



GRAMEEN SHAKTI



Partnership Experience on Renewable Energy Between ILO and Grameen Shakti, Bangladesh

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**Prepared for Presentation at The National Conference on
Climate Change and Green Jobs**

28 April 2011

Kathmandu, Nepal

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South Asia



- **Bangladesh is :**
 - **vulnererable to and facing the dangers and problems of climate change**
 - **environmental degradation**
 - **pollution and man-made and natural disasters.**

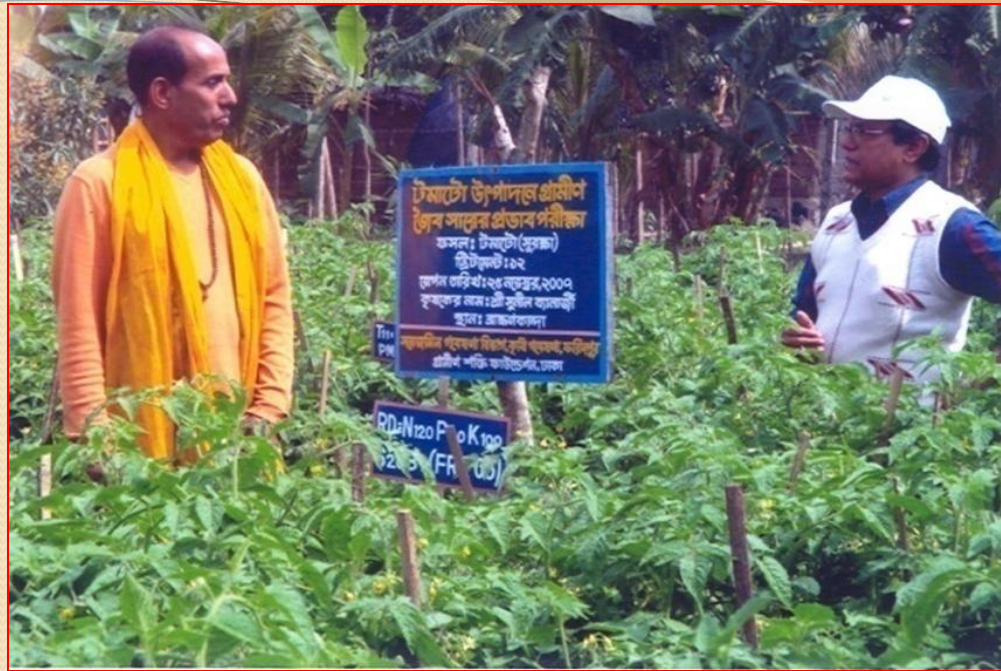
- **Bangladesh suffers from energy poverty**
 - **more than 70% of the rural people lack access to grid electricity**
 - **and is forced to depend on kerosene, firewood, cow dung and other polluting energy sources.**

- **Bangladesh needs to reduce its carbon foot print and adopt renewable energy technologies to protect its environment.**

- **Unemployment and underemployment are major issues and challenges in Bangladesh.**
- **There is need to create jobs and income generating opportunities for rural youth to stop unwanted migration to urban areas and also to other countries.**
- **These jobs and businesses should be environment friendly and do not do further damages to the environment,**
- **We must create Green Jobs and Green Businesses**

GREEN JOBS

Initiatives





Concept

On Green Jobs

Concept of Green Jobs is new

- **It deals with direct employment creation that contributes to the reduction of environmental impact to levels that are ultimately sustainable.**
- **It includes jobs that help reduce the consumption of energy and raw materials as well as decarbonizes the economy**

- **Green jobs protect and restore ecosystems and biodiversity and minimize production of waste and pollution.**
- **Green jobs lead to lower environmental impacts directly or indirectly.**
- **Green jobs may take the form of highly skilled research and development or management functions as well as low skilled work.**

Green Jobs

- **Definition**

- **Green Jobs are *Decent Work* created in economic sectors and activities.**
- **These jobs reduce their environmental impact, ultimately leading to environmentally, economically and socially sustainable enterprises and economics.**






Composting Unit



WHY GREEN JOBS

Short-medium term impacts

Impact of Climate Change & Environmental Constraints

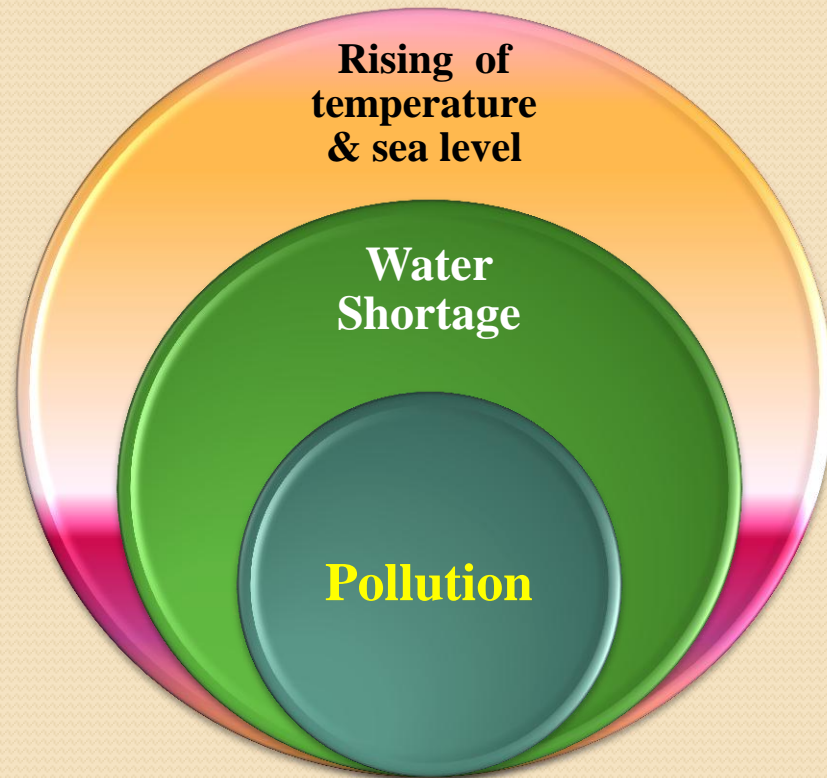


Increased Variability of Weather Impacts	<ul style="list-style-type: none">• Agriculture• Tourism
Storm & Floods	<ul style="list-style-type: none">• Disaster induces migration
Exploration of Natural Resources	

