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## Can we do without nuclear power in India? - Shankar Sharma, Power Policy Analyst (Part 3)

### Efficiency of power sector in India

It is a well known fact that the overall efficiency of the power sector in the country is one of the lowest in the world. T&D losses alone are reported to be about 25% against international best practice of 5%. A quick look at the efficiency levels within the power sector in India can reveal that there is a huge scope for generating virtual additional power to the extent of 40% to 50% of what is being produced now.

### Power Sector Efficiency in India

Power Sector Area	Prevailing level of efficiency / loss in India	Potential for improvement/savings (percentage of total annual energy)
Generating capacity utilisation	50 - 60%	5-10 %
Aggregate Technical & Commercial losses (AT&C)	35 - 40 %	15 -20%
End use efficiency in agriculture	45 - 50 %	15-20%
End use efficiency in industries and commerce	50 - 60 %	5 -10 %
End use efficiency in other areas (domestic, street lights and others)	40 - 50 %	5 -10 %
Demand Side Management	Potential to reduce the effective demand by more than 20%	

(Source: Author's estimation based on IEP, National Electricity Policy, Annual reports of CEA, and many other reports/article on Indian Power Sector)

Efficiency increase in the end use of electricity alone, whether in lighting, heating or motive power etc. is estimated to provide more than 20% of virtual additional power capacity at about 25% of the cost of new nuclear power plant without any of the attendant risks. Improving the overall efficiency of the power sector to international best practices alone can provide virtual additional power, which can be more than the planned nuclear power capacity by 2032. The real need for additional nuclear power capacity should be objectively considered in this context.

### Costs and Benefits Analysis (CBA) and alternatives

It is an accepted practice worldwide to deploy the CBA in order to determine the most suitable option in any project which can provide maximum benefits at least cost to the society. In the case of nuclear power technology in India such a CBA would reveal that there are many much benign options to meet the electricity demand of our masses. Just to cite one example, the capital cost estimated for the proposed Jaitapura Nuclear power project in Maharashtra is estimated to be about Rs. 20 Crores per MW, whereas the capital cost for a coal based or dam based hydel project is reported to be in the range of Rs. 7 to 10 crores per MW.

The issues, which have been raised in a number of papers released within the country on the economics of nuclear industry, need to be fully appreciated and addressed. Various research papers have found that the real cost of a modern nuclear power station is clearly higher than that of a comparable size coal based power station. If we also take into objective account the long term storage costs and all the associated environmental and health costs, the nuclear power projects will be much costlier than the coal based power projects. (contd on Page 2)

The life cycle cost of nuclear power including that of nuclear fuel mining, transportation, processing, decommissioning of reactors, and safeguarding nuclear wastes for hundreds of years (though not quantified so far), is projected to be many times more than that of other power generation technologies. Very sadly, these costs are not being accounted for in determining the cost of nuclear power to our society. The direct and indirect costs to our densely populated and ill-prepared country in the unfortunate event of an accident such as the ones in Chernobyl and Fukushima can be horrendous. One major accident alone can negate all the electricity benefits from all the nuclear power plants in the country since independence.

An essential part of the CBA is the objective consideration of all feasible alternatives for a given project. If we consider the Jaitapura Nuclear power project in this context one can clearly see many credible alternatives to obtain the equivalent of net power/energy from that project. The net average output from the plant in a year can be expected to be about 6,300 MW of peak power & about 44,000 MU annual energy (assuming 80% PLF, 10% auxiliary consumption and about 25% T&D losses in the Western Region). Credible alternatives look highly attractive. T&D loss reduction from 25% to 5% in Western Region alone can yield about 6,400 MW & 47,000 MU (demand met was 32,100 MW and 233,000 MU in 2009-10 as per CEA). Using CFLs/LEDs in place of incandescent lamps and loss reduction techniques in IP sets within Western Region can yield about 6,400 MW and 47,000 MU of annual energy.

