Natural Group

Driving Green Value

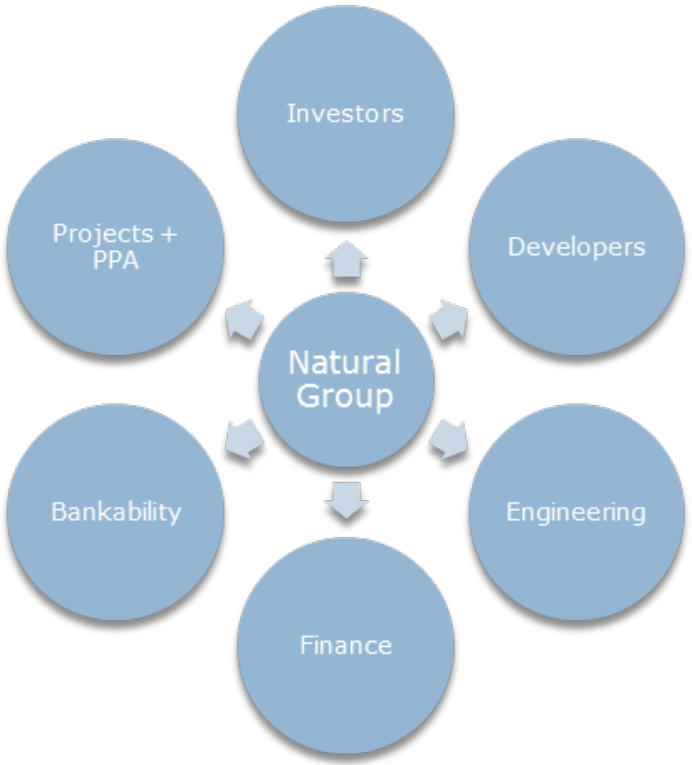
SOLARTECH - 22ND AND 23RD JULY, 2014

About Us - Introduction

Vision Mission & Values

A Safer, Better and Healthier Planet
Delivering Green Value
Innovative, Sustainable, Enhanced

- India focused Renewable Energy Advisory
- Rooftop PPA and Biomass Energy Plantations
- NG sustainable value added business models - Solar, Biomass
- Concept to Commissioning – Advisory, Consulting, Project Management, PPA Sourcing / Structuring, EPC, Finance….
- Largest India focused renewable and solar energy forums on LinkedIn
  - Renewable Energy and Cleantech – India
  - Solar Energy Professionals – India
- Published across varied global Industry leading journals, websites and magazines – Energy Next, Solar Business Focus, Renewable Energy Magazine, Infraline…….
- www.natgrp.org - most read blog on Solar and Renewable Energy in India

