Overview - India

4th largest installed capacity of wind power in the world

6th largest installed capacity of solar power in the world

Ranked 2nd in the "Renewable Energy Country Attractiveness Index 2017"

The International Energy Agency's World Energy Outlook projects a growth of renewable energy supply to 4,550 GW in 2040 on a global basis

About 4.96 million household size biogas plants have been installed in India

India has a record 11 GW of combined wind and solar capacity

Source: Invest in India

Renewable Energy - India Scenario (1/2)

As on 31st March 2018, total installed power capacity from renewable energy sources (excluding Hydro Power) was 114.32 GW, accounting for ~20% of the total installed power capacity

Break-up of installed power generation capacity in 2018

<table>
<thead>
<tr>
<th>Source: Ministry of Power; Ministry of New and Renewable Energy, Government of India</th>
<th>Installed capacity of renewable energy (in GW) in 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coal</strong></td>
<td><strong>45.3</strong></td>
</tr>
<tr>
<td><strong>Gas</strong></td>
<td><strong>34</strong></td>
</tr>
<tr>
<td><strong>Oil</strong></td>
<td><strong>21.7</strong></td>
</tr>
<tr>
<td><strong>Hydro</strong></td>
<td><strong>8.8</strong></td>
</tr>
<tr>
<td><strong>Nuclear</strong></td>
<td><strong>4.5</strong></td>
</tr>
</tbody>
</table>

Source: Ministry of Power; Ministry of New and Renewable Energy, Government of India
Renewable Energy - India Scenario (2/2)

Installed Capacity (in GW) from different RES

CAGR 9.29%

Source: India Brand equity Foundation

Growth Drivers

**RENEWABLE ENERGYFINANCING:** IREDA to raise bonds worth USD 366.2 million

**PROPOSED SOLAR CITIES:** Power demand is met only by Solar energy

**GOVERNMENT COMMITMENTS:** 24*7 eco friendly & affordable Power
Industry Trends in India

100 Smart City projects
Provision for rooftop Solar & 10% renewable energy mandatory

Upgradation & Modernization
Upgradation of water mills & micro hydro projects

Solar Pumps
100,000 Solar pumps required for Agriculture

Green Energy Corridor
Green energy corridor is being set up

New Solar Parks Sanctioned
34 Solar parks of Capacity 20,000MW

DEMU Train
Solar powered Local trains are launched in India

Source: Invest in India, Government of India

Advantage India

Robust Demand
- Low per capita energy and electricity consumption
- The electricity consumption is projected to reach 15,280 Twh in 2040 from the 4926 Twh in 2012

Increasing Investments
- Non-conventional energy received FDI inflow of USD 6.39 billion between April 2000 and March 2018
- With government's ambitious green energy targets, the sector has become quite attractive for both foreign and domestic investors

Competitive Advantage
- 300 days of sunshine is an enabler to harness the solar power available. Hydro power potential is being explored in the north - eastern states of the country
- Setup and financing costs for solar parks have come down significantly in the past two years

Source: India Brand Equity Foundation
Major Investors

This list is indicative.
Tamil Nadu Renewable Energy Sector Overview
Overview (1/2)

- Leader in Renewable energy sector among all other states with a total installed capacity of 11,113MW as on Mar 2018
- Ranks 9th globally in terms of Renewable Power Output

Tn is one among the top nine markets globally to have large share of renewable power generation

Due to extensive use of renewable energy, TN has reduced about 5,406 million tonnes of carbon emission (by reducing the use of hard coal)

Source: Investing in Tamilnadu, TOI

Overview (2/2)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Renewable energy Sources</th>
<th>Capacity in MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wind</td>
<td>8,152.39</td>
</tr>
<tr>
<td>2</td>
<td>Solar</td>
<td>2,034.25</td>
</tr>
<tr>
<td>3</td>
<td>Biomass - Combustion</td>
<td>237.67</td>
</tr>
<tr>
<td>4</td>
<td>Co - Generation</td>
<td>688.40</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>11,112.71</td>
</tr>
</tbody>
</table>

