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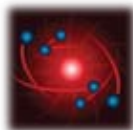
Bill's Gamble

Will Cairn succeed in selling out to Vedanta?

Everyone's Liable

A low-down on the Civil Nuclear Liability Bill

Suppliers will not accept unlimited liability: M V Kotwal



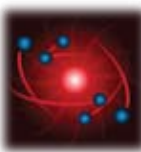
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Everyone's Liable

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**LOOK OUT FOR
AN IN-DEPTH ANALYSIS
OF CHANGING
TAX LANDSCAPES
IN OUR**

OCTOBER ISSUE

**PART II OF OUR ANALYSIS
OF THE
CIVIL NUCLEAR
LIABILITY BILL**

&

**INTERVIEW
WITH
NOBUO TANAKA
EXECUTIVE DIRECTOR, IEA**

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The second year of our existence has fortuitously coincided with the passing of the Civil Nuclear Liability Bill by both houses of Parliament. The bill now awaits Presidential consent before becoming law. As expected, it raised some questions while settling some others. One of the questions it settled without any doubts is the UPA government's continued commitment to the Indo-US nuclear accord, and by extension, its commitment to ensuring the long-term energy security of the country. It cannot be denied that nuclear power in the coming decades will increasingly become the preferred choice for ensuring the base-load requirements of a growing economy on a low carbon path. If all goes well,



and as planned, it may very well contribute a good 60 per cent of the base-load scenario 2050 onwards. In Baba Kalyani we found the most representative face of this future. Though he began his career as, and has remained for most of it, an auto man, Kalyani has demonstrated that he has the vision to look into the future as it were and make the right business moves: whether it

is his move to globalize his auto component business in the early years of this century on a global platform or move his company towards becoming a capital goods manufacturer across sectors including power and nuclear power. It is this individual vision for the future that will find answers to vexed questions such as those being posed by clauses like 17b, a product of political compulsion.

True, there are some questions like the suppliers' liability clause that is damping down the euphoria of the landmark bill being passed. It is equally necessary for us to remember, at a time when we as a nation are stepping into a new paradigm for growth, to carry along the interests of the majority of the people who have borne the brunt of corporate greed and lack of responsibility – whether it was Vedanta's Niyamgiri operations or Union Carbide's handling of the Bhopal gas tragedy.

Gayatri Ramanathan

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THE SMALL EDIT

The cost of carbon capture and storage systems is a matter of concern

Though the IEA has been talking about the first signs of an energy revolution towards greener technologies, it is shying away from taking on the issue of the cost of technology transfer. At his recent interaction with Indian energy professionals, Nobuo Tanaka, the chief of the International Energy Agency made an impassioned speech calling for sustained commitments towards low carbon growth led by technologies developed in the west such as carbon capture and storage (CCS).

Tanaka and his ilk are right in their assertions that a dramatic reduction of carbon emissions is a must. If current emission patterns are sustained, then the average global temperature rise is likely to be closer to 6 degrees than the preferred 1.5-2 degrees in the coming decades. At the same time, given that it is China and India which are leading the growth in energy demand, it is equally important to take into consideration the cost of implementing technologies such as CCS. According to IEA projections, we would need to close to 3,000 CCS plants by 2030 to keep emissions from coal-based power projects down to manageable levels. Now there is no way that kind of number is going to become a reality without the cost of technology transfers being shared. But even the most seasoned negotiators agree that it will continue to be one of the biggest stumbling blocks of the on-going climate negotiations.

No government, if it is serious about its commitments to reduce carbon emissions while continuing to secure its energy future, will base its projections on market mechanisms such as carbon trades, however stable the market. And no market maker will guarantee the stability of any market for a prolonged length of time.

Clarity, Please

The government needs to come out with a clear stand that protects the interest of both the state-owned ONGC and the interests of the small investor

The entire deal between Vedanta and Cairn Plc for selling Cairn's controlling stake in its Indian subsidiary has been shrouded in mystery, while the Indian government's blow hot-blow cold attitude on the deal is only adding to the confusion on the whole issue.

Cairn's India operations have always been less than transparent. The funds it raised after listing in India were repatriated to the original shareholders of Cairn Plc. The RBI at that time raised concerns over such repatriation but the finance ministry chose to ignore it. Although the majority of its revenue comes from the Rajasthan oil field, the Cairn management never considered it necessary to consult its 30 per cent partner in the block, the state-owned Oil and Natural Gas Corp. Now Cairn will again repatriate the moolah it makes on the stake sale and use it for financing its next exploration project in Greenland.

However, ONGC will reap no benefit from the Rs 80 premium that Vedanta is paying over the traded price of Cairn India's shares. The government's position on the issue can be best described as ambiguous. Petroleum secretary S Sunderesan dashed off a letter to Cairn India asking for clarifications because, in the case of some exploration blocks, the production sharing contracts (PSCs) signed by Cairn India have guarantees from the parent company. Indeed, some PSCs have an explicit provision of prior government consent in case there is a change of ownership of the company. This means the takeover cost for Vedanta will shoot up from around US \$ 9.6 billion to US \$20

billion, making the deal unviable. But so far the government has not come out with any clear statement on whether or not it intends to give a go-ahead to the deal. It recently rejected a stake sale by Canadian company Canoro, so whether the same set of rules will be applied to Cairn India is not known. Initial indications from government quarters were that it does not approve of the stake sale, and that it will ask ONGC and IOC to make a counter-bid. ONGC has also written a letter to Cairn that they have the right of first refusal. However, this initial enthusiasm about making a counter offer seems to have died down, and it looks as if it was more of an injured reaction than a well-thought-out strategy on the part of the

government and ONGC. Another interesting point is that market regulator Sebi is currently mulling the new takeover code which makes it mandatory for the company which is taking over to make



ONGC will reap no benefits

an open offer for 100 per cent of the holdings of the company as compared to just 20 per cent under the present regime. Interestingly, the Achuthan panel appointed by Sebi to draft a new takeover code has rightly recommended the abolition of the room for deception which consists of camouflaging 20 per cent of the negotiated price with the promoter (in this case, Cairns Energy UK) as non-compete fee which has nothing whatsoever to do with the cost of the acquisition of a controlling interest. The government of India clearly needs to come out with a clear-cut stand which protects the interests of both ONGC as well as those of the small investor.

A Man of Faith

It was Sethna's unshakeable faith in the country's engineering capabilities that has borne fruit as Indian engineering companies get ready to take on the global nuclear business



Homi Sethna

When a person who has made an outstanding contribution to society or the nation passes away we use clichéd phrases like 'an era has come to an end.' Yet nothing else can describe the demise of Dr Homi Sethna who made pioneering contributions to the country's nuclear programme.

A chemical engineer by training, Dr Sethna played a crucial role in converting the country's nuclear dreams to reality. The father of India's nuclear programme, Dr Homi Bhabha, spotted talent in the young engineer and invited him to join the nation's nuclear programme which was

then at a very nascent stage.

Almost everyone connected with the Indian atomic energy establishment knows the important role that Sethna, along with Dr Raja Ramanna, played in India's first nuclear explosion in 1974.

What is often ignored is Sethna's contribution to building India's first nuclear reactor with Canadian cooperation, the Canada India Reactor (CIRUS), built in the late 1950s. He also contributed to India's first reprocessing plant, which was completed in the mid-1960s.

CIRUS provided the technological basis for the first stage of India's nuclear power programme based on natural uranium reactors. The second project gave India the capacity to produce plutonium without which there would have been no nuclear weapons programme in the country. With resources being scarce and very little exposure to international laboratories, Sethna and other young scientists of that era showed the world that nuclear research need not be the prerogative of the rich and the mighty. After the untimely death of Dr

Bhabha and his equally worthy successor, Vikram Sarabhai, Sethna stepped into their shoes and took India's nuclear programme forward.

The most difficult challenge that Sethna faced was to keep India's nuclear programme running in the wake of severe international sanctions after the 1974 explosion when not only fuel but even crucial spare parts were denied to us. But he put his faith in the ability of Indian companies to deliver complex engineering. These companies not only kept his faith but are today at the forefront of the country's nuclear business. As India opens up to international nuclear commerce, they are likely to emerge as serious players.

With his faith in India's ability to take on the world, Sethna lent his support to the Indo-US civil nuclear deal when an influential section of the nation's atomic energy establishment was against it. And perhaps, with the passage of the Civil Nuclear Liability Bill by parliament, the nation has paid its greatest tribute to one of its most eminent scientists.

LETTERS

Write to us at
theenergybusiness@ubmindia.com

In your August issue, which carries an interview given by me, there are a few errors which I would

like to point out.

1. Electricity has been provided to 5,000 villages, primarily through biomass and some with solar.
2. Two systems of 100 kW each of solar have been installed in two units by Omax Auto in Manesar. These do not run the complete units. They mitigate the use of diesel and save around 40,000 litres of diesel annually.
3. Renewable energy is currently about 3-4 per cent of the electricity mix and

is about 10 per cent of the total power capacity installed in the country.

4. It is not correct to say that 90 per cent of this comes from solar energy. In fact, at present solar energy's contribution is very marginal. It comes mostly from wind. Then there is biomass, co-generation and small hydro.
5. It is not 20,000 Mw power to be generated but 20,000 Mw solar power capacity to be installed.
6. The cost of generation per unit is less than Rs18 today. It is not correct to say that per unit cost is Rs 18 which goes to Rs 25 as the size of the unit declines.

-Deepak Gupta, Secretary, MNRE, Via email

It was nice to note that The Energy Business has successfully completed one

year. Hearty congratulations for achieving this milestone and all the very best for a long and rewarding journey ahead in the years to come. I am sure that *The Energy Business* will become a medium to make India an energy super power in the years to come. Keep up the zeal and passion.

-Rajiv A. Vaishnav, vice president, NASSCOM

Even though the REC scheme has been announced, effective from April 2010, so far most of the states have not started registering RE projects, nor has the central registry at New Delhi registered any project. Furthermore, the power exchanges have not announced rules for trading. How will it be possible to implement it in the manner announced?

-S C Katyal, Via email

Coal India files draft paper for IPO | OIL to invest Rs 100 crore in shale gas | BHEL bags Rs 2,525 crore order from

Abhijeet Infra for thermal plant | Suzlon wins 30 Mw order from Altrade | ONGC eyes Rosneft for Russian field's bid |

New NTPC CMD

Arup Roy Choudhury has taken over as chairman and managing director of NTPC. A civil engineer from BITS with a post-graduation degree in management from IIT, Roy Choudhury started his career in 1979 and worked in prominent public and private sector companies such as RITES, IRCON and DLF. He brings with him varied experience from both the private and public sectors, and has been rated as an outstanding performer with many firsts to his credit. He is a strong believer in 'Project Implementation by Proactive Approach.' Roy Choudhury was earlier CMD, National Buildings Construction Corporation (NBCC), the largest central public sector construction undertaking in India.



Arup Roy Choudhury

PPAs not bankable

Raising finance for solar power projects under the Centre's ambitious Jawaharlal Nehru National Solar Mission (JNNSM) will be difficult as banks are not happy with the present structure of the power purchase agreements (PPAs). The existing PPA structure provides for a trader PPA with NTPC Vidyut Vyapar Nigam, which passes on the risk of default by state distribution companies to the developer. Several banks, including the State Bank of India, Bank of India and Central Bank of India, have argued that many discoms were delaying and sometimes defaulting on payments, and they have therefore called upon the Centre to contemplate



The 14 per cent levy on imported power equipment will increase costs

a tripartite agreement between the developer, the discom and the Reserve Bank of India to ensure the PPA's bankability. Banks said that solar power remained a risky and expensive option despite the support being provided by the Centre and the state governments. The mission envisages an installed solar power generation capacity of 20,000 Mw by 2020, 100,000 Mw by 2030 and 200,000 Mw by 2050. The total expected funding from the government for the 30-year period will run from Rs 85,000 crore to Rs 1.05 lakh crore.

IPPs oppose levy

Independent power producers (IPPs) have strongly opposed the government's proposal for levy of 14 per cent duty on imported power generating equipment, particularly from China. The cabinet note to this effect has been circulated by the ministry of heavy industries. The new levy will translate to a 5 per cent basic duty on the total value of the equipment, plus 10 per cent of this basic duty as countervailing duty (CVD) and 4 per cent of the CVD amount as special additional duty. The IPPs, which include Reliance Power, Tata Power, Essar Power and Adani Power, have

written to the government against the duty arguing that it will increase project costs for power project developers who are working on financial closures based on less expensive Chinese equipment. The private producers have warned the government that the higher import duty will increase project costs, increase power tariffs for consumers, and derail the government's plans to increase India's power generating capacity.

CIL may set up plants

The world's largest coal producer, Coal India Limited (CIL), is thinking of setting up power plants for the effective use of the stockpiles of coal at its mines. "We may set up power plants if stockpiles keep rising. Currently, stockpiles stand at 53 million tonnes," said the company's CMD, Partha S Bhattacharyya. CIL is already in a pact with the state-owned NTPC to set up two 2,000 Mw power plants in Jharkhand. "Inventories are rising mainly due to a shortage of railway wagons," Bhattacharyya said. On an average Coal India needs around 210 wagons per day, but the company has been getting only 170 wagons per day.

Power ministry recommends KG gas for ADAG's Andhra unit | ONGC stake sale to fetch Rs 13,000 crore |

Government pursuing import of natural gas from Iran | OMEL's Nigerian fields are not commercially viable |

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Clover plans to enter solar power with Rs 300 crore investment | Max Petroleum finds fresh oil in Kazakhstan | Coal ministry seeks to deallocate non-explored CBM blocks | Phase I of Adani's Dahej terminal to be operational this month

GSPC to import more LNG

Gujarat government-owned oil and gas company, GSPC, has announced that it will import additional LNG cargo in the wake of the shortfall arising from the ongoing *force majeure* in the Panna-Mukta fields since July. GSPC has imported its fourth LNG cargo of the year under a short-term supply contract with a Spanish company, Gas Natural. The gas was offloaded at the Hazira LNG terminal. "LNG carrier *Castillo de Villalba*, loaded at Trinidad & Tobago, and containing over 53,000 metric tonnes of LNG, was discharged at the Hazira LNG regassification terminal," a statement issued by the company said. BG Group Plc of UK had shut crude oil and natural gas production from the Panna-Mukta fields, off the west coast, after a leakage in the sub-sea pipeline was reported in mid-July. Crude output of about 40,000 barrels per day and natural gas production of 5.5 million standard cubic metres per day were halted due to the leakage. GSPC proposes to sell gas to city gas distribution companies, industrial customers, and power companies across Gujarat using the state-wide gas grid of its subsidiary, Gujarat State Petronet.

PNGRB to invite bids

The downstream regulator, Petroleum and Natural Gas Regulatory Board (PNGRB), will soon invite bids for two natural gas pipelines. This includes a 1,700 km pipeline between Surat in Gujarat and Paradip in Orissa. Apart from this, PNGRB will be also inviting bids for the 300 km Asansol-Kolkata pipeline, according to its chairman, L Mansingh. The board

has already invited bids for three major pipelines: Mehsana-Bhatinda, Mallavaram-Bhopal-Bhilwara and Panipat-Jammu-Srinagar. "The award process for these pipelines is on, and we expect to finalise the bids within a month," Mansingh stated. He said the national gas grid will be completed in four years, with an approximate investment of US \$50 billion. The natural gas pipeline network will be more than doubled from the present 11,000 km to about 25,000 km in the same period. The city gas distribution network is also being widened to cover 300 geographical areas from the present 35, he added.

NTPC looks to Qatar

NTPC wants to offer up to 49 per cent equity stake to Qatar Petroleum in its gas-based project at Kayamkulam in Kerala to secure fuel supply for the power plant. The current capacity of the Kayamkulam plant is 350 Mw, which the company is planning to expand to 1,050 Mw in the next two years and further expand to 1,800 Mw later. The company may form a special purpose vehicle for the last stage (1,800 Mw) expansion of the power project for which it would offer stake to Qatar Petroleum. NTPC is keen to get Qatar involved in the Kayamkulam project as the Gulf nation would help by bringing gas for the plant. With uncertainty over gas from Reliance Industries' KG Basin, a deal with Qatar Petroleum would give some stability to India's largest power producer. The company generates about 4,000 Mw of electricity from its seven gas-based plants, and 1,940 Mw from the Ratanagiri plant in a joint venture with GAIL and the Maharashtra government.



