

First Draft

**PART – E**  
**ENERGY ISSUES**

## UNIT 18

### FUTURE OF ELECTRICITY INDUSTRY

*Our vision of India in 2020 is of a nation busting with energy, entrepreneurship & Innovation*

*India Vision 2020 prepared by the Planning Commission*

#### 18.1 Background <sup>1</sup>

In 1983, when India's total software exports were only \$ 12 million, who would imagine that they would multiply 500 times in 17 years and the country would be recognized around the world as a major IT Power. Probably similar is the destiny of the power sector

Economic growth the world over is driven by energy. It powers the nations industries, vehicles, homes and offices. For future growth to be both rapid and sustainable, the energy source needs to be as resource efficient as possible. Business as usual will mean that total demand of power will increase by another 3.5 times in the next two decades. This will mean that we need to strive to triple the installed generation capacity by the year 2020.

#### 18.2 Renewable energy

Reliance on renewable sources of energy will offer enormous economic, social and environmental benefits. India is already fifth largest producer of wind power. Interestingly most of the (almost 95%) investment in the wind sector is from the private sector. Renewable technologies such as solar power, Biomass, small hydro, and bio-fuels will play greater role. The greater emphasis on the alternative energy will probably reduce India's dependence on imported fuels And also helping in better environmental management. Tapping the same would require conducive national policies and programme to attract strong participation by the private player.

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<sup>1</sup> substantially borrowed from Report of the committee on India Vision 2020( Chairman Dr SP Gupta), Planning Commission. Substantially follows Shri APJ Abdul Kalams vision (President of India). Full document available at [http://planningcommission.nic.in/plans/planrel/pl\\_usn2020.pdf](http://planningcommission.nic.in/plans/planrel/pl_usn2020.pdf).

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Interestingly BHEL has manufactured zero emission electric vehicle shuttle service. This probably can be the base for future development.

### **18.3 Alternate Thinking**

With growing literacy and awareness, new possibilities of power system management will be increasingly used. Fortunately many states have started contemplating implementation of Demand side measures, Madhya Pradesh being first of them. Demand side Participation can be used with benefits to all the stakeholders. The Time of Day tariff which many regulatory commissions have accepted in principle can be taken as a preliminary step towards incentivising off peak period use of Electricity for better management of the system.

Some industries even at this preliminary stage are contemplating creation of Value Chain- From Mining of Fuel to end supply of Electricity POOL System. For example the famous words used by one of the entrepreneur are "from Well head to the Wall Socket".

### **18.4 Immediate technological Changes**

Human interface will also tremendously reduce with greater technology application and innovation. Some of the new technology which are at different stages of implementation and testing in India are-

**1.Pre Paid Meters** –Human interface can be avoided in metering , billing and collection

Availability based tariffs. Recently The West Bengal Renewable Energy Development Agency (WBREDA)<sup>2</sup> has developed a prepaid card for electricity bills .

**2.Automated Meter Reading-** This will Eliminate the possibility of human error in Power billing .The System will remove the practice of giving power bills on the basis of estimated reading when the consumers house is found lock. However the Distribution Licensee find

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<sup>2</sup> 13<sup>th</sup> March,2003 Business Standard, Kolkatta .

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the system prohibitive ,hence it has not been adopted as of now .Nevertheless this is a system which will be implemented in future.

**3.Thermo Vision Cameras<sup>3</sup>**-they can film the grids and all other installations to detect even the smallest of troubles .The infrared image from the camera highlights the areas that are relatively hot. The rise in temperature can be caused due to loose contacts and can result in breakdowns.

**4.IT Based Solutions for Power Sector<sup>4</sup>** - Broad areas of development can be-

- a. Enterprise Asset Management
- b. Control Systems and knowledge based decision systems for power plants and plant equipment.
- c. Consumer Billing
- d. Plant maintenance Management tool
- e. ERP solutions for Power Plants

**5.Automated Storage and retrieval system<sup>5</sup>** (ASRS)- The major benefits of the system are efficient use of vertical space .The design flexibility also helps in accommodating a wide range of loads and configuration of bins .Inventory management and control also becomes easier.

**6. E-Bill**-DHBVN(Dakshin Haryana Bijli Vitran Nigam ) has already introduced the System in few places. Any domestic and Non Domestic consumer could get information on the mobile service applying through SMS.