Tamil Nadu Vision 2023 envisages an investment of US$ 39.6 billion to expand generation capacity by 30,000 MW

Source: India Brand equity Foundation
Year on Year consistent growth in Renewable energy Capacity

Capacity in MW

Source: Energy Policy Note 2018 - 19

Wind Power in Tamil Nadu

The State has harnessed around 13,000 million units of wind energy during the year 2017 - 18

Tamil Nadu is endowed with four prominent passes having high wind potential, due to the tunneling effect during south West Monsoon

<table>
<thead>
<tr>
<th>S.No</th>
<th>Districts</th>
<th>Annual avg. wind Speed (Km/Hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Palghat Pass, Coimbatore, Erode</td>
<td>18-22</td>
</tr>
<tr>
<td>2</td>
<td>Shencottah Pass, Tirunelveli, Tuticorin</td>
<td>18-22</td>
</tr>
<tr>
<td>3</td>
<td>Aralvoimozhi Pass, Kanyakumari</td>
<td>19-25</td>
</tr>
<tr>
<td>4</td>
<td>Kambam Pass, Dindigul district</td>
<td>19-25</td>
</tr>
</tbody>
</table>

Tamil Nadu has an installed capacity of 8152 MW as on MAR 2018
Solar energy (1/2)

- Reasonably high solar radiation (5.6 - 6.0 kWh/sq. m) with around 300 clear sunny days in a year enabling the State to come up with a policy to promote solar energy development
- India has solar incidence in the range of 4 - 7 kWh/sq.m./day
- Solar power may help reduce the use of expensive diesel for backup gensets
- Pioneer in announcing net metering policy
- Potential destination for investments in solar energy

Source: India Brand equity Foundation, TEDA, Energy Policy Note 2018

Solar energy (2/2)

- The state’s total solar installed capacity is 2034 MW, as on Mar 2018
- Most number of solar projects with a capacity of 2,000 MW (2018)

SOLAR POLICY & SCHEMES IN TN

Tamil Nadu Solar Energy Policy 2012
Net metering, Exemption of payment of electricity tax, Tax Concessions, Exemption from demand cut

Chief Minister’s Solar Powered Green House Scheme:
3 lakh houses were built with solar powered lighting systems over a period of 5 years for benefit of poor in rural areas

Energization of Street Lights through Solar Power:
The State Govt. has decided to energise 1 lakh street lights in villages over a period of 5 years

Source: TEDA, Energy Policy Note 2018
Cogen Raw Material Availability in Tamilnadu

- The raw material for power generation using cogeneration plants is bagasse which is generated from sugar factories.
- 3rd largest sugar producer in India with 43 factories and it accounts for about 10% of the total production.
- There are 29 plants in the State that together account for the capacity of 659 MW of cogeneration power capacity.
- This capacity is spread across the state in the delta region, Districts of Erode, Coimbatore, Tirunelveli etc.

Upcoming Co-generation Projects

Planned for establishment of 12 Co-generation Plants with an estimated cost of INR 1241.15 crore.

Co-generation plants have a total capacity of 183 MW.

Source: Energy Policy Note 2018

TEDA - Accolades

- Installed Solar rooftops for a cumulative capacity of 24.60 MW.
- Utility Power Plants for a cumulative capacity of 312 MW.
- Declared as the Procurement agency for renewable energy.

- 2nd highest number of solar home lighting systems across the country.
- 3rd highest number of Solar Power packs across the country.
- ENERTIA Award for being top investment and infra excellent State in Sustainable energy & Power.
- Best Nodal agency Award For the year 2016.