The national gas grid is expected to be completed in four years

BPC buys shale asset

State-owned Bharat Petroleum Corporation has entered into an agreement with Australian company Norwest Energy to acquire shale gas assets in Australia. In a statement, the company said that it has executed a letter of intent with Norwest Energy through Bharat PetroResources Limited (BPRL), its subsidiary for upstream activities, for farming into two exploration acreages in the Perth basin (EP413 and TP15) which hold shale gas potential. Currently, Norwest holds 100 per cent interest in TP15 and 55.6 per cent in EP413, and it is the operator in both these blocks. BPRL will acquire half of Norwest's interests in each of these blocks. Upon execution of the transaction and after getting approval from the Australian authorities, BPRL would hold 50 per cent interest in TP15 and 27.8 per cent in EP413. With this, BPRL's commitment to these projects will be around US \$13.5 million for exploration and drilling funding, including a carry of the part of Norwest's share of the investment.

ONGC resumes KG basin operations | R-Power plans 25 per cent stake sale | Aban bags Rs 2,285 crore order from Petrobras | Oil India to form JV with US company for shale gas | India to add 100 Mw solar power capacity |

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Haryana shortlists players for solar power plants | Tamil Nadu receives 708 Mw captive power proposals | Over 50

per cent wind power installation target met: minister | ONGC, Oil India lose Rs 4,745 crore on gas sales: government |

Vedanta rating slips

Standard & Poor's ratings services said that it had placed its 'BB' long-term corporate credit rating on London-based metals and mining company Vedanta Resources plc, and the rating on all of the company's issues on CreditWatch with negative implications. The CreditWatch action follows the announcement of Vedanta's decision to acquire a controlling stake in Cairn India. The release from S&P said, "The CreditWatch placement reflects our view that the proposed acquisition could significantly increase Vedanta's debt and weaken its financial risk profile to levels below our expectation for the current rating." Vedanta and its Indian subsidiary, Sesa Goa, will acquire about 40 per cent and 20 per cent interest in Cairn respectively from the company's UK-based parent Cairn Energy plc. "We expect Vedanta to finance its direct share (US \$5.2 billion-US \$6.7 billion) of the proposed acquisition largely through debt. Vedanta depends on dividends from its subsidiaries to service its debt. The Cairn acquisition will

provide Vedanta with a foothold in the Indian oil and gas sector. Nevertheless, the company may not immediately benefit from business diversification as Cairn is currently increasing its production capacity. Vedanta already has a portfolio of metals and mining operations and power assets," S&P said.

Mahanadi find viable

An ONGC-led consortium of state-owned energy firms has proved the commercial viability of its Mahanadi gas find, paving the way to start production from the field which has about 2.7 trillion cubic feet (tcf) of natural gas reserves. The management committee of the Mahanadi offshore block (MN-OSN-2000/2) comprising representatives of the government and energy firms has approved the commerciality of the gas find, an official in the Directorate General of Hydrocarbons said. The block is expected to start production by 2015-16. The consortium was awarded the block in 2001 under the second round of the New Exploration Licensing Policy, and in 2006 it discovered gas. ONGC,

the operator of the block, has a 40 per cent interest in the asset. The balance stakes are shared equally by Indian Oil Corporation, Oil India Ltd and Gail India. It is likely that ONGC may take a little more time because it wants to develop the offshore block jointly with another adjoining deepwater block (MN-DWN-98/3) where gas discovery is already made. ONGC has a 100 per cent interest in this block.

L&T bags order

L&T has bagged two projects worth Rs 1,195 crore from the state-owned ONGC to set up additional processing units (APU) at its gas processing complexes in Hazira and Uran. The APU project at the Uran complex will enhance the gas processing capacity at the Uran complex by 5 mmscmd. New facilities to be set up include a gas sweetening unit (GSU), LPG recovery unit, condensate fractionation unit, condensate handling unit and other utilities. The additional gas processing facilities project for the Hazira complex is for augmenting the gas processing capacity at the Hazira complex by 5.6 mmscmd. New facilities to be set up include a GSU, gas dehydration unit, dew point depression unit and offsite utilities. The scope of the contract includes project management, residual basic design, planning & monitoring, residual process engineering, detailed engineering, procurement, supply, fabrication, manufacturing, inspection, transportation, storage, construction, installation, testing, mechanical completion, pre-commissioning, commissioning, performance guarantee run test and handing over of new process units and utilities to the owner.



L&T bags projects worth Rs 1,195 crore

Karnataka to buy 1,000 Mw from private sector | 79 per cent of leaked oil from BP's well still remains in the Gulf of

Mexico | ECIL may get Maharatna status | Platts to introduce daily coal price assessments for India |

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Arunachal keen on Lower Subansiri project | Need more hydel projects: R Chidambaram | Hydel projects may make

Ravi river disappear: Himachal Pradesh | Blackstone invests Rs 1,350 crore in Moser Baer arm |

New BPCL CMD

PS Radhakrishnan has assumed additional charge as chairman and managing director (CMD) of Bharat Petroleum Corporation. Ashok Sinha demitted office as CMD after his term ended in mid-August. Radhakrishnan, a mechanical engineer from IIT-Chennai and an MBA from IIM-Bangalore has been director (marketing) of the company since 2002. He also served as the MD of Bharat Shell, a joint venture between BPCL and Shell International, between 1997 and 2002. He is currently the chairman of Indraprastha Gas and Bharat Stars Services, and is a director on the board of Numaligarh Refinery, Sabarmati Gas and Matrix Bharat Marine Services Pte.



P S Radhakrishnan

Demand to restrict PSUs

As the government gets ready to launch the 9th round of bidding for oil and gas blocks under the NELP regime, private sector players have demanded that the government must restrict participation by public sector E&P companies like ONGC and OIL in order to attract the private sector to the E&P business. The government is likely to launch the NELP-IX round in October, and in preparation for that upstream nodal authority DGH held an investor meet to seek comments from the industry on policy regulations.

The Adani group suggested that "to promote higher private participation,



The solar project at Parliament House will be completed in the next five months

the number of blocks allocated to PSUs/ national oil companies has to be limited to one-third of the total offer."

Lanco to power parliament

Lanco Solar Energy has bagged a contract for setting up a solar power project at Parliament House. Five companies, including the Mukesh Ambani-led Reliance Industries (solar group), Punj Lloyd and Wipro Ecoenergy were vying for the project. "We have allotted the solar energy project to Lanco as it was the lowest bidder among all bidders by quoting Rs 1.29 crore for the project to be set up in parliament," said a senior official of the Punjab Energy Development Agency (PEDA), which was asked by the Centre to implement the project. The project is expected to be completed within the next five months, he said. PEDA had invited bids for commissioning a power project with a capacity of 80 Kw using solar photovoltaic technology, plus its operation and maintenance for 10 years.

Power projects approved

The government has approved 1,000 Mw of grid-connected solar power projects, the New & Renewable Energy

minister Farooq Abdullah has said. The government is targeting 1,000 Mw of solar power by 2013, of which 500 Mw would be solar PV and 500 Mw through solar thermal technology.

A demo tidal wave power project of 100 Mw in West Bengal will be executed, Abdullah said. He also said that as an experiment, 100 telecom towers would be switched from diesel to solar power for cooling. The government has targeted 20,000 Mw of solar power by 2020 through the Solar Mission. The total potential for renewable energy output is estimated at 85,000 Mw.

200 Mw by Greenko

Clean energy producer, the Greenko group, has said it has made a push into the fast-growing wind energy market in India with a short-term target of 200 Mw, and signed a power purchase deal with Reliance Infrastructure. The company, with its assets mostly in India, said that it has started building a 65 Mw wind project in Maharashtra, and that the Reliance Infra deal was to supply 200 Mw of wind power at a current rate of Rs 5.07 per kilowatt-hour.

Solar Semiconductor in pact with Canadian firm Sonepar | Indian Energy commissions 16.5 Mw wind farm in Tamil Nadu | Rs 650 crore wind power project by ONGC | NTPC to acquire stake in two Indonesian coal mines |

Challenges before Mahagenco

MR Shelar, director of operations at Mahagenco, on the various challenges faced by the second-largest generation utility in the country. Excerpts from his column.

Mahagenco is the largest among state utilities in the country with an installed capacity of 6,800 Mw of thermal, 2,469 Mw of hydro and 852 Mw of gas power. Thermal generation contributes around 68 per cent of the total generation of Mahagenco. About 13 per cent is contributed by very old units and 50 per cent is from units between 20 to 25 years old.

Very old units: Out of these 34 units, 10 units with capacities below 210 Mw are between 33 to 42 years old. These units are facing more forced outages, are

difficult to maintain, operate under the norms given by MERC, and are commercially incurring heavy financial losses. Mahagenco has therefore recently decided to close down these units (total installed capacity 570 Mw), and proposed replacement units in place of these old units. These replacement units will be commissioned during 2013-14. They are Koradi-1 to 4, Bhusawal 1, and Parli 1 & 2. All these will be replaced with 660 Mw units. Paras and Nashik 1 & 2 are also being proposed for replacement.

Other old units: Out of the remaining 24 units, 14 are more than 25 years old and require major renovation and modernization (R&M) as their boiler components, equipment, breakers and cables have exhausted their lives but were not been

replaced earlier because of inadequate provision of funds. Mahagenco has decided to take up a major R&M programme for the following units in phase I in the 11th plan period: Koradi unit 6 (210 Mw) will be replaced with World Bank funding while Nashik unit 3 (210 Mw) will be replaced with the help of KFW; both are to be completed by the end of 2013. Similarly, other units are also proposed for major R&M in phase II with the help of the World Bank in the 12th Plan. Forced outages on account of boiler tube leakages are a major concern for Mahagenco. This is because of the high erosion rate of boiler tubes as the ash percentage in coal is relatively high: 40 per cent. To tackle this problem a committee was formed with



M R Shelar

a member from BHEL to suggest suitable preventive and remedial action. The committee recommended that boiler components such as economizer, LTHS, super heaters and reheater coils need more frequent replacement. Mahagenco is implementing a five-year rolling plan to replace these boiler components in a phase-wise manner during the annual overhaul of the units.

For full story log on to www.energybusiness.in

"We plan to launch trading in RECs by September-end"

■ MAKARAND GADGIL

CERC chairman Dr Pramod Deo explains how renewable energy certificates (REC) will function. He also addresses the apprehensions expressed by both industry and distribution utilities regarding RECs.

What is the rationale behind the introduction of Renewable Energy



Dr Pramod Deo

Certificates?

Under the Prime Minister's Mission on Climate Change, out of the country's total electricity consumption, 15 per cent should come from renewable sources by 2020. To achieve this goal, CERC, along with the Forum of Regulators, created the renewable purchase obligation (RPO) under which each distribution utility will have to source at least 5 per cent of its total power purchase in 2010, increasing by 1 per cent every year till 2020. While some states are blessed with renewable energy resources, others are not. Among those who are blessed with renewable energy sources, very few have taken

proactive steps to achieve their renewable potential. Those distribution utilities which don't have adequate power purchase agreements for renewables to meet their RPO requirements can buy RECs to fulfill their RP obligations.

How will the REC market function and by when will the trading start?

As in the case of share markets, there are designated depositories in the case of RECs too. NLDC will work as the depository of the RECs, which can be traded through the two power exchanges which are currently operating, IEX and PXIL. We are trying to launch the trading of RECs by the end of September.

Industry fears that considering the non-mandatory nature of the RPO, and in the absence of any punitive mechanism, there will be very few takers for the RECs.

That's why we have suggested to the government that it include the tariff policy for non-solar sources of renewable energy in the National Mission on Climate Change as it did in the case of solar power. Let me also add that all the state-level regulators have agreed to RPOs at the Forum of Regulators. They have to now frame the respective state-wise rules.

For full story log on to www.energybusiness.in

“Our target is 50 Mw grid-connected solar thermal”

■ RENJINI LIZA VARGHESE

Alternate energy in India gained momentum after the ministry for new and renewable energy announced the Jawaharlal Nehru National Solar Mission. The first phase target of 1 Gw is doable while the rest of the target may not be as easy to achieve, says James Abraham, MD & CEO, SunBorne Energy.

India has huge solar power potential. How do you see the market shaping up?

The government has come out with a plan to tap the solar energy potential in the country with the Jawaharlal Nehru National Solar Mission (JNNSM). The sector is still in a very nascent stage. The majority of the players will

adopt proven technology from other countries. Right now the concentration we see is in the solar photovoltaic segment. For solar thermal it is a wait and watch attitude, at least for now.

Do you think the plan of achieving 20 Gw by 2022, the target set under the solar mission, is achievable?

The target of 1 Gw by 2013 as the first phase of the solar mission is doable. 5 Gw in the second phase also appears to be an achievable target with some subsidies. However, in the last phase of the solar mission, we may not achieve the set target.

As you said, solar PV is now being adopted widely in the country. But there are lots of complaints about

the quality of the products being distributed. Your comments?

Like in any other industry, we see a lot of fly-by-night players here as well. These are the initial hitches of a growing segment. In solar PV the high prices may be playing a role in making consumers opt for the cheaper models available. The prices will reduce as competition increases. The products are 20 per cent cheaper than they were a few years back. They will be another 20 per cent cheaper by 2014.

The cost of production and the tariff are major concerns for players in the field, especially for those who are looking at solar thermal. Going forward,



James Abraham

where do you figure in solar thermal?

Rajasthan, Gujarat, Madhya Pradesh and parts of Maharashtra are the best areas to set up solar projects. Our target is 50 Mw grid-connected solar thermal. In this segment there are only a few players present because of the high cost involved.

For full story log on to www.energybusiness.in

Energy considerations have become vital

The Indian nuclear power strategy calls for an increase in generation capacity of up to 63,000 Mw by 2032. This translates into 4-6 nuclear power plants each year, says Nikhil Gurjar, president, Consulting Connoisseurs.

Energy considerations have become vital for every country today. According to a study by MIT, the growth in global energy demand is expected



Nikhil Gurjar

to be around 75 per cent by 2020 (ref 2002), and it is assumed that this will be met by many diverse sources such as hydro, thermal, wind, solar and nuclear power. However, the projection for the increase in the use of nuclear power is a meagre 5 per cent of the 75 per cent. Let us revisit some of the developments in this area to understand the actual challenges involved from an Indian perspective.

There are two fundamental stages which differentiate businesses in the energy sector: (a) generation and (b) transmission & distribution (T&D). With T&D losses running high across the country (33 per cent national average), we are way behind our global counterparts who have losses of around

2 per cent. Further, the absence of reliable power supply at the consumer level only compounds the issue. This means two things: (a) distribution losses are at a cost to society, and ultimately require compensation through the consumers, and (b) reliable power would mean a quest for alternative sources which avoid the distribution element and are more dependable. This is a different market in itself; although not commercially the best, it is still a promising competitor to other available sources. Just as private satellite dishes are now a fast-growing market over the traditional cable operations, the technologies which could eliminate the traditional T&D could grow rapidly provided they are economical

at the retail scale and easy to operate and maintain. The roadmap of the Indian nuclear power strategy calls for an increase in generation capacity of up to 63,000 Mw by 2032. This translates into 4-6 nuclear power plants each year, and raises a lot of questions in the minds of the common man. However, given these challenges, a number of issues emerge from a project management perspective. To delve into some of these issues in detail, it is essential to understand the dynamics of the industry. From a practical standpoint, there are some very specific drivers (or limiting factors) to harness nuclear power more effectively.

For full story log on to www.energybusiness.in

Renewcon Day 1 - Solar

The inaugural Energy Business Conference, Renewcon 2010, was held on August 26 and 27. A two-day conference on the rapidly growing wind and solar power segments, it was a power-packed affair attended by senior industry professionals.

On the first day of the conference, various aspects of converting the Jawaharlal Nehru National Solar Mission (JNNSM) from policy to reality were discussed. The conference began with Gireesh Pradhan, additional secretary, power, explaining the dos and don'ts under JNNSM through a video address recorded specially for the conference. He pointed out that the guidelines ensure that non-serious players are kept out by asking for higher bid bonds from those who quote higher discounts to the CERC tariff. Pradhan's address was followed by a panel discussion on attracting investment into the solar sector. The chairperson of the Joint Electricity Regulatory Commission, V K Garg, SBI Capital Markets vice president Gopal Aggarwal, and B K Rao, GM, IREDA participated in the panel discussion.

Garg pointed out that solar power needs to achieve grid parity to be competitive. He said he is confident it will happen as efficiencies grow. "In wind we started with 250 kW turbines, but now we use turbines of 2 Mw and 2.5 Mw. These have helped reduce the cost of wind power and brought it closer to grid prices. IREDA's Rao observed that renewable purchase obligations will play a major role in giving financial institutions the comfort that investment in this sector is viable. He pointed out that financial institutions like NABARD will be refinancing the projects.

The panel discussion was followed by another discussion on the structure of the power purchase agreements under JNNSM. Gujarat Electricity Regulatory Commission chairman P K Mishra, Tata BP Solar's Anjan Ghosh, Sunborne Energy's Aseem Sharma and Astonfield Renewable's Ravinder Raina participated in this discussion.