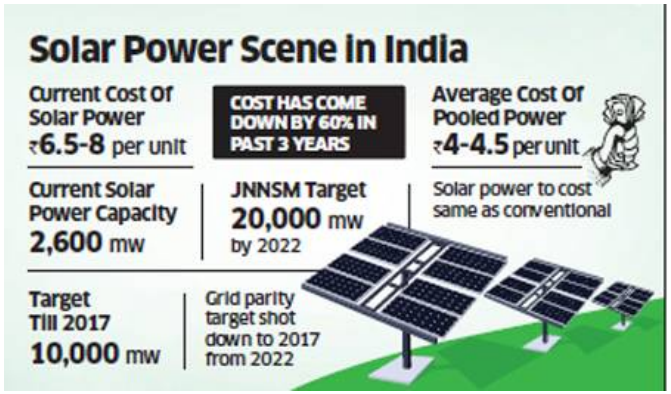


About Us - Services

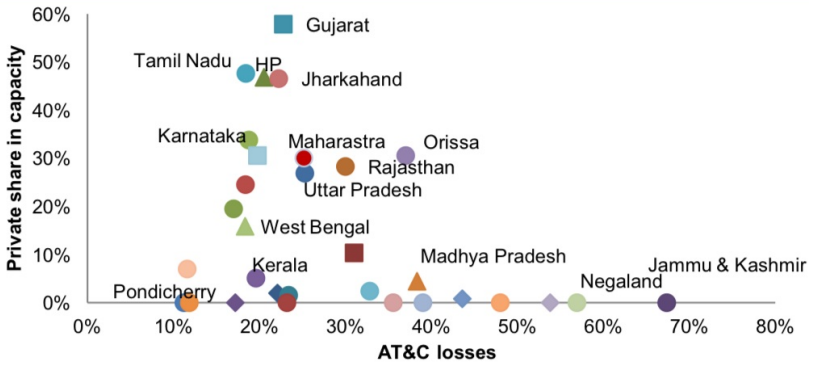
Investors / Developers	Finance / Bankability	Project	Engineering
✓ Buyouts / M&A's for Solar Project PPA holders ✓ Renewable Energy Entry Assistance ✓ Qualified, lucrative projects for Hassle free investing ✓ Bankable PPA's ✓ Innovative & highly profitable business models ✓ Fund Raising	✓ Structured Financing ✓ Optimization of Return on Equity ✓ Securitization of CDM Revenues ✓ Improved Cash flows ✓ Power Generation Insurance ✓ Advances against & Insurance of CDM revenues ✓ PPA Provisioning	✓ Land Bank Assistance ✓ Ready Land and Power Evacuation ✓ Improved Project IRR's ✓ *Off Balance Sheet funding ✓ Enhanced Funding Options ✓ Project Management ✓ Energy Plantation Management	✓ Technology & EPC selection ✓ Quality Management ✓ Value Structuring ✓ Reduced Costs Engineering ✓ Concept to Commissioning ✓ Owners Engineer ✓ Lenders Engineer

India - Energy Today

- Huge Gap between Generation and Consumption with high AT&C Losses
- Power tariffs held at artificial low, with a widening gap and not in line with actual costs, due to subsidies and freebies
- Grid availability poor across most states and infrastructure in need of upgrade
- Industry plagued by unreliable power and high costs of running Diesel Gensets
- Yearly National AT&C losses at 75,000 Crores and mounting
- Discoms still resorting to Load Shedding
- Grid too expensive for low density locations coupled with growing rural needs and lifestyle
- Poor Discom infrastructure and health unable to support the growing needs of the country
- RECs future is hazy without enforcement and 2nd Amendment has no value
- Rooftop Subsidies – No MNRE disbursements since Feb 2013, No State Clarity
- Solar accounts for Barely 1% of all Electricity Generation



• **AT&C losses & private investment in states**



work based on CEA, 2012a and PIB, 2011.

Electric Power	Value	Date reported
Total installed capacity (GW)	209.27	October 2012
Available base load supply (MU)	893371	October 2012
Available peak load supply (GW)	125.23	October 2012
Demand base load (MU)	985317	October 2012
Demand peak load (GW)	140.09	October 2012

Current Power Scenario

Installed Capacity as on	Thermal (in MW)				Nuclear (in MW)	Renewable (in MW)			Total (in MW)	% Growth (on yearly basis)
	Coal	Gas	Diesel	Sub-Total Thermal		Hydel	Other Renewable	Sub-Total Renewable		
31-Mar-1997	54,154	6,562	294	61,010	2,225	21,658	902	22,560	85,795	4.94%
31-Mar-2002	62,131	11,163	1,135	74,429	2,720	26,269	1,628	27,897	105,046	4.49%
31-Mar-2007	71,121	13,692	1,202	86,015	3,900	34,654	7,760	42,414	132,329	5.19%
31-Mar-2012	112,022	18,381	1,200	131,603	4,780	38,990	24,503	63,493	199,877	9.00%
30-June-2014	148,478	22,608	1,200	172,286	4,780	40,730	31,692	72,422	249,488	10.35%