WHY GREEN JOBS

Impact of Climate Change & Environmental Constraints

Medium-long term impacts



WHAT ARE GREEN IN JOBS

- ➔ Reduction of consumption of energy and **raw materials**
- ➔ Avoidance of **GHG** emission
- ➔ Protection and restoration of ecosystem
- ➔ Minimization of **Waste & Pollution**

Basic Ingredients

Dematerialization of Economy

Decarbonization of Economy

Protection and restoration of ecosystem

Minimization of Waste & Pollution

TWO IMPORTANT POINTS

→ Clearly there are **different shades** of green. **Focus** needs to be on sustainable development and transformation of the labor market.

→ **Profiles of green jobs** range from highly skilled research and development or management functions through technical and skilled worker levels to relatively low skilled worker

OPPORTUNITIES FOR GREEN JOBS

**Energy
Efficiency**

**Renewable
Energy**

Mobility

Recycling

**Sustainable
Agriculture
& Forestry**

**Environ
Services**

RBSA initiative

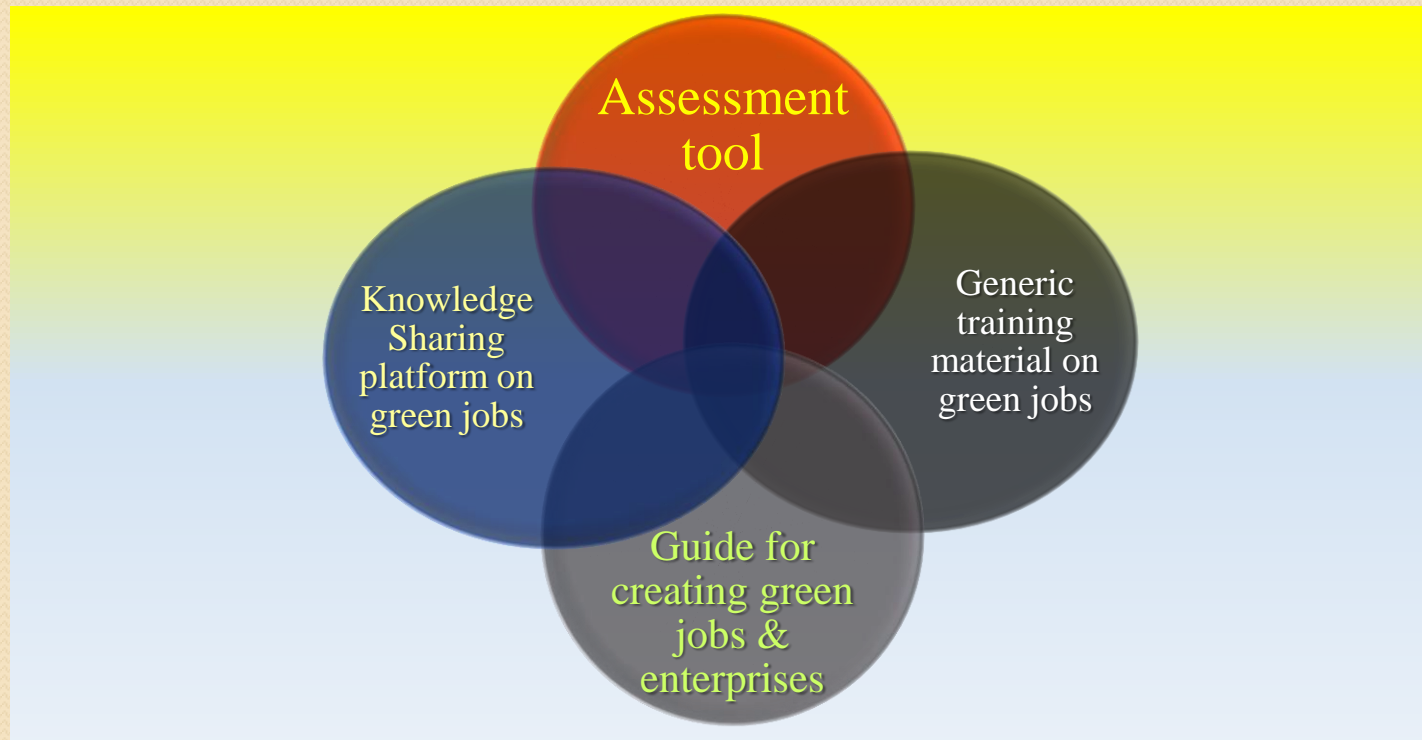
OBJECTIVES

- ➔ **Demonstrate the use of renewable energy as a viable approach and a policy instrument:**
 - ☐ **for clean local development and poverty reduction through the creation of direct green jobs and of**
 - ☐ **induced decent work opportunities in small enterprise**
- ➔ **Generate informed dialogue and consensus about future directions for green jobs in Asia Pacific**

- **Link with UNDAF and government's identification of climate change as priority**
- **ILO RBSA funding: \$ 280000**
- **Build off Grameen Shakti's experience in extending renewable energy supply to rural areas, particularly women, through creating a credit linkage**
- **Match with ILO's experience in entrepreneurship training**
- **Link with existing ILO programs**

RBSA initiative: Bangladesh

RBSA INITIATIVE: OUTPUTS (REGIONAL LEVEL)



Under ILO funding Grameen Shakti

- **Trained 16 Trainers (women Engineers of GTC):**
who trained **90 solar technicians** at different technical centers of the Bureau of Manpower, Training and Employment.
- **Trained 20 Trainers (women Engineers of GTC):**
who trained **250 young women** on entrepreneurship for solar accessories business at different divisional head quarters.



