Program Introduction

- The UK’s Department for International Development (DFID) has been supporting the power sector in India over the last two decades

- The Govt. of India has put in ambitious plans to deliver 24x7 Power for All as well as a target of increasing renewable energy generation capacity to 175 GW by 2022. In order to meet its target, the government is taking several pro-active measures

- To support the reforms process further, UK Government and Government of India have now approved a Technical Assistance titled, “Power Sector Reform Program” to be delivered over the next four years to support at national and state level

- The objective is to achieve improved efficiency, reliability and sustainability of electricity supply, with an increased share of renewable energy in the mix.
The program design is logically grouped into 5 work streams:

1. **Program Architecture**
2. **Design Interventions**
   - Sustainability
   - Viability
   - Modernization

3. **Work Streams**
   - Structural & Regulatory Reforms
   - Power Markets
   - RE Deployment & Grid Integration
   - Utility Sustainability
   - 24x7 Access & Stakeholder Welfare

4. **Impact Initiatives**

5. **Work Packages**

6. **Outputs**
   - Institutional Strengthening/Creation of new Institutions
   - Tools & Methodologies
   - Pilots/Demonstration & Business Case Adoption
   - Policy & Regulatory Recommendation
   - Technical Papers
   - Partnerships & Link Ups
   - Analytics Dashboard & Mobile Apps
   - Industry Indices & Metrics
Utility driven 5MW Pilot

Key features of scheme:
- Targeted for low end domestic consumers
- Project capacity-5MW; SRT system capacity-1-1.5kWp
- Capex structure- CFA: 40%, Consumer share-60%
- Consumer to fund 10% of SRT Cost as upfront Equity
- Consumer to avail loan from Bank for 50% of SRT cost
- Utility would collect EMI on consumer loan as part of electricity bill and remit to Bank
- EPC Contractor to provide free O&M for 5 years

Utility:
- Reduced subsidy burden on Government for target consumers
- Meeting RPO for excess energy injected to Grid

Consumer:
- Consumer self generates to meet consumption after loan period thereby savings in Utility bill
- Access to finance at reasonable terms

Key achievements:
- CFA sanctioned by MNRE @30%. Proposal to be submitted on SPIN portal for 40%
- Andhra Bank has given consent to Utility to fund consumers with Loan tenure: 7.5 Yrs; Interest rate: 9.20%
- L1 price is discovered as INR 51,500/kWp through a tender published for 5MW project capacity

Utility:
- Demand aggregation
- Collection of EMI through Utility Bill and remit to Bank
- Availing CFA from MNRE
- Advance release upto 30% of CFA

Consumer:
- Facilitate in project related approvals/clearances
- Facilitate financing to consumers
- EMI sharing on NPV neutral basis

Role of Utility
- Demand
- Subsidy
- Approvals
- Financing
Journey so far

SRT potential estimation and consumer feedback on proposed model;
- Feasible SRT capacity is estimated (~ 12 MW); 2
- Locations identified are Madhavadhara and Muralinagar
- Consumer feedback on proposed models were sought

Regulatory approval from APERC;
- Sought comments from Chairman and members on each model before finalisation
- Attended 2 public hearings before receiving final order

Finalisation of model:
- Model 1: Customer owned on NPV neutral basis
- Model 2: Gross metering

Evaluating Pros and Cons for various Utility driven SRT models;
- Utility Capex
- Developer/ 3rd Party
- Consumer owned

Bid process management for 5 MW pilot project;
- Drafting bid documents
- Pre bid meeting
- Technical and financial bid evaluation
- L1 price discovery and empanelment

CFA from MNRE;
- Seeking confirmation on applicability of CFA
- Confirmation on advance release of CFA
- Conformation on release of CFA direct to Utility @30%

Onboarding of Banks;
- SBI, PNB, Canara, IDBI, Yes, ICICI and HDFC were reached out
- Obtained customized Loan product approved from Andhra Bank

Stakeholder consultation on shortlisted models such as;
- Energy dept.
- APERC
- APEPDCL
- Banks and Consumers

APEPDCL seeking support from MNRE for devising Utility driven SRT scheme under PSR program

Jan’-May’18

Oct’18-May’19

Sep’18-Feb’19

Jan’-May’18

Sep-Dec’ 18

May’18

Apr’18-Mar’19

Jun-Aug’ 18

May’18

Dec’17

Jun-Aug’18

Jan’18-May’19

Apr’18-Mar’19

Jan’-May’18

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Issues hindering scale up of SRT capacity

**Awareness and Capacity building**
- Awareness among domestic consumers on benefits of SRT is low.
- Utilities undermine the subsidy reduction potential possible through SRT adoption.
- Lack of capacity of Discom in organizing awareness program, workshops etc.

