

# **Solar Photovoltaic Application in Bangladesh-Prospect and Opportunity in the off-grid areas**

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**Manila, Philippines**

# Country Profile

- **Geographical location:** Between 20<sup>o</sup>34' and 26<sup>o</sup>38' North latitude; 88<sup>o</sup>01' and 92<sup>o</sup>41' East longitude
- **Area:** 144,570 sq km
- **Population:** 141 million [ population density 941/km<sup>2</sup>]
- **Literacy rate:** 43%
- **Per Capita GNI:** US\$ 440
- **Per Capita energy consumption** 157 kgoe (2003)
- **Per Capita Electricity Consumption:** 144 kWh, annually
- **Access to grid electricity:** About 35% Population

# Introduction

- **Despite only 35% population has access to the National grid, The Government of Bangladesh a noble vision to provide electricity for all by the year 2020**
- **Target of meeting 5% of total electricity demand from RE by 2010 and 10% by the year 2020**
- **For the last three decades attempts have been made by GOs, NGOs, and Development partners to promote modern RE technologies**
- **About 175,000 Solar Home Systems have been installed. Other application of Solar Photovoltaic is being piloting by Local Government Engineering Department**

# Policy support

- ✌️ **GOB is actively considering “ Draft National Energy Policy - 2006” which has been submitted by the Power Cell of MEMR**
- ✌️ **Tax exemption on royalties, technical know how and technical assistance fees and facilities for their repatriation**
- ✌️ **Establishment of Sustainable Energy Development Agency (SEDA) has been proposed**
- ✌️ **Solar PV program of different government bodies (BPDB, LGED, REB) are basically subsidy driven**
- ✌️ **Present grant for SHS is €30 and refinancing is €176**

# Renewable Energy Resources in Bangladesh:

## Solar Energy

- **Average solar radiation varies between 4 to 6.5 kWhm<sup>-2</sup>day<sup>-1</sup>**
- **Maximum amount of radiation is available in the month of March-April and minimum in December-January.**

# Major Renewable Energy players in Bangladesh

## Govt. and Institutions:

- **Local Government Engineering Department (LGED)**
- **Bangladesh Power Development Board (BPDB)**
- **Rural Electrification Board (REB)**
- **Renewable Energy Research Centre (RERC)**
- **Bangladesh University of Engineering and Technology (BUET)**
- **Khulna University of Engineering and Technology (KUET)**
- **Bangladesh Agricultural University (BAU)**
- **BCSIR, IDCOL**

## Development partners:

- **UNDP**
- **World Bank**
- **GTZ**
- **JBIC**

## NGOs:

- **Grameen Shakti**
- **BRAC**
- **Prakaushali Sangsad Ltd.**
- **Shubashati**
- **Thangamara Mohila Sobuj Shangha (TMSS)**

