CEEW
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BSES
BSES Yamuna Power Limited

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#REdialogue

SCALING ROOFTOP SOLAR

Powering the RE Transition with Households and DISCOMs

Image: Pexels

For Delhi to meet its 2 GW solar target, the Council on Energy, Environment and Water (CEEW) in partnership with BSES Yamuna, Delhi's electricity distribution company, has developed three utility-led business models to overcome prevailing market challenges and create a conducive environment for households, DISCOMs, and developers.

Households Save with Solar

Up to **~95%** on an electricity bill* (rooftop system owners)

Up to **~35%** on an electricity bill* (solar energy subscribers)

**over the system lifetime* *Source: CEEW analysis*

MARKET CHALLENGES

For Households	For Developers	For DISCOMs	For Financiers
- High capital cost - Lack of access to finance - Lack of awareness - Issues with roof ownership and access - Roof lock-in for 25 years	- Lack of access to finance - Fragmented distribution of rooftop installations - Ownership of roof - Delay in approvals	- Loss of revenue from rooftop solar system owners (primarily, high-paying consumer categories) - Lack of trained staff - Higher variability at dis-tribution transformer level	- Small size of rooftop projects - Credit worthiness of individual consumers - Sanctity of contracts

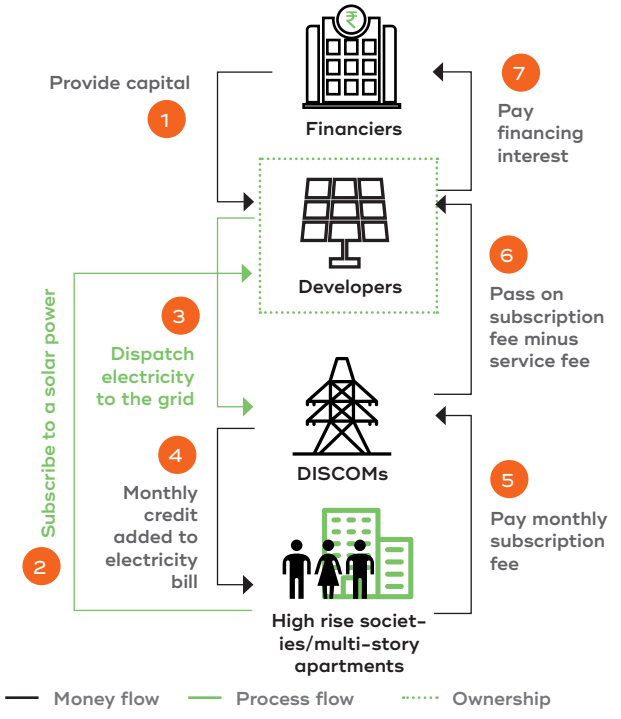
BUSINESS MODELS TO OVERCOME STAKEHOLDER CHALLENGES

1. The one for the roofless

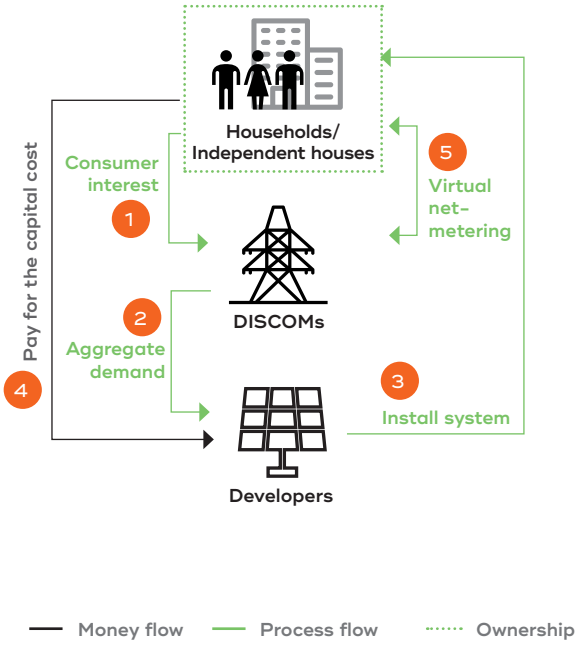
Community solar model

	On-site model	Off-site model
Description	Group of consumers from a community jointly share the benefits of rooftop system located on their shared roof	Group of consumers from a community jointly share the benefits of rooftop system located on available roof spaces nearby
Target households	• Residents in high rises and multi-unit buildings with shared roofs • Consumers with no access to suitable roof spaces	• Residents in high rises and multi-unit buildings with shared roofs • Consumers with no access to suitable roof spaces
Household payment method	Upfront payment or monthly subscription	Upfront payment or monthly subscription
Ownership	Community (society or group of consumers), if payment is upfront. Third-party, if payment through monthly subscription fee	Community (society or group of consumers), if payment is upfront. Third-party, if payment through monthly subscription fee
Location	Common areas and rooftop within a society's premises	Government buildings, commercial buildings, institutions
Metering arrangement	Virtual Net-metering	Virtual Net-metering

