

Introduction to Theme - A Solar Roof Concept

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Boston Solar Decathlon House Using Green Technologies



A Green Building

'Good Design is sustainable, Great design is responsible'

Top 10 Countries Using Solar Power in 2010

- Germany (9,785 MW)
- Spain (3,386 MW)
- Japan (2,633 MW)
- United States (1,650 MW)
- Italy (1,167 MW)
- Czech Republic (465 MW)
- Belgium (363 MW)
- China (305 MW) now > 2000 MW, (Production>8G)
- France (272 MW)
- **India (120 MW). now > 1000 MW**

Solar Energy Resource at a Place

- Surface temperature of Sun - 5762°K, it is a storehouse of virtually inexhaustible energy
- Average solar radiation received on the entire earth is 5×10^5 k Wh, but it is variable in space and time
- We measure Solar constant and Insolation
- Global (G) and Diffused (D) Solar Radiation
- For solar heat energy uses, the value of G is important. For solar light energy the value of (G + D) is important.

Forms of Solar Energy Extraction

INPUT

- Heat
- Light
- Chemical energy

OUTPUT

- Thermal Energy – water heater and space heating
- Electricity
- Plant growth by photosynthesis
- Hydrogen production
- Desalination

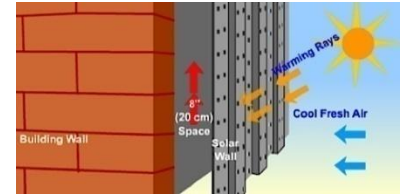
Solar Energy Uses in a Green Building

- **Solar thermal** energy can be used in water heating, process heat and space air conditioning.
- **Solar collectors** are a set of mirrors used for collecting solar heat and achieving higher temperatures.
- **Solar light energy** can be used directly for producing electricity. Solar photovoltaic arrays convert solar light to electricity for meeting lighting and cooling needs.



Solar Energy Uses in a Green Building

- **Solar wall** is a system that allows solar heat to create warmth in the interior environment. It can be designed with use of perforated metal panels to pre-heat ventilation air.
- **Solar balcony** is an enclosed balcony that acts as a solar collector.
- **Solar dye cells** provide color windows materials that generate electricity and help in low energy sustainable construction technologies.



Solar Roof Tops



Belgium Solar
Flowers



Solar Roof in Spain



Solar
Home
in
Japan

Is Rooftop Solar Power a Game-changer for India?

- Delhi Government has announced a policy in 2011
- The first rent-a-roof model rooftop programme was brought out by the Gujarat government, which awarded 2.5 MW each to two developers—SunEdison and Azure Power
- Indian Renewable Energy Development Agency (IREDA) has launched a Rooftop PV Small Solar Generation Program (RPSSGP) Scheme
- ANERT 10,000 Rooftop Programme in Kerala

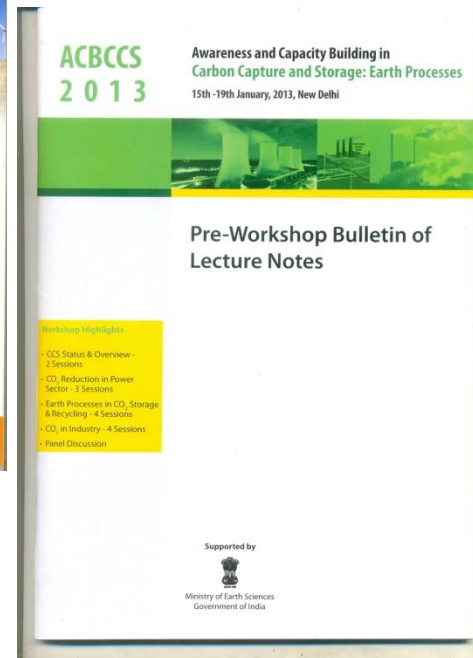
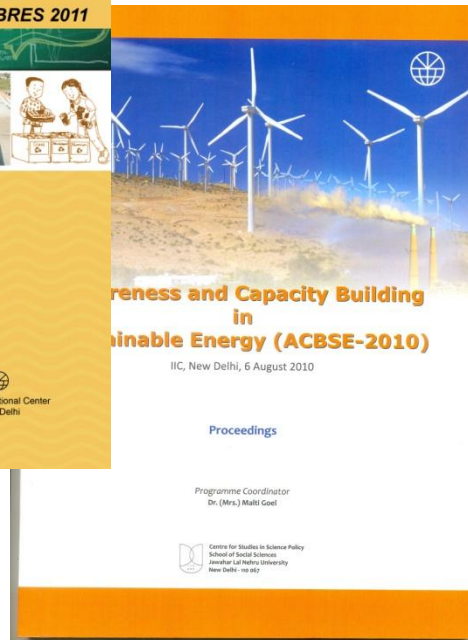
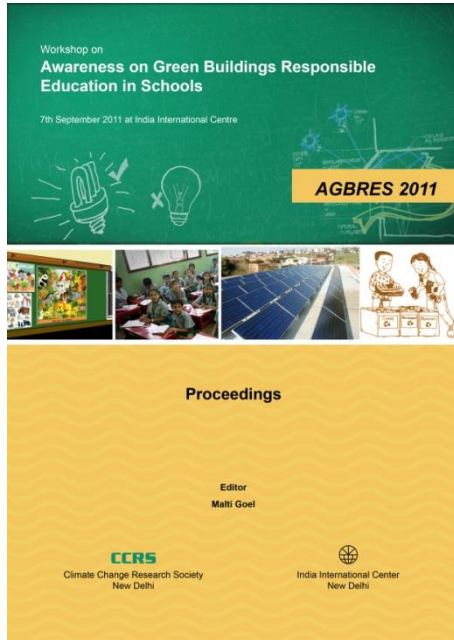
Technology of Mounting and Installation



What it Requires?

- Production capabilities
- Regulatory framework
- Grid integration capabilities
- Building integration
- Technology of installation & maintenance
- Economics and incentives – Feed in tariff, Net metering
- **A Business Model**

CCRI Publications



ABC of Green Buildings Responsible Education

THANK YOU