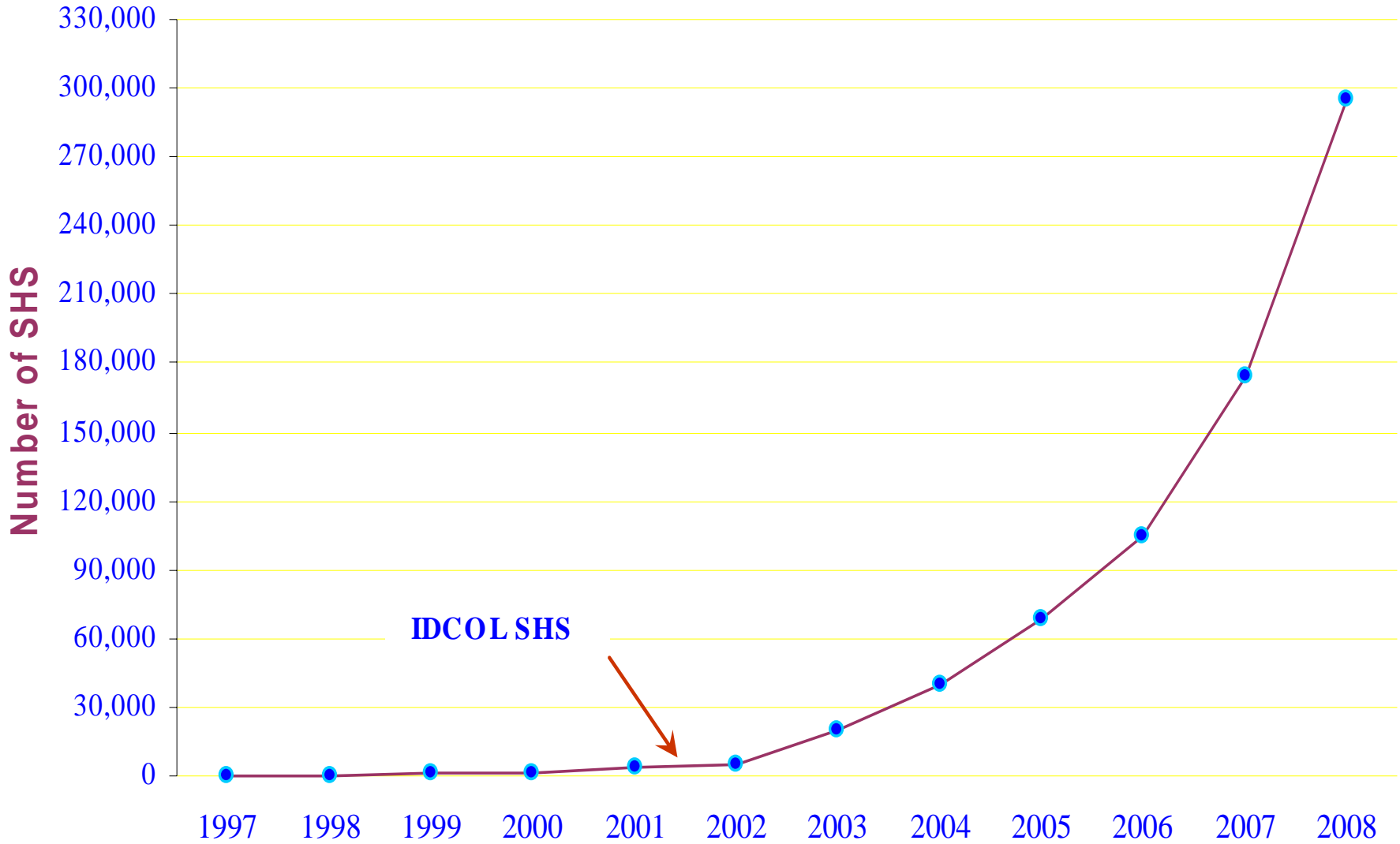
## Private Organizations:

- **Rahimafrooz Solar Ltd.**
- **Fare Trade Ltd.**
- **Micro Electronics Ltd.**
