



CHANGING THE WORLD WITH COMPELLING IDEAS

German Indian Renewable Energy Dialogue
1st of October 2008

Agenda

- 1) Company presentation IBC Solar
- 2) Situation photovoltaics in Germany and India
- 3) Project presentation DENA solar roof programme

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IBC SOLAR – a company with a tradition

- 1982: Established as an engineering agency: “IBC Solartechnik”
- 1986: Initiation of the annual PV Symposium at Kloster Banz
- 2000: Change to IBC SOLAR AG
- 2000 – 2008: International expansion (with subsidiaries and representative offices on 3 continents)



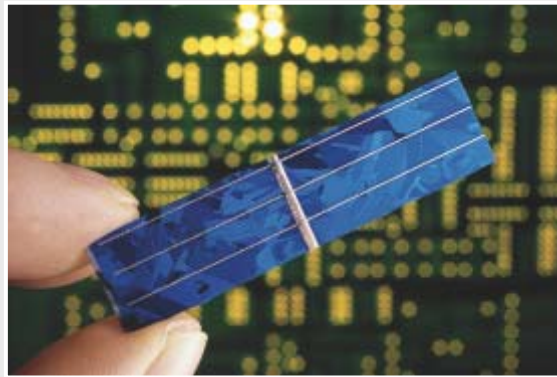
IBC SOLAR – international solar competence

- More than 25 years of experience and know-how
- More than 200 highly-qualified and motivated employees
- More than 50,000 reliable PV systems world-wide



IBC SOLAR – values

- Customer-oriented processes
- Optimum product and service quality
- Qualified, responsible and motivated employees
- Environmentally-responsible action
- Swift and flexible reaction to changing market requirements



IBC SOLAR – range of services

- On-site photovoltaic support for our partners
- Implementing Projects for major commercial customers and investors
- Solar funds



IBC SOLAR – range of services

- Comprehensive portfolio of selected PV brand products
- IBC SOLAR brand product lines in the premium segment

Full service offered by IBC SOLAR:

- Consulting
- Planning
- Feasibility studies
- Location development
- Distribution
- Solar monitoring
- Training and courses



IBC SOLAR – range of systems

The right system for any requirement:

- Grid-connected PV systems
- Stand-alone PV systems
- Hybrid systems
- Backup systems



IBC SOLAR – product range

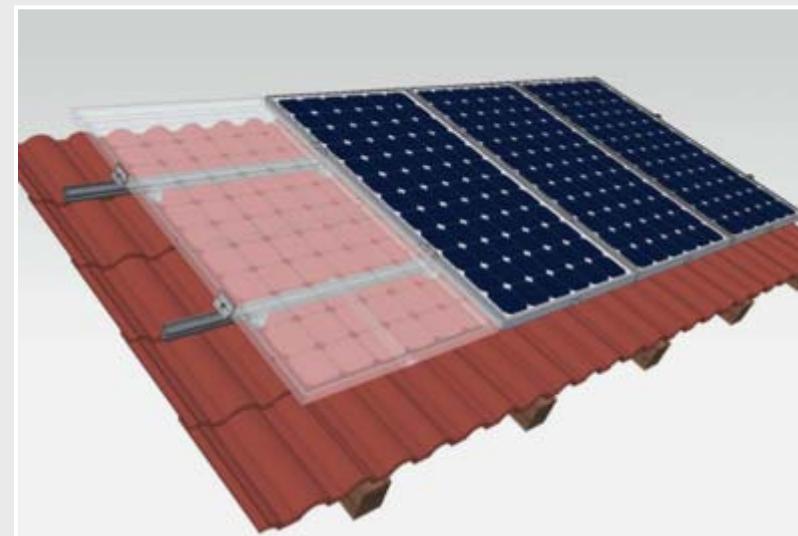


- Modules (monocrystalline, polycrystalline, thin-film technology)
- Tested mounting systems for all applications
- Inverters for grid-connected and off-grid systems
- Large-digit displays, measurement equipment, monitoring
- Charge regulators
- Batteries
- Cables, wiring, electrical equipment
- Pumps, lamps and accessories

IBC SOLAR – range of systems

The right installation solution for any surface:

- Pitched roofs
- Flat roofs
- Roof integration
- Building integrated photovoltaic (BIPV)
- Open space systems
- Tracking systems

