A monthly newsletter of
Indian Association of Energy Management Professionals

The Uria Watch

January 2010, Vol. III/Issue 19

It is about "Conscience Keeping on Energy Matters"

COAL & ENERGY

COAL AND ENERGY

What's inside…?

From the Editor's Desk...

Dirty Coal and Clean Energy

As we step into 2010, "The Urja Watch" continues its journey into the third year since launching in 2008. I take this opportunity to thank fellow-members of the editorial board, contributors, reporters, IAEMP members and dear readers for your continued support and cooperation. My best wishes to all for a Happy New Year!

It took millions of years for nature to create coal. India is blessed with vast natural reserves of coal. With proven reserves of about 260 Billion tonnes, coal is one of the most abundant sources of energy in India. Coal accounts for over half of the primary energy consumed in the country, the greatest demand coming from power plants, steel and cement industries.

For long, coal has been a popular and cheap source of energy in India – but it's also dirty. The dirty black substance is burned almost everywhere as fuel, from industrial boilers to home stoves, and for bulk electricity generation.

Coal mining is very aggressive to the environment. The impacts of coal mining include destruction of land, pollution of water ways, and massive damages to human health. Pollution from coal plants produces dirty air, acid rain and contaminated land and water. Health problems associated with coal pollution include childhood asthma, birth defects and respiratory diseases. Safeguards are therefore required in coal mines.

And then there is the massive waste of ash generated from burning coal. Indian coal is known to be of poor quality having high ash content. Millions of tons of coal ash are dumped every year causing environmental problems.

Power plants are generally designed for a specified coal quality range for optimum plant efficiency. Presence of mineral matters in coal has a detrimental effect on power plant operations. Apart from producing harmful emissions, poor quality of coal results in wear and tear of coal and ash flow paths, combustion chambers, mills, crushers and other components thus impacting the plant's thermal efficiency. Studies indicate that most coal-based power plants in India are operating at lower efficiency rates in comparison to power plants in the U.S. or other advanced countries.

Coal Combustion

The combustion of coal, particularly in thermal power plants, produce various emissions such as carbon dioxide, nitrogen oxides, sulfur oxides, chlorofluorocarbons, and air-borne inorganic particles such as fly ash, soot, and other trace gas species. They include several greenhouse gases that are considered to be responsible for global warming. The high levels of ash in Indian coal and inconsistency in coal quality are areas of key concern as they contribute to lower efficiency and environmentally harmful emissions.

Emerging Technologies

In recent years, many new technologies have emerged to transform dirty coal into a cleaner energy source. Clean Coal Technology (CCT) is a term often used to such technologies that aim at reducing the detrimental effects of burning coal. There are technologies that convert solid coal into cleaner liquid or gas. Some of the coal-gasification technologies make the dirtiest coal behave like clean-burning natural gas. Through patented processes, low-grade coal is turned into clean burning coal. CCT is a global phenomenon, with many innovations taking place worldwide. It is gaining attention from many countries including India.

Though dirty and poor in quality, coal cannot be eliminated from India's energy scene. Coal is the most abundant source of energy and will continue to be used as the major feedstock for India's power plants in the foreseeable future. The good news is that emerging technologies offer the hope of clean energy from humanity's oldest - and dirtiest fuel: coal.

With the anticipated growth of coal-fired electricity- generating capacity, India will require increased investments in coal mining operations, and power plants – most promising areas for developing new businesses that will improve the efficiency and environmental impact of using coal as an energy source.

Ultimately, how do we ensure that we tap clean energy? The answer lies in exploring diverse energy technologies that share a common thread: they improve the country's economy and environment while effectively reducing the gap between energy demand and supply.

As always, I welcome your comments and suggestions.

Energetically,

S.Subramanian
Editor

COAL AND ENERGY CONSERVATION OPPORTUNITIES

By G. Harihara Iyer

Introduction

Coal is a very important fossil fuel, being the indigenously available primary energy source for power generation, which would last for over 150 years, when compared to 30-40 years of Oil and Natural gas.

However, coal has its inherent problems. It is highly polluting, and its extraction and utilisation, highly energy intensive. There is immense scope for improvement of energy efficiency in coal mining, and coal utilisation.

Coal - Primary Energy Resource

India is the third largest producer of coal with 7% of the world coal reserves. In the overall primary energy resources, Coal maintains its dominant position in India at 53%, followed by Oil – 33% and natural gas – 9% and negligible Hydro – 3% and Nuclear – 1%. Our future energy needs are going to be, for many future decades, met by coal, as is the case with other countries, until the renewable energy sources are fully developed and commercially viable.

80 % of our electrical energy needs are met by coal-based thermal power plants. For a sustained 8 to 10% growth rate, annual generating capacity of the present 1.5 Lac MW has to be stepped up to 12 Lac MW by 2030. The present annual coal production of around 500 Million Tonnes is expected to 2500 Million Tonnes by 2030.

India has proven geological coal reserves close to 105000 Million Tonnes. The process of conversion of vegetal matter takes millions of years for transformation to coal undergoing the following stages:

Peat

Earliest stage of coal having least carbon content and no commercial value.

Lignite

Bio chemical changes take place, adding to the carbon content, has high moisture content, low calorific value, and high volatile content. It is inferior to coal, present in Tamil Nadu (Neyveli Lignite), Rajasthan and Gujarat (Kutch - Panandharo).

Bituminous Coal

It is the fuel we use for power generation, has higher carbon content and calorific value.