- **Nebula Techno Solutions Ltd.**

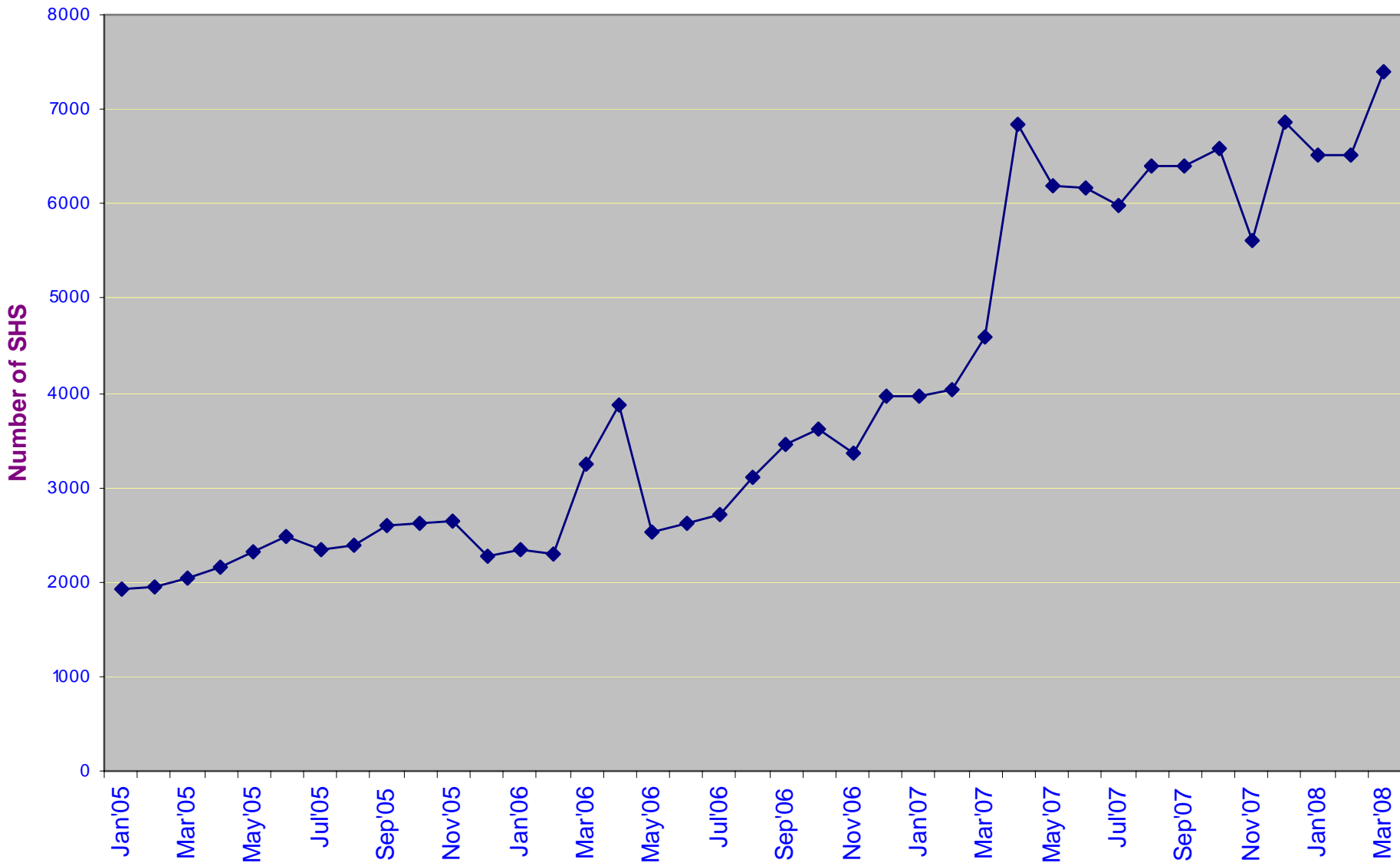
# Summary of Renewable Energy utilization