Source: Energy Policy Note 2018
Major Players

Gamesa

KCP

RRB Energy

WinWinD

adani
Investment Opportunities
Investment Opportunities (1/2)

#1 Tidal Projects at Commercial Scale
#2 Development of Solar PV manufacturing Capabilities
#3 Construction of Solar and Wind parks in large Scales
#4 Offshore Wind energy projects
#5 Development of Wind - Solar Hybrid installations and Biomass projects

Investment Opportunities (2/2)

Solar Energy
- Manufacturing core products - Ingots & Wafers
- Manufacturing Cells and Modules
- Manufacturing BoS Utility Grid
- Installation & Support
- Training, consulting and IT
- Power Plant Developer

Wind Energy
- Machinery Suppliers
- Original Equipment Manufacturing
- Component Manufacturing
- Trading Opportunities
- IT & Training and Support Services
- Power Plant Developer

Biomass Energy
- Feedstock producers & processors
- Biofuel companies
- Equipment Manufacturers & Technology suppliers
- Transport services
- Power Producers
Government Support
### Key initiatives by the Government of Tamil Nadu

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hon’ble CM’s Solar Powered Green House Scheme</strong></td>
<td>Under this Scheme, 300,000 houses were constructed during the period of 2011-16</td>
</tr>
<tr>
<td><strong>Cm’s Solar Rooftop Capital Incentive Scheme</strong></td>
<td>A capital Subsidy of INR 20,000 per kW of installation over and above the Government of India’s 30% subsidy</td>
</tr>
<tr>
<td><strong>Bio Energy</strong></td>
<td>The main objective is to optimally use the vast Bio mass resource for Power through Biomass Gasifier and Plants</td>
</tr>
</tbody>
</table>
| **Wind Solar Hybrid System**                                    | • A way to offset the Seasonality of the power Sources  
• The cost of this Hybrid is 40% - 50% cheaper than pure Solar Systems |
| **Wind Energy**                                                 | The State has the installed wind capacity of 8152.39 MW which is approximately 36% of the country’s total installed Wind Capacity |

*Source: TEDA, Energy Policy Note 2018*
Planned Infrastructure facilities

- Wind Solar Hybrid Power Plant Establishing a 10MW Grid Connection to the plant
- 50 Mw Solar park in Kayathur in 250 Acres of land
- Solar Irrigation Pumps to farmers
- Establishment of 500MW Solar Park
- Solar Village in Villupuram District

Source: Energy Policy Note 2018
Existing Renewable Energy Systems

1. 10 Kw Solar Power System at a Child Hospital
2. 10 Kw Solar Power System at a Corporation School in Chennai
3. 10 Kw Solar Power System each at four colleges in Chennai
4. 330 Kw at BDO/Panchayat union offices in various districts
5. 69 Kw Solar Power Systems at buildings of transport departments in various districts
6. 330 Kw at a prison complex

Source: Energy Policy Note 2018
Government Support to Investors Industrial Policy 2014
<table>
<thead>
<tr>
<th>Category</th>
<th>A Districts (Chennai, Tiruvallur, Kancheepuram)</th>
<th>B Districts (Other than A &amp; C)</th>
<th>C Districts (Southern districts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mega Projects</td>
<td>Above 500 - 1500 and creating an employment of 300 in 3 years</td>
<td>Above 350 - 1000 and creating an employment of 200 in 4 years</td>
<td>Above 200 - 500 and creating an employment of 100 in 4 years</td>
</tr>
<tr>
<td>Super Mega A</td>
<td>Above 1500 - 3000 and creating an employment of 400 in 5 years</td>
<td>Above 1000 - 2000 and creating an employment of 300 in 5 years</td>
<td>Above 500 - 1500 and creating an employment of 250 in 5 years</td>
</tr>
<tr>
<td>Super Mega B</td>
<td>Above 3000 - 5000 and creating an employment of 600 in 6 years</td>
<td>Above 2000 - 4000 and creating an employment of 400 in 6 years</td>
<td>Above 1500 - 3000 and creating an employment of 350 in 6 years</td>
</tr>
<tr>
<td>Ultra Mega</td>
<td>Above 5000 and creating an employment of 700 in 7 years</td>
<td>Above 4000 and creating an employment of 600 in 7 years</td>
<td>Above 3000 and creating an employment of 500 in 7 years</td>
</tr>
</tbody>
</table>

