

**Promoting Solar Lighting in Rural areas to Alleviate  
Poverty and Mitigate Climate Change**

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By

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**GRAMEEN SURYA BIJLEE FOUNDATION  
(GSBF)**

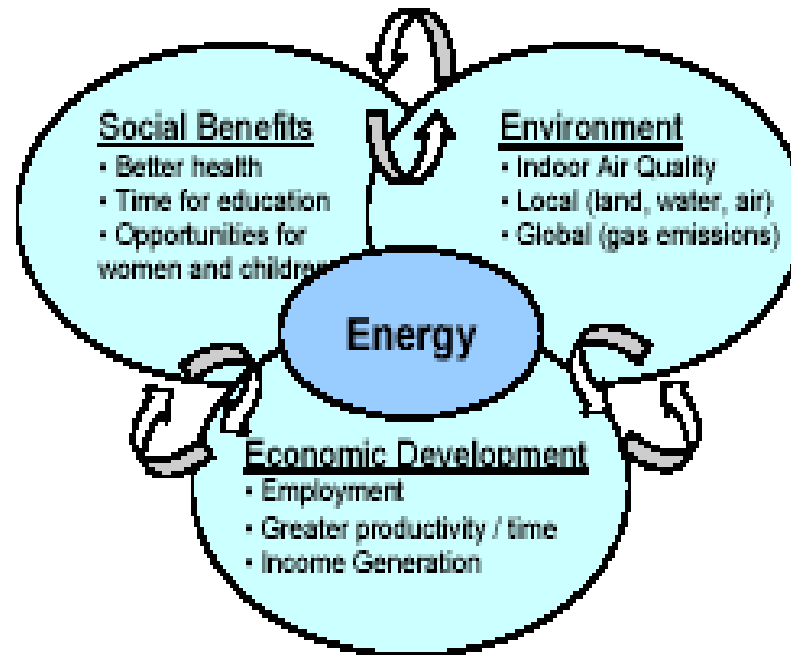
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From DARKNESS to **LIGHT**

*Dignity through Empowerment*

# Energy is the Key to Empowerment

**“Modern Energy Is the Key Link to Eliminating Poverty, by Stimulating Social Benefits and Economic Development in an Environmentally Sustainable Manner”\***



\*Adapted from 2002 E+Co business plan

# GSBF MISSION STATEMENT

- Use Renewable ENERGY (RE) as the HUB
- Around RE build lighting, potable water, e-education (healthcare, environment)
- Prevent rural migration to urban areas using sustainable development
- Preserve local culture but be part of global village
- Be the leading developer and low cost manufacturer of **Off-grid & On-grid LED Lamp Systems**

<b>Year 2001 Census</b>		<b><u>DISTRIBUTION OF HOUSEHOLDS BY SOURCE OF LIGHTING</u></b>					
	<b>Total number of households</b>	<b>Electricity</b>	<b>Kerosene</b>	<b>Solar energy</b>	<b>Other oil</b>	<b>Any other</b>	<b>No lighting</b>
<b>Total %</b>		<b>55.85%</b>	<b>43.30%</b>	<b>0.27%</b>	<b>0.10%</b>	<b>0.16%</b>	<b>0.32%</b>
<b>Total</b>	<b>191,963,935</b>	<b>107,209,054</b>	<b>83,127,739</b>	<b>522,561</b>	<b>184,424</b>	<b>305,308</b>	<b>614,849</b>
<b>Rural</b>	<b>138,271,559</b>	<b>60,180,685</b>	<b>76,896,701</b>	<b>394,425</b>	<b>146,165</b>	<b>227,210</b>	<b>426,373</b>
<b>Urban</b>	<b>53,692,376</b>	<b>47,028,369</b>	<b>6,231,038</b>	<b>128,136</b>	<b>38,259</b>	<b>78,098</b>	<b>188,476</b>
<b>Rural</b>	<b>72%</b>	<b>56%</b>	<b>93%</b>	<b>75%</b>	<b>79%</b>	<b>74%</b>	<b>69%</b>
<b>Urban</b>	<b>28%</b>	<b>44%</b>	<b>7%</b>	<b>25%</b>	<b>21%</b>	<b>26%</b>	<b>31%</b>