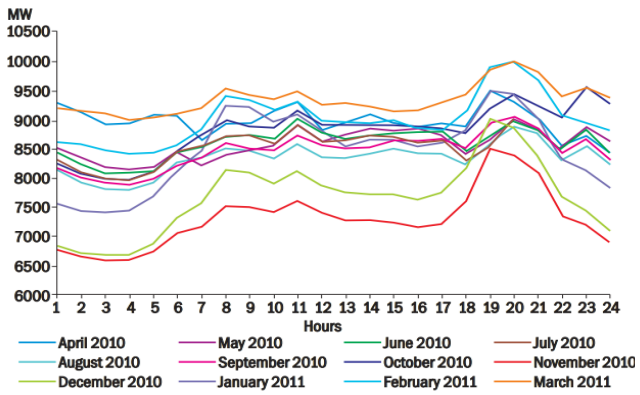
Source: CEA

Conventional vs Renewable

Conventional Power Sources vs Renewable Power Sources - India by Ritesh Pothan				
S.no	Feature	Conventional (Coal, Nuclear, Gas, Fossil Fuel.....)	Renewables (Solar - PV & CSP, Wind, Biomass, Geothermal, Hydro, Waste to Energy, Tidal....)	Advantage
1	Capacities	Megawatts to Gigawatts	Watts to GigaWatts	Conventional
2	24 Hour Power	Yes	Yes (Biomass, Solar CSP, Hydro (Issues during Summers), Waste to Energy, Tidal, Geothermal)	Conventional
3	Raw Material Availability	High (Causes Major Damage to Ecology)	High (All locally available) - Sun, Wind,	Renewables
4	Time to Install	3 Years to 10+ Years	1 Day to 5+ years	Renewables
5	Average Levelized Cost Of Energy	Rs. 2 - Rs. 6 (Variation on Power Exchanges not considered)	Rs. 2 (Hydro) - Rs. 10 (CSP)	Conventional
6	Type of location favourable	Dense Metros	Spaced out Metros, Towns, Villages,	Varies by population density
7	Financing	Established Model	Difficult on Non-Recourse Basis	Conventional
8	Plant Life	20-50 years	20-50 years but uses a local supply chain causing reduced GHG	Renewables
9	Supply Chain Requirements	Yes, extensive, in some cases International	No, Only Biomass and that too local	Renewables
10	Investment	Heavy - $ Millions to $ Billions	Light to Heavy - ($ 100 to $ Billions)	Renewables
11	Transmission Investments	Heavy	Minor to Major (Based on Size)	Renewables
12	Transmission Types	National and State Grid Infrastructure	Micro, Mini Grids to National, State Infrastructure	Renewables
13	Transmission Losses	High	Low for localized and Medium for large sizes	Renewables
14	Eco Friendly	No (Major Cause of Global Warming)	Yes	Renewables
15	Pollution	High	Low for Biomass to Non-Existent for the rest	Renewables
16	Local Distributed Power Supply	Rare	Yes (Biomass, Solar CSP, Hydro (Issues during Summers), Waste to Energy, Tidal, Geothermal)	Renewables
17	Distributed Grid Capability	No	Yes, excellent to reduce peak time usage	Renewables
18	Energy Security from DISCOM	No	Yes, excellent for daytime power cuts and night with storage options	Renewables
19	Rooftop	No	Yes, excellent for daytime power cuts	Renewables
20	Net Metering	No	Yes	Renewables
21	Local Ecology Impact	Hazardous	Minor for all except for Large Hydro	Renewables
22	Job Creation	Low	High	Renewables
23	Entrepreneur Friendly	No, only favours established business	Yes	Renewables
24	Corporate Social Responsibility	Not commensurate with degradation and GHG levels	Easy Compliance	Renewables

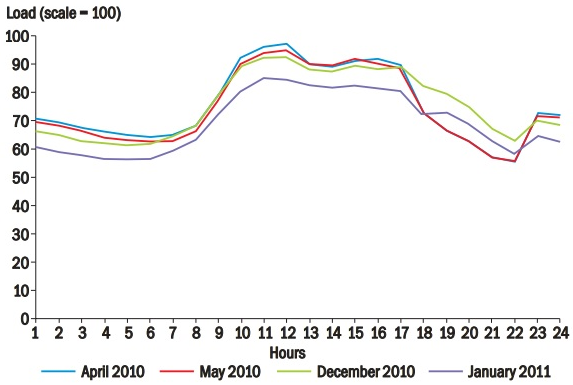
The Need for Solar - TN (As an example)

