Public Financing Models for Grid-connected Solar in India: A World Bank Perspective

SOUTH ASIA SUSTAINABLE DEVELOPMENT ENERGY
THE WORLD BANK

THE FUTURE OF SOLAR ENERGY IN INDIA
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GANDHINAGAR, GUJARAT
Widespread commercial lending missing despite downstream public financing through FiTs

- Solar PV and CSP development in JNNSM Phase-1 seeks around USD 2 billion of investments; USD 1.4 billion of debt

- Only few participating SCBs with combined debt market share of less than 30%; US EXIM estimated to have sanctioned USD 480 m loans under Phase-1 and Gujarat policy

- Financing of most solar projects limited to full recourse and at higher rates than conventional projects; SCB lending restricted to large corporates and developers with scale

- Consortium lending by Indian lenders for even 5 MW project sizes led to substantive time and effort in financial closures
Upstream public financing, through DFIs, hasn’t made much impact either

<table>
<thead>
<tr>
<th>Development Financial Institution</th>
<th>Financing Products</th>
<th>Actual Participation in solar sector in India</th>
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</thead>
<tbody>
<tr>
<td><strong>OPIC (Requires US Company involvement)</strong></td>
<td>Direct Loans to Projects, Loan Guarantees to Lenders, Export Credit Insurance and Working Capital Guarantees to Lenders.</td>
<td>Direct lending to 6 PV projects under JNNSM &amp; Gujarat state solar scheme – concessionary &amp; Libor linked, long-tenor</td>
</tr>
<tr>
<td><strong>IFC: Private financing – World Bank group</strong></td>
<td>Include equity &amp; debt financing, investment funds, and risk products</td>
<td>Direct lending to 5-6 PV projects (JNNSM &amp; Gujarat state solar scheme) – long-tenor, Libor linked</td>
</tr>
<tr>
<td><strong>ADB: Developmental &amp; Private Financing</strong></td>
<td>Include financing facilities for intermediaries as well as projects, and risk products</td>
<td>Direct lending for a solar thermal project; structured a USD 150 million partial Credit Guarantee (PCG) for lenders</td>
</tr>
<tr>
<td><strong>GiZ/KfW: Developmental Financing</strong></td>
<td>Include export financing, Lines of Credit, and grants</td>
<td>Focus on industrial solar applications &amp; Distributed Generation under JNNSM</td>
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Defining roles and objectives of providing public finance critical

- Efficacy in terms of “Buying down” tariffs vis-à-vis addressing structural impediments to financing
- Leveraging, and not crowding out, commercial financing towards a sustainable and self-rolling market
- Facilitating and supporting appropriate technology development
- Bettering entire ecosystem development for parallel commercial lending

3,600 MW of solar only under JNNSM Phase-II would require around USD 6.4 Billion, and have a debt financing requirement of around USD 4.5 billion
An analytical comparison of past and proposed public funding mechanisms for solar PV

<table>
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<tr>
<th>Options for public finance</th>
<th>Funding Instrument / Mechanism</th>
<th>Extent of Budgetary support / MW</th>
<th>Key additional benefit</th>
<th>Key criticism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy-down cost of solar by financing incremental costs</td>
<td>Capital Subsidy / Viability Gap funding</td>
<td>~ USD 85,000</td>
<td>Direct impact on tariff; Reduces capital exposure of lenders</td>
<td>Not appropriate for commercial technologies: low emphasis on actual performance</td>
</tr>
<tr>
<td>Generation-based incentive</td>
<td>~ USD 89,000</td>
<td>Output linked; Incentivizes developers and efficient equipment suppliers</td>
<td>Extends government support over the entire project life-cycle</td>
<td></td>
</tr>
<tr>
<td>Address or cover specific risks perceived by commercial lenders and impediments to optimal financing</td>
<td>Interest Subvention</td>
<td>~ USD 81,500</td>
<td>Draws commercial banks into lending; reduces cost of finance</td>
<td>As concessional finance is limited, it effectively translates into subsidy</td>
</tr>
<tr>
<td>Sub-ordinated Public Finance to prolong loan tenor</td>
<td>~ USD 14,800</td>
<td>Recoverable credit, draws commercial lending; due diligence by commercial lenders</td>
<td>Financing delays on account of combined lending; requires larger upfront commitment</td>
<td></td>
</tr>
<tr>
<td>Credit Guarantee / Enhancement</td>
<td>~ USD 68,500</td>
<td>Contingent exposure and can leverage investments with zero or limited public funding</td>
<td>Propensity for free-riding &amp; moral hazard by financiers / Distribution companies</td>
<td></td>
</tr>
</tbody>
</table>
While CSP requires an even more careful approach in deploying public finance

**Develop Demonstration Projects**
- Using public finance with desirable technology features such as storage, air-cooled condensation, and hybridization
- Tap into concessional funding, such as Clean Technology Fund or other multilateral and bilaterals

**Public Private Partnership Model**
- Bidding with specific technical specification and deterministic approach with site identification, preliminary activities and techno-commercial feasibility completed by a public-sector entity
- Analyze development in manufacturing value chain & explore need for coordinated industrial policy actions and eco-systems development plans to indigenize areas of solar thermal manufacturing

**Private-led model**
- Evaluate shift to project allocation on a purely private model and competitive bidding

**Phase -II**
- Gather lessons from Phase II projects: Decide on desirable technology standardization & incorporate them into grid-connectivity standards

**Phase -III**
- Analyze development in manufacturing value chain & explore need for coordinated industrial policy actions and eco-systems development plans to indigenize areas of solar thermal manufacturing
A few takeaways and suggested way forward

- Critical to evaluate public financing mechanisms: short-term buying down of solar power cost vis-à-vis addressing long-term structural impediments

- Public finance should not crowd out commercial lending, but also not impede technology deployment and diffusion due to lack of public support

- Sub-ordinated Public Finance to provide loans with prolonged tenor (where the commercial lender gets repaid first) seems to offer the maximum impact on a per MW basis and leveraging commercial lending

- CSP requires a careful public funding approach in terms of more project upfront project preparation, technical assessment of bidders, and following a Case-2 approach
Thank You

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