# Home Lighting System

## 2 LED Lamp + 1 Night Lamp System

Solar Panel	Battery	LED Lamp Luminosity Lumens			Night Lamp	Usage Hrs. / Day
		200	300	400		
		10Wp	7.0 Ah	2		
20Wp	14.0 Ah	4	-	-	1	4
		-	3	-	1	4
		-	-	2	1	4



### Features:

Light Output : Sufficient for all activities including reading in a room of size : 12' x 10' x 7'

### Options Available :

- Mobile Phone Charging Outlet
- Battery Charging from Mains Electricity 220V AC in addition from the Solar Panel



## LED LAMP ( Low Power Consumption and Longer Life )

Options available for :

### a) 220V Mains AC Input

Light Output Options : Equivalent to a 40W // 60W or 100 W Incandescent Bulb

### b) With 12V DC Input :

Light Output Options : Equivalent to a 20W // 40W Incandescent Bulb

Direct Insertion into any standard Bulb Holder Socket (Bayonet Pin type)

Save over 90% Electricity and minimum 15 times longer Life than an Incandescent Bulb )



## LED Lantern

Solar Panel	Rechargeable Battery	Luminosity Light Output (Lumens)	Usage Hrs. / Day
3Wp	4.5 Ah	150	4
5Wp	4.5 Ah	250	4

### Features:

Sufficient light for walking in the internal roads of the village  
Can be used as light at Home when hung. No maintenance required.



## Hanging Light cum LED Torch

Solar Panel	Rechargeable Battery	Luminosity Light Output (Lumens)	Usage Hrs. / Day
2Wp	2.5 Ah	100	4

### Features:

Can be used as light at Home when hung.  
No maintenance required.

Sufficient light for walking in the internal roads of the village

# PROCESS

- Work with local NGOs & SHGs within communities
- Facilitate micro-loans through co-operative banks
- GSBF will train SHGs in the distribution, implementation & maintenance
- SHGs as end users become independent sales representatives
- Market the systems to other talukas and districts
- Gain livelihood income
- Use carbon credits to subsidize cost of systems
- NGOs may start a solar Urja shop financed by MNRE

# Marketing Program

- NGO's, SHG's, Financial Institutions (NABARD)
- MNRE ( Ministry of New & Renewable Energy)
- Rural Electrification Corporation & Ministry of Power
- State Level RE & Rural Development Departments
- Village-Level Distribution through Panchayats
- Domestic & Multi-National Corporations (CSR)
- High Net Worth Individuals, Individual Donors, NRIs



# CUSTOMERS

- WWF (World Wildlife Fund) (Delhi, UP, MP)
- World Vision (Rajasthan, Tamil-Nadu)
- Pratham (Bihar)
- Lions Club (Bombay)
- SEDT (Parbhani, Maharashtra)
- REDS (Tumkur, Karnataka)
- MNRE & State RE Nodal Agencies (Orissa, Maharashtra)

# Benefits to the Villager

- Substitute for monthly expenditure of Rs. 100 - Rs. 150 on kerosene
- Payback period of 2-3 years using micro-credit & saving on monthly expenses
- Superior lighting for children's studying, cooking & practicing artisans
- Improved healthcare due to non-use of kerosene which generates carbon dioxide
- Reduce greenhouse gases and protect the environment

# Improve Health, Wealth & Education via Off-Grid Lighting

## 1) Ensuring the continued education of the rural underprivileged children:

- Case Study: Home Lighting systems (given thro' the Azim Premji Foundation) only for Households whose Children Attend School
- Improve School Attendance, Reduce drop out rates
- Motivates Parents to Encourage their Children Attend School
- Home Study in the Night Time
- Increase Literacy Rates Especially for Girls

# Improve Health, Wealth & Education via Off-Grid Lighting

## **2) Benefit the community as a whole:**

- Improve Social Bonding Among Family Members
- Income Generating Activities in the Evening Hours
- Reduce Alcoholism in the Male members
- Help Women Cook & Perform Household Chores with Greater Ease

# Improve Health, Wealth & Education via Off-Grid Lighting

## **3) Help the Environment:**

- Reduce Carbon Dioxide Emissions & Create CERs (carbon emission credits)