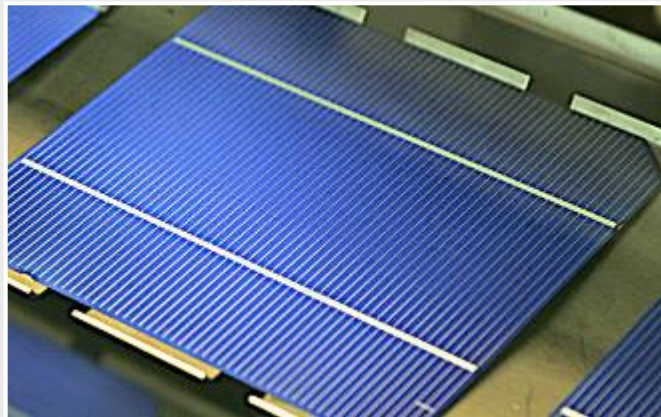


IBC SOLAR – brands



- IBC SOLAR
- BP Solar
- Fronius
- KANEKA
- MOLL
- SANYO
- SMA
- Steca
- Sulfurcell
- Suntech Power
- Trina
- Yingli
- and other high-quality brands

IBC SOLAR – quality management



IBC SOLAR ensures system and component quality by:

- applying brand products by leading manufacturers
- comprehensive supplier audits
- holding proof of international quality such as IEC certificates and TÜV testing
- conducting individual internal and external tests
- comprehensive incoming goods inspections
- long-term testing on the IBC SOLAR test system

And therefore offers:

- a product guarantee of up to 5 years
- a service guarantee of up to 25 years

IBC SOLAR – international presence

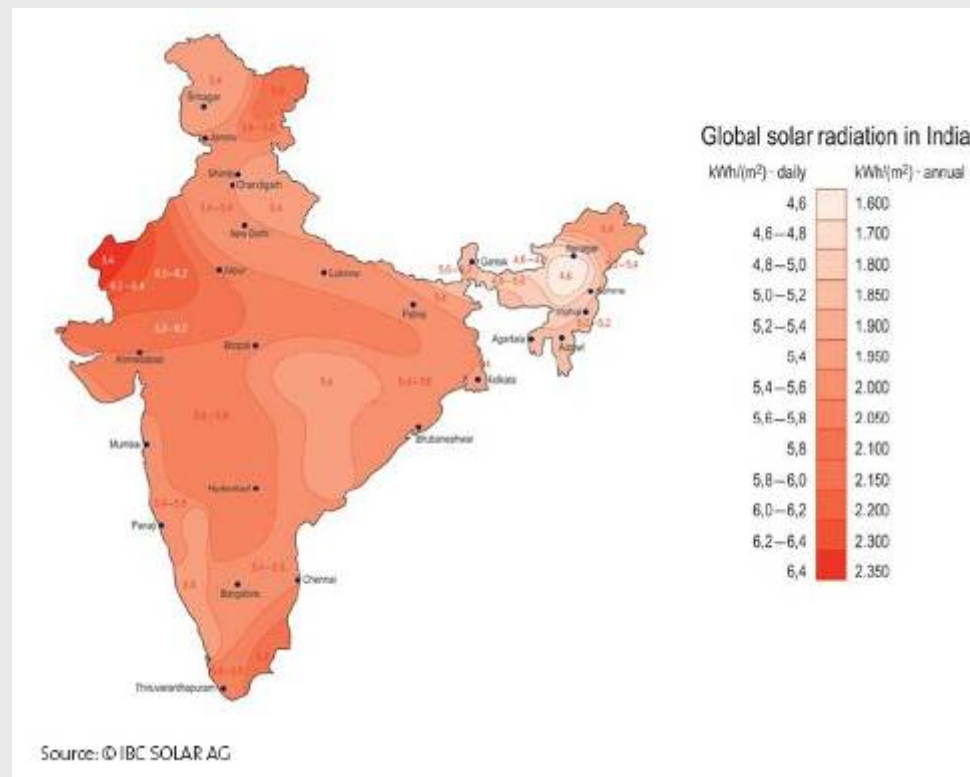


- Comprehensive network of specialist partners in core markets
- Realisation of projects world-wide
- Subsidiaries and representative offices in:
 - France
 - Greece
 - Italy
 - Malaysia
 - Netherlands
 - Spain
 - South Korea
 - USA

