



# SOLAR ROOFTOP : POTENTIAL & CHALLENGES



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# AMPLUS: WORLD CLASS ROOF-TOP SOLAR COMPANY



New York, Houston, London, Hong Kong, Singapore, New Delhi

## (1) World-Class Suppliers:



Photovoltaic Mounting Systems, U.K.

Remote Monitoring Systems, Germany

## (2) Industry Associations:



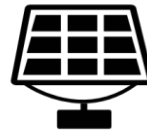
Sustainable Energy Association of Singapore

## (3) Select Customers:



## INR 1,000 Crore of Equity to Invest

I Squared Capital, a US\$ 3 Billion global private equity fund has invested in Amplus



## High Quality Components

We only work with Tier 1 component suppliers, ensuring high system reliability



## World Class Design

International validation of mounting structures design and remote monitoring system



## Rooftop Specialists

We only do Distributed Energy and Rooftop and have worked on 300+ rooftop projects!



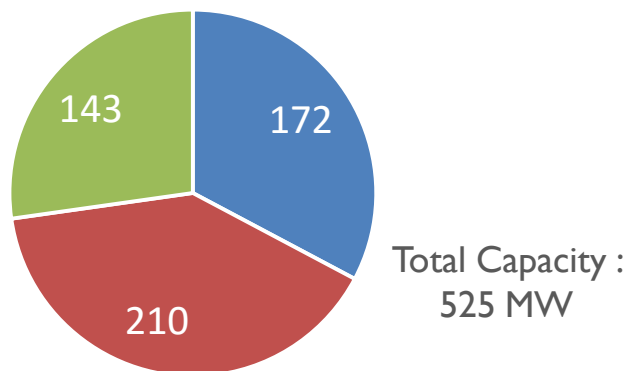
## Pan Asia Focus

Amplus is looking to develop multiple projects across Asia

# ROOF-TOP SOLAR POTENTIAL

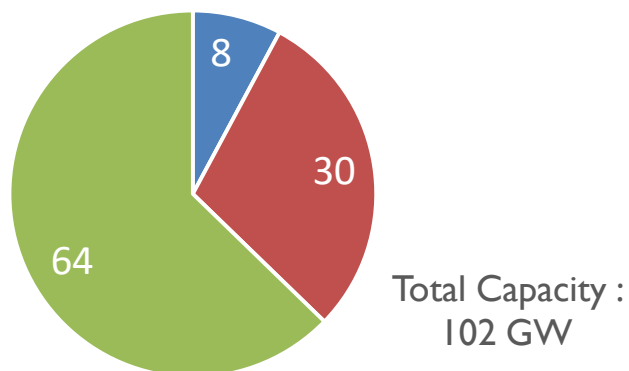


## Present Installed Capacity (in MW)<sup>1</sup>



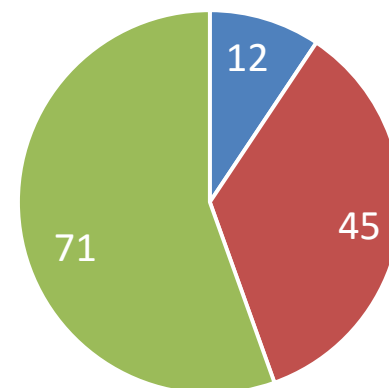
■ Commercial & Govt. ■ Industrial ■ Residential

## Present Potential (in GW)<sup>1</sup>



■ Commercial ■ Industrial ■ Residential

## Potential in 2022 (in GW)<sup>2</sup>



■ Commercial ■ Industrial ■ Residential

Total Capacity : 128 GW

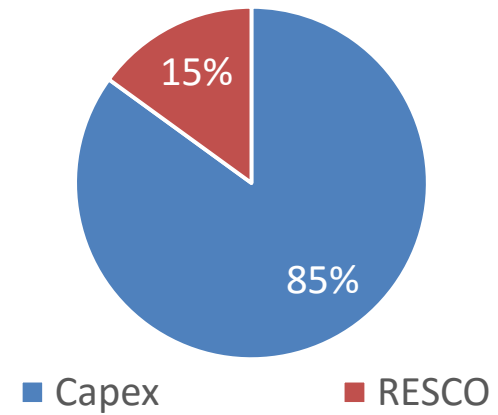
*Potential calculated on the basis of available roof-top area*

# ROOF-TOP SOLAR : BUSINESS MODELS



- **Capex**
  - Roof-owner is also owner of the project
  - Capital Expenditure borne by roof-owner
  - Benefits from tariff savings to the roof-owner
- **RESCO**
  - Roof-owner and project owner are different
  - Capital Expenditure by project development company
  - Revenue for project development company through electricity sale
  - **Growing at a rate of 150%**

