Natural Group

Driving Green Value

SURYACON – PUNE

4th OCT 2016

Solar for India

About Us

A Safer, Better and Healthier Planet

Delivering Green Value

Innovative, Sustainable, Enhanced

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

India - Today

- Gap between Generation and Consumption with AT&C Losses
- Power tariffs held at artificial low, with a widening gap and not in line with actual costs, due to old plants, 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
- Discoms still resorting to Load Shedding and refuse to buy power
- 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
- Rooftop Subsidies – Finally Back
- Solar accounts for 1% of all Electricity Generation
- Current installation of 6 GW

Current Power Scenario

Anticipated All India Power Supply Position for the year 2016-17

State / Region	Energy				Peak			
	Requirement	Availability	Surplus (+)/ Deficit (-)		Demand	Met	Surplus (+)/ Deficit (-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Northern	357,459	351,009	-6,450	-1.8	55,800	54,900	-900	-1.6
Western	379,087	405,370	26,283	6.9	51,436	56,715	5,279	10.3
Southern	310,564	320,944	10,381	3.3	44,604	40,145	-4,459	-10.0
Eastern	151,336	135,713	-15,622	-10.3	21,387	22,440	1,053	4.9
North-Eastern	16,197	14,858	-1,339	-8.3	2,801	2,695	-106	-3.8
All India	1,214,642	1,227,895	13,252	1.1	165,253	169,503	4,250	2.6