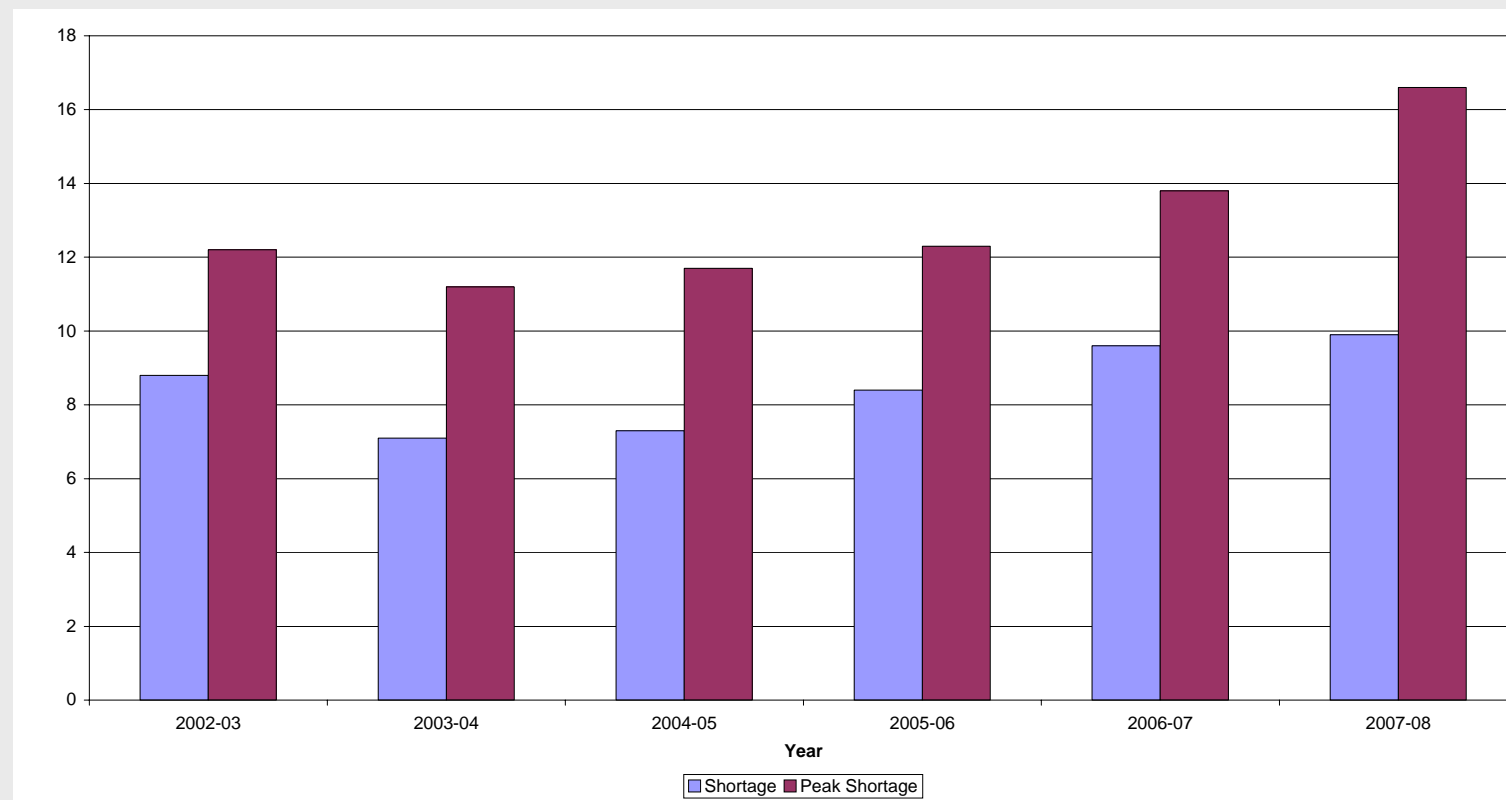
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India



