

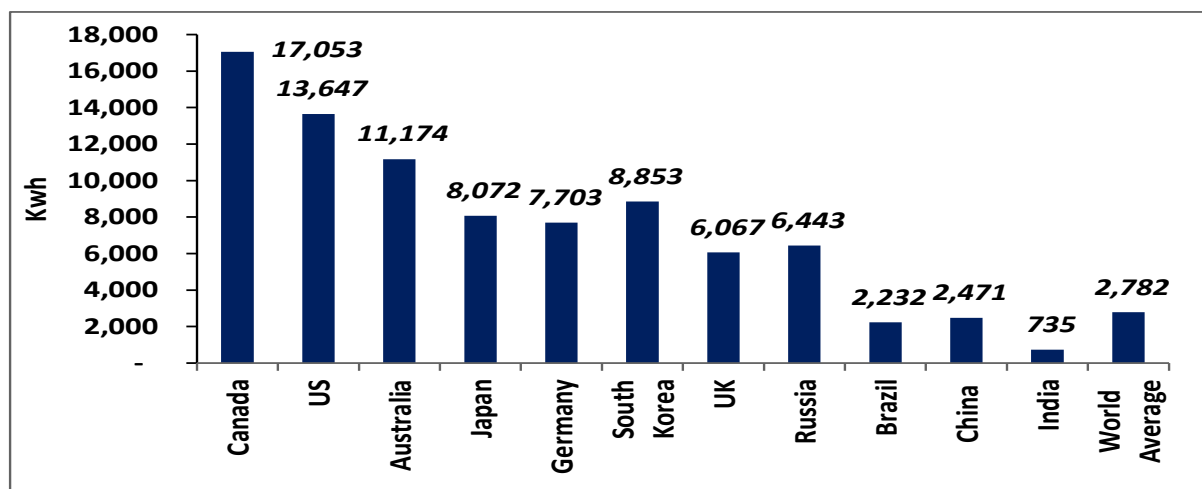
Demand robust, but fuel supply issues mar outlook

Power demand kept artificially low by excessive load shedding

Historically, Indian generation capacity addition was only 40-50% v/s target set in the five year plans except for the ongoing 11th plan (2007-12) due to 1) lack of enough power equipment players i.e. inadequate BTG and BoP capacity 2) delay in land acquisition and 3) environmental and forest clearances delays.

India remained power starved, however, the demand remained extremely price sensitive due to 1) Single buyer-multi seller model which kept expensive fuel options out of use as ailing SEBs are the only buyers of electricity and 2) huge Aggregate Technical and Commercial (AT&C) losses coupled with free or grossly subsidized rates of electricity to agriculture and residential consumers kept these options out of reach from most of the IPPs despite very low per capita electricity consumption. Consequently, India lags behind most of the developing countries in case of per capita electricity consumption as shown in the following graph.

Per Capita electricity consumption (2009)