Mishra objected to the bundling of solar power with NTPC's unallocated quota, and warned that this could lead to raising the cost of thermal power. Other panellists pointed out that solar project developers have no assurance under the present PPA structure from NTPC Vidyut Vyapar Nigam Ltd (NVVNL) on how they can recover their dues from state discoms. NVVNL will be selling to the state discoms on their behalf.



The first panel of the day led by V K Garg on the dais



The conference began with Gireesh Pradhan's remarks



The panel on PPAs for solar led by P K Mishra

A full house



Renewcon Day 2 - Wind

The second day of Renewcon was dedicated to the wind sector. It began with Central Electricity Regulatory Commission (CERC) chairman Pramod Deo's presentation on the evolving structure and dynamics of the wind sector. Deo, in his presentation, pointed out how CERC is helping the sector by putting the renewable purchase obligation (RPO) and renewable purchase certificate (REC) mechanisms in place. In reply to a question from the audience Deo said, "Till the time the REC market in the country develops sufficient depth and becomes broad-based, CERC would like to have restrictions such as the bar on the participation of traders in REC trading and price ceilings in REC prices."

However, some who participated in the panel discussion which followed Deo's presentation, as well as some in the audience, were sceptical about RPOs helping the industry in their present format. They felt that the non-mandatory nature of the RPOs was not an encouraging state of affairs. This was complicated by the fact that some state regulators were coming out with their own RPO regimes and mechanisms for RECs.

In the panel discussion on attracting investment into the wind sector, Actis' investment principal Krishna Chaitanya raised concerns about the non-availability of independent data about wind patterns in the country. He pointed out that data is mostly provided by the turbine manufacturers who also provide end-to-end solutions for the wind farm owner, and that there are hardly any independent power producers in the sector.

Wind turbine manufacturing giant Suzlon's vice-president Chintan Shah pointed out that the new tax regimes such as Direct Tax Code and Goods and Service Tax will have a major impact on the renewables sector, especially the wind segment, because so far the sector has been driven mostly by tax sops such as accelerated depreciation and a 10-year tax holiday. Suzlon's Harshvardhan Bhatnagar made the audience aware of the opportunities and challenges in the offshore wind sector which has become quite a rage in Europe. He stressed the need for proper studies to be carried out by the government or government-owned agencies before the country's potential in offshore wind capacity is established (and sites are identified) so that investors are attracted to the sector. He also pointed out that class A and class B sites on land are getting exhausted fast, and that offshore wind is the future.



Prominent panellists from the wind segment responding to concerns raised by the audience



The second panel of the day addressed investment concerns



An attentive audience



Dr Deo spoke about the dynamics of wind power

Cairn India sell-out

Bill's Gamble

The Cairn-Vedanta deal took many by surprise. For instance, the Government of India

■ Gayatri Ramanathan

The top brass at the nation's biggest oil producer, Oil and Natural Gas Corp (ONGC), were as surprised as anyone else when London-based

Cairn Energy Plc announced that it planned to sell a majority of its stake in its Indian subsidiary to another LSE-listed firm, Vedanta Resources Plc, which owns bauxite and iron ore mines in India through subsidiaries.

Said a senior ONGC executive, "The first we heard of the sale was when a wire service broke the story on 13 August. Obviously, as a minority stake holder in the Rajasthan block, we expected to have been consulted."

Bill Gammell greeting workers at Cairn's Rajasthan field





Rahul Dhir

Since then there has been an injured silence from the state-owned behemoth even as the petroleum ministry, to which it reports, is seeking a legal opinion on the status of the various contracts that have been signed by Cairn India for the different blocks in which it holds stakes. Interestingly, just days after announcing the stake sale, Bill Gammell, Cairn's chairman, announced that the company had struck oil in its Greenland block. In a call with journalists, Gammell said that the company saw itself primarily as an explorer, and would plow back the money raised from the sale into developing the Greenland discovery. Meanwhile, Cairn's executives are busy trying to convince the Indian petroleum ministry that all is well, and that it is not selling off its assets in Rajasthan and elsewhere (see list of assets).

However, the stake sale may not be smooth-sailing for Vedanta and Cairn, with the government dashing off a letter to stock market regulator Sebi saying that Cairn Energy Plc has not yet been given its approval to sell its stake in Cairn India.

The petroleum ministry has also asked Cairn Energy to make a formal application for the approval of transfer of ownership for each of the 10 blocks it holds in India through a complex maze of 31 subsidiaries. All these subsidiaries are incorporated offshore.

In its letter to Sebi, the ministry has categorically stated that it has the right

to vet any change of ownership in a company operating fields like the giant Mangala oilfield in Rajasthan, which is at the centre of Cairn's deal with Vedanta. It further asserts that the deal will have to fall within regulations under production sharing contracts (PSCs) for the 10 properties which make government or partner state-owned ONGC approval a prerequisite for any stake sale.

Petroleum secretary S Sundareshan however said, "We can take a decision only after Cairn makes a formal application," but he refused to elaborate on the letter to Sebi. The ministry is concerned about Vedanta's lack of experience in the high-skill-based oil exploration business, and wants to scrutinise how the new management would operate complex reservoirs like the Rajasthan fields. Both Vedanta and Cairn are trying to assure the government that it will continue to be business as usual. Bill Gammell, in his letter to Sundareshan said that the proposed stake sale "will not adversely affect the performance or obligations under the various PSCs (signed by Cairn India) nor be contrary to the interests of India."

Also, Vedanta has promised continuity in operations at Cairn India, which will remain independent, Gammell said, adding that Cairn Plc along with Vedanta was willing to comply with "any reasonable" conditions put by the Government of India to ensure the performance of Cairn India's contractual liabilities. Acknowledging that under some of the PSCs it needs to take consent from the government, Gammell said that "Cairn India is committed to complying with all such contractual obligations."

Pointing to the recent judgment of the Supreme Court in the Ambani brothers' gas dispute case, an analyst said that the "government can simply reject the deal as it is the sole owner of natural resources like oil and gas, and companies like RIL or Cairn are simply contractors. In the case of the Rajasthan block, it is easier to stand legal scrutiny as it is a pre-NELP nomination block."



Anil Agarwal

Meanwhile, Vedanta has started scouting for finances to raise money for the US \$9.6 billion deal.

The mining group has issued a term-sheet seeking to raise US \$6.5 billion to US \$7 billion for short-to-medium term debt for 1-5 years. However, the deal has become a sensitive one for international financial institutions with the government-appointed committee exposing Vedanta's violation of environmental and rehabilitation norms. The in-principle environmental clearance issued to Vedanta's Niyamgiri project has been withdrawn by the ministry.

Cairn India's existing blocks

Block's Name	Cairn India Group Companies' PI%	Operator
Ravva	22.5	CEIL
CB/OS-2	40	CEIL
RJ-ON-90/1	70	CEIL
KG-DWN-98/2	10	ONGC
GS-OSN-2003/1	49	ONGC
KG-ONN-2003/1	49	CEIL
PR-OSN-2004/1	35	CEIL
KK-DWN-2004/1	40	ONGC
MB-DWN-2009/1	100	CEIL
KG-OSN-2009/3	100	CEIL

Source: Cairn India

Turning Rhetoric

Prayas, the Pune-based energy think tank has recently released a discussion paper that outlines 10 ideas that could achieve the much-talked about target of Electricity for All



Distribution side initiatives can ensure that the poorest of the poor have access to power

1. 100 X 100 Connection Drives: Mountain to go to Mohammed

Bold proactive initiatives like 100 x 100 drives by DISCOMs to give connections to all within 100 meters of the line are essential to meet the target of universal access. This needs a change in the mindset, with the DISCOM approaching consumers and offering connections.

2. Rationalising tariff structure: A just and fair tariff for the poor

Special attention has to be paid to the BPL households and those who use very low amounts of electricity to ensure that their electricity bills are fair and not unreasonably high. This includes improving BPL tariff implementation, and having all LT consumers under a single category with a graded tariff.

3. Transparency and equity in load shedding: Share the shortage

It is essential that there is transparency, fairness and predictability in load shedding, so that there is fairness in sharing the shortage. This can be achieved through public consultative processes initiated by Regulatory Commissions to design and monitor load shedding, as has been done in some states.

4. A UMPP for the east, a UMPP for the west, how about a UMPP for the poor?

Backward areas suffer from a vicious downward spiral: load shedding leads to low development, which further increases the load shedding. The only way to break out of this deadlock is to take bold steps like reserving an Ultra

Mega Power Project (UMPP) to get rid of load shedding in the most backward districts, thus helping the poor get out of poverty.

5. Third party audits of DISCOM metering and billing: Set your house in order first

For most legally connected consumers, especially the poor, maximum problems with the DISCOMs are in the area of metering and billing. Discoms are responsible for this function, and unless there is a third party audit by a credible agency, the situation cannot improve.

6. Make grievance redressal mechanisms effective: Reach out to people

Explicit quantification of quality of supply and service performance

to Reality



benchmarks, and setting up consumer grievance forums, are two pro-consumer initiatives. But very few small consumers and groups know about them. Used only by a few, they have not become effective pressure points for the discoms to improve quality of supply and service. There is an urgent need to strengthen the grievance redressal process, and increase its attention towards poor consumers.

7. For whom the RGGVY tolls? Organise public reviews

The RGGVY is India's biggest rural electrification programme, which is being implemented in 500 odd districts across the country. The programme is planned, financed and monitored largely by the Central Government, with limited roles for state level institutions. It is

high time that SERCs organise a public review of the RGGVY, so that state actors and people can participate and thus provide midcourse corrections.

8. Listen to the poor: Bring their voice into regulatory forums

The regulatory processes have indeed helped to increase the participation of consumers in regulatory forums, including public hearings. But the representation of the poor in these forums has remained dismally low. Increasing their representation requires pro-active efforts by the SERCs.

9. Power power everywhere, where is the light for homes near the power house?

It is a sad commentary on our development paradigm, that houses even

in the vicinity of big power plants do not have electricity. Providing sustainable electricity access to them should be an integral part of the project design.

10. How can one fix what one does not know: Data collection and analysis for small consumers

There is a severe inadequacy in data collection and analysis of data for all aspects of small consumers: their actual numbers, consumption patterns, and hours of supply. It is imperative that existing reporting agencies like the CEA increase their coverage to regularly report these aspects of small consumers. This is essential to track the progress of the electricity service to the poor and solve their problems.

For the full discussion paper, log onto prayaspune.org

Energy Buzzing

The Indian energy sector is abuzz with M&A activity for the first time since the recession

■ Renjini Liza Varghese

Recession, the experts say, is an opportunity to increase your assets if you have a stable account book. However 2009, the year which witnessed the peak heat of recession, had fewer activities in mergers and acquisitions (M&A). But 2010 is buzzing with deals, the good news being that China and India stand tall in M&A this year.

According to a recent study by consultancy firm KPMG, there was a 25 per cent increase in M&A deals in the last six months in comparison to the second half of 2009. The latest Emerging Markets International Acquisition Tracker (EMIAT) report by KPMG says that 243 Emerging-to-Developed (E2D) deals were recorded in the first half of 2010 as

compared to 194 in the second half of 2009. And India led the deals.

What favours India Inc

The return of confidence and liquidity has made India Inc go aggressive on M&A deals. The first half of the current year has already registered deals close to US \$50 billion, which is over three times the total for the whole of 2009. In the previous year the total deals were worth about US \$16 billion whereas in 2008 it stood close to US \$40 billion.

Data compiled by research firm VCC Edge showed that energy, health care and materials were the most targeted sectors in July 2010, with each witnessing deals worth over one billion dollars. The month's biggest deal was the Reliance Natural Resources Ltd (RNRL) merger with another Anil Ambani group firm

Reliance Power in an all-stock deal valued at US \$1.56 billion.

Though sectors like telecom, IT and health care lead the bandwagon in the M&A segment, the energy sector in India is not lagging behind in acquisitions. Reliance Industries acquired three shale gas assets in the last five months while Vedanta bid US \$9.6 billion for Cairn India. This is not all. While power generation companies targeted coal mines abroad, the power component industry (especially the electrical and switchgear segment) is also on an upward trend.

"In the energy spectrum, we still see higher value deals in the oil and gas. In June we saw the RNRL-Reliance Power merger. Apart from this you see a lot of acquisitions in the electrical and switchgear segment. ABB's consolidation is the best example. ABB was present in

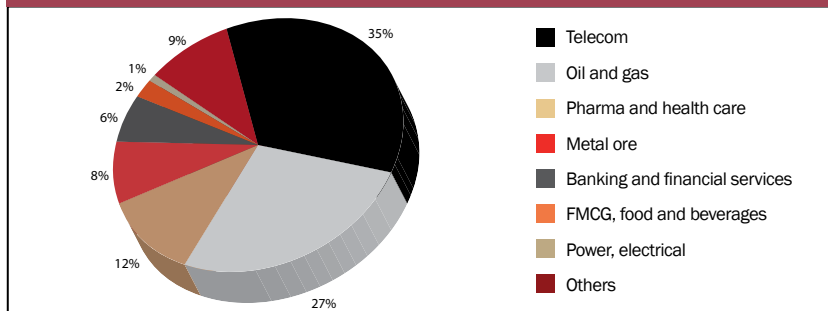
The waiting and watching is over. Deal making is back



India for so many years as a listed entity. The US \$1 billion stake consolidation by ABB gives out the clear indication that there is more business coming from the allied segments," says Arun Natarajan, CEO of the Chennai-based Venture Intelligence.

According to data from deal tracking agencies, power equipment segment deals stand at US \$4.6 billion till September 2010. "There is a notable increase in deal size and volume in the energy segment. If you compare last year and this year, out of the total deals, energy constituted 7.5 percent of the total volume and close to 26 per cent of the deal value. Till September this year, it is 6.51 per cent of the total deals and in value it is 15 per cent," says Rohit Madan, research director, VCC Edge. "In power, especially in the electrical and switchgear segment, there are more deals happening now. This is directly related to the booming power sector which is ramping up capacity to meet 11th plan targets and bridge the power shortfall." Adds Natarajan, "There is more consolidation in the power equipment and electrical segment. Look at Greenko Energies; they created an SPV outside India for acquisitions while domestically they concentrated on consolidation through an IPO. It is a similar story with Orient Green, a subsidiary of Shriram EPC. It is a JV with a Singapore-based company which is doing the green window acquisition for the company." Domestically, the limitations to growing organically is driving Indian companies towards overseas acquisitions. Apart from this, higher valuation keeps the companies away from pursuing domestic acquisitions. These overseas acquisitions also help the companies in cross-border expansion which in turn opens up a wider market. There are also several private

Sector-wise break up of deals in 2010



Source: Grant Thornton

equity investments in the energy segment valued at a billion dollars. Sector analysts believe that there may be more M&A deals in the energy segment because the companies will take advantage of the lower valuations following the negative news still emerging from the US and European markets.

On the deal charts, the oil and gas sector trails just behind telecom, the leader in the M&A segment. The companies in the oil and gas sector have already grown too big, and the only growth prospects come from acquisitions. The best example is RIL's foreign asset acquisitions. "Out of the US \$41 billion plus (excluding the Vedanta-Cairn deal) M&A deal value for transactions that have been announced so far in 2010, the energy sector (including power, oil & gas, and renewable energy) accounted for over US \$11 billion, which is a significant proportion," points out C G Srividya, partner, special advisory services, Grant Thornton. "The deals in the power sector are increasing in all segments including electrical and switchgear. Companies like Legrand, Crompton Greaves and Havells are extremely active in the market and have made some significant acquisitions this year."

Comments a power analyst who does

not wish to be identified, "It is not surprising that there is increased activity in energy segment acquisitions by India Inc as the country has aggressive power addition plans. The number and value of outbound investments are soaring; inbound investments into India continue to outnumber them."

The green energy sector is also witnessing higher M&A deals by Indian companies. In this the solar segment is leading, followed by wind and bio-fuels. In the last 12-month period, according to a report by M&A organisation IMA, China had 23 transactions with US \$5.4 billion and India stood fifth with 14 deals worth US \$1.2 billion.

The pre-recession era saw strong takeover moves by companies the world over, but this was subdued during the recession-hit period of 2008 and 2009. Even companies with clear and strong balance sheets opted for the slow track for the last two years while adopting a wait-and-watch attitude. The momentum seen now indicates that companies are trying to encash the prevailing low-valuation opportunities in a fast-paced manner. It is to be seen how Indian companies beat the competition out there in the global market and get a larger share of the pie in the long run.

Total M&A deals in last four years

	2010 (Till Sep 5th)		2009		2008		2007	
M&A	Deal Volume	Deal Value (\$mn)	Deal Volume	Deal Value (\$mn)	Deal Volume	Deal Value (\$mn)	Deal Volume	Deal Value (\$mn)
Total	384	\$31,091.00	407	\$12,359.00	526	\$26,432.00	621	\$48,518.00
Energy Sector	25	\$4,660.61	31	\$3,203.97	21	\$3,435.63	21	\$2,576.71
	6.51%	14.99%	7.62%	25.92%	3.99%	13.00%	3.38%	5.31%

Source: VCC Edge

The government must take a pragmatic view on environment

R S T Sai, chairman and managing director, THDC India on the prospects of hydro power in the country and what is holding up the sector's growth

■ Sapna D Singh



How has the hydro power sector fared in the last five years?

