SOLAR POWER IN INDIA 2016
Trends, Developments and Sector Outlook

Two elements:
- Research Report
- Data-set (Excel)
# Table of Contents

## SECTION A: OVERALL SECTOR SCENARIO

### 1. Executive Summary
- Investment Trends
- Debt Financing
- Equity Financing
- Government Grants and Subsidies
- Risks and Concerns

### 2. Sector Overview
- Size and Growth
- Key Enablers for Segment Growth
- Policy and Regulations
- Investment and Financing
- Tariff Trends
- Solar RPOs
- REC Market
- Key Challenges
- Future Outlook

### 3. Recent Developments
- Recent Capacity Commissioned
- Capacity Awarded
- Central and State Policies
- Regulatory Developments
- Manufacturing and Key Financings

### 4. Progress towards 100 GW
- Government’s Objectives
- Detailed Roadmap
- Progress so Far
- Key Hurdles and Issues
- Likely Achievement

### 5. State Initiatives
- Experience so Far
- Current Capacity
- Capacity under Development
- Current and Upcoming Tenders/Awards
- Inter-state Comparison
- Issues and Challenges
- Outlook and Projections

### 6. SECI’s initiatives
- Role in JNNSM
- Rooftop Projects
- Solar Parks
- Future Plans

### 7. JNNSM Review
- Historical Review
- Progress under Phase II
- Tenders and Timelines
- Risks, Issues and Challenges

### 8. Tariff Trends
- CERC-determined Tariffs
- SERC-determined Tariffs
- Tender-wise Analysis of Tariffs Realised
- Future Expectations

### 9. Financing

## SECTION B: STATE PLANS AND PROGRAMMES

### 16. Gujarat
- Overview
- Solar Power Policy
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Future Plans
- SWOT Analysis

### 17. Rajasthan
- Overview
- Solar Power Policy
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Future Plans
- SWOT Analysis

### 18. Karnataka
- Overview
- Solar Power Policy
- Rooftop and Net Metering Policies
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Capacity Allocation Experience
- Future Plans
- SWOT Analysis

### 19. Tamil Nadu
- Overview
- Solar Power Policy
- Rooftop and Net Metering Policies
- Open Access Charges
- Investment Climate
- Capacity Allocated
- Capacity Allocation Experience
- Future Plans
- SWOT Analysis

### 20. Andhra Pradesh
- Overview
- Solar Power Policy
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Future Plans
- SWOT Analysis
21. Telangana
- Overview
- Solar Power Policy
- Rooftop and Net Metering Policies
- Open Access Charges
- Investment Climate
- Capacity Allocated and Project Development Experience
- Future Plans
- SWOT Analysis

22. Madhya Pradesh
- Overview
- Solar Power Policy
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Future Plans
- SWOT Analysis

23. Punjab
- Overview
- Solar Power Policy
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Future Plans
- SWOT Analysis

24. Maharashtra
- Overview
- Solar Power Policy
- Open Access Charges
- Investment Climate
- Key Players
- Capacity Allocated
- Future Plans
- SWOT Analysis

25. Other States
- Overview
- Uttar Pradesh
- Chhattisgarh
- Odisha

Released Date: March 18, 2016; No. of Slide: 365
List of Tables

Solar RPO Trajectory in Key States
Capacity commissioned during 2015-16 (as of January 2016)
State Tenders
Central Tenders
Net metering regulations released during the past year
State-wise Targets for achieving 100 GW of Installed Solar Power Capacity by 2022
State-wise and Year-wise Targets for achieving 40 GW of Solar Rooftop Capacity by 2022
Cumulative Capacity of Grid-connected Solar Power Projects
List of Solar Parks approved by MNRE
Projects Likely to be Commissioned in 2015-16 under State Policies
Projects Likely to be Commissioned in 2015-16 under Central Government Policies
Overall Status of Tendering for Commissioning under Central Government Policies in 2016-17
Overall Status of Tendering for Commissioning under State Government Policies in 2016-17
Inter-state Comparison
State-wise Capacity Addition Plans in the Solar Power Segment
State-wise Solar Capacity Addition Projections based on Solar RPO targets
Snapshot of Key Tenders invited by SECI under JNNSM Phase II Batch III
Snapshot of various Phases of SECI's Rooftop Project up till December 2014
Solar Parks under Development
Key features of JNNSM Batch I Phase II
Snapshot of select parameters under the guidelines for Phase II Batch II Tranche I
Snapshot of Select Parameters under the Guidelines for Phase II Batch III
Key Features of Phase II Batch IV
Snapshot of tenders invited by NTPC Limited under JNNSM Phase II Batch II Tranche I (3,000 MW)
Snapshot of tenders invited by SECI under JNNSM Phase II Batch III (2,000 MW)
Tendering/expected tendering under Select other Schemes (as of January 31, 2016)