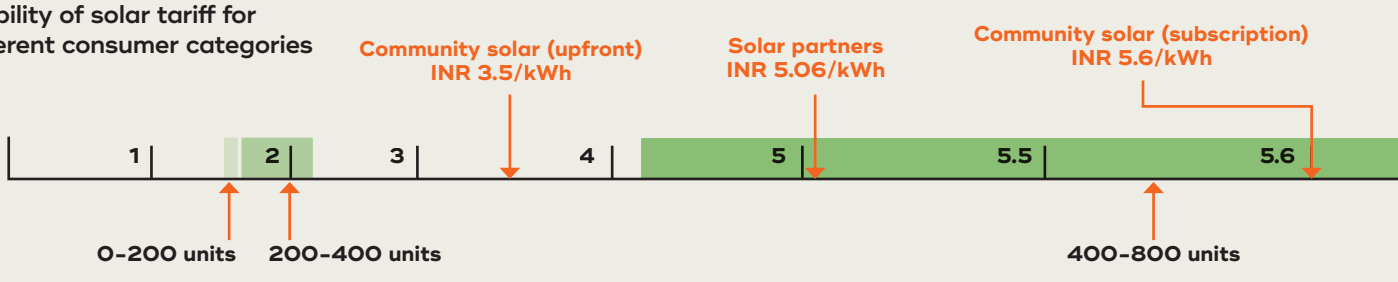
Community solar model – Subscription method



Community solar model – Upfront payment



Viability of solar tariff for different consumer categories



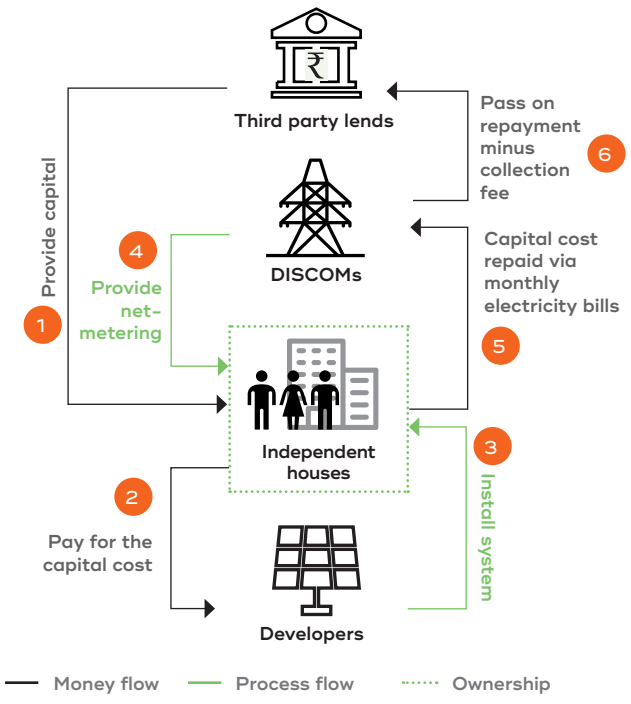
Average grid tariff (INR/kWh)

