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Project: Cost Effective Solar Energy for Grid Connected Areas

-Three possibilities:

- Large scale solar thermal plant
- Large scale solar photovoltaic plant
- Rooftop solar pv network in urban area



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Cost-effective rooftop grid connected solar system



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Why rooftops?

Avoid extra land usage

Reduce heat inside the building

Generating close to consumer- not subjected to
distribution & transmission losses

Control given to user

Storage problem eliminated

Solar Mission targets 3GW from rooftop solar



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Deliverables of Project

- Demonstration of prototype deployment in campus or small locality as test bed
- Overcoming engineering challenges
- Evolve practical financial models
- Suggest effective Government regulation to promote further deployment
- Comparative analysis of currently available PV technologies for rooftop deployment



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Technologies likely to be used

- Crystalline/polycrystalline silicon
- Amorphous silicon
- CIGS/non-silicon inorganic technologies



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Main Challenges

- Balance of systems
- Government incentives
- Financing
- Civil Engineering Challenges
- Billing, Monitoring & Analysis



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Cost

- Generates 250 KW- 2kw per buildings X 125 buildings
- Installation cost circa. 250 rupees per watt
- Investment of 500,000 rupees per building
- Running expenses – 2% capital costs per annum



Financial Models

-Mandated or optional?

-Three financing options:

- Building owners investing in the installation
- Government renting out the rooftops from building owners and investing in the installation
- **Modified Third Party BOOT model**



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Billing and Consumption

- Solar energy generated is consumed within the building
- Any surplus is evacuated into the grid
- Net metering to identify solar energy generated
- Government to reward based on the above



Third Party BOOT Model- operation and challenges

- Owners get rent, plus some portion of profit from electricity
- After 10 years, owner gets greater portion of profits
- But as PV cost might to go down
 - how do you lock homeowner into using existing panel
 - early adopter incentives
- House sales- how do you transfer responsibility
- Feeding into grid vs. consuming at source



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Civil Engineering Challenges

- Look at effective design of solar module frames
- Lightweight, strong frames of solar panels
- Earthquake safety
- Mechanism to evaluate load bearing capacity of roof
- Standard for certifying existing buildings



Installation and Maintenance Challenges

- balance of systems
 - inverters limits
 - synchronisation electronics
- commercial incentives for maintenance
 - as pay-out linked to energy generated
- Inspection, monitoring needed
- More suited for suburbs
- Apartment complexes in high density environments



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Next steps

- Identify team- 2 months
- Detailed report 3 months
- Identify test-bed location and implement
- Five year monitoring
- Recommendations to MNRE based on results