**O&M beyond CMC period**
- Performance of modules is guaranteed for 25 years.
- Suppliers provide free O&M for only 5 years.
- Utility to designate dedicated team to carry out O&M beyond 5 years.

**Financing**
- Cost of debt fund available is costly (>9.5% with loan tenure <5 years).
- Banks are reluctant to fund domestic consumers anticipating default risks.
- Concessional financing and multilateral funding to be tapped to ensure project viability.
- Priority sector lending to be targeted for retail consumers as well.

**Policy related**
- Disbursement of CFA is accompanied with delays.
- Vendors offload such cost on project.
- Lack of standardization of equipment (primarily inverter) for capacity < 3 kW owing to meagre demand.

**Quality of installations and new technology**
- Lack of Certified installation agencies and trained technicians.
- Lack of adoption of new technologies for centralized Monitoring & predictive maintenance.
Interventions required from Utilities a

- Creation of awareness and centralized demand aggregation by Utility will help in bringing down the project cost due to economies of scale
- Creating a dedicated O&M wing for distributed solar rooftop plants
- Facilitate in arranging financing for consumers at preferential rates by onboarding Banks
- Time bound release of CFA by MNRE and revision of benchmark costs to accommodate any technological advancements
- Create demand for lower capacity SRT systems (< 3 kW) so that vendor ecosystem is developed resulting in standardization of products
- Extend financial support in the form of part EMI payment/ additional capex support up to 10-20% of project cost to make scheme more viable
**Status: MNRE**

- CFA sanction in place
- Phased release of CFA possible
- APEPDCL shall facilitate the disbursal of CFA

**Achievements**

- Availing 40% CFA under phase II SRT scheme
- Submitting proposal on SPIN portal once the modalities of Phase II SRT scheme is notified by MNRE
- Customized Loan product in place
  - Loan limit: INR 65,000
  - No loan processing fee
  - Loan tenure: 90 months (with moratorium of 6 mons)
  - Interest rate: MCLR + Term Premium of 0.25% to 0.50%

**Way Forward**

- MoU to be executed between APEPDCL and Andhra Bank
- Tender published for Pilot project of 5MW capacity
- Pre bid meeting was held
- L1 Price discovered as INR 51,500/kWp of SRT System
- LoIs are issued to successful bidders.

**5 MW pilot project**

- Estimation of SRT potential (12 MW)

**Demand Aggregation**

- Marketing the scheme (Online and Offline)
- Creating awareness through workshops at Zonal/sub-division level for consumer demand aggregation
### Economics of the model

**Baseline scenario @ 30% CFA**

<table>
<thead>
<tr>
<th></th>
<th>Discom</th>
<th>Customer</th>
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</thead>
<tbody>
<tr>
<td>Discom's share of EMI on loan for first month</td>
<td>80</td>
<td>397</td>
</tr>
<tr>
<td>Levelized annual savings (during loan tenure)</td>
<td>3,850</td>
<td>-43</td>
</tr>
<tr>
<td>Levelized annual savings (Post loan tenure)</td>
<td>2,170</td>
<td>3,492</td>
</tr>
<tr>
<td>Levelized annual savings (25 Yrs)</td>
<td>2,950</td>
<td>1,813</td>
</tr>
</tbody>
</table>

**Customer**

- Levelized annual savings (during loan tenure): 4,291
- Levelized annual savings (post loan tenure): 2,353
- Levelized annual savings (25 Yrs): 5,150
- Upfront equity: 0
- No of years consumer to pay his EMI beyond loan tenure: 0.0
- Simple Payback period: 9.3

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<table>
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<tbody>
<tr>
<td>Total EMI on loan for first month</td>
<td>477</td>
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</table>

**Scenario @ 40% CFA**

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<td>2,950</td>
<td>-9</td>
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<tr>
<td>Levelized annual savings (Post loan tenure)</td>
<td>2,278</td>
<td>4,291</td>
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<tr>
<td>Levelized annual savings (25 Yrs)</td>
<td>2,278</td>
<td>2,353</td>
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</table>

### Key inputs

<table>
<thead>
<tr>
<th>Baseline parameters</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of SRT per kWp due to scale</td>
<td>INR/kWp</td>
<td>51,500</td>
</tr>
<tr>
<td>Capacity Utilization Factor (CUF)</td>
<td>%</td>
<td>19%</td>
</tr>
<tr>
<td>Customer Equity Ratio</td>
<td>%</td>
<td>10%</td>
</tr>
<tr>
<td>Customer loan tenure</td>
<td>Years</td>
<td>7.50</td>
</tr>
<tr>
<td>Customer Debt Cost</td>
<td>%</td>
<td>9.2%</td>
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