PLF improvement in thermal power plants and loss reduction in domestic and commercial applications can yield about 6,300 MW and correspondingly high annual energy. It should be noted that the capital cost of these alternative measures is much lower than that of the proposed nuclear power plant, and the operational costs are negligible. As per Bureau of Energy Efficiency (BEE) at the prevailing cost of additional energy generation, it costs a unit of energy about one fourth the cost to save than to produce it with new capacity. Additionally, the social and environmental costs of these efficiency improvement measures will be negligible as compared to the costs of a nuclear power plant. (contd)

## TN Electricity News

### TN Energy Policy Note 2014-15— Finance of Electricity Sector (Extract)

As per the Financial Restructuring Plan approved by Government of Tamil Nadu, 50% of the short term liabilities of TANGEDCO are to be taken over by the State Government. Towards this, Bonds to the extent of Rs 6,353.49 crores have been issued to the commercial banks. The repayment of principal and interest of Bonds is being borne by Government of Tamil Nadu. The interest to the tune of Rs 578 crores per annum is being released by Government of Tamil Nadu directly to the commercial banks.

The tariff subsidy of Rs 4,917.99 crores relating to the financial year 2013-14 has been released by Government of Tamil Nadu. The Government of Tamil Nadu has also provided Equity Share Capital assistance of Rs 2,153 crores during 2013-14. The Government of Tamil Nadu has also released loan assistance of Rs 962 crores under Financial Restructuring Plan. Further, the Government of Tamil Nadu has provided Government Guarantee to an extent of Rs 12,185 crores for mobilizing funds during 2013-14. For the current financial year 2014-15, the Government of Tamil Nadu has provided the following financial assistance of Rs 10,575 crores in the Budget Estimate 2014-15.

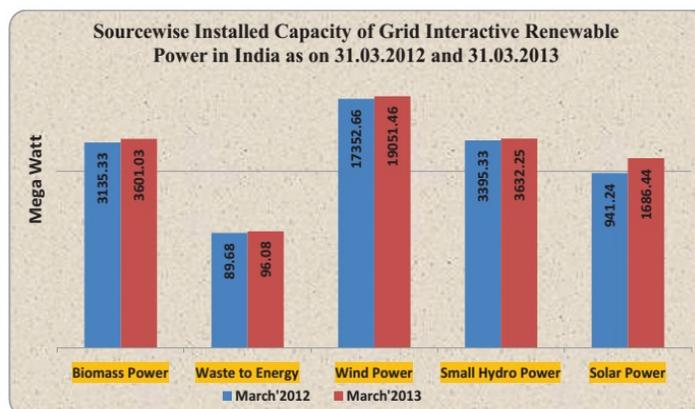
Sl.No.	Financial assistance	Amount (Rs. in crores)
1	Equity Share Capital Assistance	2,050
2	Tariff Subsidy	5,400
3	Loans under FRP	1,000
4	Taking over of Bonds of TANGEDCO	2,000
5	Hydel Swing Subsidy	125

## India Electricity News

### Grid Interactive Renewable Power—Energy Statistics 2014

Out of the total installed generation capacity of renewable power as on 31-03-2013, Wind power accounted for about 67.88%, followed by small hydro power (12.94%) and Biomass power (12.83%). Tamil Nadu had the highest installed capacity of grid connected renewable power (7849.09 MW) followed by Maharashtra (4188.40 MW) and Gujarat (4078.58 MW), mainly on account of wind power.

As on 31.03.2013 out of total number of Biogas plants installed (46.69 lakh) (Table 2.6), maximum number of plants installed were in Maharashtra 8.43lakh) followed by Andhra Pradesh, Karnataka, Uttar Pradesh and Gujarat each with more than 4 lakh biogas plants.



## Strong competition as a reform (Part 2)

The cornerstone of the Act's design of a liberal electricity market for India—an "open access" regime which allows consumers the freedom to choose their distributors—remains a non-reality. This is primarily because the regulatory institutions implementing the law have been hijacked by extraneous political or socialist agendas, including rampant misuse of the provisions of the Act by state governments to thwart competition and manipulate the market for supply of power. Directions issued by the Central Electricity Regulatory Commission (CERC) to discipline such errant behaviour have been largely ignored. Further, in spite of India's tariff policy providing for competitive procurement of electricity, pricing remains heavily politicized. In the last 10 years, power tariffs have increased by 65% while the cost of generating power went up by 300%. Routinely, political parties have used the power sector as a populist football. Regulating for lower electricity tariffs, causing substantial losses to both state-owned and private electricity companies and forcing mere token private investment in the sector are normal.