<b>NO</b>	<b>Technology</b>	<b>Number of units</b>
<b>01.</b>	<b>Solar home systems</b>	<b>Above 175,000</b>
<b>02.</b>	<b>LED home systems</b>	<b>Around 400</b>
<b>03.</b>	<b>Solar lantern</b>	<b>Above 500</b>
<b>04.</b>	<b>Solar thermal (Water heater)</b>	<b>10 units</b>
<b>04.</b>	<b>Other PV applications</b>	<b>50 kWp</b>
<b>05.</b>	<b>Wind-Solar hybrid</b>	<b>20kW</b>
<b>06.</b>	<b>Wind pumps</b>	<b>5 Nos</b>
<b>07.</b>	<b>Micro-hydro</b>	<b>60 Kw</b>
<b>08.</b>	<b>Biogas plants</b>	<b>Around 25000</b>
<b>09.</b>	<b>Improved Cooking Stoves</b>	<b>Above 300,000</b>
<b>10.</b>	<b>Biomass briquetting machines</b>	<b>Around 100</b>
<b>11.</b>	<b>Wind generator</b>	<b>1900kW</b>

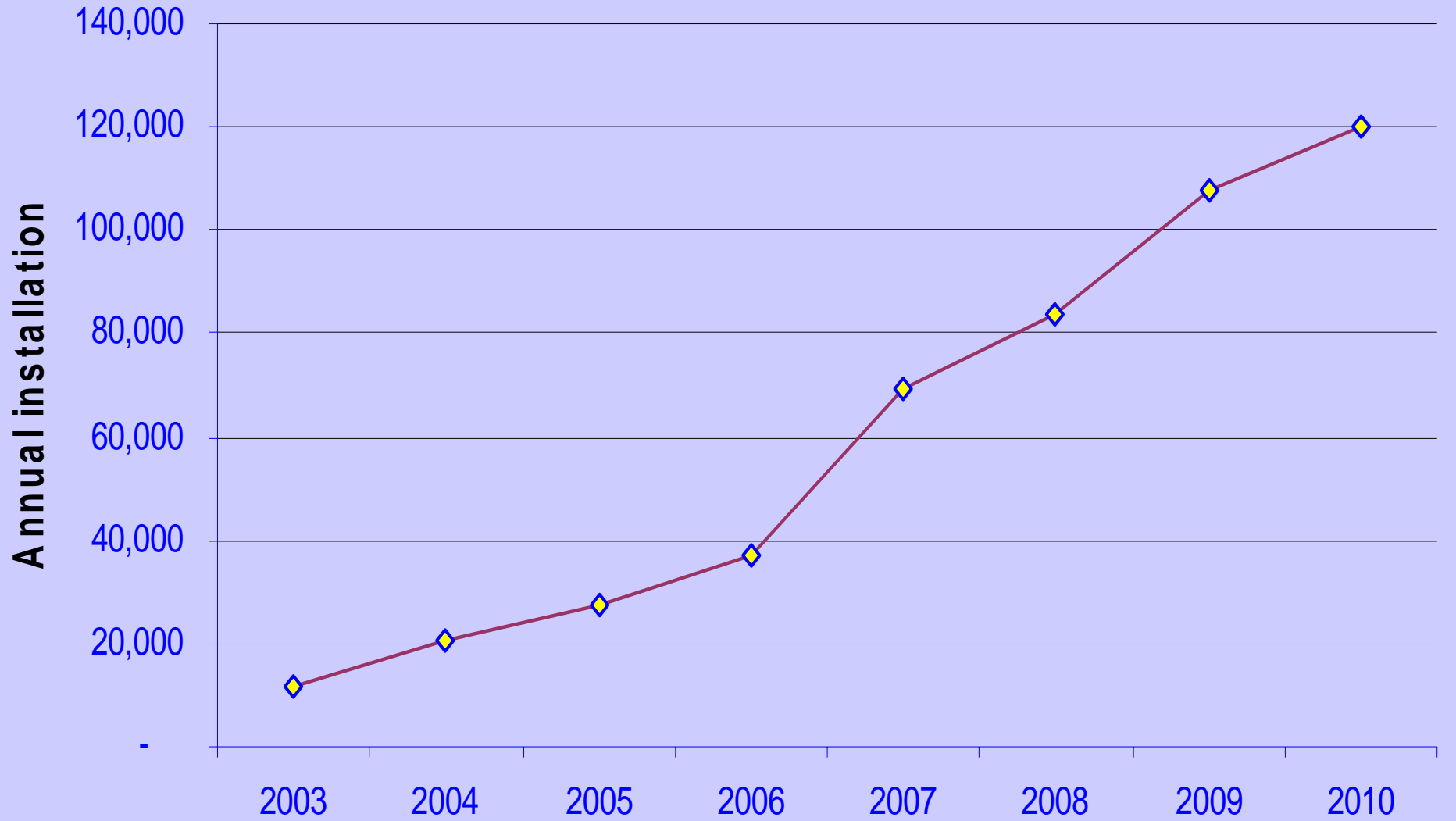
# Installation of SHS in Bangladesh



### SHS Installation under IDCOL Solar Program

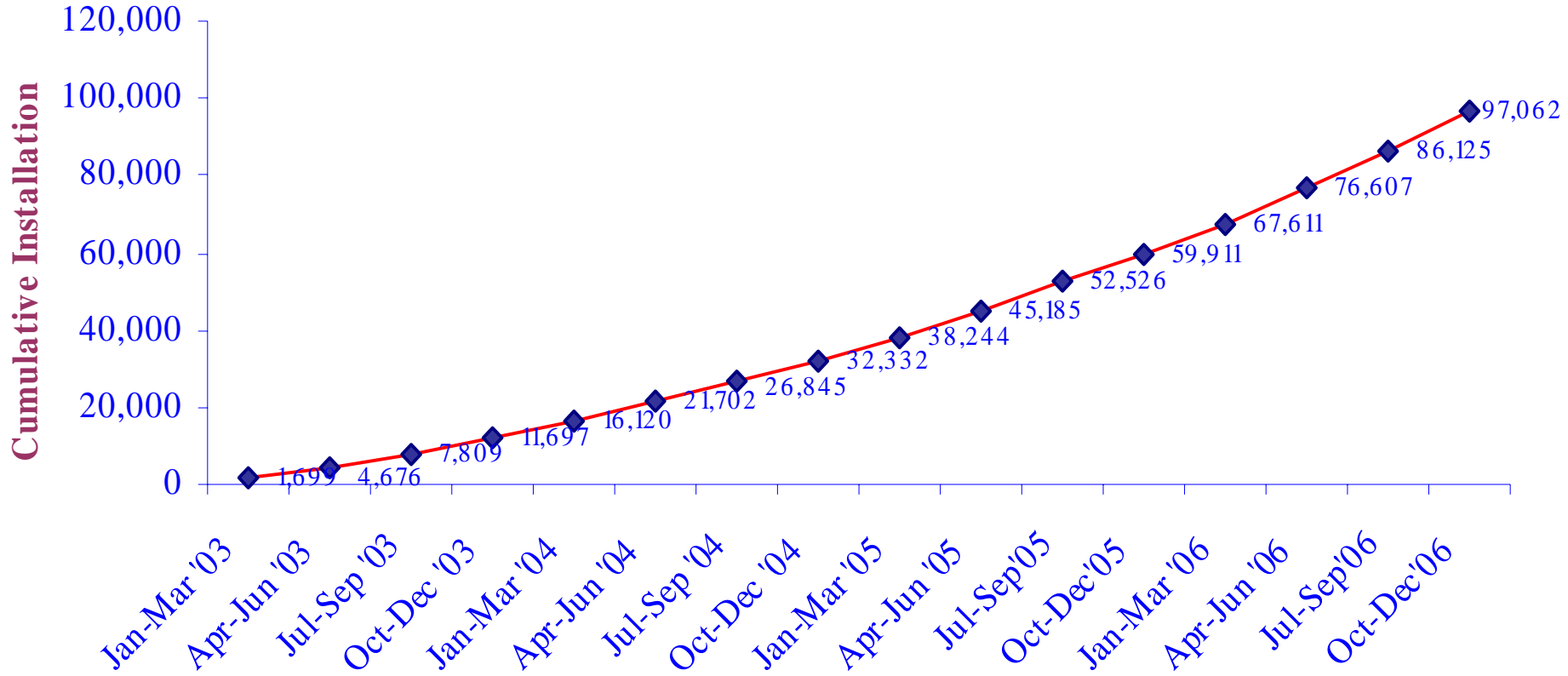


# Installation of SHS under IDCOL Solar Energy Program



# Progress of SHS Installation (January 2003-December 2006)

◆ Cumulative Installation



# Phased reduction of the grants

Item	Amount of Grant available in US \$ per SHS		
	Total in US \$	Buy-down grant in US \$	Institutional Dev. Grant in US \$
First 20k SHS	US \$ 90	US \$ 70	US \$ 20
Next 20k SHS	US \$ 70	US \$ 55	US \$ 15
Next 30k SHS	US \$ 50	US \$ 40	US \$ 10
Next 88k	€38	€30	€8
Next 35k	€36	€30	€6
Next 35k	€34	€30	€4

# **Main features of IDCOL SHS**

- Program is being implement through Partner Organizations**
- IDCOL provides grant, refinancing, technical standard, publicity materials, training as well as monitoring and evaluation**
- Offer soft loan to POs; 10Y maturity with 2Y grace period @6% per annum interest rate**
- Only 10% of system cost as down payment**
- Loan tenor offered by POs is 1 to 5 Y @ 10-15% depends on the method of payment**

# **Main features of IDCOL SHS**

- Program is executed by two committees; Operation committee and Technical Standards Committee.**