1 litre Kerosene is equivalent to 2.56 kgs of Carbon Dioxide emission-----

70 million Homes = 6.4 Million Tons of CO<sub>2</sub> per year

Reduce Deforestation, Improve Green Cover

## **4) Increased savings due to non-use of kerosene:**

## Power Comparison between WLED Lamps, CFL & Incandescent Lamps

No. of LED's in each Lamp *	LUMINOSITY (Lumens)	CFL (Watts)	Incandescent Lamp (Watts)	Total Wattage per Lamp based on Lumens/LED for each period - present & future			
				<u>Dec-06</u>	<u>Jan-07</u>	<u>Jun-07</u>	<u>Dec-07</u>
				<u>4.0 Lu/LED</u>	<u>4.5 Lu/LED</u>	<u>5.0 Lu/LED</u>	<u>6.0 Lu/LED</u>
				(Watts)	(Watts)	(Watts)	(Watts)
21	85	2	10	1.6	1.4	1.3	1.1
33	135	3	15	2.5	2.2	2.0	1.7
54	225	5	25	4.0	3.6	3.2	2.7
108	440	8	40	8.0	7.1	6.4	5.3
<b>144</b>	<b>600</b>	<b>11</b>	<b>60</b>	<b>11.0</b>	<b>9.8</b>	<b>8.8</b>	<b>7.3</b>
UD	810	14	75				
UD	1,200	18	100				
UD	1,500	23	120				
UD	1,710	30	150				
UD	2,050	36	180				

\* 5 mm diameter LED's

**UD** Under Development

**As Lumens/LED increases, the no. of LEDs decreases for each Lamp for ' same Luminosity, thereby reducing ' cost of the Lamp. Cost per LED lamp goes down, Luminosity increases for the same # LED's, with Longer life cycles for LED lamps**

# Value Proposition for Partners

- Corporate Social Responsibility (CSR)
- Gain mind-share and market-share in the second largest market in the world
- Penetrate both the private and public sector companies involved in Renewable Energy systems and LED Lighting systems
- Use GSBF as a platform to launch various other Renewable Energy and LED Lighting applications

# Summary

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## STRENGTHS

- Triple A - availability, affordability, accessibility
- Technology & economic barriers solved
- Focus on product development, leverage supply-chain partners
- Proven business models
- Duplicate the IT success story with RET (Renewable Energy Technologies)



# Summary

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## CONCERNS

- Lack of awareness (CFL)
- Bureaucracy
- Vested interests
- Subsidy - corruption
- Holistic solution not point solutions
- Lack of Govt support
- Solar panel (thin film) technology
- Battery technology

# GSBF Management

- **Jasjeet Singh Chaddah**, Founder & Chief Executive Officer
  - Electrical Engineering degree from IIT, Kharagpur, 1985
  - Owner-founder of Harman Plastics for 15 years, a successful export-oriented Cosmetics packaging company
- **Kama Krishna**, President
  - B.Tech (Hons.) from IIT, Kharagpur, 1985 & MBA from USA
  - Senior Technology Analyst on Wall Street for 15 years
  - Founded two investment firms in financial research & portfolio management, Equitis Inc., Himalayan Investments
- **Ashok Seth**, Chief Operating Officer
  - Bombay University
  - Director-Manufacturing Operations for multi-national healthcare firms - Smith and Nephew, and Production & Contract Manufacturer: Johnson & Johnson

# GSBF History

- **IIT** (Indian Institute of Technology) graduates receive the finest public education from the Government of India
- Decided to give back to society and country in a meaningful way after achieving professional goals
- Founders have a track record in successful businesses
- Environment, Education and increasing Population are key issues in Indian society

# Highlights

- GSBF is one of the first companies to market Solar Energy based LED Lighting Systems (SELLS) at low cost
- Large and rapidly expanding renewable energy based lighting market
- Value proposition for Indian government agencies & NGO's involved in renewable energy and rural electrification
- Align “Best in Class” companies throughout the value chain
- Experienced management team and advisory board members
- GSBF Helps Alleviate Poverty and Mitigate Climate Change