2. The one for the credit-less
On-bill financing model

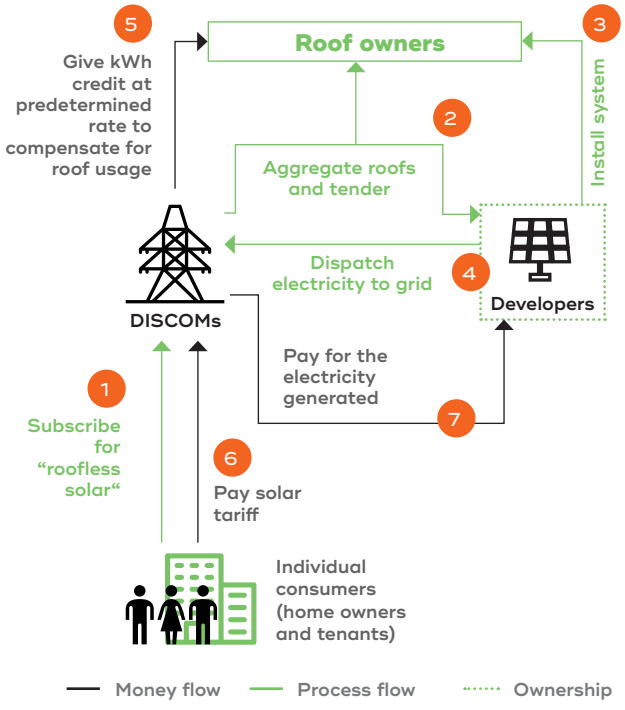
3. The one for all
Solar partners model

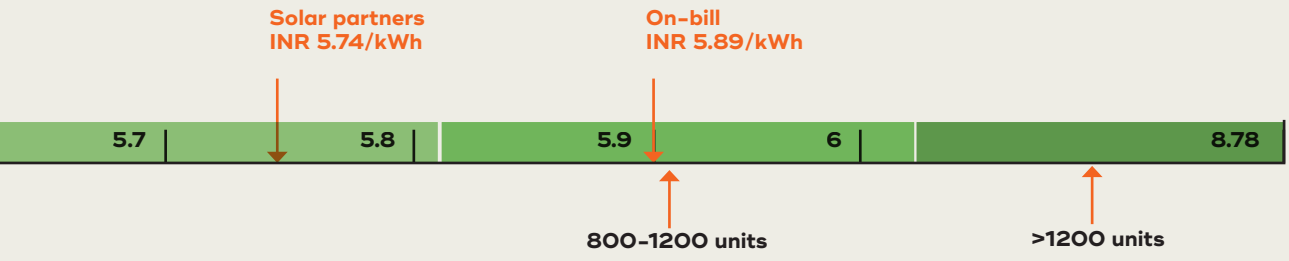
On-bill financing model	Solar partners model
Individual consumers obtain the capital as loan from third-party lenders which is repaid through monthly electricity bill	DISCOMs aggregate rooftop owners, tender capacity and sign PPAs with developers who install and maintain the systems. Consumers then subscribe for the solar electricity generated
Individual consumers with exclusive roof ownership but cannot finance upfront	Tenants and owners without roof access and consumers sceptical of installing and owning a rooftop solar system
EMI payment through monthly electricity bill	Annual subscription
Ownership transferred to consumers after loan repayment	Developers, DISCOMs, municipalities
Consumer's rooftop	Public, commercial and industrial buildings, community spaces, and other available roof spaces
Net-metering	Virtual Net-metering

On-bill financing model



Solar partners model





MEET THE RENEWABLES TEAM @ THE COUNCIL

The Renewables team supports India's – and the world's – clean energy transition. It does so through timely, research-based interventions based on extensive policy, regulatory, and market analyses. The team also assesses, through surveys, India's renewable energy jobs potential and skills requirement, the risks facing renewable energy investments, and designs strategic financial mechanisms to address the identified risks.

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The Energy sector is going through a revolutionary phase driven by technological advancements and economic viability for renewables and storage solutions. The future of energy may well see a higher participation of distributed solar energy, its increased per capita consumption, and the electrification of the transport sector. A low-carbon economy with cleaner and high-efficiency technologies shall shape the future of utilities around the world. The future of energy is smart, more decentralised, yet more connected with increased reliability, sustainability, and affordability.

P. R. Kumar, *CEO, BSES Yamuna Power Limited, Delhi*

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The Council on Energy, Environment and Water (CEEW) is one of South Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain – and change – the use, reuse, and misuse of resources.

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FOCUS AREAS

ENERGY ACCESS | RENEWABLES | POWER SECTOR | INDUSTRIAL SUSTAINABILITY & COMPETITIVENESS | LOW-CARBON PATHWAYS | RISKS & ADAPTATION | TECHNOLOGY, FINANCE & TRADE

Ranked the best in South Asia with annual operating budgets of less than USD 5 million five years in a row
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Among top 100 out of 6846 think-tanks in eight categories
Global Go To Think Tank Index 2017

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ICCG Climate Think Tank's standardised rankings 2016