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INDIA SOLAR ROOFTOP MARKET

C 8/5, DLF Phase I
Gurgaon 122001 India

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Authors
Sai Siddhartha N, BRIDGE TO INDIA
Vinay Rustagi, BRIDGE TO INDIA

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Acronyms

AD	Accelerated Depreciation
ADB	Asian Development Bank
BIS	Bureau of Indian Standards
CAPEX	Capital expenditure
C&I	Commercial & industrial
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CSR	Corporate Social Responsibility
DIPP	Department of Industrial Policy and Promotion
DISCOM	Distribution Company
ECBC	Energy Conservation Building Code
EPC	Engineering, Procurement, Construction
GBI	Generation Based Incentives
HT	High Tension
IEA	International Energy Agency
INR	Indian Rupee
IREDA	Indian Renewable Energy Development Agency
KSEB	Kerala State Electricity Board
kWh	Kilowatt Hour
LT	Low Tension
MNRE	Ministry of New and Renewable Energy
MPUVNL	Madhya Pradesh Urja Vikas Nigam Limited
MoUD	Ministry of Urban Development
MSEDCL.	Maharashtra State Electricity Distribution Company Ltd.
MW	Megawatt
MWp	Megawatt Peak
NABARD	National Bank for Agriculture and Rural Development
NBFC	Non-Banking Financial Company
OPIC	Overseas Private Investment Corporation
PPA	Power Purchase Agreement RBI Reserve Bank of India
PSU	Public Sector Undertaking
RBI	Reserve Bank of India
REC	Renewable Energy Certificates
RESCO	Renewable Energy Service Company
RPO	Renewable Purchase Obligation
SECI	Solar Energy Corporation of India
SERC	State Electricity Regulatory Commission
SNA	State Nodal Agency
SRISTI	Sustainable Rooftop Implementation for Solar Transfiguration of India
USICEF	US-India Clean Energy Finance
USD	United States Dollar
WB	World Bank

Executive summary

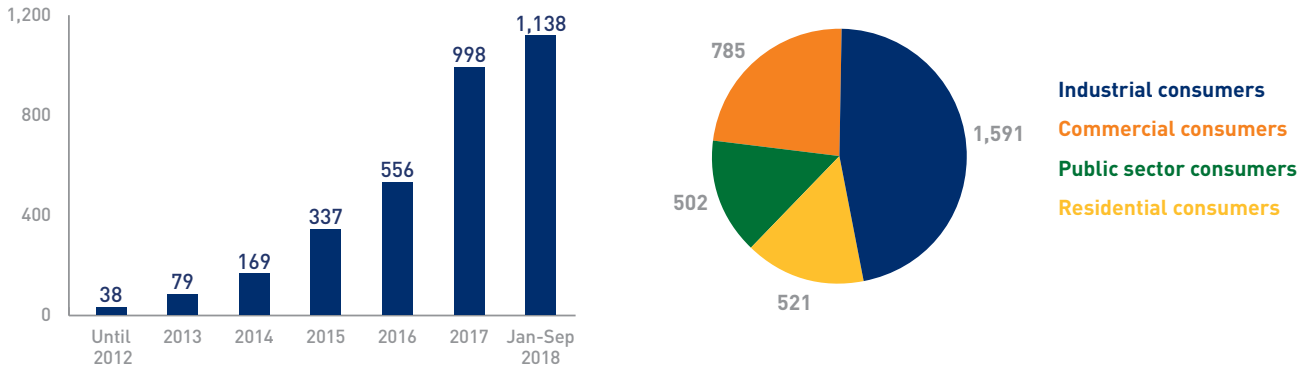
Policy emphasis has been primarily on reducing cost of rooftop solar through tax and financial incentives but has failed to meet changing needs of the market

Indian rooftop solar market has grown rapidly at a CAGR of 88% in the last five years. Capacity addition in the 12-month period ending September 2018 is estimated at 1,538 MW. Total installed capacity is estimated to have reached 3,399 MW.

There have been a number of government policy initiatives supporting the rooftop solar market. The emphasis has been primarily on reducing cost of rooftop solar through tax and financial incentives in the form of capital subsidies, cheaper debt, accelerated depreciation and tariff top-ups. Costs have come down dramatically but the policy framework has failed to meet changing needs of the market. Some much needed initiatives for encouraging DISCOM participation (SRISTI scheme), improving quality standards and consumer awareness are still in draft stages and/ or yet to become effective.

