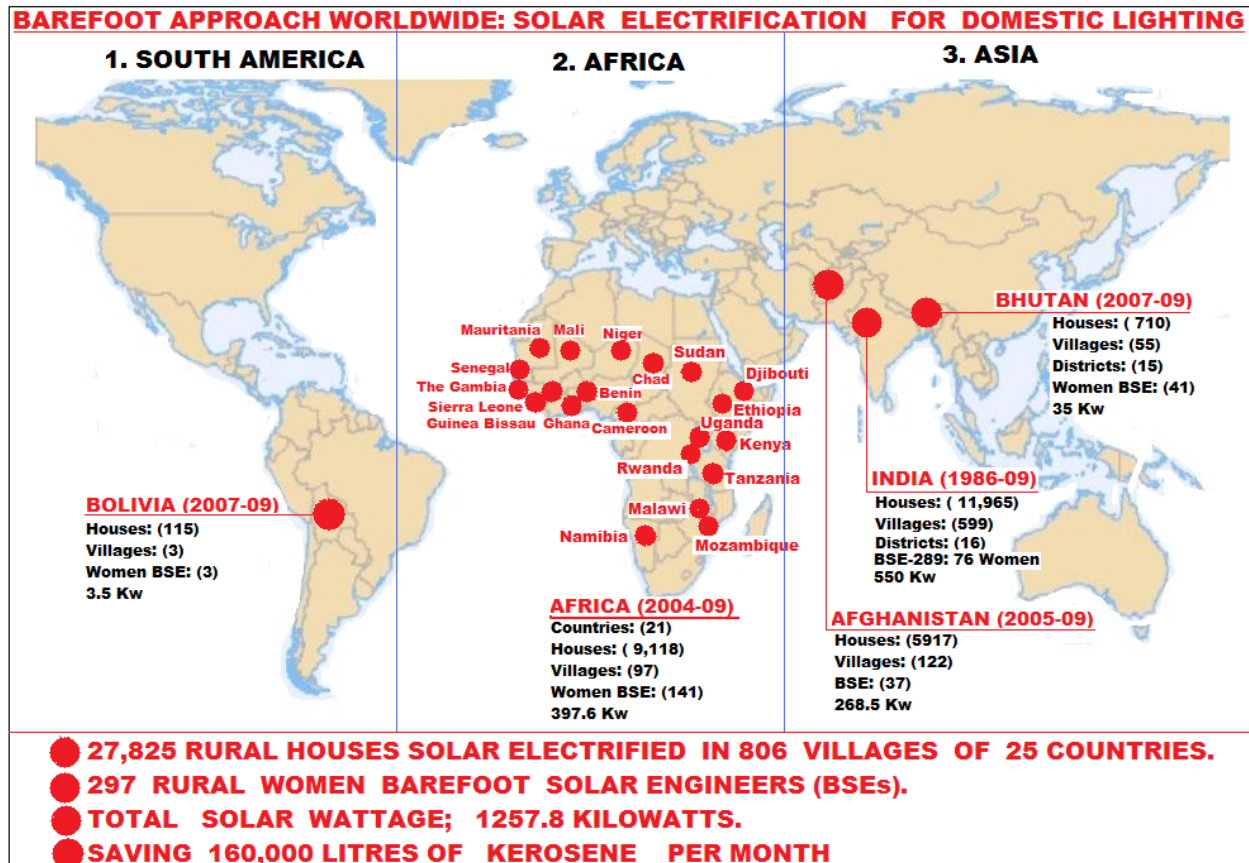
## **Paper Qualifications, Literacy and Even Common Language Are Not Needed**

For women who have rarely left their village, it requires undeniable courage and patience to leave their homes and families to come to India for six months. With time they adapt to new food, shelter and clothing.

The presence of so many nationalities creates a positive environment of cultural diversity, but initially raised concerns over language and communication. The need for expression has given birth to a unique “language” of gestures, signs and broken English cutting across all language barriers.

“Learning by doing” has long been the philosophy adopted by Barefoot College for training. Practical demonstrations, “hands-on” experience and regular repetition help trainees get familiar with terms, tools, equipments and components used in the solar technology. With each passing day their level of hesitancy decreases and confidence and technical dexterity increases.