Power shortage

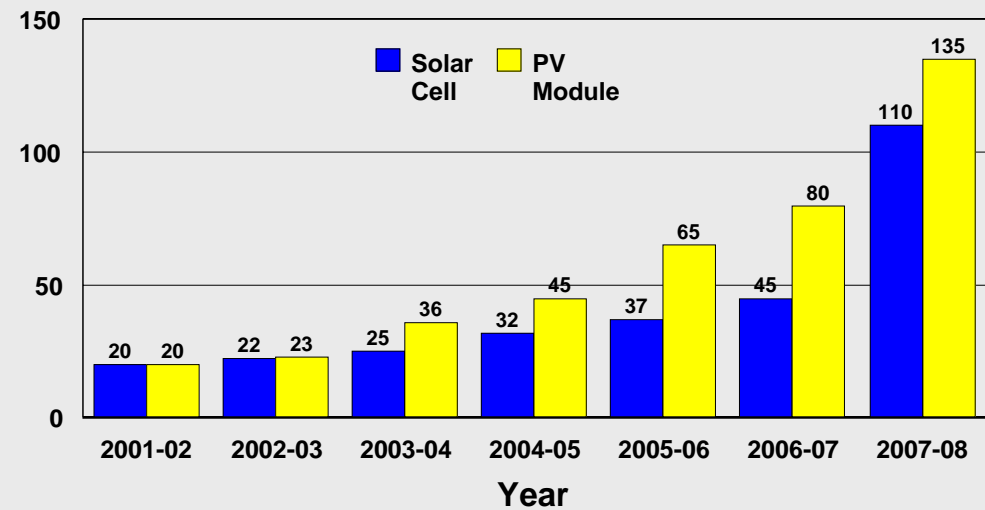
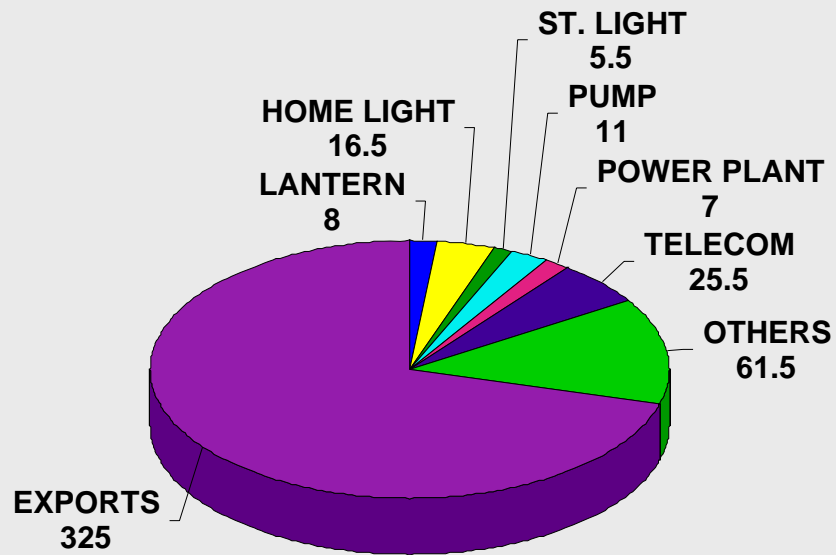


Power sector and potential for solar energy

- Indian Power Sector Target
 - Installed Capacity – 141 GW (Share of RE 7.7% at approx 11GW)
 - Targeted Renewable Energy share of 12.5% by 2012; 20% by 2020

- Potential of Solar Energy in India
 - Many parts of India have 300~330 sunny days in a year
 - Average Solar energy incidence 4 – 7 kwh/m²/day
 - This translates into a potential of 600GW
 - Actual realization so far is very limited
 - Grid-connected: A paltry 3~4 MW

Production in India



Development in India

- Under 11th Five Year Plan period an aggregate capacity of 50 MW solar power plants is proposed to be installed
- Each state will be allowed to set up 10 MW aggregate capacity
- Preference would be given to states where SERC have announced or are in the process of announcing the tariff for solar power
- A generation based incentive of a max. of Rs.12.0 per kWh for Solar Photovoltaic and Rs.10.0 per kWh for Solar Thermal Power will be provided for a period of 10 years
- Any project developer can set up grid interactive solar thermal power generation projects up to a maximum of 5 MW capacity in the country, either through a single project or multiple projects of a minimum capacity of 1 MW each
- Project developer will enter into PPA with distribution company for a period of 20 years

Development in India

Rajasthan:

- For plants commissioned up to 31.12.2009 & covered under GOI policy :
- Solar Photo Voltaic Power Plants = Rs15.78/kWh
- Concentrated Solar Power Plants = Rs13.78/kWh
- For plants not covered under GOI policy (limited to 50 MW) tariffs are Rs15.60/kWh and Rs13.60/kWh for the above two categories
- State working to add another 50 MW + 150 MW in the next two years
- The next projects will include accelerated depreciation and tax benefits

Haryana:

- For solar plants commissioned up to 31.12.2009 = Rs15.96/kWh
- For solar plants commissioned after 31.12.2009 but by 31.03.10 is 15.16/kWh