**Experiences of
Grameen Shakti
On Green Jobs**

Journey Towards Green Energy Revolution

- ❖ **Grameen Shakti (GS) was established in 1996 by Professor Yunus, Founder of Grameen Bank.**

- ❖ **Our Mission is to empower the rural people with access to Green Energy and Income Opportunities**

- ❖ **GS now operates all over Bangladesh with about 1100 field offices and about 8000 staff**

- ❖ **We foresee a future where all rural households of Bangladesh will have access to environment friendly energy at an affordable cost.**



Bangladesh is an Energy Starved Country

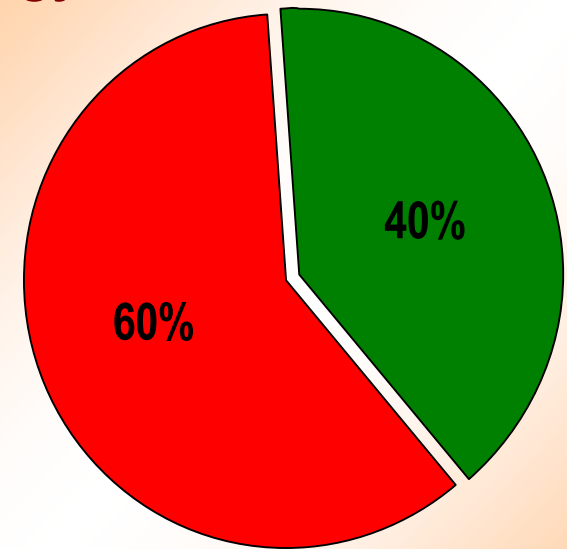
Only 40% of population is connected to the national power-grid

- ❑ 85 % of this power is generated from natural gas - supply expected to be insufficient by 2016
- ❑ Electricity Production is only about 145 kWh per capita

Thus, 96 million people have no access to the national power grid

- ❑ Most (87 %) live in rural areas
- ❑ Majority of rural people depend on inefficient, primitive sources of energy
 - ❑ such as kerosene for light

Energy Scenario



■ Non Electrified Area
■ Electrified Area

Development Requires Energy. Renewable Energy can be a cost-effective and pollution-free suitable for stimulating development.

Renewable Energy to Fuel Bangladesh's Sustainable Development

Women and children : the main victims of energy poverty





Grameen Shakti is one of the largest rural based Renewable Energy Companies in the world

Grameen Shakti is very successful in providing sustainable clean energy solutions to rural people in Bangladesh.

- Installed more than 577,679 SHS
- Constructed more than 16,807 Biogas Plants
- Produced more than 259,221 Improved Cooking Stoves
- Created more than 30,000 Green Jobs and trained 9,291 rural women as Renewable Energy Technicians and Entrepreneurs



A Vision for 2015

75 million people of Bangladesh

(45% of the population)

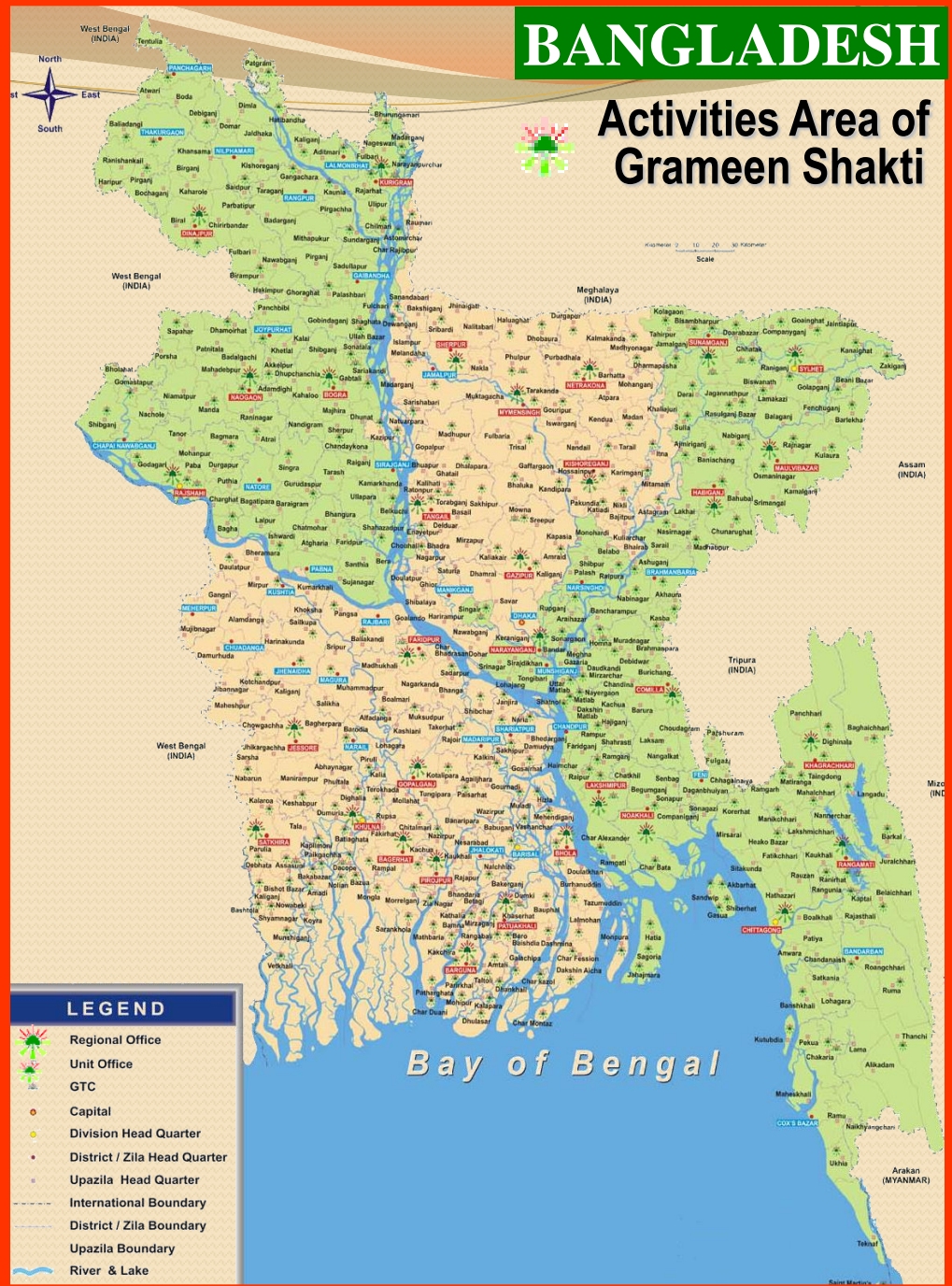
**will benefit from
access to modern,
clean, and
affordable
energy**