Summary of the Latest Available SERC Tariff Orders for Solar PV Projects
Tariffs determined through Competitive Bidding under JNNSM (Reverse Bidding)
Tariffs determined through Competitive Bidding under JNNSM (Viability Gap Funding)
Tariffs Discovered in the Concluded Bidding Process across States (as on January 31, 2016)
Future Expectations
IREDA's Sanctions and Disbursements
Financial Support Provided by Multilateral Agencies in 2015-16
Green Bonds Issued in India
Key PE and VC deals in Indian Solar Industry in 2015-16
CERC Solar PV Plant Capital Cost Breakdown
Cost of Modules - Domestic vs Imported
Estimated EPC Costs for Rooftop Projects
Key Normative Parameters for Solar Power Plants as per CERC's Tariff Order for 2015-16
Comparison of CERC-determined Levelised Solar Power Tariffs between 2009-10 and 2015-16
State-wise and Category-wise Installed Solar Rooftop Capacity in India
Snapshot of Net Metering Framework across States
Status of Solar Pumps for Irrigation Installed by various State Nodal Agencies
Estimated energy demand by telecom towers in 2047
Installed Capacity of Solar Cell and Module Manufacturers in India
Domestic Manufacturing Plans of Select Players
Summary of Key Domestic Manufacturers
Key Financials of BHEL
Key Financials of Indosolar Limited
Key Financials of Moser Baer Products and Services Offered by PLG Power Renewable Limited
Key Customers and Projects of PLG Power Renewable Limited
Key Financials of Tata Power Solar Operational Highlights of Tata Power Solar
Key Financials of Websol Energy System Limited
Key Financials of XL Energy Limited

Installed Projects of ACME Solar
Project Pipeline of ACME Solar
Solar Project Portfolio of Azure Power
Project Pipeline of Azure Power
Solar Project Pipeline of First Solar
Key Financials of First Solar
Solar Project Portfolio of Hero Solar Energy
Solar Project Pipeline of Hero Solar Energy
Solar Project Portfolio of Hindustan Clean Energy
Solar Project Pipeline of Hindustan Clean Energy
Key EPC Projects executed by Hindustan Clean Energy
Project Pipeline of Hindustan Clean Energy
Solar Project Portfolio of Mahagenco
Project Pipeline of Mahagenco
Key Financials of Mahagenco
Solar Project Portfolio of NTPC
Project Pipeline of NTPC
Key Financials of NTPC
Project Pipeline of ReNew Solar Power
Solar Project Portfolio of SolaireDirect
Project Pipeline of SolaireDirect
Solar Project Portfolio of SunEdison
Key Third-Party EPC Projects Executed by SunEdison
Project Pipeline of SunEdison
Solar Project Portfolio of Tata Power Renewable Energy
Key Financials of Tata Power Renewable Energy
Solar Project Portfolio of Welspun Renewables
Project Pipeline of Welspun Renewables
Current Status of Tendering/PPAs for Commissioning in 2016-17
Current Status of Tendering/PPAs for Commissioning in 2016-17 under State Policies
Domestic Manufacturing Plans Announced
SPO Targets and Compliance in Gujarat
Financial Performance of Discoms in Gujarat
Key Projects in the Charka Solar Park
Solar Capacity Commissioned in Rajasthan up to October 2015
SPO Targets and Compliance in Rajasthan
Financial Performance of Discoms in Rajasthan
List of Tables and Figures

Projects Allocated under State Solar Policy in Rajasthan (February 2013)
Details of Ongoing Grid-connected Solar Power Projects in Rajasthan under various Schemes
SPO Targets and Compliance in Karnataka
Financial Performance of Discoms in Karnataka
Capacity Allocated in Karnataka Phase 1 (April 2012)
Capacity Allocated in Karnataka Phase 2 (August 2013)
Capacity Allocated in Karnataka Phase 3 (July 2014)
Capacity Allocated in Karnataka Phase 4 (November 2014)
Financial Performance of Discoms in Tamil Nadu
SPO Targets and Compliance in Andhra Pradesh
Financial Performance of Discoms in Andhra Pradesh
Capacity Allocated in Andhra Pradesh under Phase II (October 2014)
Financial Performance of Discoms in Telangana
Capacity Allocated in Telangana under Phase I (November 2014)
Capacity Allocated in Telangana under Phase II (August 2015)
SPO Targets and Compliance in Madhya Pradesh
Financial Performance of Discoms in Madhya Pradesh
Capacity Allocated in Madhya Pradesh under Phase I (August 2012)
Capacity Allocated in Madhya Pradesh under Phase II (February 2014)
Capacity Allocated in Madhya Pradesh under Phase III (July 2015)
SPO Targets and Compliance in Punjab
Financial Performance of Discoms in Punjab
Capacity Allocated in Punjab under Phase I Category A (June 2013)
Capacity Allocated in Punjab under Phase I Category B (June 2013)
Capacity Allocated in Punjab under Phase II Category A (February 2015)
Capacity Allocated in Punjab under Phase II Category B (February 2015)
Capacity Allocated in Punjab under Phase II Category C (February 2015)
Capacity Allocated in Punjab under Phase III (September 2015)
SPO Targets and Compliance in Maharashtra
Financial Performance of Discoms in Maharashtra
Cumulative Installed Solar Power Capacity of Other States

