Technology advancement in Solar Photovoltaic System for Building sector

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Technology advancement should target to have

- Higher efficiency
- Better affordability
- Higher reliability
- More flexibility
Limited Roof space is the major challenge.

Solar cell spray:
- Sprayed onto glass at room temperature
- Generate electricity from both natural and artificial light source
- Solar Glass Buildings Now Possible, Just 10% Increase In Total Building Facade Cost
- 12% efficiency
Conventional Inverters

- Each module can have one micro-inverter-producing AC power
- More flexible
- Can capture more power (20-30%) with shaded scenarios
- Performance of each module can be monitored
- More safe, fast installation, plug and play system
- Micro-inverters are expensive (30-40% more)
- Needs to be weather-proof

Technology Trend

This figure depicts the standard design of solar PV systems.

- The batteries, which are the weakest link, are always in the system loop which negatively impacts the reliability and efficiency of the system
- There is little scope for system expansion or grid connectivity.
More efficient: Able to directly feed power to the load thus avoiding losses through double conversion
More reliable: Allow seamless operation of multiple energy resources
More flexible: Same configuration compatible for taking power and feedback power to the grid; thus avoiding redundancy of infrastructure in future
Less O&M cost: Intelligent load and resource management requires less batteryreplacement cost
Less post-monitoring cost: Support remote monitoring and remote control from the central location with minimal cost
Distributed Generation based Smart Mini-Grid system at TERI, Gram, India

Introducing the SMG facility at TERI, GualPahari
Smart Mini-grid- An electricity distribution network operating below 11 KV, providing electricity to a community. It is supplied by a diverse range of small, local, conventional generators, such as a diesel gensets combined with a range of renewable generators, such as micro-hydro power plants, wind turbines, biomass and solar PV.

Courtesy: TERI
Thank You
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