



## Gujarat Solar Rooftop program

Sharing experience on structuring an innovative  
Solar PPP Project



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for Green Growth

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# Structure

- The Concept
- Background & Context
- Business Model/Transaction Structure
- Current Status
- Key Takeaways

# International Finance Corporation

- A member of the World Bank Group created in 1956 to foster private sector investment in developing nations
- Full range of financial products: loans, equity, guarantees, carbon finance
- Renewable Energy (RE) commitments form over 50% of IFC's power sector portfolio of over USD 5 billion
- Invested in more than 100 RE projects globally

**Climate Business is a core priority for IFC**

# The Concept

## The Concept

- Every building whether home, industry, institution, commercial establishment can generate some solar power by installing PV panels on rooftop or on wasteland

## Key Benefits

- Savings in developing transmission infrastructure
- Savings in transmission and distribution losses
- Ability to leverage a larger retail investor base and self-replicate
- Ease of development (permitting, siting & clearances)
- Creation of value from under-utilized rooftops



# Gujarat Rooftop Solar PPP Project

- Gujarat has a long-term goal of making Gandhinagar (capital city), a solar-powered city
  
- Initiated a pilot of 5MW grid connected distributed rooftop solar project in Gandhinagar on a **PPP model**
  - First roof top solar project in India to be developed in a PPP mode
  - Potential to reduce ~ 6000 tons of CO2 equivalent annually
  - Demonstrate technical, commercial and regulatory viability and sustainability
  - Develop potential of urban rooftops for solar energy development in Gandhinagar and other cities
  
- Scale-up in 5 more cities in Gujarat (On-going)
  - Mehsana, Vadodara, Surat, Rajkot, Bhavnagar with total capacity 25MW
  - Project designed to further demonstrate and scale up projects based on gross metering model and,
  - Encourage a shift to significant use of private rooftops (relative to the Gandhinagar pilot where 80% of buildings were government/public owned)



## IFC's Role and Responsibilities

- Detailed project due diligence (technical, commercial, legal & regulatory)
- Financial analysis & project Structuring: Financial analysis; Transaction Structure
- Technical aspects of Project: Inter-connection scheme, consultation with incumbent utility, technical Specifications of system etc
- Site analysis and rooftop assessment
- Stakeholder consultations: Government, Bidders, Regulator, Rooftop owners, utility
- Managing the bid process: Preparation of bid documents, bid evaluation

Supported by consultants: Deloitte(technical/commercial) & CMS/HSA(legal)

## Program Status

- Sun Edison Energy India Pvt. Ltd. and Azure Sun Energy Pvt. Ltd. won the 25-year concession for a 2.5 MW solar rooftop project each
- Project commissioning ongoing: Phased approach, 200kW already commissioned
- Several residential owner has registered on line or at the program office
- The developers are in the process of installing solar photovoltaic panels on the rooftops of public buildings and private residences and connect them to the grid
- Knowledge sharing and dissemination: Development of a white paper on solar rooftop for wider circulation
- Support Forum of Regulators on regulatory framework for solar rooftop program at the national level

## Key Takeaways

- Availability of rooftop inventory based on reliable and scientific rooftop survey
- Capacity building of utility staff for rolling out the projects (technical and commercial)
- Attractive feed-in-tariff till grid parity is achieved to attract third party ownership
- Renewable Purchase Obligations for renewables/solar (roof-top solar as a separate category) to progressively increase
- Incentives for individual rooftop owners to encourage participation
- Robust payment security mechanism for investors (letter of credit,, Escrow, reliable credit ratings etc)
- Access to finance is key: Need to design appropriate financing scheme for individual rooftop owners as the sector grows

# Phases in rooftop market development

**Key focus on implementation of demonstration projects in Gujarat to:**

- showcase technical and financial feasibility of rooftop solar PV projects.
- provide insights to policy makers to envisage implementation models and capacity targets.
- reveal implementation issues to move market towards self-replication phase.

Proof of Concept Phase

- Japan's Monitoring Programme for Residential PV Systems
- Germany's 1,000 rooftop programme

Market Transformation Phase

- Market transformation - bridge between proof of concept and mature self-replicating phase  
Focus of the phase to build capacity in market
- Government or public agencies play an active role as market facilitator.
- E.g. Germany's 100,000 rooftop programme.

Mature Self-Replication Phase

- Markets in self replication & self sustaining phase (e.g. Japan and Germany).
- New implementation models emerge which drive the market towards greater efficiency
- Government inputs are minimal with focus on providing a facilitating regulatory environment

# The Vision



# Typical Gross Metering PV System Architecture