Capacity addition in the hydro sector in the past has ranged from 3,300 Mw to 7,900 Mw. The capacity addition achieved during the 10th plan was 7,900 Mw, which was 55 per cent of the target. Against the 11th plan target of 15,627 Mw, till date 3,600 Mw capacity has been added, while the anticipated addition for the plan could be 8,200 Mw. Despite the various initiatives and measures taken by the government, hydro projects continue to be affected by various problems like land acquisition, forest and environmental clearances, inter-state issues, geological surprises, etc.

Which policy changes were responsible for the turnaround of this sector?

The Electricity Act, 2003 laid the basic framework for reforms in the power sector. The act promoted direct commercial relationship between generating companies and consumers/traders, at the same time providing the generating companies the right to access the spare transmission capacity available. The act also emphasized the development of hydro power including optimal development of river basin and safety of the dams. Subsequently, various policies such as the National Electricity Policy, Hydro Policy and the National Policy on Rehabilitation and Resettlement were put in



India has a huge potential to develop projects in upstream river region which is untapped

place. The National Electricity Policy, in its provision relating to hydro power emphasized full development of feasible hydro potential, particularly, in the north eastern states as well as northern states. The policy also impressed upon the state governments to review the procedures for acquisition of land and other provisions for speedy implementation of hydro projects. The policy also proposed debt financing of longer tenure to compensate the large capital investment, a measure which could, however, not be implemented so far.

The Hydro Policy, which was issued in 2008, envisaged providing a level playing field to private developers. This policy also stipulates that criteria for awarding sites to private developers should be on the basis of a transparent process. Another measure, which largely benefits the private developers, is the sale of merchant power up to 40 per cent of total generation. The policy also considered the development needs of the region around the project. The developers are to provide 100 units of electricity per month to each PAF (project affected families) for a period of 10 years. The developers shall also contribute the 10 per cent share of the state government under the RGGVY scheme. Further, additional one per cent free power from the project is to be earmarked for the local area

development funds. While the National Policy on Rehabilitation and Resettlement, 2007 sets the minimum benchmark for R&R, the additional provisions in the hydro policy, supplements the sector specific needs of hydro projects. With a view to promoting economical development of large hydro projects, the Mega Power Policy stipulates that hydro projects of capacity of 500 Mw and above (350 Mw or more for projects located in J&K and Northeastern states) are offered incentives by way of custom duty exemption, deemed export benefits, income tax benefits, etc.

How do you see the hydro sector in the next five years and what are issues that need to be sorted out both at policy level and ground level?

Hydro projects inherently face the constraints of remote and inaccessible locations. While the accessible projects and projects in downstream reaches of the rivers have been largely developed or are under development, the remaining projects are located in the upstream regions and are not accessible. Also these projects face severe climatic conditions like being snowbound for a major portion of the year, prone to land slides, etc. The basin wise development approach for the

hydro potential is of paramount importance. A coordinated approach is required to optimally exploit the potential of a river basin. States have allocated projects in a river basin to various developers. Since the approach road would be common till the most upstream project, it is necessary that either all the projects in a river basin be allocated to one single developer, or the state government should coordinate the construction of the approach road, which could be funded proportionately by the developers. Forest and environmental issues, including wildlife issues continue to affect the implementation of the hydro projects.

Four of our own projects are held up on account of wildlife clearances for survey and investigation. One approved project, which is at implementation take-off stage, is delayed on account of forest land availability. After environment clearance was accorded, the forest land case is sought to be linked to a proposed study of the carrying capacity of the river basin. Environmental clearance was accorded to the project many years ago, with the stipulation of three cumecs of minimum ecological flow. Unless the authorities concerned take a pragmatic view of environmental issues, the projected hydro potential of 15,000 Mw may not hold any meaning.

On the financing of hydro projects, we carried out a study internally and concluded that banks and financial institutions need to provide a debt of longer tenor. Regulators need to put in place depreciation norms matching with the loan repayment period. Higher equity component could be allowed as against the 30 per cent cap presently applicable. Exemption from

minimum alternative tax could bring down the tariff in the initial years. These measures once accepted, would enable developers to fund a larger number of hydro projects while protecting the interest of the consumers.

What are the current projects with THDC and what are your plans for next five years?

THDC has developed the capabilities to undertake hydro power projects from concept to commissioning. The corporation presently has a portfolio of 14 projects totaling an installed capacity of 8,868 Mw, located in Uttarakhand, Maharashtra, UP and the Bhutan under various stages of implementation. THDC is developing the Indravati Valley in Chhattisgarh with a potential of about 2,500 Mw in a JV with the Chhattisgarh state government. We have taken strategic initiatives in the implementation of pumped storage scheme for meeting peak shortages in the country. An MOU was signed between THDC and Nuclear Power Corporation of India for the joint development of pumped storage systems (PSS), synergizing the expertise and resources

of both the organizations. The JV has been allotted two PSSs in Maharashtra, viz., the 600 Mw Malshej Ghat PSS and the 400 Mw Humbarli PSS.

We are working on updates of two DPRs for projects in Bhutan, Sankosh (4,060 Mw) and Bunakha (180 Mw). Discussions are being held with the state governments of Uttarakhand, Karnataka and Orissa for allotment of hydro projects. We are also exploring opportunities for hydro power development in Nepal and Bhutan.

Since the approach road is common till the most upstream project, it is necessary that all the projects in a river basin be allocated to one single developer

Environmental and forest issues continue to affect implementation of hydel projects



Can you throw some light on THDC's tie-up with the Bhutan government?

THDC had been allotted two projects – the 4,060 Mw Sankosh project and 180 Mw Bhunakha project under the Indo-Bhutan co-operation in hydro power development for the updation of DPR. For Sankosh, we are the possibility of a concrete dam in place of original earth and rockfill dam. The work on Bhunakha will be ready by March 2011.

Is THDC planning to diversify into other areas?

We see ourselves as a major global player in the power sector and intend to enter renewable energy and consultancy. We are setting up a 50 Mw wind farm for which a road map has already been prepared. The wind farm will be operational by March 2012.

Forging

Bharat Forge, the Pune-based auto components maker, is recasting itself as a global player in the power equipment segment

■ Makarand Gadgil



Partnerships

Bharat Forge Ltd is a name synonymous with large forging and casting parts for the automobile industry. In recent years it has emerged as the world's second largest forgings company. The US \$2.4 billion giant is now venturing into the high-growth Indian energy market with plans to become a leading supplier of generation equipment for thermal and nuclear power plants. The company's heavy dependence on one sector put it in a spot during the 2008 recession and forced it to look for other options not only for growth but also to stay afloat. That's when it got serious about its power sector plans. Fortunately for Bharat Forge, the Indian power sector began to seriously look at its own capacity addition plans at around the same time.

As Baba Kalyani, the 60-year-old chairman of the company says, "The Americans pulled the rug from under all of us." Until then Bharat Forge was "a company looking only for growth and

didn't even consider the flip side." As it knows now, the flip side isn't pretty. In FY2009 profit before tax plummeted 60 per cent year on year to Rs 160 crore on net sales of Rs 4,770 crore. Cash flows fell from Rs 400 crore to Rs 160 crore. Although Bharat Forge had been thinking of diversifying since the mid-2000s, it managed to give some shape to these plans only after inking JVs with NTPC for the supply of balance of plant (BoP) equipment and French power equipment major Alstom for manufacturing supercritical turbines and boilers in 2008. More recently the company signed an agreement with another French firm, Areva, for the heavy forgings required for nuclear power plants. The power sector provided the perfect opportunity to Bharat Forge as the country embarked on an ambitious plan to add 78,000 Mw in the 11th plan.

Kalyani analysed the constraints in meeting that target - the non-availability of main equipment such as boilers, turbines and generators (BTG), and the shortage of good EPC contractors. Because of these factors the country could add only around 21,000 Mw in the 10th plan against a target of 42,000 Mw.

One of the major reasons behind the non-availability of equipment was the near-monopoly of the state-run engineering major BHEL in the power equipment business. This gap between equipment supply and demand lured not only Bharat Forge but many other business houses as

well. The Sajan Jindal-led JSW group has tied up with Toshiba for manufacturing BTG. Similarly, L&T has joined hands with another Japanese giant, Mitsubishi Heavy Industries. Meanwhile, Italy's Ansaldo Caldaie SpA is eager to enter the Indian power equipment business; it is tying up with a Tamil Nadu-based engineering firm, GB Engineering. Various government initiatives have helped to reassure power equipment manufacturers.

50 per cent of all the plants coming up in the 12th plan and 100 per cent of the 13th plan projects will use supercritical technology. Besides, it has been made mandatory for all the companies that want to participate in NTPC's bulk-tendering process to have a manufacturing base in India. And if the government bows to industry

pressure and passes a proposal to levy 14 per cent customs duty on imported power equipment (especially of Chinese origin), then these JVs will literally rake in the moolah as the country plans to add one lakh Mw capacity in the 12th plan alone. Bharat Forge, along with its JV partner Alstom, is setting up a manufacturing base in Mundra with an investment of Rs 1,500 crore, and the first turbine and generator units are expected to roll out by the end of 2012. Elsewhere, the foundation stone for the company's JV with NTPC for manufacturing BoP near Solapur in Maharashtra was laid earlier

The power sector provided the perfect opportunity to Bharat Forge as the nation embarked on an ambitious plan to add 78,000 Mw in the 11th plan

this year.

Bharat Forge is also partnering French nuclear giant Areva for the heavy forgings required for erecting nuclear power plants. The proposed facility will have a state-of-the-art 14,000 tonne open-dye forging press and will be operational by 2012.

In addition, talks are said to be on between the two companies for a JV to manufacture reactor pressure vessels in the country. Areva is hoping to get the necessary clearances from the Nicolas Sarkozy government, but both sides remain tight-lipped about the deal. Says Patricia Marie, spokesperson of Areva France, "Indian industry will participate in the construction of the first two units (at Jaitapur in Maharashtra where Areva is erecting six LWRs), and its share will increase with the following units."

Bharat Forge is already earning close

to 30 per cent of its revenues from non-auto sales, but wants to take this figure to 40 per cent by 2012 and 75 per cent by 2015. The company hopes its entry into the power sector, upstream and railway sector equipment manufacturing business will lead to a three to four times jump in its turnover from the present Rs 4,000-5,000 crore to Rs 15,000-20,000 crore. As Kalyani puts it, "We want to be known as an engineering conglomerate which supplies high-technology critical products to various sectors across the full value-chain both in India and abroad - and not just as an automobile component maker."

Smart gamble

The question that many are asking is whether the company's strategy of diversifying into non-core areas will pay off. Kalyani's determination to change the revenue mix at Bharat Forge isn't

without risks. "It's a difficult game to pull off," remarks Rajesh Chakrabarti, professor of finance at Hyderabad's Indian School of Business. "It's tough to leverage competitive strengths in unrelated sectors."

Counters Kalyani: "India's GDP is growing at 8, 9 or even 10 per cent. For such a country, the power sector has to be a massive priority. Since fundamentally everything starts with equipment, if equipment is available power plants can come up. We therefore believe we are in a win-win situation unless the growth engine stops suddenly."

Some experts agree and say that the gamble will pay off because the power sector needs to grow by at least 20 per cent year on year if the GDP has to grow at 10 per cent - and that means sustained business for equipment manufacturers. With cumulative power demand projected at nine lakh Mw by 2030, there

Bharat Forge is aiming to increase its revenue from non-auto sales to 75 per cent by 2015





The power sector needs to grow by at least 20 per cent year on year if the GDP has to grow at 10 per cent

is no way an equipment manufacturer can fail. "Next year the growth will come in as they have entered the power equipment segment. The auto story is going to be there, but the trigger would be the non-auto segment coming up in a big way," comments broking firm K R Choksey's Kunal Dalal.

Another reason why Bharat Forge may pull off the gamble is because it has chosen the right partners such as Alstom and Areva, both major technology providers in their chosen fields. Also, since NTPC is the biggest operator in the country, it will help to generate business for the BoP venture. From a foreign partner's perspective, what makes Bharat Forge attractive - besides its capabilities in the metallurgical field - is the company's Indian roots which partners hope to leverage in a tough market subject to political, bureaucratic and regulatory controls.

Other initiatives

In addition, the company recently formed a joint venture with Pune-based technology firm KPIT Cummins to

offer low-cost hybrid solutions for the auto industry and automobile owners. The joint venture will offer a plug-in conversion kit which considerably saves on fuel efficiency and carbon emissions. The joint venture says that it has reduced the cost of hybridisation by a fifth compared to similar technologies being

Another reason why Bharat Forge may pull off the gamble is because it has chosen the right partners like Alstom and Areva, both major technology providers in their chosen fields

used elsewhere.

The new technology, developed indigenously, is expected to cost about Euro 1,500 compared to at least

Euro 10,000 in Europe. Under the JV agreement, KPIT Cummins will give the technology on license to the JV, and Bharat Forge will bring in its manufacturing capabilities to produce the kit.

The Automotive Research Association of India, which tested the technology, says it produced fuel efficiency gains of more than 40 per cent on a standard fuel-consuming engine.

While Bharat Forge is all set to achieve its dream of becoming a capital goods manufacturer across sectors, much will depend on the company's ability to quickly acquire the skill set and new technologies required to run its new businesses, says KPMG's executive director and head of business advisory, Arvind Mahajan. That should not be a problem for a company which in the past decade has positioned itself as a serious global player and acquiring 360-degree capabilities in the auto sector.

A man of few words he may be, but Kalyani has proved himself to be a man of action time and again.

“We are also looking at



Baba Kalyani

Baba Kalyani, chairman of Bharat Forge and its guiding light, speaks about the company's vision for the next few years. On the horizon: power generation and EPC

Since your JV with Alstom has qualified for NTPC's bulk tendering, will you be participating in the re-tendering for supercritical boilers? When will the first BTG roll out of the Mundra factory?

Whenever the opportunity for supplying power equipment comes up we would definitely like to be a part of the process. In the case of NTPC's bulk tendering, we have already participated in the bidding process. We are not into manufacturing boilers; we are essentially looking at manufacturing turbines, generators and balance of plant (BoP) equipment. We are looking forward to roll out the first set of equipment from Mundra by the end of 2012.

Any reason for not being in boiler manufacturing?

Our JV partner Alstom already has a boiler manufacturing facility at Durgapur.

Is your entry into the power equipment business a part of the forward integration strategy of the company? Does Bharat Forge see synergies between its forging and casting business and power equipment business?

There are a lot of synergies in our

present business and the power sector which we are entering. Our present business is manufacturing large components for the automotive sector. This has a lot of correlation with the power equipment business as the power equipment business is nothing but the assembly of large metallurgical components.

If you look at the situation in India, the non-availability of equipment is hampering the growth of the power sector. We can hopefully bridge this gap. If one looks at it from a market perspective, the energy market in India is huge. It is growing at a rapid pace, so it presents a manufacturing company like us with a good long-term opportunity.

What plans does the company have for the nuclear sector?

Our JV agreement with Alstom also provides for manufacturing turbines and generators for nuclear power plants. But that is restricted to only manufacturing generators and turbines and not the whole nuclear power plant. As far as a nuclear power plant is concerned, we have aligned ourselves with Areva, another French firm that will be setting up nuclear power plants in the country. Our arrangement with Areva has been formalised, and we have the document in

place now.

You have said that you want to make your company a capital goods manufacturer and reduce your dependence on the auto sector. How are you going about this?

As part of our strategy to expand our presence in non-auto sectors, we are concentrating on a few sectors like power equipment manufacturing. To some extent the decision has to do with the cyclical nature of the automotive sector, and to some extent to the new growth opportunities that we see elsewhere in the market. We also want to test whether our knowledge and expertise in forging and casting large components can be used in these new sectors.

What will be your total investment in the power equipment sector?

The total investment required for the JV with Alstom is around Rs 1,500 crore. With a 60:40 debt:equity ratio, our share of the investment is around Rs 300 crore. The JV with NTPC, which is for manufacturing BoP equipment, is a small one. Our investment here is likely to be less than Rs 100 crore.

You are already a US \$3 billion group,

power generation''

so where do you see yourself in a decade?

I don't like to put numbers and I don't like to give sales guidance for my companies. India's GDP is growing at 8-9 per cent, and is likely to grow at 10 per cent in the coming years. We are a power-deficit country; half the country doesn't even get electricity. For such a country, the power sector has to be a massive priority. Since fundamentally everything starts with equipment, if equipment is available power plants can come up. We have therefore identified power equipment as a growth area for ourselves.