The market growth varies highly across different consumer segments due to differences in grid tariffs, regulatory compulsions and availability of financing. C&I consumers dominate the market with 70% (2,376 MW) share of total installed capacity. These consumers pay higher than average grid tariffs and stand to gain the most financially through rooftop solar. Falling cost means that savings can be as high as 20-60% across India. Carbon emission reduction is also an important driver for many C&I consumers.

Figure: Rooftop solar capacity addition, MW



Source: BRIDGE TO INDIA research

Public sector consumers account for 15% of total installed rooftop solar capacity. Such consumers have similar incentives as their private sector counterparts (cost savings, reduction in carbon emissions) for adoption of rooftop solar plus the benefit of 25-60% capital subsidy. A major challenge faced by public sector consumers is poor coordination between different agencies and complex tender-based procurement.

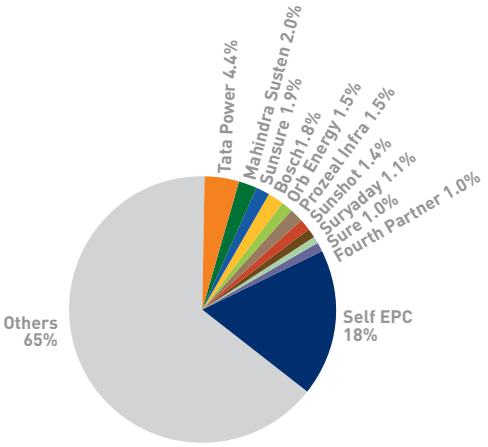
Residential consumers account for the remaining 15% share of the total market. They face formidable financial and operational challenges in installing rooftop solar systems. We expect outlook for the residential segment to remain weak in the next 2-3 years. Continued reduction in capital cost, development of new financing models and improved consumer awareness over time should lead to better growth prospects for this market.

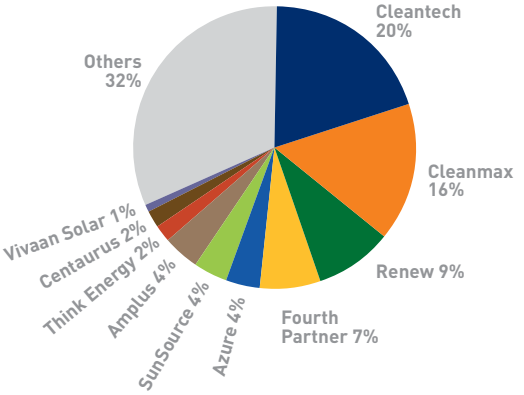
The OPEX model offers an attractive win-win proposition for both the customer and project developer but faces significant challenges

CAPEX has been the preferred business model but share of OPEX based installations has risen steadily to 35%. Other hybrid business models and roof leasing model have so far failed to take off. OPEX model offers a very attractive win-win proposition for both the customer and project developer but faces significant challenges in the form of limited number of highly rated C&I consumers, low contract enforceability and consumer reluctance to sign long term PPAs.

The market place for both EPC and OPEX models is extremely dynamic and fast changing. Low entry barriers mean that the market is highly fragmented specially for EPC services.

Figure: Market share of EPC contractors and OPEX players, Oct 2017-Sep 2018





Source: BRIDGE TO INDIA research
Note: Self EPC denotes projects where EPC work has been done by project developers themselves.

Several leading IPPs, international developers and PE investors are interested in developing OPEX portfolios. There have been some large PE transactions helping to create specialist rooftop IPP platforms including Cleantech Solar, CleanMax, Amplus and Fourth Partner. Meanwhile, for smaller developers and start-ups, it still remains a challenge to raise both equity and debt. Financiers are concerned about execution challenges, high regulatory risk, default risk and poor legal rights.

Concerns of DISCOMs, who see rooftop solar as a threat, need to be addressed through technical and financial support

We believe that the rooftop solar market holds huge growth potential. It should be given more policy support particularly when utility scale solar is facing increasingly acute land and transmission connectivity challenges. Concerns of DISCOMs, who see rooftop solar as a threat, need to be addressed through technical and financial support. The net metering policy framework needs an overhaul to accommodate new business models and do away with unnecessary caps on system sizes. Uptake of rooftop solar in residential and SME segments can also be boosted by addressing poor consumer awareness and financing constraints.