Percentage Split

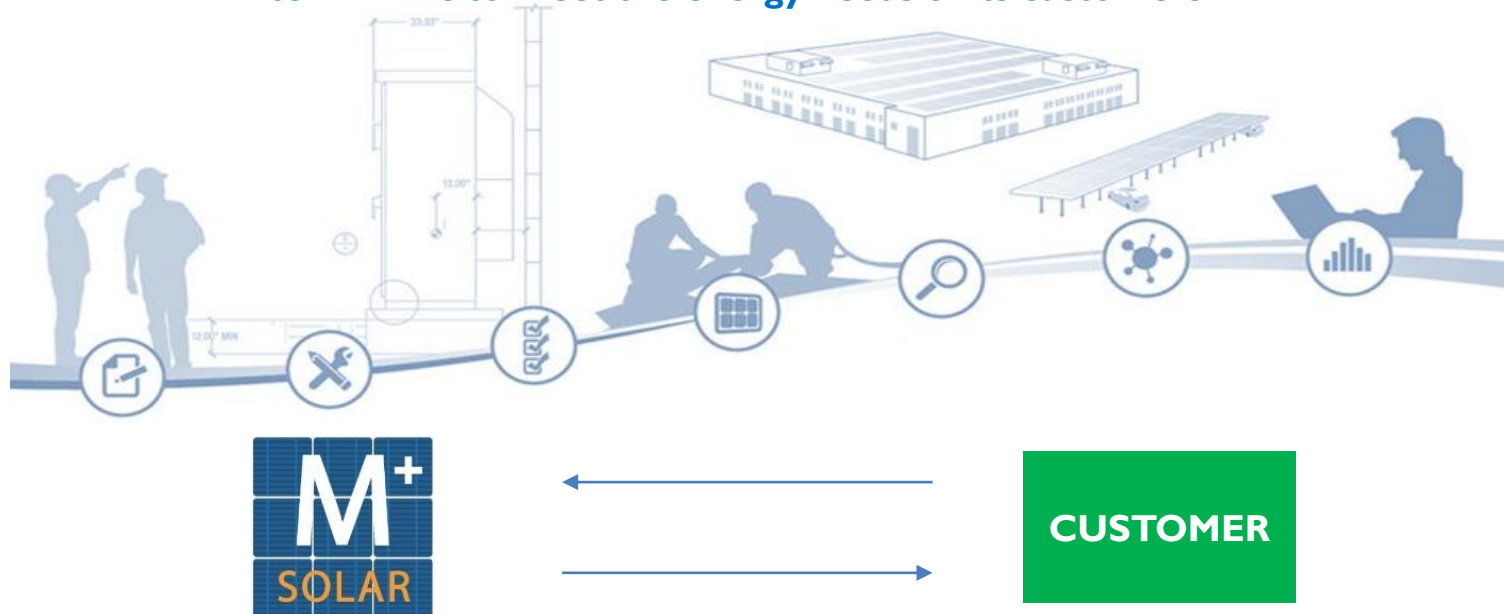


**Solar roof-top market is currently dominated by Capex model, but strong growth is expected from RESCO**

# AMPLUS ROOF-TOP SOLAR MODEL (RESCO)



**Amplus funds, installs & maintains a rooftop solar power plant and enters into long term PPAs to meet the energy needs of its customers**



- Amplus designs, procures, installs, commissions and maintains the solar plant on customer's rooftop
- Amplus invests 100% of the capital required

- Customer signs a long-term Power Purchase Agreement (“PPA”) with Amplus
- Power rate will be cheaper than current tariff, leading to significant savings to the customer over the project's lifetime.

**Amplus offers its customers a solution with Zero upfront investment, Zero maintenance obligations and Guaranteed Savings from day 1**



# ROOF-TOP SOLAR : ADVANTAGES & CHALLENGES



## ADVANTAGES

- Small transmission infrastructure
- Utilization of otherwise unutilized roofs
- Reduced transmission losses
- Easier regulatory compliance
- Green energy

## CHALLENGES

- Financing
  - Creditworthiness of Off-taker
- Net Metering related
- Grid Integration & DISCOM Associated Challenges
- Acceptance of Deemed Generation

- **Equity Financing**
  - Need of flexible equity capital
  - Subsequently replaced by project debt
  - Redeployment of freed up equity into newer projects
  - **Challenge**
    - Growth investors (too small)
    - Capital markets (no track record)
    - Domestic capital (too expensive)
- **Debt Financing**
  - Credit worthiness of off-taker
  - Asset Quality and Return
  - Stable Regulatory Framework
  - Robust Technology
  - Borrower capability & track record
  - **Challenge**
    - Small off-takers with limited familiarity with lenders
    - Few established institutional players so lack of a borrower track record or established balance-sheet
    - Bond markets unavailable to unknown issuers

## AMPLUS Experience

- Raised US\$ 150 MN from I-Squared Capital in 2015
  - Development & Implementation capital
- I-Squared is a US\$ 3 BN global private equity fund based out of New York, Houston, London, Hong Kong, New Delhi and Singapore
- Designed the business plan to suit institutional investor requirements (scale & profitability)

## BENEFITS

- **Financial Benefits**
  - Charge only for net energy consumed
  - If generation > consumption, the owner gets credit
- **Avoids Battery Usage**
  - Excess energy generated is fed to the grid
  - No need of storage and hence expensive batteries

## CHALLENGES

- **State-wise Disparity**
  - Regulations related to grid-connected solar rooftop projects
  - Regulation related to net-metering/feed-in-tariff
  - Regulations exist but not operational in many states
- **Disparity because of difference in Tariffs**
  - Capital cost largely equal for same-sized projects
  - Pay-back period varies on applicable tariff rates
  - Low adoption in states & market segments with low tariffs



## Grid Integration Challenges

- **Grid Stability**
  - Multiple small power-sources introduce high variability in the system
- **Technical challenges**
  - Reverse Power Flows
  - Lack of/Gaps in technical specification for synchronization
- **Restriction on Net Export of Energy to Grid**
  - Limits on capacity to 80-90% of load

## DISCOM Associated Challenges

- **Challenges faced by DISCOMs**
  - Loss of revenue as most profitable customers (Industrial & Commercial) shifting to solar energy
  - Increased cost of grid integration & upgradation
- **Benefits to DISCOMs**
  - Ability to meet peak demand
  - Reduction in transmission cost & losses
  - Reduction in distribution infrastructure

- Implementation of already existing Net-Metering regulations
- Reduce disparities in state regulations, replicate best practices and successful models
- Grid upgradation
- Remove sanctions on allowable capacity
- Plug gaps in technical specifications & make these uniform across states
- DISCOMs to become partner in solar energy through offering services
- Govt. to provide short term support to DISCOMs till the benefits of solar energy can be passed on to DISCOMs

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