Monthly average load curves for FY 2010-11



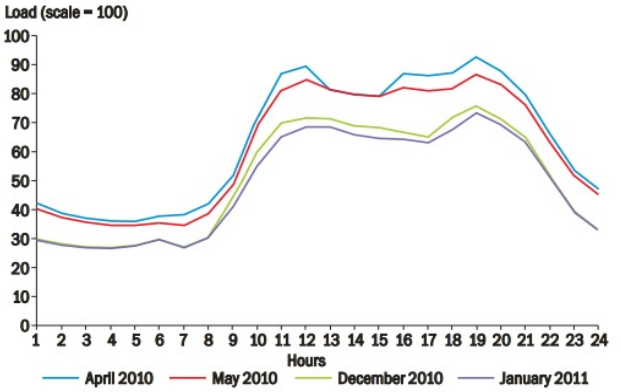
Source: TERI analysis

Pattern of load demand for industrial category



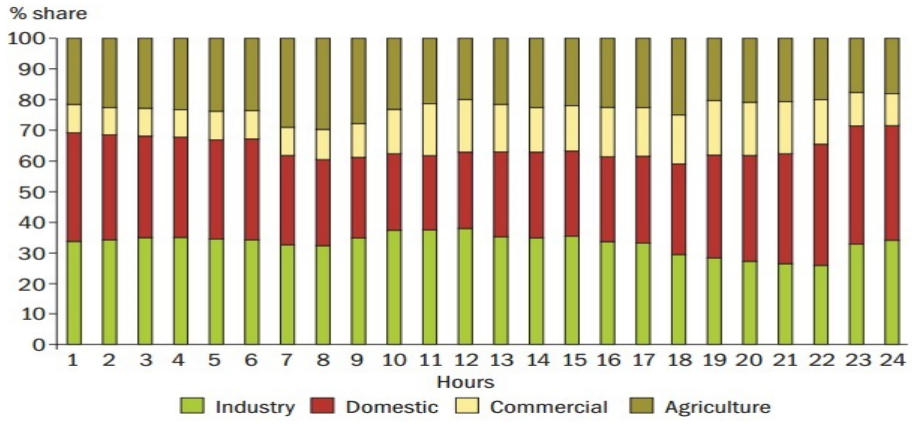
Source: TERI analysis

Pattern of load demand for commercial category



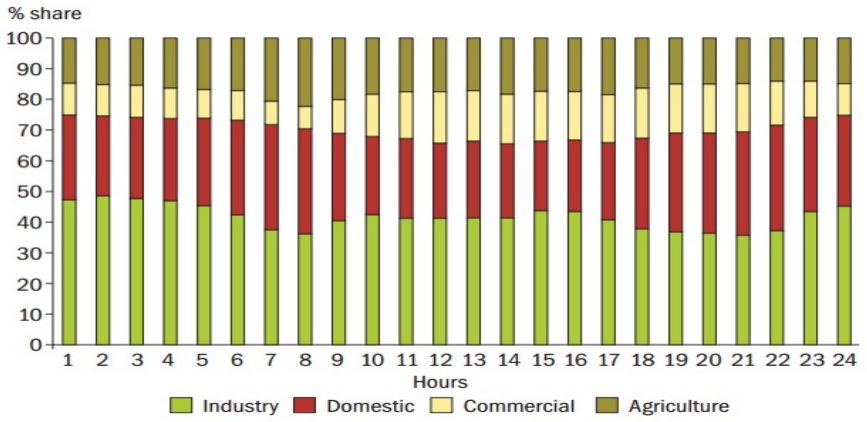
Source: TERI analysis

Indicative share of different consumer categories on aggregated hourly demand for summer months (Average of April and May 2010)



Source: TERI analysis

Indicative share of different consumer categories on aggregated hourly demand for winter months (Average of December 2010 and January 2011)



Source: TERI analysis

Solar Policy

- Focus has to be on Distributed Generation <500KWp
- Incentivise efficiency for Discom and State
- Introduce a layered FIT across States bands could be 5KWp, 50 KWp, 300KWp
- Make Net Metering Mandatory for States
- Apply Net metering units towards RPO, REC
- Discoms that do not apply Net Metering don't qualify for central assistance
- Provide low interest loans 5-8% to solar consumers upto 5 KW only
- Provide higher subsidy 70% to Agri Consumers especially water pumps
- Reduce remote locations dependence on the grid
- Timely distribution of Solar Subsidy
- Clean coal fund dedicated to renewables only
- Subsidy payments on time
- Diversify large installations with none above 2MW in a certain radius to reduce losses