Source: CEA, CARE Research

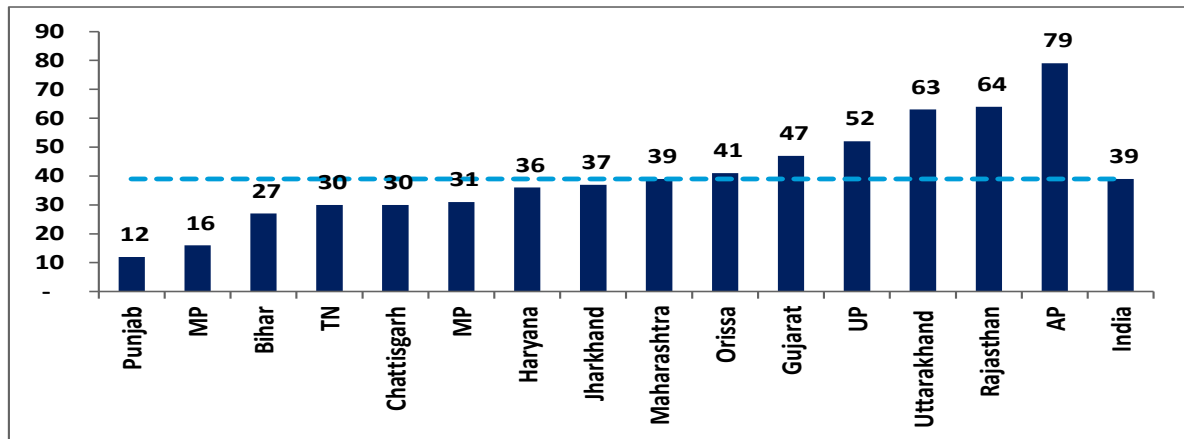
Indian per capita electricity consumption grew only at 4.7% CAGR over the last six years mirroring the capacity addition in the country. However, compared to most of developed or even other developing countries, India's per capita consumption is very less. India's electricity demand is grossly under reported owing to 1) inadequate connectivity (only 39% villages connected as of FY11, with just 10% households connected) 2) 2-18 hours of power cuts especially in summer by SEBs deflating the actual demand and 3) latent demand suppressed due to poor quality and reliability of power.

Ailing SEBs stifled demand growth...just 39% of villages are electrified

The Rajeev Gandhi Grameen Vidyutikaran Yojana (RGGVY) scheme was implemented from 2006, but had limited success due to last-mile implementation problems. There is also dearth of good transmission EPC players in far flung areas.

Since, most of the State distribution companies heavily cross-subsidize to their residential and agricultural consumers, their revenue model operates on Average Cost of Sale (ACS) > Average Revenue Realization (ARR) (cost>revenue) basis. Hence, it is easier to cut demand by load shedding, which in turn curbs subsidized power usage to curtail losses. State distribution companies resort to extensive load shedding which under-reports the actual demand scenario, especially for the rural and semi urban areas.

Number of villages electrified



Source: RGGVY; CARE Research

CARE Research believes that the un-met demand can be fairly estimated in the election season with no restriction on electricity supply from state distribution companies.

Coal demand supply gap is widening

Though, India is the third largest producer of coal in the world, just behind USA and China, the domestic coal sector is unable to keep pace with the growing needs of the power sector due to environmental clearance delays faced by coal miners in the last few years. The railway infrastructure too has been grossly inadequate for the requisite amount of coal transfer leading to acute coal shortages faced by most of the power plants today.

Thus, the demand supply mismatch, if not timely addressed, could cripple the power capacity addition growth going forward. The demand CAGR over FY09-12 stood at 6.6%, vis-a-vis coal production CAGR of 4.6% over the same period led to an acute coal shortage. In FY12, the coal imports are expected to reach 142MT due to faster capacity addition (being last year of the 11th plan). Though, As per Union budget 2012-13, Coal India has been directed to enter into legally binding Fuel Supply Agreements (FSAs) with power producers with project commissioned after March, 2009 or likely to come with capacity by March, 2015. However, as CIL’s domestic coal production stagnated from last three years, it is imperative it may have to import coal to fulfil coal requirements going forward.

Coal demand supply gap

Figures (MMT)	FY09	FY10	FY11	FY12E	CAGR
<i>Indegenious coal supply</i>	490	515	536	554	4.6%
<i>Demand</i>	550	597	625	696	6.6%
<i>Gap met through imports</i>	(60)	(83)	(89)	(142)	21.6%
<i>Imports as % supply</i>	-12%	-16%	-17%	-26%	

Source: Coal India; CARE Research

India is facing acute gas shortage too

The total gas-based capacity in India stood at 17.7 GW as on November 30, 2011, which represents 9.6% (v/s 22% globally) of the total 185 GW installed capacity. The main sources of gas are 1) APM gas from ONGC and OIL 2) RIL KG basin and PMT gas and 3) R-LNG. With increasing investment in the supporting infrastructure (like R-LNG terminals, gas pipelines), R-LNG is expected to become a major source of gas in the near future.