There is no silver pill for the malaise and the government should quickly realize that a mere forward-looking, pro-competitive law—as envisaged under the Act—is not sufficient for market reforms unless such policy is implemented within a regulatory framework that favours competition unimpaired by bureaucratic politics and political red-tapism. Expectedly, the electricity sectors of states with governments having a pro-growth focus have fared better. A 2013 report of the international financial accounting firm Deloitte shows that states which made most progress in implementing the reforms under the Act are Rajasthan, Maharashtra, Madhya Pradesh, Gujarat and Punjab. Not surprisingly these states also are among the highest economic achievers in India.

One of the first promises made by the new Union power minister Piyush Goyal was to study the governance practices of the efficiently and commercially run electricity industry of Gujarat and replicate that in the entire country. But with India's electricity regulation being largely left to the states how will the Modi government undertake such reform efforts? The need of the hour is to adopt an institutional framework which will help the government harmonize decision-making for India's electricity sector such that the Union government's pro-growth policies translate into ensuring a seamless, free, electricity market with minimal political or regulatory risk for investors.

The government can create a platform for co-operation of India's electricity regulators on the lines of the European Agency for the Cooperation of Energy Regulators to harmonize decision-making in the sector. The agency could be designed as a peer-to-peer body consisting of various decision-makers in the electricity value chain including members of Central Electricity Authority (CEA), CERCs and various other state electricity regulatory bodies under the leadership of the power minister. It could help align the regulatory agendas of India's Union and state electricity regulators to the reform goals of the Union government. The body could also enhance regulatory synergy and better implement the pro-growth reforms envisaged under the Act, with powers to guide and discipline the various actors when they deviate from a market led investment friendly agenda.

The role of institutions goes beyond the legal framework. Government attitudes toward markets and the efficiency of its operations are equally important. Such an institutional framework will enforce an "arms-length" approach to electricity regulation, replacing the current political or corporatist regulatory approaches adopted by various state electricity regulators besides providing a level playing field for public and private electricity companies. ([Live Mint](#), Aug 24, 2104)

## Consumer Corner

### Electricity Consumers - Rights Statement ([Maharashtra Distribution Company—MAHADISCOM](#)) (Part—5)

#### RIGHT TO RECEIVE NOTICE AND DUE PROCESS PRIOR TO DISCONNECTION AND PROCEDURE OF RECONNECTION

1. To receive minimum fifteen clear days' notice in writing before disconnection under default of payment under section 56 of the Act
2. To receive thirty days notice in writing before disconnection for failure to deposit required security amount under Section 47 of the Act.
3. To receive supply after removing cause(s) of the disconnection by the consumer and obtaining the reconnection order by paying the amounts due within a period stipulated in Standards of Performance Regulations.
4. To receive supply after removing cause(s) of the disconnection by the consumer and obtaining the reconnection order by paying the amounts due within a period stipulated in Standards of Performance Regulations.
5. Right of prior notice is not available in cases where the consumer's installation poses a danger to the health or safety of other consumers or electricity supplier's employees or the public, and in cases where the consumer is indulging in theft or unauthorized use of electricity.

#### STANDARDS OF PERFORMANCE OF ELECTRICITY DISTRIBUTION COMPANIES

Certain standards of performance of the electricity distribution companies are guaranteed under the Standards of Performance regulations notified by the MERC. Consumers have a right to receive service at such standards, some of which are provided below:

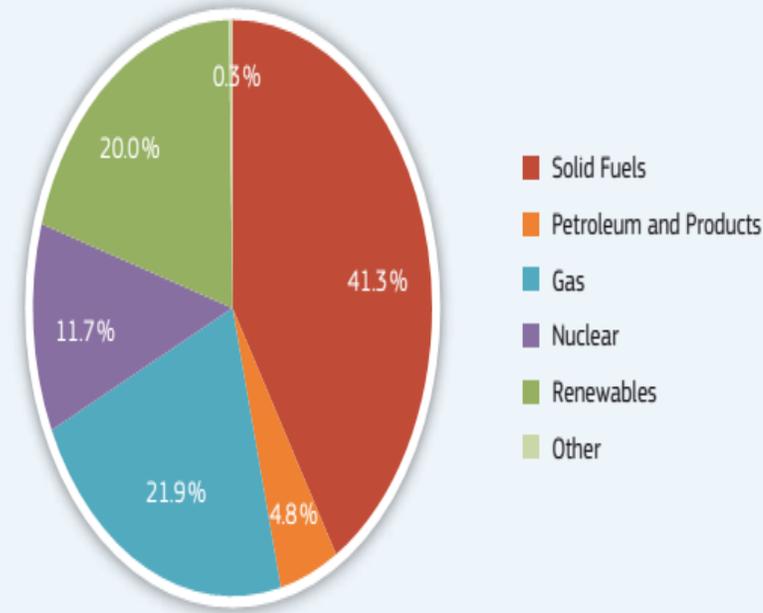
1. To receive supply at the voltage and frequency as per Standards of Performance regulations notified by the MERC at the point of supply.

## Around the World

### EU Energy—2014 (DG-Energy)

#### World Electricity Generation by Fuel (%)

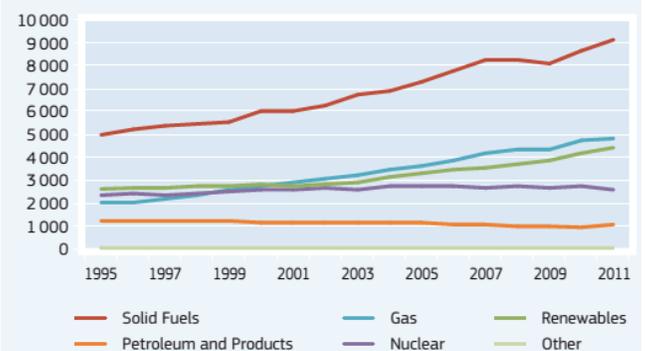
Total 2011 = 22 126 TWh



#### World Electricity Generation by Fuel

TWh	1995	2000	2005	2010	2011	2011 (%)
Solid Fuels	4 994	6 002	7 335	8 655	9 144	41.3%
Petroleum and Products	1 232	1 200	1 141	966	1 058	4.8%
Gas	2 010	2 740	3 668	4 781	4 852	21.9%
Nuclear	2 332	2 591	2 768	2 756	2 584	11.7%
Renewables	2 638	2 840	3 292	4 220	4 422	20.0%
* Hydro	2 480	2 620	2 930	3 442	3 490	15.8%
* Solar/Wind/Other	10	35	116	381	505	2.3%
* Biofuels and Waste	133	170	233	387	422	1.9%
* Geothermal	40	52	58	68	69	0.3%
Other	25	37	46	60	66	0.3%
Total	13 231	15 411	18 251	21 438	22 126	100.0%

#### World Electricity Generation by Fuel (TWh)



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#### Publications

- Maharashtra Electricity Regulatory Commission, A Report on Reliance Infrastructure Limited Distribution Business (Rinfra-D), Advice to Government of Maharashtra, 2014. click [here](#)
- DG -Energy, Employment Effects of selected scenarios from the Energy roadmap 2050, 2014. Click [here](#)

#### Latest Regulations

- MERC, Transmission Licence I of 2014 dated 14 August, 2014 : Licence granted to Tata Power Co. for Transmission of electricity. Click [here](#)
- GERC (Terms and Conditions of Intra-State Open Access) (Second Amendment) Regulations, 2014 - Gazetted Notification, 2014. click [here](#)

#### Miscellaneous

- Webinar—Climatescope 2014: Mapping the Global Frontiers for Clean Energy Investment., 13 November 2014. Click [here](#)
- 2015 MIT Energy Conference, February 27-28, 2015. click [here](#)

#### ABOUT CAG

Established in 1985, Citizen consumer and civic Action Group (CAG) is an advocacy and campaigning group that works towards protecting citizens rights in consumer and environmental issues and promotes good governance processes including transparency, accountability and participatory decision-making.