- Two post audit systems one is Commercial audit and the other is Technical audit**
- Intensive training program is offered to the POs, IDCOL staff and beneficiaries**
- Essential logistic supports, promotional support and exposure visit**
- Employment generation, promotion of local technical know how and poverty reduction as a whole**

# **Some milestone initiatives to disseminate RETs in Bangladesh**

# SHS and SPV street light

- Above 175,000 SHS has been installed
- Capacity range 30-100Wp
- Installation cost around \$8/Wp

# SPV mini grid system

10kWp at Barkal

- **Solar panel 200 nos each 50Wp**
- **Battery 120 nos each 920Ah**
- **72 subscribers at present**
- **Implemented by – BPDB**
- **Installation cost US\$ 150k**

5.1kWp at Shariakhali

- **Solar panel 68 nos each 75Wp**
- **Battery 72 nos each 660Ah**
- **60 subscribers at present**
- **Implemented by – LGED**
- **Installation cost US\$ 75k**

# SPV pumping

- **Array capacity 1.2 – 1.8 kWp**
- **Dynamic head 50m**
- **Water lifting capacity 13k - 26k liters / day**
- **Installation cost US \$ 8.5k – 11k**

# LED based solar lantern

- **Number of lantern supplied 600 nos**
- **Panel size 3 – 10 Wp**

# Conclusions:

- **In Bangladesh SPV applications are mainly donor driven programs for rural and off-grid electrification**
- **Renewables are slowly finding a niche market in Bangladesh**
- **Time-bound targets is essential to fulfill GOB's obligation 'Electricity for all' by the year 2020**
- **Success of dissemination SHS in Bangladesh is due to dynamic financial model and strong commitment of IDCOL**
- **IDCOL financial model could be applied to other developing countries**
- **Other application of SPV is not yet to commercialized due to its high upfront investment**

# Thanks for your patience

**Don't blame darkness- just light a lamp**

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