*“Southern Districts” means the Districts of Theni, Dindigul, Madurai, Sivagangai, Ramanathapuram, Virudhunagar, Tirunelveli, Thoothukudi and Kanniyakumari*

---

**Standard Incentives**

**Capital Subsidy**
- Subsidy ranging from INR 30 Lakhs to INR 2.25 crores
- 50% additional subsidy for industries set up in SIPCOT Industrial Parks (other than Southern districts)
- For investments made in B & C category districts, an additional 10% & 25% subsidy for industries located outside the SIPCOT Industrial Parks

**Stamp duty concession**
- 50% to industries located in SIPCOT parks in A & B districts and 100% in the case of Southern Districts

**Stamp duty concession**
- 50% to industries located in SIPCOT parks in A & B districts and 100% in the case of Southern Districts

**Environmental Promotion Infrastructure Subsidy**
- Subsidy of INR 30 lakhs or 25% of Capital cost whichever is less
- Apart from the above, Industries adopting Zero Effluent or Waste Water Discharge, Clean Development Mechanism and Emissions Trading Mechanism will be given a higher amount of subsidy

**Electricity tax exemption**
- Period of exemption depends upon the quantum of investment and the employment criteria prescribed
Incentives for Industrial Promotion in Southern Districts

- Higher fiscal benefits
- SIPCOT will allot lands at 50% of the cost in its existing and new industrial parks
- SIPCOT will acquire & allot Land for new ventures if SIPCOT Industrial parks are not available
- 50% exemption from Stamp Duty for land privately purchased by investors;
  100% exemption in case of units in SIPCOT Industrial Parks
- 25% additional back ended capital subsidy; linked to investment and employment in the case of industries located outside SIPCOT Industrial Parks

Investment Promotion Facilitators - Key Contacts

Principal Secretary to Government, Energy Department
Secretariat, Chennai - 600009
Phone: 91-44-25671496
Website: www.tneb.in

TN Industrial Guidance and Export Promotion Bureau
19-A, Rukmini Lakshmipathy Road,
Egmore, Chennai-600 008
Phone: 91-44-2855 3118
Website: www.investingintamilnadu.com

Tamil Nadu Industrial Development Corporation Limited (TIDCO)
19-A, Rukmini Lakshmipathy Road,
Egmore, Chennai-600 008
Phone: 91-44-2855 4421
E-mail: cmd.tifco@nic.in
Website: www.tifco.com

Tamil Nadu Energy Development Agency (TEDA)
E.V.K Sampath Maaligai, 5th floor,
No.68, College Road, Nungambakkam,
Chennai-600 006
Phone: 91-44-28224830, 28236592
E-mail: info@teda.in
Website: www.teda.in

State Industries Promotion Corporation of Tamil Nadu (SIPCOT)
19-A, Rukmini Lakshmipathy Road,
Egmore, Chennai-600 008
Phone: 91-44-2855 4787
E-mail: sipcot@md3.vsnl.net.in
Website: www.sipcot.com

Tamil Nadu Urban Infrastructure Financial Services Ltd.
19, T P Scheme Road,
Raja Muthaipuram, Ramakrishna Nagar,
R A Puram Chennai – 600 028
Phone: 91-44-24643103
E-mail: md@tnuifsl.com
Website: www.tnuifsl.com

Tamil Nadu Industrial Investment Corporation Limited (TIIC)
New no: 692, Anna Salai, Nandanam,
Chennai-600 035
Phone: 91-44-2433 1203
Fax: 91-44-2434 7209
E-mail: ho@tiic.in
Website: www.tiic.org