Covers all over Bangladesh

BANGLADESH

Activities Area of Grameen Shakti



GRAMEEN SHAKTI UPDATE

Total Office	1272
Branch Office	1068
Regional Office	144
Divisional Office	14
Technology Center	46
Total number of beneficiary	4.0 m
Total staff	9800
Total SHS installed	577,679
Total ICS installed	259,221
Total Biogas installed	16,807
Total electricity generation/day	130 mwh

LEGEND

- Regional Office
- Unit Office
- GTC
- Capital
- Division Head Quarter
- District / Zila Head Quarter
- Upazila Head Quarter
- International Boundary
- District / Zila Boundary
- Upazila Boundary
- River & Lake

Illuminating Lives

SHS provide access to green electricity

- Providing better opportunities for developing local entrepreneurship, income generating activities, and employment in rural areas
- **Replacing kerosene and reducing fire hazards, indoor pollution and associated health risks**
- Reducing carbon emissions



Grameen Technology Centers Creating Green Jobs for Women



Solar Home Systems in Schools



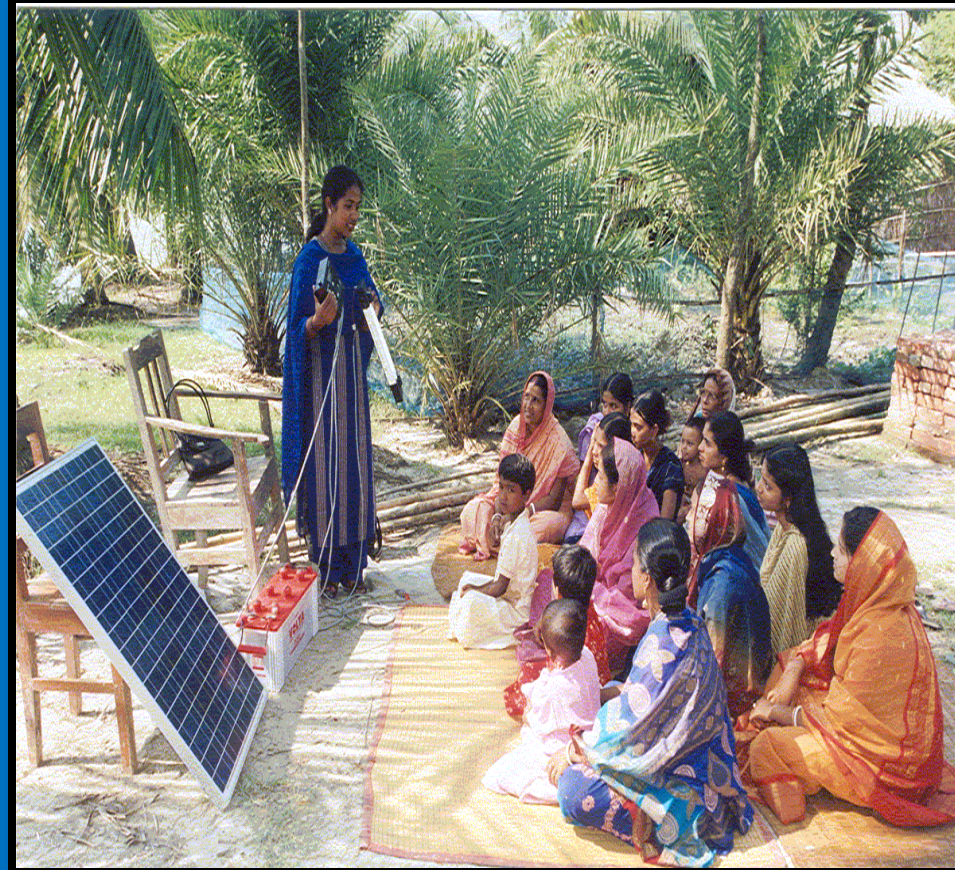
Successful Market-Based Approach for Bringing Renewable Energy to the Rural Population

GS Achieved this by Blending Technology with Social and Market Forces

Innovative use of micro-credit

Coupled with :

- **Focus on income generation**
- **Local Technology Transfer**
- **Community participation & awareness development**
- **Dedicated and Committed Staff**
- **Engineers are trained as Social Engineers with high commitment & posted to remote areas.**
- **Flexible Management**
- **A Listening Culture**
- **Strong Internal Audit System**



Solar PV Program

New Era of Renewable Energy Technologies

- ❑ Bangladesh has plenty of sunshine; a huge potential for Solar Energy.
- ❑ Rural electrification with Solar PV system is becoming very popular
- ❑ This technology is suitable for remote inaccessible areas- where there is no access of conventional electricity.
- ❑ GS provides financial model for SHS ownership