Development in India

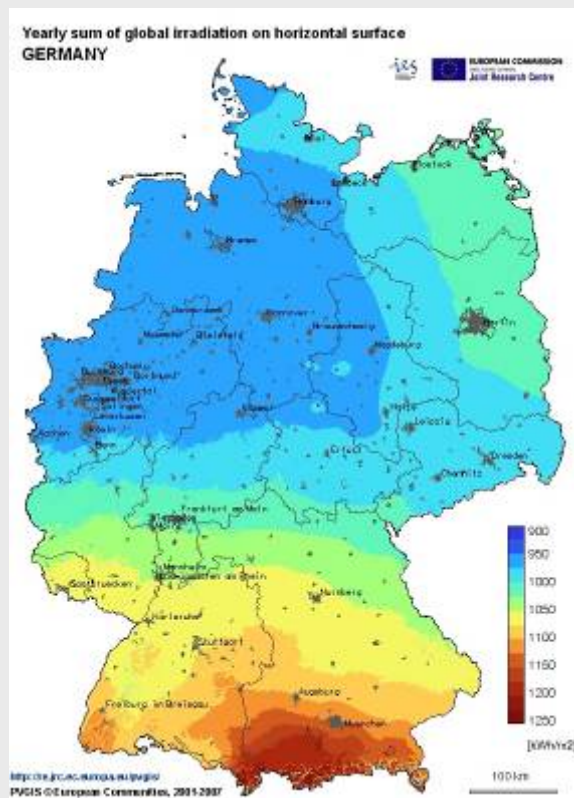
Punjab:

- Solar Tariffs is Rs 8.2/unit (base year 26-07) with five annual escalations @5% up to 2011-12

West Bengal:

- Solar Power Tariff is Rs 12.5/kWh

Germany



PV Market Data 2007

Newly installed power	1 100 MWp
Total installed power	3 834 MWp
No. of newly installed systems	130 000
No. of total systems installed	430 000
Turnover 2007	5 Bln € / 7.25 Bln \$
Employees	40 000