Are you also planning to get into power generation? It is a logical step forward.

As an activity we are looking at it, but whenever we do it we will do it in a separate structure. We are certainly looking at it.

Many Indian companies are entering into JVs for power equipment manufacturing. Do you feel that the sector is getting overcrowded?

I don't think so. Look at it like this: all these companies are already active in most of the other markets. In fact there are many more out there - Hitachi, Siemens, Ansaldo, Westinghouse and GE. But most of the markets where they are active are saturated. The only growing markets are India and China, so there is enough opportunity for everyone. In the last few years the sector has become technologically-savvy. Everybody is talking about heat rates, efficiencies, clean-coal technologies, less emission, etc, so it is good to have as many technologies as possible available. It is

also good to have four or five companies. This not only develops competition but develops a whole new industry. The reason why power equipment manufacture did not develop as a sector in India all this while is because there was just one company manufacturing equipment for the sector - BHEL. It was like in the good old days when Hindustan Motors and Premier Automobiles each

The reason why power equipment manufacture did not develop as a sector in India all this while is because there was just one company manufacturing equipment for the sector - BHEL

manufactured 25,000 cars per annum. With the entry of new players in the market, a whole new industry developed.

Companies like L&T and BHEL have complained about unfair competition from Chinese manufacturers and want an import duty to be imposed on Chinese products. What's your view?

L&T and BHEL are already in the business of manufacturing equipment so they are feeling the pinch. We have yet to reach that stage. However, as a manufacturer, we certainly won't like to face unfair competition, and we would like have a level-playing field for all the players. But the manufacturing sector is the core sector for any economy, and

most governments in most countries give a helping hand - if not actual protection - to their manufacturing industry. This is true in the case of all the major economies - USA, China, Korea, Germany or Japan. For India, it is important that we develop our own capital goods industry which suits our specific purposes. A supportive attitude from the government would therefore be appreciated. It will also help to develop capabilities domestically.

Do you plan to get into the EPC business?

Yes. We want to be present across the entire value-chain. This is the kind of business where you can't expect to be just a manufacturer of turbines and generators and do well for yourself. Companies like BHEL and L&T handle the entire portfolio, not just the supply of equipment.

Many companies are taking measures to reduce their carbon footprint. What effort is your company making?

We have mapped our carbon footprint and we intend to bring it to zero over the next decade or so. Becoming a company with a zero carbon footprint is almost impossible, but we would like to be as close as possible to this mark. We want to ensure that our need for power is fulfilled through green sources. We already have 27 Mw of installed wind power capacity, and plan to add another 20-25 Mw. We are also working on how energy consumption can be further reduced in various processes at our facilities. It also makes good business sense to go green. Perhaps by reducing our carbon footprint we can market our products as green products.

Civil Nuclear Liability Bill

Everyone's Liable

The Civil Nuclear Liability Bill has some tough provisions. Are we scaring away suppliers or – considering what happened in Bhopal – merely protecting our interests?

■ Makarand Gadgil

Speaking on the Civil Nuclear Liability Bill in the Rajya Sabha, Sitaram Yechury, politburo member, CPI (M) said, “When the chair moved a resolution on the price rise, urging the government to take care of its negative effect on the *aam aadmi*, we had hoped that the Prime Minister would intervene

and would give us his strength in actually implementing it. But that did not happen. It did not happen on the issue of the Kashmir situation. It did not happen on the issue of the Bhopal gas victims. But he intervened, in the other house, on the Civil Liability for the Nuclear Damage Bill.” Yechury’s scathing comment just goes to show how seriously the United Progressive Alliance government has

taken the civil nuclear deal with the US, if indeed proof is required. The Prime Minister had already put the UPA’s first innings at stake saying ‘So be it’ to a left parties’ threat to withdraw support to the government.

Intervening in the debate over the bill in the Lok Sabha, Singh, uncharacteristically assertive, remarked, “To say that we have in any way

Parliament passed the Civil Nuclear Liability Bill in August



compromised India's national interests would be a travesty of facts. To say that this is being done to promote American interests and to help American corporations is, I think, far from the truth."

Politics of power

It was not the first time Singh was being accused of promoting US interests. His 1992 budget as finance minister in the Narasimha Rao cabinet faced criticism from the opposition parties who said he should be impeached; they alleged that the budget had been prepared in the US. Singh and his cabinet colleagues bowed to pressure from within and outside to increase the amount of compensation in case of a nuclear accident in clear contravention of existing international conventions and frameworks. They did this knowing very well that the relevant clauses (*see box below*) would not go down very well with the Obama administration which has been keeping close tabs on the ground situation in India. According to well-placed sources, US secretary of state Hillary Clinton called Pranab Mukherjee a day before the bill was tabled in parliament to enquire about its fate, and was reportedly advised to cultivate patience as these things take their own time in democracies.

Meantime, the US envoy was with the senior BJP leadership trying to get a sense of their inclinations. In taking an anti-deal stand and moving a no-confidence motion against the government on the issue, the BJP had already burnt its fingers. In the 2009 elections it lost the support of its middle-

The government's decision to bow to pressures on the ground was not so surprising as it wanted the bill to be passed before Obama's November visit

class urban vote-bank which tends to be pro-American. The BJP needed a face-saver which it got with the government agreeing to add a suppliers' liability clause to the proposed legislation. The main interlocutors on the government side were minister of state in the PMO Prithviraj Chavan, and secretary of the department of atomic energy Srikumar Banerjee. From the

BJP former foreign minister Yashwant Sinha and leader of the opposition in the Rajya Sabha Arun Jaitley were the main negotiators on the bill. The government side was also in touch with Sitaram Yechury. However, for the left, the entire issue was more ideological. It didn't budge from its position and continued to make impossible demands such as compensation of Rs 10,000 crore in case of an accident.

Both the BJP and the government burned much midnight oil, and the bill was not only discussed clause by clause but also word by word in informal meetings as well as at the standing committee.

The parliamentary standing committee on science and technology accepted most of the suggestions from the BJP camp including tripling the compensation amount, barring the entry of private players as operators, and dropping of the phrase 'intent to cause damage.' After the report was tabled in the Lok Sabha, the leader of the opposition in the house, Sushma Swaraj, declared her party's intention to support the bill.

But then the BJP, taking a cue from the left parties, did a volte-face about adding the word 'and' between sub-clauses a and b of clause 17.

Perhaps the government's decision to bow to pressure on the ground was not



Excerpt from the bill: What is operator's liability?



4. (1) The operator of the nuclear installation shall be liable for nuclear damage caused by a nuclear incident —
(a) in that nuclear installation; or
(b) involving nuclear material coming from, or originating in, that nuclear installation and occurring before —
(i) the liability for nuclear incident involving such nuclear material has been assumed, pursuant to a written agreement, by another operator; or
(ii) another operator has taken charge of such nuclear material; or
(iii) the person duly authorised to operate a nuclear reactor has taken charge of the nuclear material intended

to be used in that reactor with which means of transport is equipped for use as a source of power, whether for propulsion thereof or for any other purpose; or
(iv) such nuclear material has been unloaded from the means of transport by which it was sent to a person within the territory of a foreign state; or
(c) involving nuclear material sent to that nuclear installation and occurring after—
(i) the liability for nuclear incident involving such nuclear material has been transferred to that operator, pursuant to a written agreement, by the

operator of another nuclear installation; or
(ii) that operator has taken charge of such nuclear material; or
(iii) that operator has taken charge of such nuclear material from a person operating a nuclear reactor with which a means of transport is equipped for use as a source of power, whether for propulsion thereof or for any other purpose; or
(iv) such nuclear material has been loaded, with the written consent of that operator, on the means of transport by which it is to be carried from the territory of a foreign state.

so surprising because it wanted the bill to be passed before Obama's November visit. More importantly, Singh could not have gambled with the future of his government as he did in 2008 given that UPA II is barely a year old.

It is also not surprising that alarm bells have begun ringing in Washington over the inclusion of the suppliers' liability clause in the bill. Washington, which saw the passing of the bill as a clearing of decks for the full implementation of the Indo-US civil nuclear deal, had not

bargained for suppliers' liability in its current form. The removal of the word 'and' between clauses 17 a and b at the instance of a determined opposition meant that liability once invoked can be either under sub-clause a or sub-clause b, unlike in the original draft where it would have been applicable only when both conditions were met.

In the Obama administration's first reaction since the passage of the bill, P J Crowley, state department spokesperson said, "We continue our discussions with

the Indian government on this issue and we note that Indian business leaders are concerned about some specific aspects of the law that was just passed by parliament. We will look to the Indian government to see what changes can be made."

Added Lisa Curtis, senior research fellow at the Washington-based think-tank The Heritage Foundation, "The law includes language which makes suppliers of equipment, raw materials and services liable after the construction of the plant



Excerpt from the bill: Limit of operator's liability



Extent of liability specified under sub-section (2) of section 6.

(4) The liability of the operator of the nuclear installation shall be strict and shall be based on the principle of no-fault liability.

Explanation.—

For the purposes of this section,—

(a) where nuclear damage is caused by a nuclear incident occurring in a nuclear installation on account of temporary storage of material-in-transit in such installation, the person responsible for transit of such material shall be deemed to be the operator;

(b) where a nuclear damage is caused as a result of a nuclear incident during the transportation of nuclear material, the consignor shall be deemed to be the operator;

(c) where any written agreement has been entered into between the consignor and the consignee or, as the case may be, the consignor and the carrier of nuclear material, the person liable for any nuclear damage under such agreement shall be deemed to be the operator;

(d) where both nuclear damage and damage other than nuclear damage have been caused by a nuclear incident or, jointly by a nuclear incident and one or more other occurrences, such other damage shall, to the extent it is not separable from the nuclear damage, be deemed to be a nuclear damage caused

by such nuclear incident.

5. (1) An operator shall not be liable for any nuclear damage where such damage is caused by a nuclear incident directly due to—

(i) a grave natural disaster of an exceptional character; or

(ii) an act of armed conflict, hostility, civil war, insurrection or terrorism.

(2) An operator shall not be liable for any nuclear damage caused to—

(i) the nuclear installation itself and any other nuclear installation including a nuclear installation under construction, on the site where such installation is located; and

(ii) to any property on the same site which is used or to be used in connection with any such installation; or

(iii) to the means of transport upon which the nuclear material involved was carried at the time of nuclear incident: Provided that any compensation liable to be paid by an operator for a nuclear damage shall not have the effect of reducing the amount of his liability in respect of any other claim for damage under any other law for the time being in force.

(3) Where any nuclear damage is suffered by a person on account of his own negligence or from his own acts of commission or omission, the operator shall not be liable to such person.

6. (1) The maximum amount of liability in respect of each nuclear

incident shall be the rupee equivalent of three hundred million Special Drawing Rights or such higher amount as the Central Government may specify by notification:

Provided that the Central Government may take additional measures, where necessary, if the compensation to be awarded under this Act exceeds the amount specified under this sub-section.

(2) The liability of an operator for each nuclear incident shall be—

(a) in respect of nuclear reactors having thermal power equal to or above ten Mw, rupees one thousand five hundred crores;

(b) in respect of spent fuel reprocessing plants, rupees three hundred crores;

(c) in respect of the research reactors having thermal power below ten Mw, fuel cycle facilities other than spent fuel reprocessing plants and transportation of nuclear materials rupees one hundred crores:

Provided that the Central Government may review the amount of operator's liability from time to time and specify, by notification, a higher amount under this sub-section:

Provided further that the amount of liability shall not include any interest or cost of proceedings.

Operator not liable in certain circumstances.

“Suppliers will not accept unlimited liability”

M V Kotwal, senior vice-president, whole-time director and in-charge of the heavy engineering division, L&T, on the impact of the Civil Nuclear Liability Bill for Indian suppliers

As per the bill passed by parliament, suppliers' liability is a part of Civil Nuclear Liability Bill. What does this mean for Indian suppliers like you?

Unfortunately this whole business of the Civil Nuclear Liability Bill got linked to the US and US suppliers and the Bhopal gas tragedy. No one has taken into consideration the Indian perspective. Nor has anyone considered that nearly 60 to 70 per cent of the components will come from Indian manufacturers, or considered the implication of such a clause (clause 17) on them. Everyone tends to ignore the fact that Union Carbide, which was responsible for the Bhopal accident, was not the supplier but the operator of the plant. The Indian nuclear sector has the potential to generate business to the tune of US \$100 billion-150 billion over the next few years, and create around one lakh jobs. Indian industry, which has been associated with the country's nuclear programme for over four decades, has an excellent track record in terms of maintaining high safety standards.

We have detailed third-party-certified quality assurance programmes, and we give guarantees ranging from 12 months to 36 months from either the date of commissioning or supply. In case we are involved in design we also give performance and workmanship guarantees.

But what clause 17 has done is that

it has gone beyond all existing laws which govern commercial contracts between two parties. Giving guarantees for 50 years (life of the plant) and beyond is simply not acceptable especially when you are not the operator of the plant. It will seriously hamper India's programme of adding 63,000 Mw through nuclear power.

How much will the cost of nuclear power go up because of the new law?

One simply cannot give any ballpark figure on this as there is no insurance cover available for something which is undefined and for such a long term. At this stage it is difficult to say what the insurance cover required by the suppliers will be, and how it will impact the cost of nuclear power.

Will the bill affect the participation of companies like yours in the nuclear programme?

As all suppliers are commercial organisations, and most of them listed companies answerable to their shareholders, they would not be in a position to accept contracts with unlimited liability. In case of unreasonably high liability, most suppliers would not be in a position to contribute to the programme, or, if they have to pay a hefty premium for getting insurance coverage, it would be transferred to the plant operator who would transfer it to the consumer



M V Kotwal

making nuclear power more costly. A lot will also depend on how the bid documents issued by the Nuclear Power Corporation of India (NPCIL) are structured. If there is no major deviation from the earlier documents then there is no cause for worry. Industry organisations have taken up the issue with the government and we are hopeful that our concerns will be addressed.

How it will affect the entry of foreign players?

Most of the plants in the pipeline are based on foreign technology, and NPCIL as the operator will try to negotiate with these foreign players to reduce the cost of the plants as much as possible. The only way to reduce the cost is to indigenise to the maximum. However, with unlimited liability being put on the suppliers, they will have no incentive to reduce their costs and indigenise components, and the whole process will make nuclear power unaffordable.

in the event of any nuclear accident.” Noting that Indian business groups have denounced the legislation, Curtis said, “This latest obstacle in the US-India nuclear deal is unfortunate as it follows the successful completion of a US-India nuclear reprocessing agreement earlier this year which granted India the right to reprocess spent nuclear fuel.”

Tunnel vision?

According to G Balachandran, senior fellow at the Institute for Defence Studies and Analysis, “The saga demonstrates the inability of the Indian polity to rise above sectional interests and put national interests first. When, decades ago, China was asked to enact a nuclear liability law in line with international conventions, it passed an ordinance specifying a liability limit far below the Indian limit and restricted the operator’s right of recourse to very limited circumstances in line with international conventions — all within a matter of weeks.”

Some solace can perhaps be drawn from the PM’s statement at a recent meeting of senior editors. “Much will depend on how the rules are formulated,” he said, indicating that framing rules is an executive action which does not require legislative consent and therefore the government may be able to undo some of the damage.

Equally, Singh seems confident that the Indian industry will follow where the government leads. At the same interaction he said, “The proof of the pudding is in the eating.” Obviously, no industrialist or insurance company is going to let go of a US \$400 billion business opportunity. “I hope their profits will tell the true story. If they make a lot of money they will forget some of the concerns they have expressed,” Singh observed. For instance, Areva is currently negotiating with the Nuclear Power Corporation for six light water reactors (LWRs) to be installed at Jaitapur in Maharashtra. Both companies are engaged in last-leg negotiations to bring down the per megawatt cost from Rs 20 crore to around Rs 10 crore. Politics and diplomacy apart, the bill has drawn much flak from Indian industry which feels that it will simply



Industry bodies have been vocal about concerns over the inclusion of suppliers’ liability

and unnecessarily raise the cost of the equipment supplied, and keep the technology leaders of the nuclear power business out of the country. The industry believes that by making the suppliers liable, the government has made the participation of foreign suppliers difficult and driven up the cost of nuclear power generation. Some senior executives of the normally-circumspect NPCIL tend to agree with this assessment. In a strongly-worded statement before the bill was introduced in the Lok Sabha a senior executive said, “The government has the power to make laws. But in the process of making such laws we should not defeat the purpose for which the laws are made. With the current formulation of 17b, no manufacturer, Indian or foreign, would be able to serve the nuclear power industry.” Another big question the bill poses is what happens to India’s agreement with Russia with whom we have a sovereign agreement on the exclusion of Russian suppliers from any liability in case of an accident. In fact the Russians, on the eve of the bill being introduced in parliament, made their position very clear to the



Excerpts from the bill: Suppliers’ liability

17. The operator of the nuclear installation, after paying the compensation for nuclear damage in accordance with section 6, shall have a right of recourse where—

- (a) such right is expressly provided for in a contract in writing;
- (b) the nuclear incident has resulted as a consequence of an act of the supplier or his employee, which includes supply of equipment or material with patent or latent defects of sub-standard services;
- (c) the nuclear incident has resulted from the act of commission or omission of an individual done with the intent to cause nuclear damage.