Solar Installation in a rural house

Financial Models

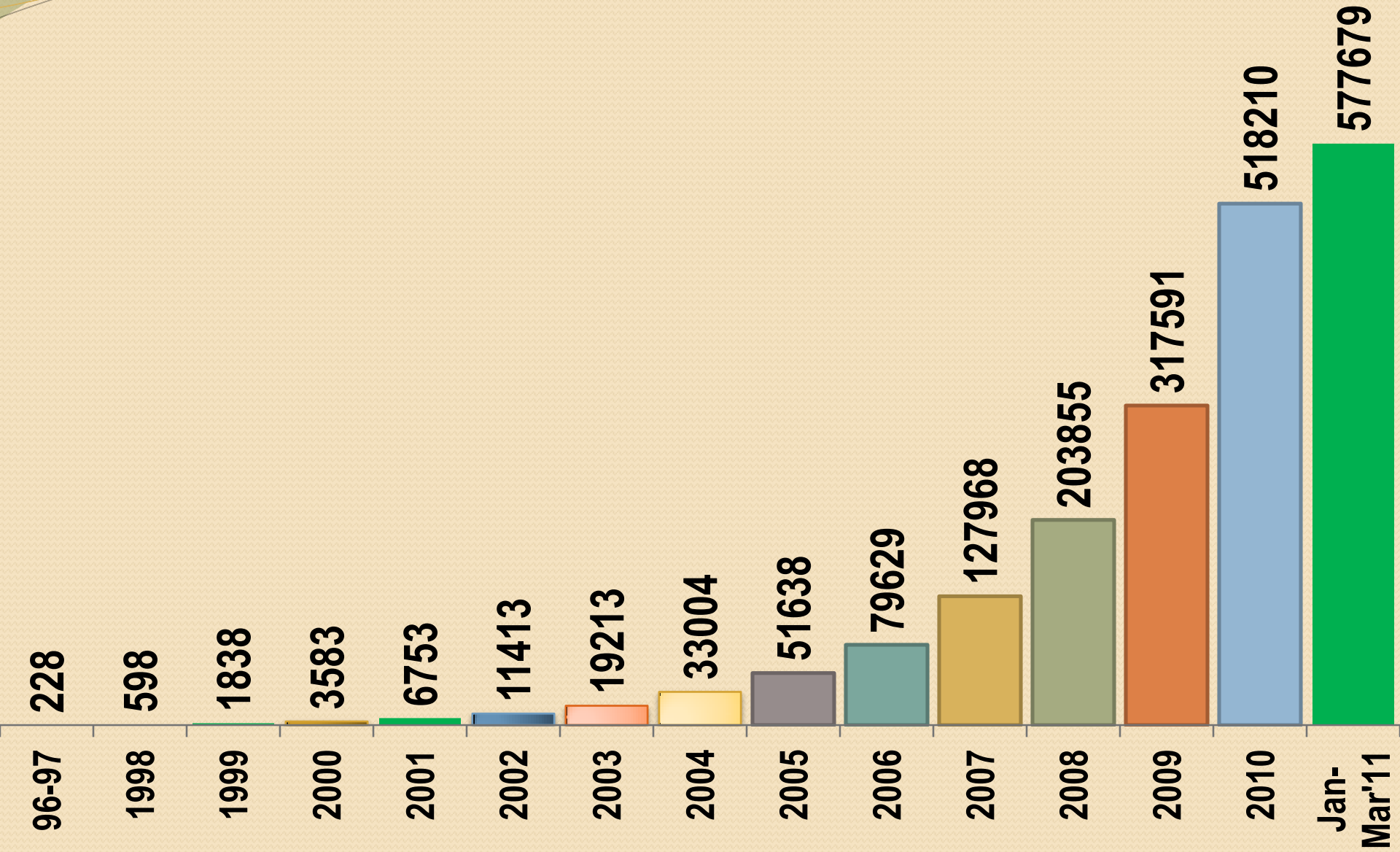
Option	Down payment	Installments	Service Charge (Flat rate)
Option-1	15%	36 months	8%
Option-2	25%	24 months	6%
Option-3	100% cash payment with 4% discount		
SSHS	Min 15%	24- 36 months	6%

People can own a SHS at the same cost of Kerosene

The Clients have been rewarded with an umbrella and become proud owners of a system by paying back all their installments



Cumulative Solar Home System Installation



Over 525,000 Solar Home Systems Illuminating Rural Homes & Businesses with around 4 million beneficiaries



- Extending business hours and boosting electronic businesses, agriculture, fish farm, poultry farm, etc
- Facilitating education and health care in rural
- Access to lights, televisions and mobile phones
- Empowering women through training and income generation

Rural House Under Solar Light in the Hilly Area



Bandarban Region, Kanapara (Dark) Village

Developing a Better Future Generation



**School children can study better under solar light.
A scholarship program has also been commenced by GS**

Bringing Affordable Quality After Sales Service to the doorsteps

GS creates a market by providing services close to the customers

- Training of local technicians & entrepreneurs
- Local production of accessories through entrepreneurs
- Free repair & maintenance during repayment period.
- Once a month visit
- Post warranty : annual maintenance agreement at low cost



**Woman Technician
working at her home**

Grameen Technology Centers Creating Green Jobs For Women

- Over 5000 women trained in sustainable energy technologies
- **Some trainees set up their own energy businesses**
- 46 GTC now set up to carry out training & manufacturing in rural areas to strengthen GS services
- **Training beyond Solar PV**



**Mrs. Ambia, woman technician working
at her home**

Grameen Technology Centers



More than 150000 users have gained knowledge of RET and learned to take care of their systems

Grameen Technology Centers Creating Green Jobs For Women



Mrs. Nilufa, woman technician working at her home

A Young Woman Technician Installing a Solar Home System



Impact of GS activities in Reduction of Carbon Emission (March 2011)

Activities	Yearly Fuel/Biomass consumption Liter/Ton Per unit	Yearly Total Fuel/Biomass Savings Ton/Liter	Total savings of money (in million US\$)	Emission Reduction per unit (tCO ₂ /Yr.)	Total CERs (tCO ₂ /Yr.)	CDM Money (US\$) (for one year only) **
Installed Solar Home System 577,679	108 liter	62.4 million liters	44.57	0.232	134021.51	1.34 million
Biogas Plants 16,807	3.5 ton	58824.5 tons	3.78	2.08	34958.56	0.35 million
Improved Cooking Stove 259,221	3.5 ton	453636.75 tons	29.16	1.04	269589.84	2.7 millions
Total			77.51		438569.91	4.39 millions

** Improved cooking stove saves 50% fire wood, ** 1 CER = 10 US\$*

Experiment on Solar Thermal by Grameen Shakti (Grameen Bank Building)

Grameen Shakti commenced a pilot project on solar thermal energy in 2010.