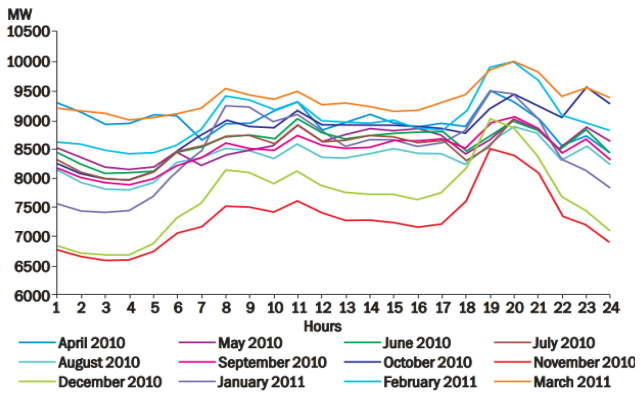
Source: CEA

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

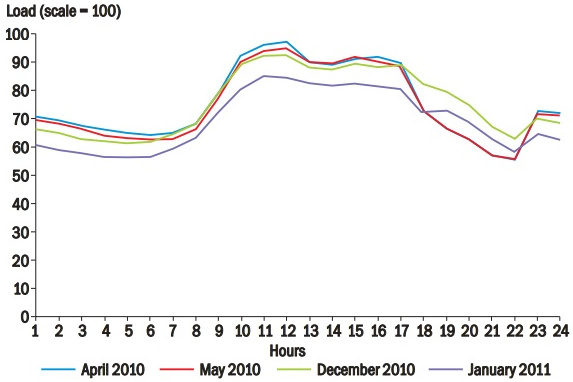
The Need for Solar

Monthly average load curves for FY 2010-11



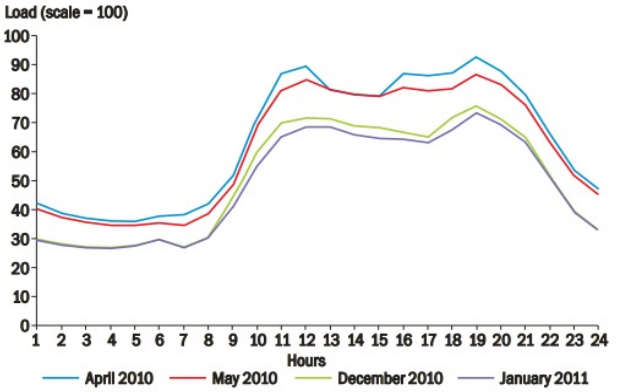
Source: TERI analysis

Pattern of load demand for industrial category



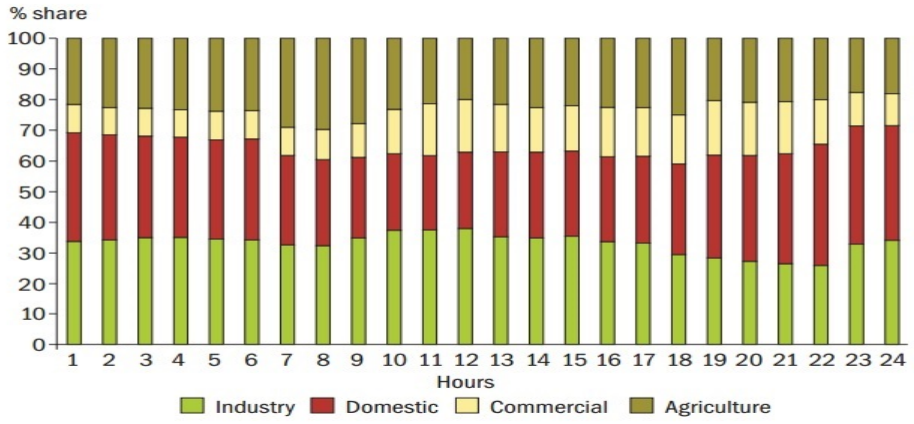
Source: TERI analysis

Pattern of load demand for commercial category



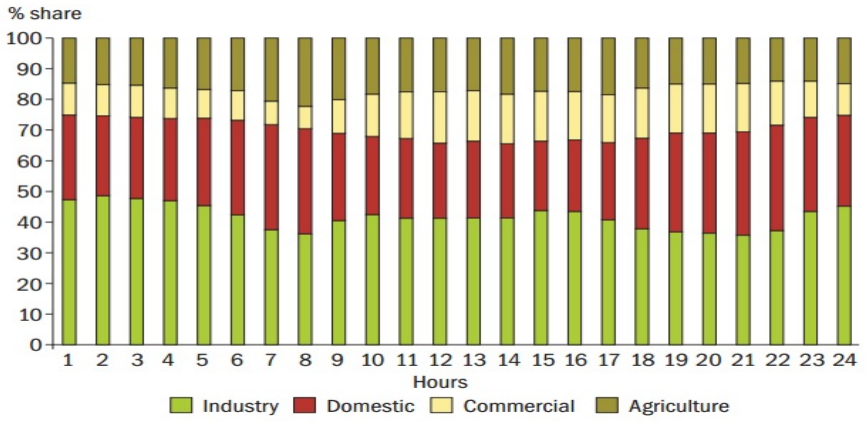
Source: TERI analysis

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



Source: TERI analysis

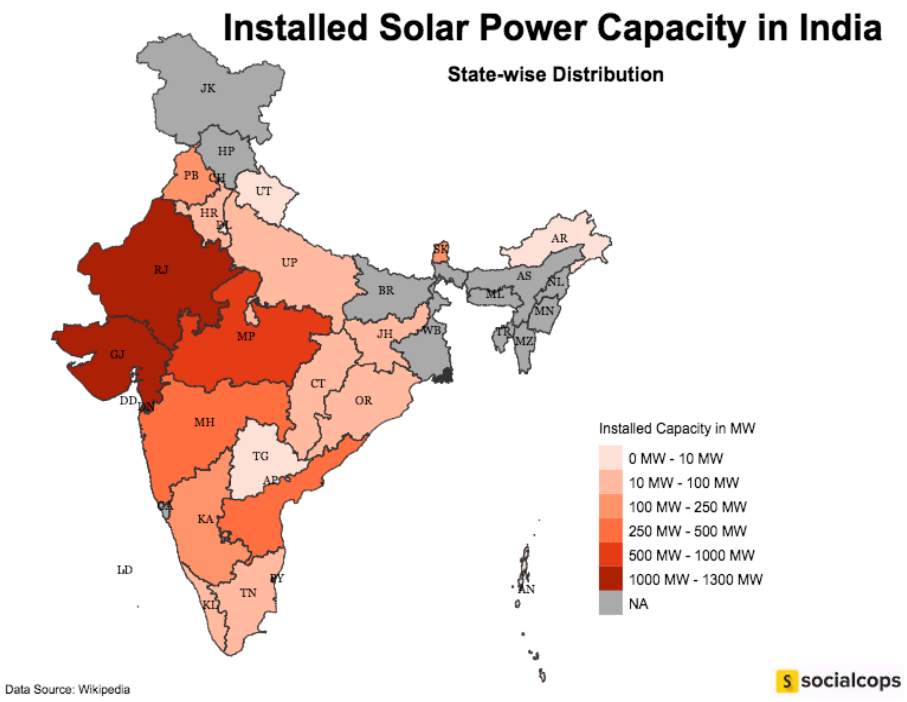
Indicative share of different consumer categories on aggregated hourly demand for winter months (Average of December 2010 and January 2011)



Source: TERI analysis

Solar – Capacity

Growth of Solar Power in India			
State	MW as of 31-Mar-2015	MW as of 31-Mar-2016	MW as of 31-July-2016
Rajasthan	942.10	1,269.93	1,294.60
Tamil Nadu	142.58	1,061.82	1,267.41
Gujarat	1,000.05	1,119.17	1,123.36
Andhra Pradesh	137.85	572.97	935.80
Telangana	167.05	527.84	845.84
Madhya Pradesh	558.58	776.37	790.37
Punjab	185.27	405.06	520.70
Maharashtra	360.75	385.76	385.76
Karnataka	77.22	145.46	238.32
Uttar Pradesh	71.26	143.50	143.50
Chhattisgarh	7.60	93.58	123.78
Odisha	31.76	66.92	66.92
Uttarakhand	5.00	41.15	41.15



Quasi Open Access States

- Maharashtra
- Gujarat

Solar – The Future

- Energy Storage
- Distributed Local Generation
- Base Load Replacement Solutions
- Solar Irrigation
- Improved Grid Efficiency
- Household Generation
- Grid Independence

Contact

Thank You

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