Interlocutors on the deal



Arun Jaitley



Sushma Swaraj



Prithviraj Chavan

government that they would not accept any liability on present or future plants supplied to India.

Indian and foreign suppliers, as well as power plant operators like NPCIL, are pinning their hopes on the rules which have to be framed under the Act to provide the much-needed clarity in terms of the circumstances under which the supplier would be liable, and his share and the time-frame of the liability. The bill is silent on these crucial questions. This has made the industry nervous, and made it assume the worst. The industry fears that suppliers will be liable for the entire 60 years of the nuclear power plant's life as well as the 20 years of the claim liability period because their liability is not defined in the Act. The Act merely offers the

operator recourse to suppliers in case of an accident. The operator's liability – a no-fault liability – is to the extent of SDR US \$300 million or Rs 1,500 crore at the present exchange rate.

Sword of liability

Companies such as L&T, and industry bodies like the Confederation of Indian Industry and the Federation of Indian Chambers of Commerce and Industry, have been vocal about their concerns over the inclusion of suppliers' liability. They say that it will not be possible for them to enter into commercial contracts when the sword of liability is hanging over their heads for periods as long as 60 + 20 years. They also fear that because the liability of the operator is not defined in the Act it may be infinite. As

of date, no insurance cover is available for undefined liabilities over such a long period of time.

Former vice-chairman of the Atomic Energy Regulatory Board, G R Srinivasan, said that with 3rd and 3+ generation reactors now being built, even if an accident takes place there is only a remote possibility of its repercussions being felt beyond the plant. "So I wonder what purpose this clause will serve." He added, "If an accident does take place after 60 years, how will someone determine which defective part caused what damage and triggered what reaction that led to the accident? If something has served you for 60 years without any hiccups it shows that the quality of the material supplied was excellent. By adding such a provision the government

**Excerpts from the bill: Central govt's liability**

7. (1) The Central Government shall be liable for nuclear damage in respect of a nuclear incident, —

- (a) where the liability exceeds the amount of liability of an operator specified under sub-section (2) of section 6, to the extent such liability exceeds such liability of the operator;
- (b) occurring in a nuclear installation

owned by it; and

- (c) occurring on account of causes specified in clauses (i) and (ii) of subsection (1) of section 5: Provided that the Central Government may, by notification, assume full liability for a nuclear installation not operated by it if it is of the opinion that it is necessary in public

interest.

- (2) For the purpose of meeting part of its liability under clause (a) or clause (c) of subsection (1), the Central Government may establish a fund to be called the Nuclear Liability Fund by charging such amount of levy from the operators, in such manner as may be prescribed.



Barack Obama

is only scaring suppliers and escalating the cost of nuclear power.” He pointed out that in the case of defective materials causing an accident there are existing laws like the law of torts under which the operator can sue the supplier. According to Sudhinder Thakur, NPCIL’s executive director for corporate planning and communication, “Because of clause 17b, we are in a unique position compared to the liability laws of other countries, so we need to work out acceptable solutions to address the concerns of suppliers. A lot will depend on how the rules are framed under the Act.”

Although he admitted that the suppliers’ liability clause will have an impact on Areva’s offer price for the six Jaitapur LWRs currently under negotiation, he said it would be difficult to put a number. The negotiations are expected to conclude shortly. Said Patrick Teyssier, Thakur’s counterpart at Areva India, “We will abide by whatever the law of the land is.”

A senior vice-president and whole-time director of L&T, the country’s leading engineering firm and a major supplier of parts to the domestic nuclear industry echoed Thakur’s sentiments. “Whether we will be able to participate in the nuclear programme or not, and if we do, to what extent, will depend on how NPCIL structures its bid documents.” Yet not everyone is sympathising with the industry. Probir Purkayastha,

scientist and secretary, Delhi Science Forum, said that the entire situation is of the suppliers’ making. “If they had not insisted on explicit provisions for no liability on the suppliers in case of an accident there would have been no such clause in the Act. They would have been governed by the normal law of torts and criminal liability.” He pointed out that they will still be governed by the guarantees and warranties one gives under normal commercial contracts signed for equipment and service supply. “If a valve supplied by a valve manufacturer is meant to last for eight years but breaks down in six and causes an accident the supplier will be held responsible. But no one will hold him responsible for its breakdown in the tenth year for then responsibility would lie entirely with the operator who failed to replace the valve after eight years.” With respect to the Russians, Purkayastha points out that the law of the land supersedes any agreement. The French insisted on having a national law in place before they signed the final agreement with the Indian government or a government-designated entity. Agreed Robinder Sachdev, president of Image India Energy Systems, a Delhi-based nuclear energy research and advisory firm, “Suppliers’ liability is not as a big monster as it is made out to be. It will delay projects by a few months because negotiations will now take place after taking into consideration the fact that the supplier is liable for damages. But suppliers will eventually come around as this is a buyers’ market, and if the Americans or Russians step out Korean and Chinese manufacturers are waiting in the wings.” But he agreed that the cost of insurance would be high, and that some kind of a pooling mechanism may have to be created on the lines of the US where all stakeholders pitch into a consolidated liability fund, including the government. The US law on civil nuclear liability, the Price-Anderson Act, sets a minimum liability of US \$10 billion but puts no cap on the maximum; the courts are free to decide on damages beyond this amount. Sachdev pointed out that it is wrong



Dr Manmohan Singh

to assume that the clause on suppliers’ liability is specifically designed for US suppliers because for US suppliers to come in not only do they require a national law but they also require the nation to be a signatory to one of the two international regimes on compensation.

Three conventions

Internationally, there are three major conventions on liabilities in the case of a nuclear accident: the Convention on Supplementary Compensation for Nuclear Damages (CSC), and the Vienna and Paris Conventions.

These conventions are based on seven principles of law: (a) no-fault liability (b) liability limited in amount (c) liability limited in time (d) channelling of liability to the installation operator (e) a single competent court to adjudicate claims (f) compulsory financial security, and (g) no discriminatory treatment [based on nationality, domicile or residence].

Currently, India is not a signatory to any of these conventions, but it has indicated that it might join the CSC to which the US is also a party. Under CSC, the operator is liable for nuclear damages up to a specified amount with a two-tier compensation system. The country where the nuclear plant is installed has to ensure the availability of at least US \$300 million SDRs; the second tier of compensation can come from contributions made by contracting parties and limits the period for compensation

Nuclear energy

Changing Paradigms



Robinder Sachdev

The nuclear energy business is changing globally. Indian and foreign suppliers must become alive to that reality

The Civil Nuclear Liability Bill, passed recently by the Indian Parliament, came with its associated loud din of political, business and legal debates. Upon passage of the bill the political debate has settled; however, there is deep rumbling in the industry that a clause in the bill which includes suppliers within the ambit of liability obligations will make it impossible for Indian or foreign suppliers to do business in the Indian market.

It is the contention of this column that such objections are not valid, premature, and that business in the Indian market will continue as usual. Let us get real. All arguments are struggling to recognize the new lay of the land. They may be knee-jerk reactions, and are surmountable, or even pressure tactics.

Yes, there will be some confusion in the interim; innovations needed in risk allocation and management; hard negotiations; and delays before clarity in new contracts emerge. Also, we may see some amendments to the bill – but any such policy diktat will continue to

uphold the basic philosophy of the bill. Thus far the global assumption has been that it is the nuclear power plant operator who is responsible for any and all liabilities that may arise in case of an accident. The bill now gives recourse to the operator to claim compensation from the supplier in case of an accident. Suppliers are protesting that this is not a standard practice; second, that this will have severe financial implications; and third, that there is no insurance mechanism for them to undertake an 80-year obligation as now required by the law.

Today, the nuclear energy business is

stiff competition from upstarts like Korea which has shocked the industry by winning a US \$20 billion contract in the UAE. China is vastly increasing its manufacturing capacity, and by 2025 it will have significant surplus capacity with which it is expected to flood the global market. And of course India is going to compete in the global nuclear business by 2015. This is the new reality that faces both foreign and Indian suppliers.

Secondly, it is said that this bill will cripple cost structures and will drive away any supplier. Nothing could be further from the truth. Let us examine a typical case – a nuclear plant typically may have 200-300 suppliers, but for brevity's sake this column assumes our discussion to be only about one large supplier (like Areva, GE, Westinghouse, RosAtom, Toshiba, Hitachi or Kepco) that shall make up to 30-40 per cent of the total plant cost.

Assuming a 1,650 Mw plant, at US \$2 million per Mw, the total cost of such a new plant in India may be around US \$3.3 billion. At 40 per cent of this, it implies that this supplier will get business to the tune of US \$1.3 billion. Assuming 30 per cent profitability, it implies that this supplier will make a profit of around US \$400 million.

Next, assuming that the maximum liability exposure for the supplier will not be more than the exposure of the operator, it implies a liability limit to the supplier of Rs 1,500 crore (about US \$325 million since this is the limit for the

There will be some confusion in the interim; innovations will be needed in risk allocation and management; hard negotiations and delays are inevitable

undergoing massive changes globally, perhaps for the first time since the 1970s. India is expected to be one of the largest markets in this next wave of atomic energy, to be followed by countries in Asia, Africa and Latin America. Traditional suppliers from the US, France, Russia and Japan are facing



India will be one of the largest markets for the next wave of nuclear power

operator under the current law). Thus, the supplier makes a profit of US \$400 million, and is exposed to a maximum liability of about US \$300 million.

The simple question therefore, without rhetoric and multiple layers of nuances, boils down to – Mr Chairman, in a worst-case scenario, if a business gets you US \$400 million in the bank, but you have to ensure risk coverage, or even pay out, in an extreme scenario, a maximum of US \$300 million or so, will you do business? Or will you stay away?

The chairmen, boards and CEOs of companies such as GE, Areva, Westinghouse, RosAtom, Toshiba and Kepco have to think of strategies for survival and take out their calculators. I lay a simple bet – in answer to above question, all will want to do business in India and run their Excel numbers. Sure, it will take time, business modeling, strategists and lawyers before the contracts are finalized; and policy directives, clarifications and even

amendments that flow from the bill – but simple business and market logic will compel the supplier to take on the business.

The third big worry, that the insurance industry globally, and in India, does not have the bandwidth to structure a solution for an 80-year liability is again wrong. Sure, this may mean foreign insurers (and re-insurers) pooling with Indian insurance companies, governments and operators, but a financial model can be structured. The market compulsions and economics have a logical case.

Business will continue as usual, with hiccups and expenses and time delays, but yes, the suppliers have to understand that the world market has changed – it is no longer business as usual for them. Those who cannot adapt will lose; those who persevere shall gain – in India, and in global markets. It is no longer business as usual.

*The author is president,
Image India Energy Systems*

claims to 10 years.

BJP Rajya Sabha MP Piyush Goel, who closely monitors all energy-related issues, said that “This initial noise will die down and the suppliers will come on board because it is a buyers’ market. It may increase the price of power, but it is a price worth paying because we would not want a repeat of Bhopal where the plant operator walked away without adequate compensation. Besides, those who are making noises about the provision are conveniently forgetting that US law also allows recourse against suppliers.”

Banerjee also tried to smooth ruffled feathers. “What is the meaning of the phrase ‘the right of recourse’ of the operator? It means the operator first takes his own liability to compensate the victims, and after the compensations are paid he has the right of recourse to sue the suppliers provided he has definite proof that faulty supplies were the primary cause of the accident.”

Banerjee’s interpretation may come as a balm to those seeking to understand how the government views the provisions of the Act and will form the rules.

Girish Sant of the Pune-based think-tank Prayas Energy Group insisted that there was a need for suppliers’ liability. He pointed out that, in the case of the Gulf of Mexico oil spill, BP, which is an owner of the asset and not a supplier of equipment or operator, has been held responsible and asked to cough up US \$20 billion as damages and might just have to pay even more. So how can the supplier get away with his responsibilities?

Sant also pointed out that recently Britain’s atomic energy regulator had rejected Areva’s design for a nuclear reactor because it had not put in adequate active safeguards. Areva wanted to get away with passive safeguards, so if India is subsidising Areva’s R&D with the designs they are giving to us then they have to accept the liability for such designs. Sant also said that only the supplier can know what decay will be caused by radioactivity to the reactor, and in how many years, and that if some accident happens before that who is going to be responsible.

Getting ready for India



Vincent Jourdain

India is poised to embark upon a comprehensive nuclear power programme. Speaking in Delhi at the international atomic conference in 2009, Manmohan Singh, the Indian Prime Minister, said the nuclear industry would have huge opportunities in India after the civilian nuclear deal signed with the US. He suggested that by 2050 nearly 500 Gw of energy could come from Indian nuclear power stations. "There will be huge opportunities for the global nuclear industry to participate in the expansion of India's nuclear energy programme. This will sharply reduce our dependence on fossil fuels and will be a major contribution to global efforts to combat climate change," he said.

Long history

India's nuclear programme has two parts – its domestically-built reactors and reactors built using international technology. Since the early 1970, due to its abstention from signing the Nuclear non-Proliferation Treaty (NPT), India has developed its nuclear reactor technology without fuel or nuclear technology assistance from the international community. Its domestically-produced

Alstom is adapting its full-speed steam turbine solution to meet India's new larger domestically-produced reactor

reactors have therefore been traditionally small by international standards. Accordingly, its conventional power islands have also been quite small. For the first three decades, the output of India's reactors was around 200 Mw until around 2006 when it built the first pressurised heavy water reactor (PHWR) unit with an output of about 500 Mw. The new indigenous units coming on line in 2013 will have an output of 700 Mw centred around the PHWR technology. To reach the ambitious development programme set by India, a further increase of individual reactor size is expected. India has already taken steps to install larger units, and more are being developed. The support of international companies for this imported programme will benefit from the operational experience gained on other projects and will also help in securing timely operation.

Matching indigenous reactors

Alstom is adapting its full-speed steam turbine solution (3,000 r/min for 50 Hz) – STN700 and STN1000 – to meet the new, larger, domestically-produced reactor. The steam turbine is closely related to the full-speed units installed in the Chinese market and is now being adapted for India.

The STN700 and STN1000 are suitable for reactor outputs of 600-1,000 Mw. Alstom already has six of these machines in operation – two in the UK (at Sizewell) and four in China (at Daya Bay).

These steam turbines feature three low pressure (LP) turbine sections for large output and low back-pressure. In India, back-pressure is high due to the warm circulating water temperature and the reactor is rated at 700 Mw. Both differences explain why STN turbines for India will feature two LP turbines instead of three.

One characteristic of heavy water reactors is the relatively low HP inlet pressure (typically 40 bar). The volume flow to be handled for a 700 Mw rating is thus quite close to the volume flow to be handled with a 1,000 Mw-rated PWR which will operate at higher pressure (typically 66 bar). A similar sizing of the HP module can thus be achieved for both cases, resulting in an easy adaptation for the Indian reactor. Adaptation to the lower inlet pressure and power output is thus straightforward.

Another characteristic of the Indian power market is the instability of the transmission network demonstrated by wide frequency variation. Plant operators are concerned about damaging machines as a result of operating under varying frequencies. Alstom blades are designed with integral banding, ensuring a very secure separation with the harmonics of the rotating frequency in the specified range of frequency variation.

Erosion is a key issue for a power plant, with a direct impact on reliability. This is particularly important in nuclear plants since the steam coming from the nuclear island is very wet. As it is expanded, it becomes wetter and can

cause severe erosion. Over the years, Alstom has developed a comprehensive methodology to address this issue for all locations within the machine. The design rules govern the acceptable steam velocities, the material resistance to flow-assisted corrosion, the protection of the sealing surfaces, etc according to years of operational feedback. These proven solutions allow the turbine to be operated for the lifetime of the plant with minimum maintenance.

The units are designed for easy maintenance since the modules are lightweight with a limited number of stages. Specific design improves the maintainability of the unit such as the bottom steam entry for the HP module, thus permitting its opening without dismantling the main steam pipes.

The sheer size of the indigenous reactor market may require specific steps to make the best use of existing or to-be-developed manufacturing and engineering capacity.

Larger turbine islands

With the International Atomic Energy Agency lifting its ban on international companies participating in the Indian nuclear power sector, the market will be in need of the larger turbine islands similar to those already installed or under construction in most major nuclear countries.