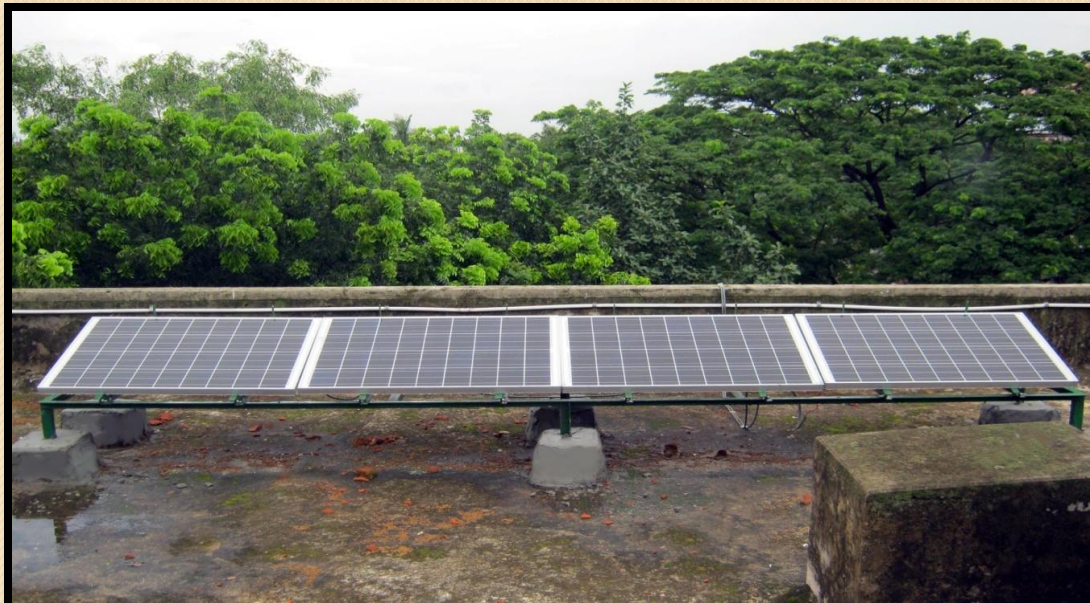
Solar Powered Irrigation Pump



Solar System Installed by Grameen Shakti in District Council Complex, Chittagong



Solar System Installed by Grameen Shakti in District Council Complex, Narsingdi



Urban Solar Home System installed by Grameen Shakti in Nando's Restaurant in Gulshan



Nando's

Grameen Shakti Telecommunication

New Initiative

- Compared to diesel, solar electricity offers a sustainable, cost-effective and environment-friendly electricity supply for Bangladesh's growing telecommunication industry.
- Grameen Shakti has installed 6.5 KW solar plants for 4 BTS of Grameen Phone
- Following success with Grameen Phone, Grameen Shakti has received more offers from other mobile phone companies to install solar panel for BTS



Grameen Phone BTS Tower Constructed by GS



Computer Center running by Solar



Solar panels on roof tops give power to computers



Computer Center, creating job opportunities for rural youth



Offices using solar powered computers in off-grid areas

Solar powered Refrigerators in Remote areas



30 Solar Powered refrigerators have been installed in Vet Clinics in remote areas and islands

These refrigerators are helping to store vital medicine for livestock vaccinations

Scope for International Cooperation

- ❑ Pilot testing & adaptive research for “2nd generation” solar pv in Bangladesh
- ❑ **International cooperation and research could be developed on low cost Solar PV module**
- ❑ Piloting of mini solar grid entrepreneur programs with the financial assistance from international donors
- ❑ **Adaptation of GS model in other countries**
- ❑ Technology Transfer & Training
- ❑ **Development & Research on other renewable energy technologies**

Grameen Shakti's Other Programs

❖ **Biogas**

❖ **Improved Cooking Stove**

Over 4 million BIOGAS PLANTS can be constructed :

Gas, Light , Electricity & Organic Fertilizers

- ❖ Livestock owners can get rid of the waste and produce clean gas for cooking comfortably with no need for biomass fuels
- ❖ Can supply gas to neighbors for additional income
- ❖ **Produce organic fertilizer**
- ❖ **Generate electricity**
- ❖ Burden of women is reduced and their health protected