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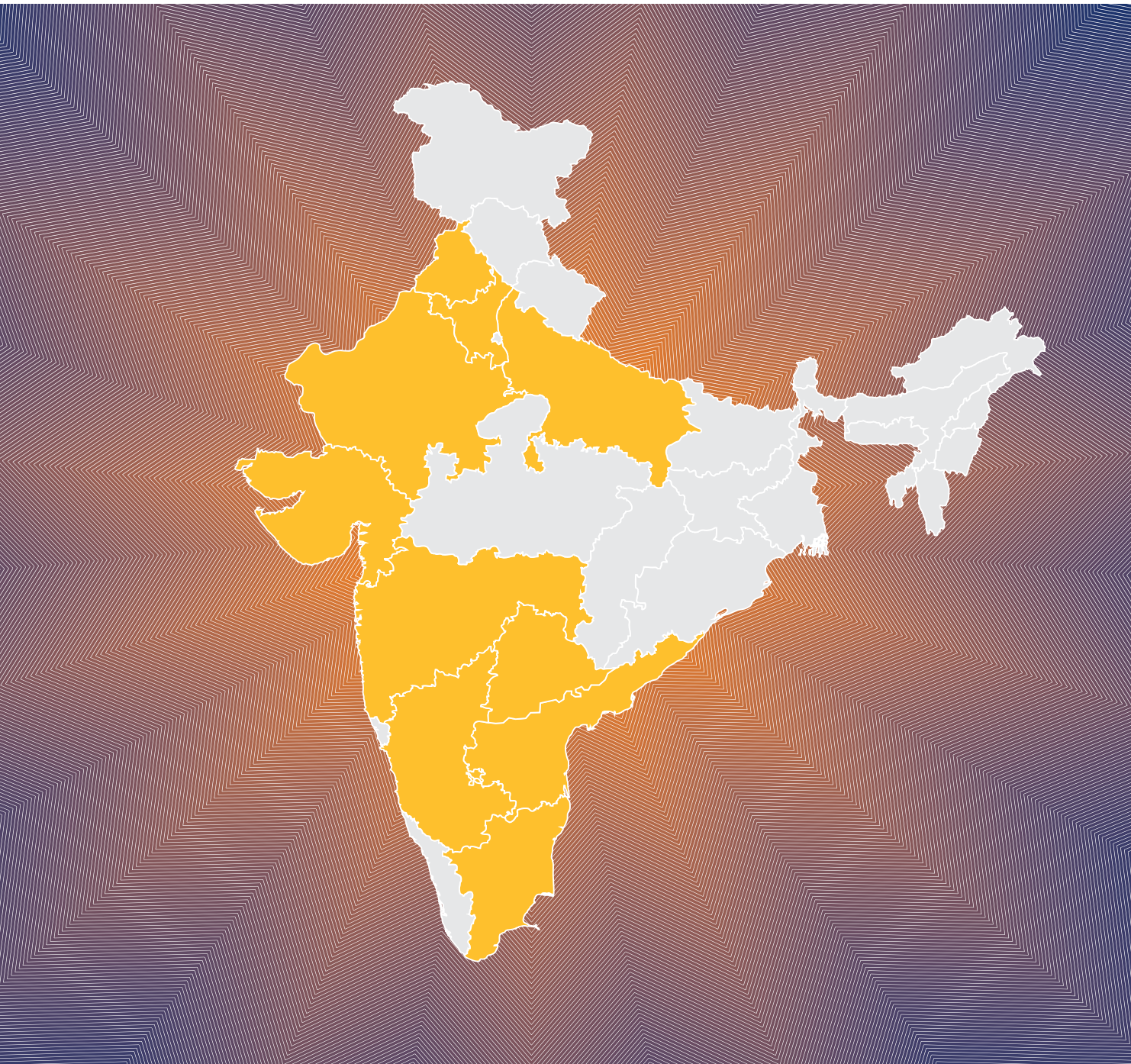
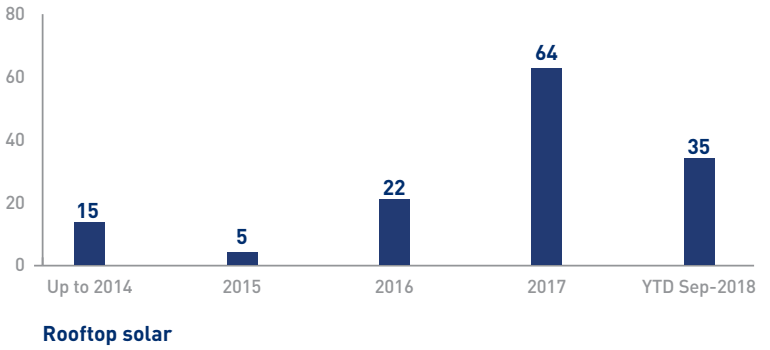
Annexure: State profiles