**7.SCADA-Supervisory Control and Data Acquisition**- This will help provide better and reliable supply to all consumer . Reliance Energy has already implemented this project in suburban Mumbai at 11 KV level. SCADA leads to increased system reliability, reduced interruptions in supply and enabled redeployment of manpower.

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<sup>3</sup> NDPL has provided these cameras to its engineers. March 30,2003 Business Today

<sup>4</sup> TCS and BHEL have already signed MOU to provide IT based solutions jointly

<sup>5</sup> new ASRS has been developed by Corporate Research and Development (R & D)of the BHEL

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**8. ECS Electronic Clearing System** – Modern tools for efficient management of the distribution system will probably be used increasingly by various utilities. This could lead to better consumer service.

## **18.5 Re-Segmenting of power business**

In future there can be re-segmenting of business into separate areas such as –

- retail supply,
- network operations,
- back office and
- energy audit and
- other similar areas .

This can spawn a host of other businesses. The states of Andhra Pradesh and Karnataka have already out sourced there collection and other services.

## **18.6 Technology Development in Power Cables**

Cables can be classified according to the voltage

1. Low Tension(LT)
2. High Tension (HT)
3. Super Tension (ST)
4. Extra High Tension (EHT)
5. Extra Super Voltage

For higher range of cables , there has been a switch from copper to aluminum for the manufacture of conductors so that vast aluminum resources available in India are effectively used .Another significant Development have been the introduction of cross linked polyethylene (XLPE) insulated Cables used earlier ,resulting in longer life and better electrical properties .In the range of 66 kv to 132 kv cables now indigenously produced and Indian manufactures have also recently developed 230 kv power cables with XLPE insulation .There has also been the development of fire retardant low smoke density (FRLS) PVC sheathed cable.

## **18.7 T & D Losses**

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Most of the efficient electricity markets have very low T&D losses for example T and D losses of United States is 8% and of Japan is 7%. There will probably be similar kind of T&D losses in India.

] The APTransco has reduced T and D losses by 10.8% in 4 years (1999 to 2003) by improving internal efficiency in the T and D sector. The widely studied Delhi privatization model also emphasizes that the distribution licensee shall reduce T&D losses by 17% within the transition period of five years.

The losses due to long distance transmission will also reduce with the application of new technology. Already the Maintenance of Transmission lines of Power Grid Corporation has been taken up by Pawan Hans Helicopters.

## **18.8 Grid Security and Reliability**

WRLDC has launched FGMO (Free governor mode operation) from May 19 2003. Under FGMO, the grid security level would rise. This will contain rapid variation in frequency. Under this system all generators would have to track power demand variations by regulating their output to change in frequency. Slow variations in frequency would be taken care of by commercial signals while fast variations will be taken care of by FGMO.

## **18.9 Alternative use of electricity system**

Internet access through the electrical lines would probably revolutionize world wide internet access. Interestingly an American company Power line communications Technologies<sup>6</sup> has already studied the option. It is cheaper than Digital Subscriber lines (DSL). Internet access is received through any electrical outlet. A modem in the distribution hub for electricity, or sub station, converts digital signals into analog.

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<sup>6</sup> Substantially taken from March 20, The Hindu Business line

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These signals pass along the unused higher frequency spectrum on power lines. The line connect to the internet backbone. That connection is made either through a line leased from the local phone carrier or through the fiber links owned by the utility.

Whether broadband through the power lines is as fast as DSL is a subject of some Debate .The fastest speed of power line communications far exceed those od DSL and the cable ,but interference and competing traffic on electrical wires slows down such communications. Still a power line communication link is considerably faster then dial up modem and it can compete effectively on price .

### **18.10 Conclusion**

Can we have a future Quality power at affordable price. The Electricity Act 2003 provides some hope in the direction. Energy Security is also a issue which the Government is taking seriously. The Oil Major of India has invested in Sakhalin basin and Sudan for reliable supply of energy. Recently Koria(Daiwoo) and India(ONGC) are jointly exploring first exploration Well in the off-shore gas block A-1(Burma) off the Rakhini bordering Bangladesh and India. All these steps it seems are in the right direction for energy security.

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