The reactor unit size dictates the choice of turbine technology. With full-speed technology being at the extent of its limits at 1,000 Mw, half-speed technology is the dominant technology above 1,000 Mw. Half-speed technology is in the middle of its application range at 1,200 Mw, and can be used efficiently under a large range of reactor and site conditions.

Half-speed technology is the only technology that can efficiently handle the very large quantity of 'cold' steam produced by large nuclear reactors. The



LP1 steam turbine rotor

lower stress level achieved with steam turbines that use half-speed technology ensures high reliability and durability over very long periods (60 years). It allows the use of longer last-stage blades that have greater mechanical resistance

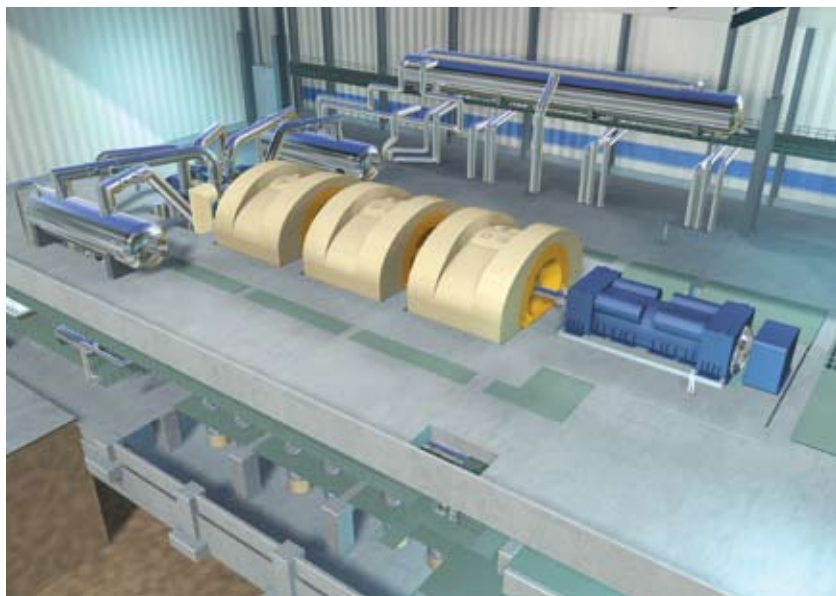
The lower stress level achieved with steam turbines that use half-speed technology ensures high reliability and durability over long periods

than blades used in full-speed turbines. Alstom's Arabelle technology is designed for reactor units with power outputs in excess of 1,000 Mw. It is widely acknowledged as the best half-

speed turbine in the market, and offers outstanding power output from 900-1,800 Mw, plus efficiency and reliability, using proprietary architecture and welded-rotor technology.

With the nuclear renaissance in many parts of the world, the fully-validated and advanced design provides proven reliability and performance in the new generation of reactors. The largest turbines in operation worldwide are of this type of machines with a 1,550 Mw power output and extremely high reliability.

Previous generations of steam turbines for nuclear plants feature one double-flow high-pressure (HP) cylinder in which the main inlet steam flow is divided into two symmetrical flows. After expansion, the steam is led to the moisture separator reheaters (MSRs) where it is first dried and then superheated by a derivation of the main steam. Superheated steam is fed to each of the four or six low-pressure flows (with two or three LPs respectively) for



Arabelle turbine island

final expansion down to the condenser pressure.

In an Arabelle turbine, steam expands in a single-flow HP path and is then divided to feed the two MSRs. The two superheated steam flows are again joined and expanded in a single flow intermediate-pressure (IP) section. The final split to feed three double-flow LP cylinders, in the case of units for India, is done at a relatively low-pressure level – about three times lower than the earlier generation of turbines.

In order to reduce overall turbine length, the HP and IP expansions have been regrouped in a combined HP/IP cylinder, similar to those sometimes used in fossil-fired applications except for their much larger size. A saturated steam nuclear steam turbine will accommodate an inlet volume flow roughly five times greater than a fossil-fired unit of the same nameplate rating because of the combination of much lower steam pressure and temperature.

Another distinctive feature of this technology is the architecture that makes the best use of the high efficiency single-flow steam expansion. The single-flow arrangement ensures higher efficiency due to the reduction of secondary losses that develop at the root and at the tip of the steam path. With this arrangement,

the single-flow steam expansion is maintained typically from the inlet pressure of about 70 bar down to 3.4 bar, thus representing more than 60 per cent of the expansion performed with the best efficiency. The overall gain in efficiency permitted by the single flow architecture

Aerodynamics have also been optimised, and the last stages benefit from the 3-D profiles developed by advanced calculations and now made possible by modern techniques

as compared to the former architecture is estimated to be 1 per cent.

Because of the high thermal load of the current proposed reactors, the turbine has a longer last stage blade (LSB) than before. Alstom's LSB for nuclear applications in India would have a length of 1,430 mm (57 inches). This blade provides an LP cylinder exhaust area well suited to the latest generation of reactors. Its design, with an integral

snubber for reliable operation and a fir-tree attachment for easier access for inspection, is well adapted to the long inspection intervals targeted with the present generation of nuclear plants. Because of the vibration control provided by the snubber connection, this type of blade has the benefit of a reduced weight compared to (for example) free-standing blades. With these relatively light blades, it is possible to define a bearing structure able to withstand the unbalance created by the postulated LSB failure scenario.

Aerodynamics have also been optimised, and the last stages benefit from the 3-D profiles developed by advanced calculations and now made possible by modern manufacturing techniques. In particular, the last two diaphragms feature bowed profiles and not the straight profiles used in the previous generation of machines.

Welded rotor technology is a key feature of the steam and gas turbines. For very large rotors, it permits the best control of the material inner properties and initial defect size. Because of the reduced stress compared to shrunk-on disks design, steel with lower yield strength can be selected for better resistance to stress corrosion cracking while maintaining the required properties for the disks supporting the last stage blades.

The Gigatop 4-pole hydrogen and water cooled turbogenerators complement the Arabelle steam turbines with a power range from 1,000 to 2,000 MVA, enabling high output with a superior efficiency of 99 per cent. This machine has been selected for the turbine islands of Flamanville 3 in France, Hong Yan He in China, Unistar in the US and other projects, with 19 units ordered since 2005.

The Indian grid requires that the turbogenerator can be operated at a frequency of 47.5 Hz (5% less than the rated 50Hz) without restriction in duration or reduction in power output. The Gigatop 4-pole turbogenerators considered for the Indian nuclear programme meet this requirement.

The author is performance and process director, nuclear, Alstom Power

Oil Shale

Did you know that industry can burn oil shale as a low-grade fuel for generation and heating

Oil shale is one of the unconventional alternate resources of energy that has emerged as a possible means to supplement declining conventional hydrocarbon production. These are fine grained sedimentary rocks containing relatively large amount of organic matter from which significant quantities of shale oil and combustible gas can be extracted. Called kerogen (a solid mixture of organic chemical compounds), it requires more processing to use than crude oil, which increases its cost as a crude-oil substitute both financially and in terms of its environmental impact. Industry can use oil shale as a fuel for thermal power-plants, burning it (like coal) to drive steam turbines; some of these plants employ the resulting heat for district heating of homes and businesses. The chemical process of pyrolysis can convert the kerogen in oil shale into

synthetic crude oil. Heating oil shale to a sufficiently high temperature will drive off a vapour which processing can distil (retort) to yield a petroleum-like shale oil—a form of unconventional oil—and combustible oil-shale gas (the term shale gas can also refer to gas occurring naturally in shales). Industry can also burn oil shale directly as a low-grade fuel for power generation and heating purposes and can use it as a raw material in chemical and construction-materials processing.

Shale gas is natural gas produced from shale formations. Gas shales are organic-rich shale formations. In terms of its chemical makeup, shale gas is typically a dry gas primarily composed of methane. Three factors have contributed to its rapid development of US gas shales: advances in horizontal drilling, advances in hydraulic fracturing, and, perhaps most importantly, rapid increases in natural gas prices in the last several years as a result of significant supply and demand

pressures.

Oil shale can be mined using one of two methods: underground mining using the room-and-pillar method or surface mining. After mining, the oil shale is transported to a facility for retorting, a heating process that separates the oil fractions of oil shale from the mineral fraction. The vessel in which retorting takes place is known as a retort. After retorting, the oil must be upgraded by further processing before it can be sent to a refinery, and the spent shale must be disposed of. Spent shale may be disposed of in surface impoundments, or as fill in graded areas; it may also be disposed of in previously mined areas. Eventually, the mined land is reclaimed.

Humans have used oil shale as a fuel since prehistoric times, since it generally burns without any processing. Britons of the Iron Age also used to polish it and form it into ornaments. Modern industrial mining of oil shale began in 1837 in Autun, France, followed by exploitation in Scotland, Germany, and several other countries. Operations during the 19th century focused on the production of kerosene, lamp oil, and paraffin; these products helped supply the growing demand for lighting that arose during the Industrial Revolution. Fuel oil, lubricating oil and grease, and ammonium sulfate were also produced. The European oil-shale industry expanded immediately before World War I due to limited access to conventional petroleum resources and to the mass production of automobiles and trucks, which accompanied an increase in gasoline consumption. Although the Estonian and Chinese oil-shale industries continued to grow after World War II, most other countries abandoned their projects due to high processing-costs and the availability of

Advances in horizontal drilling and hydraulic fracturing have contributed to shale oil growth



cheaper petroleum. The global oil-shale industry began to revive at the beginning of the 21st century.

Most exploitation of oil shale involves mining followed by shipping elsewhere, after which one can burn the shale directly to generate electricity, or undertake further processing. The most common methods of surface mining involve open pit mining and strip mining. These procedures remove most of the overlying material to expose the deposits of oil shale, and become practical when the deposits occur near the surface. Underground mining of oil shale, which removes less of the overlying material, employs the room-and-pillar method. The extraction of the useful components of oil shale usually takes place above ground (ex-situ processing), although several newer technologies perform this underground (on-site or in-situ processing). In either case, the chemical process of pyrolysis converts the kerogen in the oil shale to shale oil (synthetic crude oil) and oil shale gas. Most conversion technologies involve heating shale in the absence of oxygen to a temperature at which kerogen decomposes (pyrolyses) into gas, condensable oil, and a solid residue. This usually takes place between 450 °C (842 °F) and 500 °C (932 °F). The process of decomposition begins at relatively low temperatures (300 °C/570 °F), but proceeds more rapidly and more completely at higher temperatures. In addition to its use as a fuel, oil shale may also serve in the production of specialty carbon fibers, adsorbent carbons, carbon black, phenols, resins, glues, tanning agents, mastic, road bitumen, cement, bricks, construction and decorative blocks, soil-additives, fertilizers, rock-wool insulation, glass, and pharmaceutical products. However, oil shale use for production of these items

remains small or only in its experimental stages. Some oil shales yield sulfur, ammonia, alumina, soda ash, uranium, and nahcolite as shale-oil extraction byproducts.

Energy economists all over the world have started to admire with awe the great achievement of oil companies in the US in developing shale gas resources on a large scale during the last decade. As recently as three years back conventional wisdom was that US will have a huge gas deficit and it has to import increasing quantity of LNG. In less than two years, the US supply has changed from one of deficit to surplus. The sudden and unexpected development of shale gas has been a game changer.

In India, shale deposits are found across the Gangetic plain, Assam, Rajasthan and many coastal areas, but neither the government nor the corporate sector has carried out any exploration or estimation

It is not that we in India are not familiar with this development. In an article few months back, columnist Swaminathan Anklesaria Aiyar had urged the government to bring about policy changes to promote shale gas. In India, shale deposits are found across the Gangetic plain, Assam, Rajasthan and many coastal areas, but neither the government nor the corporate sector has carried out any exploration or estimation. Recently, ONGC announced plans to start a pilot project in 2011 when most oil companies

in Europe and the US are racing to master the technology of shale gas from those companies who have already succeeded in the US.

Oil shale reserves in India are greater than 15 billion tonnes. North-East India is endowed with rich deposits of coal. The coal is found in the Barail Formation of Tertiary age. Carbonaceous shale occurs interbedded with the coal. The presence of coal and shale has been recorded in wells drilled for hydrocarbons by ONGC and Oil India Ltd. These formations outcrop on the surface towards the south of the oil fields in a region called the Belt of Schuppen. Studies have indicated that these coals and carbonaceous shale constitute the principal source rocks that have generated the hydrocarbons produced from the region. In addition to the oil shale potential in the North East, there are identified stretches in Uttar Pradesh and Rajasthan where similar shale mining is being experimented. Indian corporates - notably Reliance Industries Ltd, have made considerable efforts to acquire shale assets as a de-risking strategy to counter crude oil shortage.

There are many concerns about this newly-popular resource that hover principally around two issues; cost and environment impact. As most of the shale needs to be dug out in strip mining rather than drilled a process that has high environmental problems. Once dug out, it then needs to be heated to 450-500°C, enriched with hydrogen via steam before the resulting oil is separated. The residue is a sludge that needs to be disposed of. Oil shale production can result into more than four times greenhouse gases as compared with conventional oil production. In theory, it has the potential to make a minor contribution to the Indian oil requirements, but it is not expected to solve the problem to any great extent.

Mobil Industrial Lubricants

Products sans emission slide

Prices of most energy commodities, barring emission instruments, fell in varying proportions last month



V Shunmugam, chief economist, MCX

Riding on the bullishness and subsequent topping of a psychological \$80 a barrel mark in the past month, crude oil futures on NYMEX started August 2010 stronger by 3.03 per cent (over the July close) at \$81.34. Further, the release of better-than-expected PMIs (purchasing manager indexes) in the US and Europe, weakness in the USD, and news of a tropical depression forming in the Atlantic were factors that drove the price higher. Reports of a higher-than-expected decline in US crude oil stocks stoked up oil prices to the month high of \$82.97 on August 4. Since then the prices cooled down throughout the month, except a few sessions at its fag end. A trigger to the slide was provided by a data release showing an increase in US jobless claims, thereby casting doubts over the energy demand outlook. Further, a deteriorating demand outlook on persisting economic concerns and the subsequent strengthening of the US dollar ensured a persistent fall in oil prices. Indications that

OPEC members were to produce more oil than their set quotas also helped bearish sentiments stick around oil prices. Besides, unwinding of the hurricane premium in oil prices

as this year's hurricane season failed to generate any strong tropical storms yet pushed the prices down. Eventually, rising supplies and an end to the summer driving season in the US, coupled with dull global market sentiments, made oil futures prices on NYMEX dip to the month low of \$70.76 on August 25. After some bargain hunting, NYMEX oil futures prices finished the month 8.9 per cent lower on a monthly basis at \$71.92 – the first monthly decline since May this year. Crude oil derivatives – heating oil and gasoline – also witnessed a monthly fall of 10.31 and 2.36 per cent respectively. Apart from a fall in crude oil prices, the fast-approaching end of the US summer driving season coupled with sustenance of US gasoline stocks well above the 5-year average amid an important driving season emerged as the major reason for a steep fall in gasoline prices.

Futures prices of another major energy commodity, natural gas, on NYMEX slumped by over 22 per cent in August, the largest monthly fall since July 2008. As mentioned before, the deteriorating economic outlook on weaker-than-expected data related to the US manufacturing and housing sectors and a calm weather outlook for offshore production areas pushed down the prices of gas. Little hurricane activity and the upcoming seasonal lull in gas use as summer cooling demand is set to decline

while winter demand is still months away were the other major reasons for the sharp fall in gas prices. Another energy commodity that experienced a fall in its prices was coal; the prices of coal futures on ICE declined in August by 1.62 per cent on a monthly basis. What largely drove down the prices of coal were weaker German power prices and an easing of the heat wave in Europe. Also, high inventory levels in China, a major global consumer, and depleted capacity of coal-consuming industries denied possibilities of a rise in coal prices. Breaking the general trend of falling energy prices, futures prices of both emission instruments – EUA and CER – on ICE-ECX rose by 8.10 and 11.83 per cent respectively in August. The prices of CERs, and hence of EUAs, were fuelled by fears of a reduced supply of the Clean Development Mechanism (CDM) credits weighing on buyers in the EU carbon market. This was largely based on UNFCCC's move to review a number of Chinese projects, particularly HFC projects (that generally yield bulk CERs) participating in the CDM offsetting scheme. Notably, the UNFCCC move follows the criticism from green groups which said that a number of projects were deliberately generating greater levels of greenhouse gases so that they could destroy them and create saleable credits.