Natural gas demand supply gap

Gas supply	FY10	FY11	FY12E	FY13E	FY14E	FY15E
<i>Old sources</i>	72	70	71	72	73	73
<i>Eastern Offshore</i>	40	50	41	43	46	61
<i>Western Offshore</i>	14	13	16	13	13	12
<i>LNG and CBM</i>	33	40	52	59	76	89
Total Gas supply	159	173	180	187	208	235
Demand for natural gas (M	FY10	FY11	FY12E	FY13E	FY14E	FY15E
Power	66	87	87	115	118	118
Fertilizer	43	57	58	59	60	62
City Gas	11	13	14	16	19	22
Petchem Refinery	24	14	14	14	14	18
Others	4	63	65	68	71	72
Total demand	147	234	238	272	282	292
Gap (MMSCMD)	12	(61)	(58)	(85)	(74)	(57)

Source: GAIL, MoPNG, PLNG and CARE Research

In the coming decade, Indian gas demand would be dependent greatly on the long term LNG supply, as the domestic gas sources mainly from ONGC and OIL are depleting. The RIL's KG basin gas production has also dropped to ~35-36 MMSCMD levels from 45-46 MMSCMD last year. Further, going forward, RIL's KG basin supply is expected to remain constrained due to insufficient infrastructure for increasing gas production beyond current levels. As a result, the ramp up to 60 MMSCMD is expected take at least 2-3 years.

The power sector remains a major consumer with 45% of the total gas demand and is estimated to reduce its share to 40% by FY15E on back of R-LNG imports rising sharply due to slump in domestic natural gas. Thus, according to GAIL, natural gas demand-supply gap is estimated to increase sharply to ~57 MMSCMD by 2015E led by rising demand from Power and City Gas Distribution (CGD) sectors.

Can R-LNG pricing be competitive?

With limited supply and significant time taken to develop new domestic gas fields, R-LNG is the only reliable and large source of gas supply for India. However, the spot R-LNG pricing

ranges between \$13-15/mmBtu, while the long term R-LNG is priced at \$6.5-8.0/mmBtu. Thus, R-LNG can become a competitive fuel vis-a-vis imported coal especially in the current scenario, where countries like Indonesia and Australia have revised their domestic coal prices closer to international coal prices.

Natural gas and R-LNG blending (in a ratio 3:1) can be competitive vis-a-vis imported coal and can be utilized to supply power especially to peaking power loads. Presently, approximately 8 GW gas based capacity is stranded for want of gas. The exhibit below shows a sensitivity analysis of cost of supply using various fuels:

Sensitivity of fuel mixes and PLFs

	Price (US \$/Mmbtu)			Price (US \$/Mmbtu)		
	Domestic Supply @ 5	Term LNG @8	Spot LNG @13	Domestic linkage	50:50-linkage+E-auction	Imported spot coal
50	3.4	4.9	6.9	3.2	3.9	5.2
60	3.1	4.6	6.7	2.8	3.4	4.8
70	2.9	4.3	6.4	2.4	3.1	4.3
80	2.7	4.0	6.0	2.2	2.9	4.1

Assumptions: 15.5% RoE, Capital Cost= Rs40 mn for Gas and Rs 50 mn/ MW for Coal; US \$=Rs50;
Domestic Coal GCV=3600 Kcal/kg; Imported Coal GCV=5500kcal/kg

Source: CARE Research

Given the cost structure, R-LNG cost clearly lies on the higher side, however, effective gas pooling and reasonably priced long term gas contracts can be the key to increase R-LNG usage for power plants, which can be compared to expensive spot imported coal (since now the imported coal prices are revised upwards by 150-160% to US \$110/tonne over the last year prices closer to spot coal prices).

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