Milestones

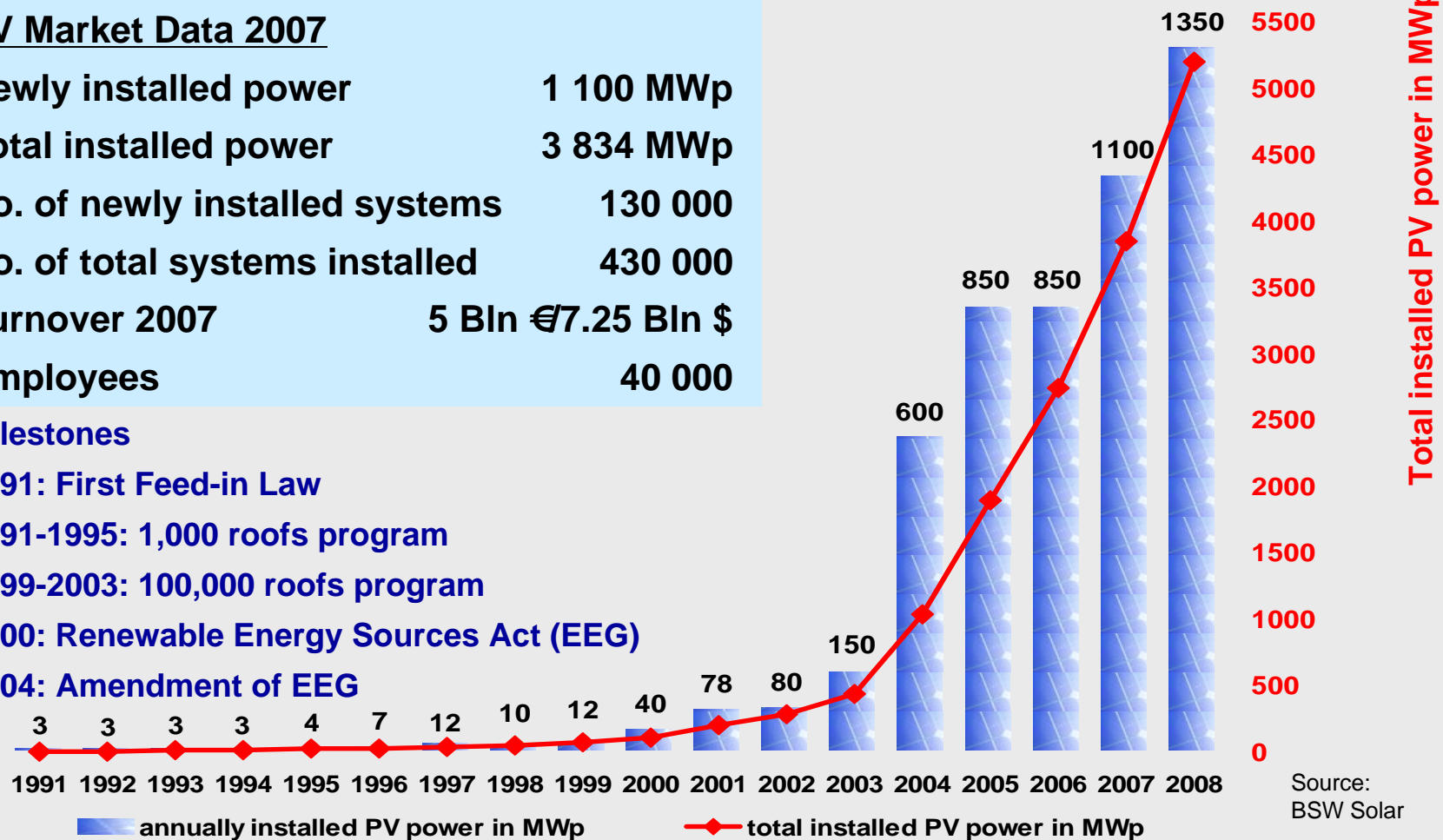
1991: First Feed-in Law

1991-1995: 1,000 roofs program

1999-2003: 100,000 roofs program

2000: Renewable Energy Sources Act (EEG)

2004: Amendment of EEG



Feed in tariff development in Germany

Roof top installations				
Year	<= 30 kW (ct/kWh)	> 30 kW (ct/kWh)	>= 100 kW (ct/kWh)	>= 1000 kW (ct/kWh)
	Reduction 8% in 09/10 9% ab 2011	Reduction 8% in 09/10 9% ab 2011	Reduction 10% in 09/10 9% ab 2011	Reduction 25% in 09, 10% in 2010 9% ab 2011
2008	46.75	44.48	43.99	43.99
2009	43.01	40.91	39.58	33.00
2010	39.57	37.64	35.62	29.70
2011	36.01	34.25	32.42	27.03
2012	32.77	31.17	29.50	24.59
2013	29.82	28.36	26.84	22.38
2014	27.13	25.81	24.43	20.37
2015	24.69	23.49	22.23	18.53

Open space installations	
Year	Reduction 10% 2009 , 2010, 9% 从2011 年起
2008	35.49
2009	31.94
2010	28.75
2011	26.16
2012	23.81
2013	21.66
2014	19.71
2015	17.94

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System specification

- Electrical power of the solar generator (DC): 7875 Wp
- Maximum AC power: 7200 W
- Nominal AC power: 6900 W
- Nominal module power: 225 Wp
- Number of modules: 35 IBC 225P TC
- IBC MEGALINE trapezoidal sheet mounting system: 35 PCs
- Total area of the solar generator: 57,52 m²
- Inclination angle of the solar generator: 5°
- Orientation of the solar generator: south (5° east)
- Inverter details: 1 x Sunny Boy 3500, 2 Sunny Boy 1700
- Sunny Backup system: 1 x Sunny Backup 5000
- Battery details: 4 x Hoppecke sealed lead-acid battery SB140
12V 140
- Grid details: Nominal voltage 3 x 230/400
- Power frequency: 50 Hz

System specification



System specification

Location:	Bangalore IN
Climate Data Record:	Bangalore IN (1981-2000)
PV Output:	7,88 kWp
Gross/Active PV Surface Area:	57,52 / 57,49 m ²

PV Array Irradiation:	116.977 kWh
Energy Produced by PV Array (AC):	11.466 kWh
Grid Feed-in:	11.466 kWh

System Efficiency:	9,8 %
Performance Ratio:	71,4 %
Specific Annual Yield:	1.453 kWh/kWp
CO2 Emissions Avoided:	10.142 kg/a

Installation (pre installation)



Installation (installation in process)



Installation (after installation)



Concept

- Independence from unstable grid power supply
- Ecological and economical system due to lesser or no usage of generator sets
- Maintenance free
- Zero emissions
- 80% accelerated depreciation if GBI is not claimed

THE OUTLOOK: **SUNNY**

Bad Staffelstein, October 2008

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