List of Figures
Solar Power Capacity Growth
Installed Solar Power Capacity under various Schemes/Programmes (as of January 2016)
State-wise Installed Solar Power Capacity (as of January 2016)
Lowest Tariffs Discovered in Recent Bids
Market Clearing Volume of Solar RECs at IEX and PXIL (January 2015-December 2015)
MNRE’s Scale-up Plan to 100 GW of Solar Power Capacity by 2022
Grid-connected Solar Capacity across Select Key States
Year-Wise Trend in Solar PV Tariffs Determined by CERC
Trends in Share of Various Components in Total Project Costs
Region-wise Average Monthly Prices of Modules Deployed in Indian Solar Projects
Share of various Components in Solar Rooftop Projects Costs
Share of various Components in Utility-scale Solar Project Costs
Potential SHS market size (No. of households)
Investment Requirements to meet the 100 GW target (Rs million)
Solar Capacity Commissioned in Gujarat up to December 2015
Year-wise Proposed Targets for Solar Rooftop Projects in Gujarat
Year-wise Proposed Capacity Addition Targets for Grid-connected Solar Projects in Gujarat
Year-wise Proposed Targets for Grid-connected Solar Rooftop Projects in Gujarat
Cumulative and Yearly Capacity Additions in Karnataka from 2012-2016
Yearly Capacity Addition Targets in Karnataka under State Solar Policy
Cumulative and Yearly Capacity Additions in Tamil Nadu from 2012-2016
Yearly Capacity Addition Targets for Rooftop Solar in Tamil Nadu
Cumulative and Yearly Capacity Additions in Andhra Pradesh from 2012-2016
Year-wise Solar Rooftop Capacity Addition Target in Andhra Pradesh
Year-wise Solar Capacity Addition Target in Andhra Pradesh
Trends in Peak Power Deficit in Telangana
Year-wise Solar Rooftop Capacity Addition Target in Telangana
Year-wise Solar Capacity Addition Target in Telangana
Cumulative and Yearly Capacity Additions in Madhya Pradesh from 2012-2016
Year-wise Rooftop Solar Capacity Addition Targets in Madhya Pradesh
Cumulative and Yearly Capacity Additions in Madhya Pradesh from 2012-2016
Year-wise Planned Rooftop Solar Capacity Addition in Madhya Pradesh
Cumulative and Yearly Capacity Additions in Madhya Pradesh from 2012-2016
Year-wise Planned Solar Capacity Addition in Madhya Pradesh
Year-wise Planned Solar Capacity Addition in Madhya Pradesh
Yearly Capacity Addition Targets in Punjab between 2012-13 and 2015-16
Year-wise Solar Capacity Addition Targets in Punjab
Year-wise Rooftop Solar Capacity Addition Targets in Punjab
Cumulative and Yearly Capacity Additions in Punjab from 2012-2016
Year-wise Planned Rooftop Solar Capacity Addition in Punjab
Cumulative and Yearly Capacity Additions in Punjab from 2012-2016
Yearly Capacity Addition Targets in Uttar Pradesh from 2012-2016
Year-wise Capacity Addition Targets for Rooftop Solar in Uttar Pradesh
Cumulative and Yearly Capacity Additions in Chhattisgarh from 2012-2016
Yearly Capacity Addition Targets for Rooftop Solar in Chhattisgarh
Cumulative and Yearly Capacity Addition in Odisha from 2012-2016
Yearly Capacity Addition Targets in Odisha
I would like to purchase the “Solar Power in India 2016” report:

<table>
<thead>
<tr>
<th>Format (PDF)</th>
<th>Price</th>
<th>GST (18%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Licence (Single Location)</td>
<td>Rs 60,000</td>
<td>Rs 10,800</td>
<td>☐ Rs 70,800</td>
</tr>
<tr>
<td>Enterprise Licence (Multiple Locations)</td>
<td>Rs 90,000</td>
<td>Rs 16,200</td>
<td>☐ Rs 106,200</td>
</tr>
</tbody>
</table>

I am enclosing a cheque/demand draft for Rs ________________, vide cheque/demand draft no. ________________ drawn on ________________ dated ________________ in favour of “India Infrastructure Publishing Pvt. Ltd.”

__________________________________________
Signature

Name (Block Letters)

______________________________
Designation

______________________________
Company

______________________________
Mailing Address

______________________________
Telephone

______________________________
Mobile

______________________________
Fax

______________________________
E-mail

**Wire transfer details:**

Beneficiary : India Infrastructure Publishing Pvt. Ltd.
Bank Name : The Hongkong and Shanghai Banking Corporation Ltd
Bank Address : R-47, Greater Kailash – 1, New Delhi - 110048
Account No. : 094179587002
Swift Code : HSBCINBB
IFSC Code : HSBC0110006

**Contact details:**

Aayushi Lahoti

Information Products

India Infrastructure Publishing Pvt. Ltd.

B-17, Qutab Institutional Area, New Delhi 110016, India

Tel: +91-11-46038153, 41034600, 41034601; Fax: +91-11-26531196

Mobile: +91-7838751085

Email: aayushi.lahoti@indiainfrastructure.com