Grameen Shakti's Biogas Program

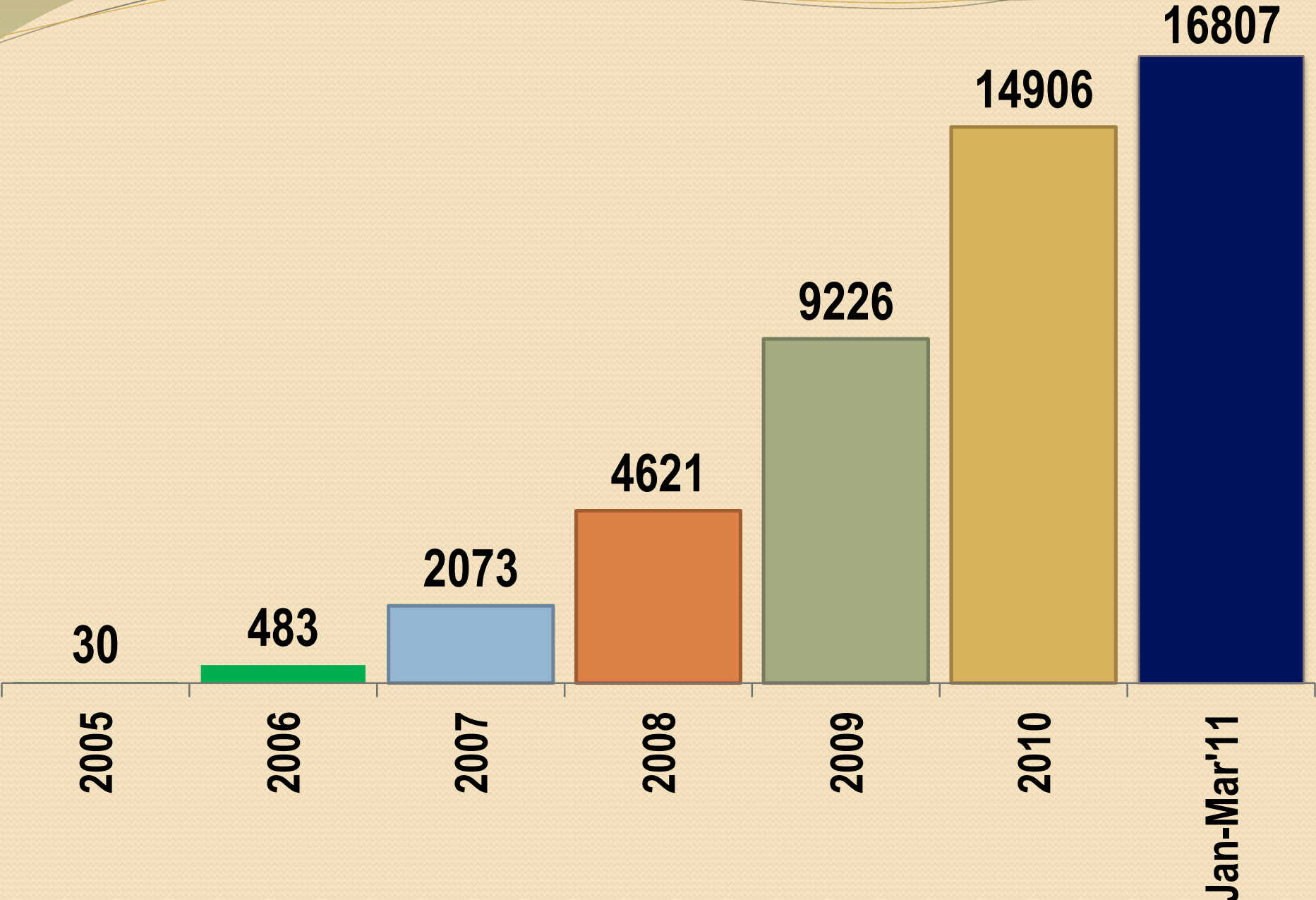
Sustainable waste management & cooking gas production

A program designed to respond to client needs :

- Flexible loans
- On the spot trouble shooting
- Adaptive research
- Mason & User training



Cumulative Biogas Plants Installation



Initially a pilot project in 2005, GS Biogas has quickly become a popular program

Constructed more than 16,807 biogas plants, around 500 large sized biogas plants

Promoted Organic Fertilizer business and linkage between Poultry/Livestock, Agriculture & biogas technology



Slurry Processing at a biogas plant

Grameen Shakti has successfully introduced fiber glass bio-digester in Bangladesh



hydraulic power bodies

Up-half body

Gas hole

fasten bolts

Bottom half body

DEMONSTRATION PLOTS

GS is promoting the use of organic fertilizers among farmers.



বোরো মৌসুমে ব্রিখান ২৯ এ বায়োমারী প্রদর্শনী প্লট
প্রদর্শনী প্লটের আয়তন- ১০মি. x ১০মি.

ট-১ বায়োমারী (গোবর): ৫০ কেজি/প্রট	ট-৪ কুমকের নিজস্ব পদ্ধতি
ট-২ বায়োমারী (গোবর): ৫০ কেজি/প্রট ইউরিয়া : ৪৫০ গ্রাম/প্রট টিএমপি : ৩৫০ গ্রাম/প্রট এমপি : ২২৫ গ্রাম/প্রট ডিএমপি : ২২৫ গ্রাম/প্রট	ট-৩, জলসিঁড়ি করে করে বায়োমারী (গোবর): ৫০ কেজি/প্রট ইউরিয়া : ২০০ গ্রাম/প্রট টিএমপি : ১০০ গ্রাম/প্রট এমপি : ৩৫০ গ্রাম/প্রট ডিএমপি : ৩৫০ গ্রাম/প্রট

• কুমকের নাম : জীবন ডাউ
বন্দেব পাতা, শাকুহানাই
• সার্বিক ও কৃষিক্ষেত্র ব্যবস্থাপনা: গ্রামীণ শক্তি

IMPROVED COOKING STOVES

Cost-effective technology facilitating a pollution-free and healthy rural environment

- ❑ 3000 ICS technicians and entrepreneurs have been created
- ❑ 101 manufacturing units set up for smooth supply of grates, chimneys etc.
- ❑ Households and businesses save 50% on fuel costs
- ❑ Women can cook in smoke free kitchens