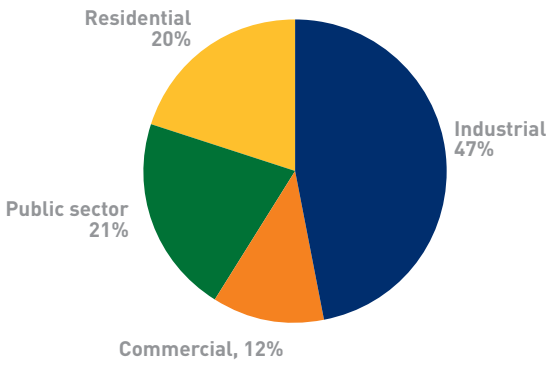
1. Delhi

Solar capacity addition, MW

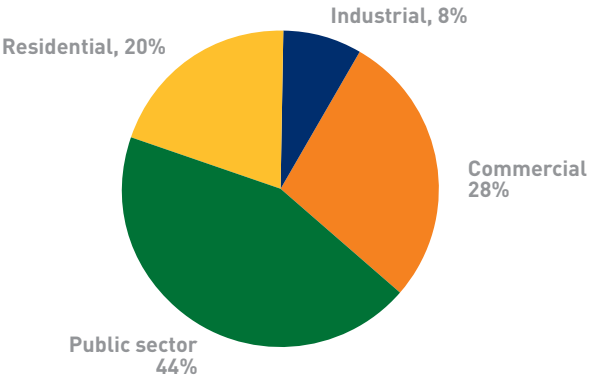


Consumer segments

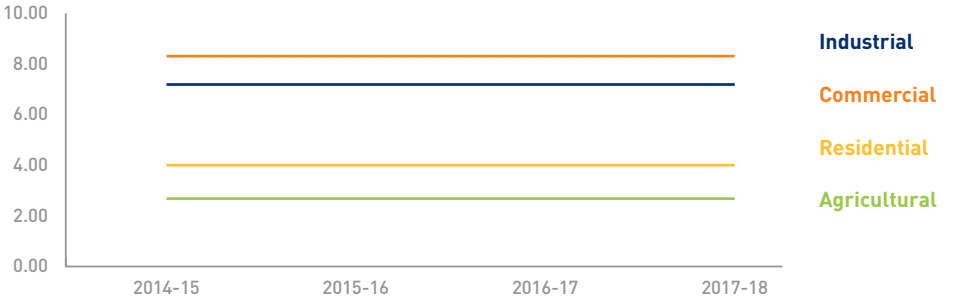
Power consumption, 2017-18



Rooftop solar capacity split as on 30 September 2018



Grid tariffs, INR/ kWh



Source: CEA, BRIDGE TO INDIA research

Notes:

1. Tariffs shown:
   i) are 'energy charges' and exclude fixed charges as well as other components including electricity duty, fuel surcharge etc;
   ii) exclude subsidies by the state government.
2. Tariffs for residential consumers are shown for a monthly consumption of 200 kWh.
3. Industrial and commercial tariffs are for consumers connected at 33 kV and 11 kV or above respectively.
4. Tariffs have remained flat in Delhi over the last four years.

Net metering policy summary

Type of metering allowed	• Net metering and gross metering
Size caps	• 1 kWp/ 1 MWp system capacity up to 100% of sanctioned load • 20% penetration cap at distribution transformer
Key features	• Cumulative capacity of all solar systems installed to not exceed 20% of local distribution transformer capacity • CAPEX and OPEX models allowed • Virtual and group net metering allowed • Billing cycle: annual; surplus electricity injected in the grid shall be paid at applicable tariff rates for residential consumers notified by DERC
Incentives	• Exemption from wheeling, banking, transmission charges and electricity tax • Residential consumers selling surplus power to the grid not required to pay commercial tax on property • Generation based incentive of INR 2.00/ kWh available for residential consumers until March 2024
Market experience, comments and outlook	• Timelines for net metering are being adhered to in most instances: 30 days for feasibility assessment by DISCOMs and one year to set up plants after registration by customer • There have been some experiences of erroneous billing, but DISCOM representatives have been prompt to rectify such instances • The level of rooftop solar penetration at distribution transformer level is quite low at 20%; the industry is seeking a hike in allowed levels of solar power injection and enhancement of transformer capacity required for the same • Because of high pollution, solar yield in Delhi is about 15-20% lower than in neighbouring regions • Initiatives such as 'Solarise Dwarka' are innovative and are finding some degree of success in the state; future capacity addition is likely to be strong considering good government and DISCOM support