Q1FY2011

Below Par



Rupesh Sanke, senior
analyst Angel Broking

The performance of power generating companies was slightly below our estimate. The performance on the top-line front was affected by fuel shortage and delay in the stabilization of plants. NTPC posted a moderate 7.8 per cent y-o-y increase in net sales to Rs 12,944 crore in Q1FY2011 driven by lower PLFs. During the quarter, the sales volume remained flat at 55.7 billion units (55.5 billion units in Q1FY2010) despite the additional 990 Mw (Dadri 490 Mw and Kahalgaon 500 Mw) units in operation. However, CESC recorded a healthy 33.7 per cent growth in top-line for Q1FY2011 driven by the recent commissioning of the 250 Mw Budge-Budge plant. CESC's total power generation during Q1FY2011 stood at 2,443 million units, up 23.4 per cent y-o-y. On a y-o-y basis CESC's operating profit declined by 119 basis points to 23.4 per cent due to the 90.6 per cent

increase in other expenses to Rs 183 crore. The interest and depreciation costs too went up by 56 per cent and 40 per cent respectively. Standalone net profit grew by a marginal 4.8 per cent to Rs 110 crore.

GIPCL's Q1FY2011 top-line remained flat at Rs 253 crore despite the 5 per cent reduction in sales volume to 786 million units. De-growth in sales volume was offset by the 5 per cent improvement in realisations. Operating profit grew 3.3 per cent y-o-y to Rs 64 crore on better realisations. Operating profit for the quarter stood at 25.4 per cent, up 82 basis points. Net profit increased 42.3 per cent to Rs 42 crore.

Tata Power registered 7 per cent growth in consolidated revenue for the Q1FY2011, but its net profit (after minority interest) was down by 43 per cent to Rs 317.7 crore. The company's operations during the quarter continued to be strong. Sales volume for the quarter

increased by 8 per cent to 4,533 million units as against 4,180 million units in the corresponding period last year. Overall generation was up by 3 per cent at 4,386 million units as compared to 4,260 million units in the same period last year. The fall in net profits is largely on account of a higher base as well as higher forex losses as compared to Rs 552.76 crore in the previous year which included Rs 232.4 crore due to MERC tariff orders and judgment of ATE received. Profit for Q1FY11 is after considering Rs 154 crore of forex loss on account of realignment of CGPL borrowings.

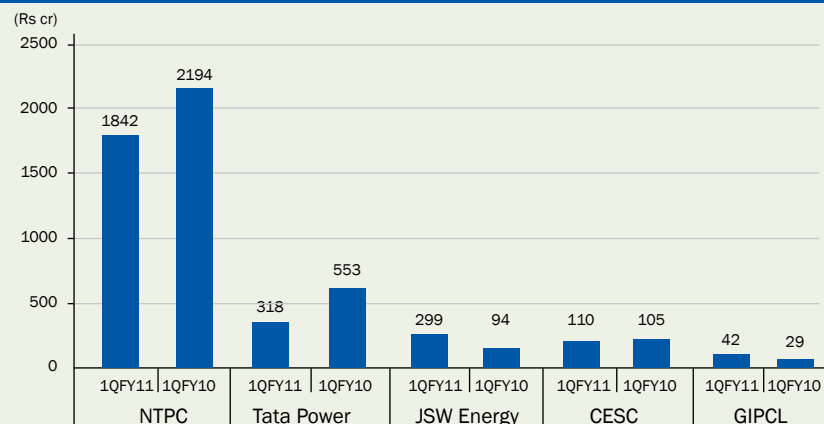
JSW Energy's total income for Q1FY2011 on a consolidated basis stood at Rs 932.4 crore indicating a 210 per cent increase y-o-y. Operating profit slipped by 1,020 basis points to 48.5 per cent. Operating profit for the period stood at Rs 452.33 crore indicating an increase of 156 per cent. Net profit after tax stood at Rs 298.6 crore indicating an increase of 219 per cent.

In terms of bottom-line performance, JSW Energy was the best performer with profit after tax at Rs 298.6 crore indicating an increase of 219 per cent.

NTPC reported a 16.1 per cent y-o-y de-growth due to higher fuel and employee expenses. Operating profit fell by 440 basis points to 25.1 per cent. Lower PLFs during the quarter also resulted in lower incentives, thereby affecting margins.

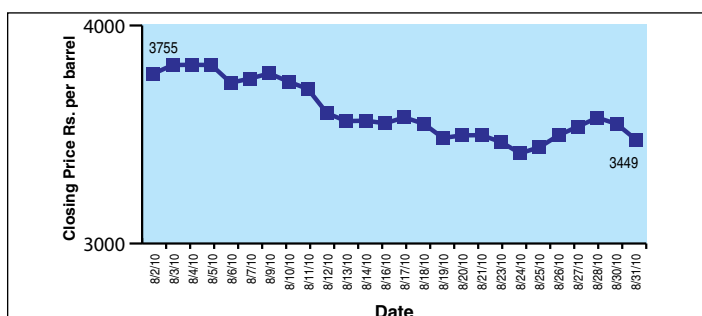
Net profit declined by 16 per cent y-o-y to Rs 1,842 crore during the quarter. GIPCL's net profits saw a 42.3 per cent y-o-y improvement in the bottom-line aided by lower fuel and tax expenses.

Net Profit



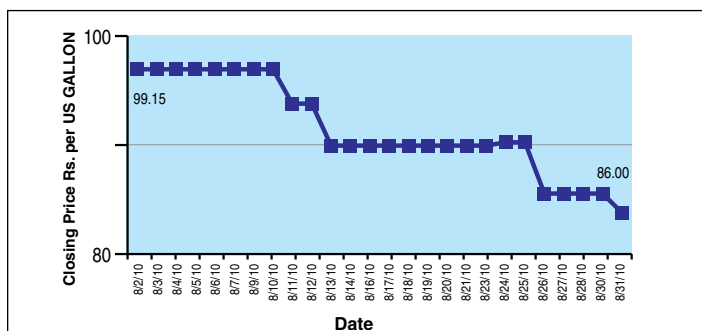
Tracking the developments in global fundamentals, futures prices of crude oil, along with those of its derivatives – gasoline and heating oil – fell on MCX by 5.6 per cent, 13.3 per cent and 1.1 per cent, respectively, in August 2010. Factors such as deteriorating demand outlook on persisting economic concerns flagged by weak economic data releases; little hurricane activity; and rising inventory levels in the US, the major global consumer of oil and its products, led to the decline in the prices of oil and its derivatives. Further, a fast approaching end of US summer driving season – the key to gasoline demand – added to the bearish sentiments, lead to a steep fall in gasoline prices.

MCX Crude oil



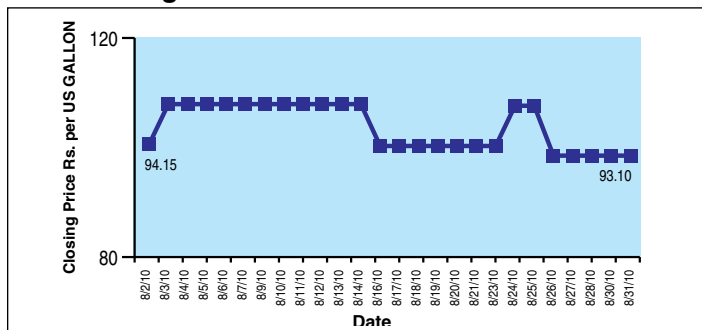
From Aug 1st to Aug 19th, the prices are for the Aug 10 contract. Following its expiry on 19th Aug, the prices from Aug 20th to Aug 31st is for the Sept 10 contract (which then becomes the near month contract)

MCX Gasoline



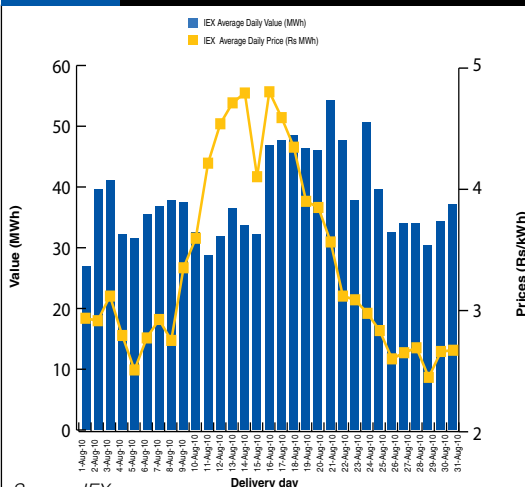
From Aug 1st to Aug 25th, the prices are for the Aug 10 contract. Following its expiry on 25th Aug, the prices from Aug 26th to Aug 31st is for the Sept 10 contract (which then becomes the near month contract)

MCX Heating oil



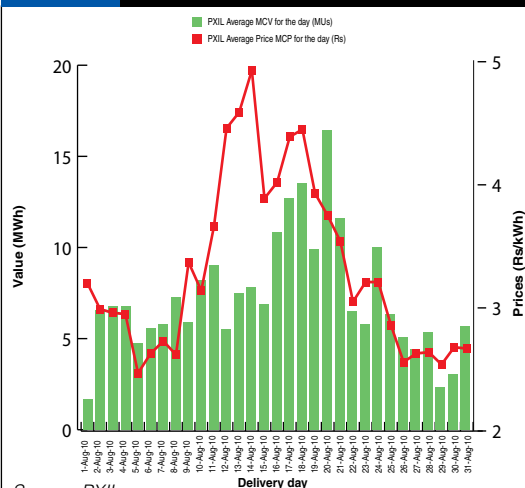
From Aug 1st to Aug 25th, the prices are for the Aug 10 contract. Following its expiry on 25th Aug, the prices from Aug 26th to Aug 31st is for the Sept 10 contract (which then becomes the near month contract)

POWER PRICES IEX



Source: IEX

POWER PRICES PXIL



Source: PXIL

STOCK MOVEMENTS

Company	9-Sep	Monthly h/l	Wtd. Av	52wk h/l
ABB	782.85	804 / 745	782.63	886 / 669
BHEL	2,478.10	2,540 / 2,382	2,465.18	2,585 / 2,105
IOC	409.95	436 / 351	411.48	436 / 272
ONGC	1,355.55	1,377 / 1,151	1,351.77	1,377 / 997
RIL	957.95	1,020 / 885	960.41	1,184 / 840
R-Infra	1,009.90	1,121 / 980	1,015.71	1,404 / 951
Siemens	711.6	726 / 677	710	764 / 486
Suzlon	51.35	58 / 43	51.57	102 / 43

Source : BSE

The country continues to add power capacity at a steady pace. In the month of August it added 975 Mw and in the earlier two months it added 1,828 Mw. The first of IPPs in Maharashtra started functioning earlier this month with JSW Energy's 300 Mw getting added to the grid. The entire 1,200 Mw of power generation plant of JSW at Jaigad in Ratnagiri is expected to be commissioned over the next one year. Crude oil production reached 2,938.7 thousand tonnes from April's 2,871 thousand tonnes in June; however, it still missed the target of 3,025.1 thousand tonnes. As the C-Series production came on stream the country's natural gas production almost doubled from 2,443.7 mmscm to 4,501.5 mmscm in June. The refineries continued to do well, processing 13,500.9 thousand tonnes of crude against 12,982.1 thousand tonne target.

POWER GENERATION

Category / Regions	Monitored Capacity (Mw)	Actual
Northern region		
Thermal	25505.26	12861.55
Nuclear	1620.00	561.00
Hydro	13486.25	6740.54
Total	40611.51	20163.09
Western region		
Thermal	36726.31	18129.81
Nuclear	1840.00	843.81
Hydro	7392.00	1012.72
Total	45958.31	19986.34
Southern region		
Thermal	2297.80	11046.62
Nuclear	1100.00	512.96
Hydro	11191.45	2911.95
Total	35262.25	14471.53
Eastern region		
Thermal	19775.05	8897.81
Hydro	3847.70	977.83
Total	23622.75	9875.64
North eastern region		
Thermal	858.50	353.29
Hydro	1116.00	591.64
Total	1974.50	944.93
	0.00	1017.20
All India		
Thermal	105835.92	51289.08
Nuclear	4560.00	1917.77
Hydro	37033.40	12234.68
Bhutan imp	0.00	1017.20
Total	147429.32	66458.73

Source : CEA

Crude oil production*

Name of the Undertaking / Unit	Planned production during the month	Production during the Month under review	Corresponding month last year	% variation over last year during the month under review	% variation during the month under review over planned prodn.
ONGC	2094	2021	2026	-0.2	-3.5
Oil India Ltd. (OIL)	301.8	264.0	289.4	-8.7	-12.6
DGH (Private / JVC)	629.3	653.7	436.4	50.0	4.0
Onshore	1185.3	1087.7	931.7	16.7	-8.2
Offshore	1839.8	1851.0	1820.1	1.7	0.6
Grand Total (1+2+3)	3025.1	2938.7	2751.8	6.8	-2.8

Source: Petroleum ministry

All figures in '000 tonnes

Natural gas production*

Name of the Undertaking / Unit	Planned production during the month	Production during the Month under review*	Corresponding month last year	% variation over last year during the month under review	% variation during the month under review over planned prodn.
ONGC	1910.5	1945.8	1900.8	2.4	1.8
Oil India Ltd. (OIL)	220.0	181.8	204.0	-10.8	-17.3
Private/JVC	2363.5	2373.9	1483.6	60.0	0.4
Onshore	717.9	684.7	727.5	-5.9	-4.6
Offshore	3776.1	3816.8	2860.9	33.4	1.1

Source: Petroleum ministry

All figures in million cubic meters

Refinery production*

Name of the PSU / Private Co	Planned production during the month	Production during the Month under review	Corresponding month last year	% variation over last year during the month under review	% variation during the month under review over planned prodn
IOC	3986.0	4380.2	4111.9	6.5	9.9
BPCL	1700.0	1883.6	1482.3	27.1	10.8
HPCL	1195.7	902.0	1368.7	-34.1	-24.6
CPCL	927.0	954.9	877.0	8.9	3.0
NRL, Numaligarh	234.0	161.2	231.2	-30.3	-31.1
MRPL, Mangalore	1100.0	1088.3	993.4	9.6	-1.1
ONGC, Tatipaka	4.4	3.3	4.6	-28.3	-25.0
Private Sector	3835.0	4127.4	4057.5	1.7	7.6
Total	12982.1	13500.9	13125.6	2.9	4.0

Source: Petroleum ministry/*Production figures for June/ All figures in '000 tonnes

Captive coal mines

Increasing Production



Sanjeev Aggarwal, MD Amplus Infrastructure Developers

The development of coal blocks has become a challenge both for the economy as well as industry. The economy suffers tremendously both in terms of growth and competitiveness when domestic coal, though available in plenty below the ground, is not available to meet the requirements of a growing economy.

Since 1993 the government has allotted 203 coal blocks having more than 48 billion tonnes of coal, but production has started only in 26 coal blocks with just 35 million tonnes being mined in 2009-10. While one can blame it on issues like land acquisition and forest clearances, there is no denying the fact that the problem is not only on the policy side. Companies, having acquired a mine, try to delay its development targeting the best time for unlocking its value.

In the recent past there have been a couple of reviews to monitor the progress of the coal mines, but till now only five coal blocks have been cancelled. This just goes to prove that the system of allocation itself has been lacking somewhere, and thereafter, that the monitoring is not able to achieve the desired objectives. My argument is not against seeking government help in getting the clearance process straight – it should surely do everything possible to help in land

acquisition and enviro-forest clearances of the mines that have been allocated. We need to move beyond the issues of 'go/no-go' areas for planned investments based on allocations. The discussions over the last 15 months on this issue are yet to reach a conclusion despite top decision makers being involved in the exercise. Clearly, not a very desirable situation considering the impact on the projects involved, some of which have spent a considerable amount of time and money on development. By any measure, change of policy retrospectively or uncertainty in the same is the single largest factor which impacts investments in a growth economy.

Moving Forward

The government is now considering coal block allocation through competitive bidding. It will certainly be more transparent compared to the present screening committee system. However, if we do not get the fundamentals right, coal production is unlikely to increase. The allocation should not be for promoting the end-user industries of steel and power which are no longer working in a controlled pricing regime; it should be for increasing coal production in the country. Learning from the past, there are two factors – the intent and the implementation – that need to be put right. We need to put intent first – if the government and the industry both have the intent to achieve,

it will be done. It is absolutely important that the allocation be done in a manner that avoids hold-ups and squatting on this scarce and important national resource. Therefore, allocate the right blocks by examining the enviro-forest issues upfront and give them to the companies which are serious about mining. Rather than allocating mines to companies that link coal production to their end-use plants, blocks should be allocated to world-class mining companies whose business is mining. The mining companies can carry out mining most efficiently using the best technologies, improving both the recovery and production rates. The government should do its part in expediting the final clearances that should be pre-screened before allocation.

The advantages of this system will be plenty. To start with, the value of the coal reserves will be based on the cost of production of coal rather than on the basis of the price of electricity. While it may lead to some notional loss to the government in terms of bid premium, it will provide coal to a larger number of users without creating any significant competitive advantage for some of the users that control the coal mines. Of course, the long-awaited coal regulator can take care of the concerns about excessive profiteering. But coal will be available in plenty to all those who need it, and at the right cost.