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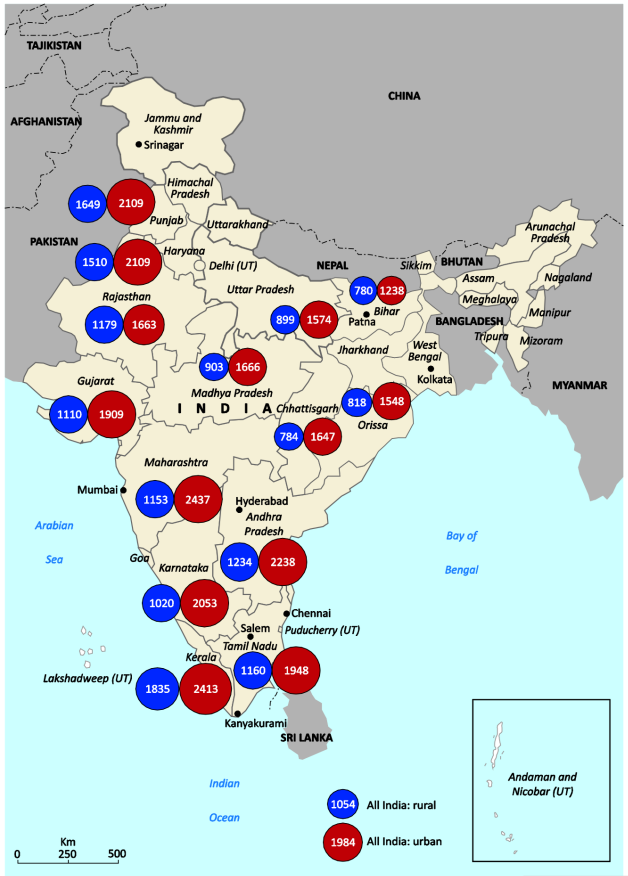
Figure 2 • Average monthly per-capita expenditure: major states (INR)



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Source: created by the author based on MOSPI, 2011.

Solar – Possible PPA Structure's

Type	On Grid / Open Access	Commercial / Industrial	Residential / Habitat	Off Grid / Mini Grid
Size	1MWp+	50KWp - 1MWp	0.3 – 5 KWp	5-50 KWp
PPA	Rs. 6.48 + escalation to 10th	<Rs. 7 + Grid based escalation	Net Metering / FIT Rs. 6 +	Dist. Access ~Rs.8 - 14
Tenure	20+ Yrs	15+ Yrs	10+ Yrs / Variable	Monthly / Yearly / Variable
Escalation	Fixed	Discom, APPC	Discom	Fixed
Incentive	AD / REC	AD / REC / Subsidy	Capital + Interest Subsidy	Capital + Interest Subsidy
Probability	High – 2000 MW	High – 500MW	Low – 50 MW	Medium – 5 MW
Backup	Hydro, Grid	Grid, DG Sync,	Battery, Grid	Battery
Audience	Factory, IT Parks, SEZs, Industries, State Discom	Colleges, Education Institutes, Malls, Factories, Commercial Buildings,	Residential, Small Shops, Small Scale Industries, Offices	Telecom Tower, Villages,

Residential and Off-grid

- Residential / Agricultural capital costs subsidized up to 70% of the cost especially for solar pumps
- Hybrid, Smart grids and normalisation in a cluster
- Delivery system to be privatized
- Private prepaid style delivery i.e. Simpa
- Mix of technology and delivery
- Government funding for such private programs (entrepreneurs)
- Innovative Solar based devices with higher subsidies i.e. Solar Cookers (<Rs. 1500), Dryers, Pumps)
- No Discom expensive infra required, service providers or franchises

End State

- Energy Security
- Solar as a mainstay for the next stage of growth
- Grid losses reduced to manageable levels
- Better living conditions and stronger economy
- Lower subsidies on fossil fuel
- Lower impact of grid failures
- Higher grid availability
- Reduced load on the grid
- More efficient technologies given preference
- Increased commercial activity resulting in high standards of living
- Local employment generation
- Rural progress

Thank You

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