A Technician making an ICS with mud



Cooking with ICS made of cement

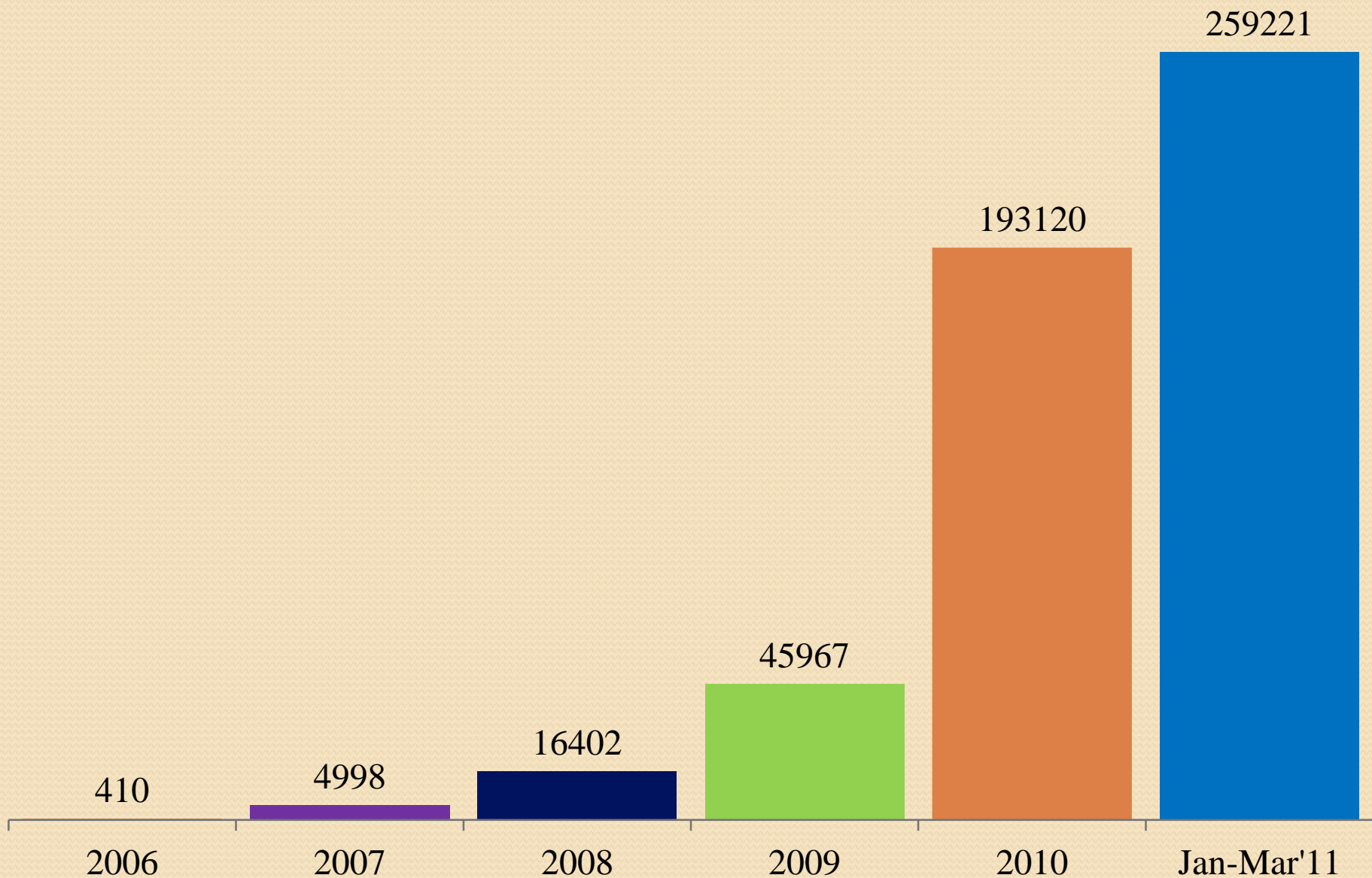


- **Cement stove was created just three months ago**
- **Already established 101 production centers**



- **Has a longer life span**
- **More visually appealing**
- **Easier and quicker installation**

Cumulative Improved Cooking Stove Installation



More & more rural women are switching to Improved Cooking Stoves

- ☐ Smoke free kitchens, no soot, saves women's lives
- ☐ Face, chest protected from stove heat
- ☐ Swifter and better cooking
- ☐ More free time
- ☐ Saves 50% firewood & cooking expenses



A woman technician making a stove



Housewife cooking with Improved stoves

Production Centre of ICS Made of Concrete at Kalihati, Tangail



The Challenges Ahead

- ❑ **Financial and legal framework needs upgrading**
- ❑ **Attracting investment of financial institutions**
- ❑ **Higher prices of Solar PV system (Price of Battery & other accessories are increasing)**
- ❑ **Increasing power efficiency of Solar PV system & decreasing production cost of PV including accessories**
- ❑ **Creation of new & skilled manpower**
- ❑ **Creating Green Entrepreneurship Opportunities**
- ❑ **Improvement of back up service**

Road Map to 2012

Solar program

- Set up 1400 Branch Offices in the next 4 years to install **5 million SHSs by 2015**
- Setting up 100 GTCs in the next 4 years

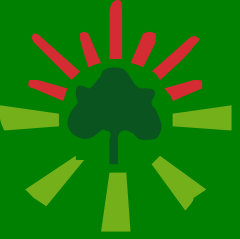
Biogas plants

- Install of 205,000 biogas plant within 2015.
- Scale up linkages between biogas technology, live stock, agriculture and income generation to create a sustainable program

Improved Cooking Stoves

- 5,000,000 stoves by 2015 through local entrepreneurship





National and International Achievements

1. Solar World Einstein Award (Germany) 2010
2. International Microfinance Awards 2008 from PlaNet Finance (Paris) 2009
3. Ashden Outstanding Achievement Award (UK) 2008
4. National Environment Award (Bangladesh) 2008
5. Energy Globe Award (Brussels) 2008
6. Right Livelihood Award (Sweden) 2007
7. Tech Museum Award (USA) 2007
8. European Solar Prize (Germany) to 2006
9. Ashden Award (UK) 2006
10. IDCOL Award (for scaling up SHS) 2005
11. Solar Prize (for outstanding performance) 2004
12. USAID Best Theme Award 2003
13. European Solar Prize (Germany) 2003
14. Energy Globe Award (Austria) 2002

Thank you for your Kind Attention