The program breaks a critical myth associated with solar technology and learning. It proves that “paper qualifications” are not required to become a Solar Engineer.



## A Proven Model for Self-Sustaining Community Development

The Barefoot Approach was designed to demonstrate the first technically and financially self-sufficient, solar electrified rural villages in Afghanistan, Bhutan and Africa.

The target constituency has been the rural poor families living on less than \$1 per day in rural communities where the women spend hours fetching wood or kerosene, or rely on candles and flashlight batteries for lighting at very high costs. After food, the highest family expenditure is on lighting.

By training an illiterate rural grandmother to be a fully competent solar engineer there is no need for an urban, paper-qualified solar engineer and eliminates the dependency of rural communities on urban experts.

By getting the communities to pay every month for the use of the solar units (thus reaching the very poorest of the poor who cannot afford to buy these systems even in installments), the financial commitment is assured for the purchase of replacement components and payment of the monthly salary of the woman solar engineer. This salary provides the incentive for the woman solar engineer to work and look after the units regularly or she will not receive her monthly salary.

Each household agrees to pay a fee between \$5 to \$10 a month for the solar lighting, roughly what they used to spend on kerosene, candles and flashlight batteries.

### **A Scalable Solution for Solar Electrification Across Africa**

This Barefoot model for implementation of community-owned and managed systems has resulted in solar electrification benefiting nearly 190,000 people in over 750 communities in 16 states in India and is being replicated in 24 other countries in Africa, Latin America and South Asia.

The Barefoot Approach leverages local community contribution and participation with public and private sector investment and financing. Working in partnership with the local community, the Barefoot Approach draws on a mix of resources including government and international funding agencies, private foundations, and corporate and individual sponsors to enable the appropriate investment for cost-effective and self-sustaining solutions for delivering solar power in poor, rural communities.

The Government of India is funding the air travel and training costs of the African women being trained by the College in Tilonia.

### **Decentralizing and Demystifying Technology**

Very ordinary people written off by society because they are labeled as poor, primitive and backward are doing extraordinary things that defy common expectations. What the Barefoot College has effectively demonstrated is how the combination of traditional knowledge (barefoot) and demystified modern skills can bring lasting impact and fundamental change when the tools are in the control and ownership of the rural poor.

All other initiatives providing solar-powered lighting in remote villages are implementing a top-down approach where the installation is done by a “paper-qualified” engineer coming from a city who has no idea how to work and communicate with poor communities. The experts’ belief in the technology is total. Their faith in the capacity and competence of the rural poor to fabricate, install and maintain the solar units is totally absent.

The primary obstacles that are coming in the way of the demystified Barefoot Approach spreading faster all over the world is the “blinkered” mind of the paper-qualified expert and the limited vision to dream or take risks by the Literate Man and Woman in corridors of power.

It is beyond their comprehension and understanding to accept that an illiterate rural woman who has never been to school or college can be a Solar Engineer. They do not believe that sophisticated 21<sup>st</sup> century technology like solar should be or could be managed, controlled and owned by very poor rural women earning less than \$1 a day.

It is by taking whole communities into confidence and making them take all the decisions that wastage can be minimized, urban migration reversed, and pilferage and theft of solar panels in villages eliminated.



That is why a change in work style and mindset is required to provide clean, inexpensive, pollution-free light to the poor around the world.

**The Jim Lehrer News Hour on PBS featured the Women Solar Engineers of Africa**

[http://www.pbs.org/newshour/bb/asia/july-dec08/indiaschool\\_10-06.html](http://www.pbs.org/newshour/bb/asia/july-dec08/indiaschool_10-06.html)

**Videos of the Women Barefoot Solar Engineers of Africa**

<http://www.youtube.com/user/barefootcollege>



*Illiterate grandmothers from rural villages in seven African countries train to become solar engineers at the Barefoot College in Tilonia, India.*



*Solar lanterns fabricated by women solar engineers in Mauritania provide clean light at night, eliminating the smoke of kerosene that damages eyes and health of children in particular.*



*Solar Lanterns provide clean light at night, enabling women to earn additional income through their needlework. The Barefoot College helps women artisans to market their crafts online through [www.Tilonia.com](http://www.Tilonia.com).*