Indian coal, when compared to its Australian or Indonesian counterpart, is inferior, has lower calorific value and higher sulphur and ash contents. The result is inefficiency in plant operation, generation of very high ash volumes, containing approximately 40 % of ash contents, involving high energy consumption, posing problems of ash disposal.

There are bright prospects of using the fly ash for building or construction activities, thanks to the pozolanic qualities.

It is often techno economically favourable to import superior coal, especially for coastal, sea shore based plants.

Anthracite

It is the most superior grade coal with highest carbon content. The organic matter is mostly in the form of carbon and the volatile content is almost absent. The presence of anthracite is comparatively negligible in India.

GHG Emissions from Coal Combustion

From mining and transport operations, and from left over mines, large quantities of methane gas are released.

Coal combustion results in greater carbon emissions than burning of oil and gas. For producing 1 KWH, the carbon emission is 920 Kg from coal, 583 Kg from oil and 452 Kg from gas. Coal has the largest share (42%) of carbon emissions worldwide.

A single 500 MW coal-fired power plant produces annually 3 Million tonnes of Carbon Dioxide besides other GHG emissions like Sulphur Dioxide, Nitrous Oxides, Mercury and Particulates

Clean Coal Technologies

There are many clean coal technologies – some of them from the mining/extraction stage, such as:

- Selective Mining without contamination.
- Appropriate coal beneficiation/coal washing to remove contamination and deleterious substances, improving the quality, grade and calorific value.
- Introduction of circularised fluidised bed combustion boilers to burn the low-grade beneficiation rejects.

Further there are clean combustion technologies such as:

- Sub-critical Pulverised coal firing with steam pressure and temperature below 22.00 MPa and 550 degree centigrade with generating efficiency of 33 to 37%

- Circulating Fluidised-Bed Combustion technology (CFBC) where air is combined in combustion process in a circulating fluid bed. Lime stone, used as fluidising material, is especially useful for low quality Indian coal with high ash content and Lignite.

- Integrated Gas Combined Cycle (IGCC) – It is a superior technology involving coal gasification, driving gas turbines with 20% more efficiency than conventional Pulverised Combustion technologies, with low emission of carbon dioxide Nitrous Oxide Sulphur dioxide. Ash discharged in the form of molten slag could be used in construction works

- Underground Coal Gasification.

- Coal bed Methane

(Source: "Controlling power plant carbon emission" by John Marion et al).

Energy Conservation: There are many energy conservation opportunities in coal mines. Through energy audits, we can identify such opportunities and adopt energy conservation measures.

Overview of Mining and Extraction Methods for Coal

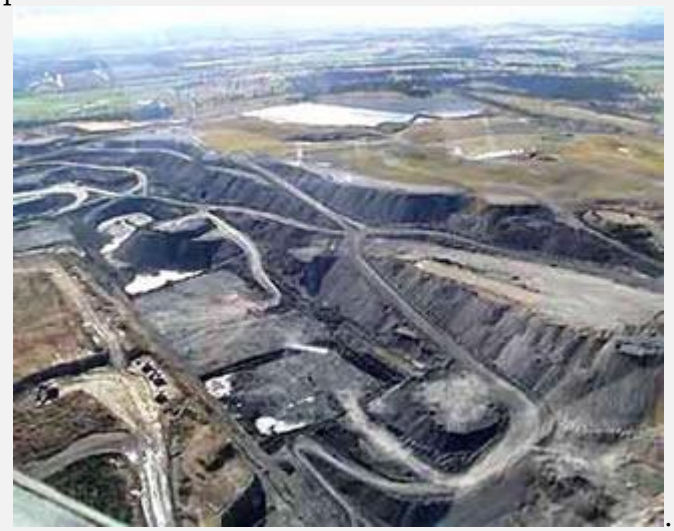
India had a well developed coal mining culture in the pre-independent British days. Indian mining laws such as safety legislations, rules and regulations owe their origin to parent British laws. There were a number of British companies successfully operating in the Bihar and Bengal region in the pre independent days.

During early days, the mining method was primarily underground, extraction was manual, and transport to the surface by electrical haulers or winders, and water pumping, the only electrically driven equipments. The power consumption was minimal. Most of the coal supply was for captive power generation.

After independence and nationalisation of coal mines, to meet the increasing need for power generation, mechanisation was adopted for higher production of coal, with growing thrust on open cast mining. From 90% of underground mining, the role reversal took place with 90% of opencast mines and 10% underground mines. There was a natural shift from electrical energy for underground operations to imported petroleum fuels such as HSD oils and lubricants for mechanised opencast mining operations, deploying heavy earth moving equipment such as blast hole drills, bull dozers, power shovels, load haul dumpers and others. This led to a huge requirement of HSD oil and lubricants for coal mining operations. In essence, our coal mining operations involving 90% of opencast mines became highly imported petroleum fuel intensive.

The rare exception in the energy input in opencast mines is at Neyveli where electrically driven continuous mining operations use bulk handling bucket wheel excavators, high speed steel chord belt conveyors and mobile crawler spreaders. However, when compared to the total national annual production of 500 Million tonnes of coal, 21 Million tonnes /annum (2005 to 2009) of Lignite from Neyveli Lignite Mines alone is electricity dependent from its captive power plant.

Open Cast Coal Mine



Neyveli Lignite Mine, Bucket Wheel Excavator

Energy Conservation Opportunity in Coal Mining Operations

90% of our annual 500 Million tonnes of coal production comes from petroleum fuel intensive opencast mines and remaining from electrical intensive underground mines. The energy consumption in opencast mines is around 90% from petroleum fuels and 10% electrical energy. In the case of underground mines the case is reverse, with 90% electrical and 10% diesel oil or even less.

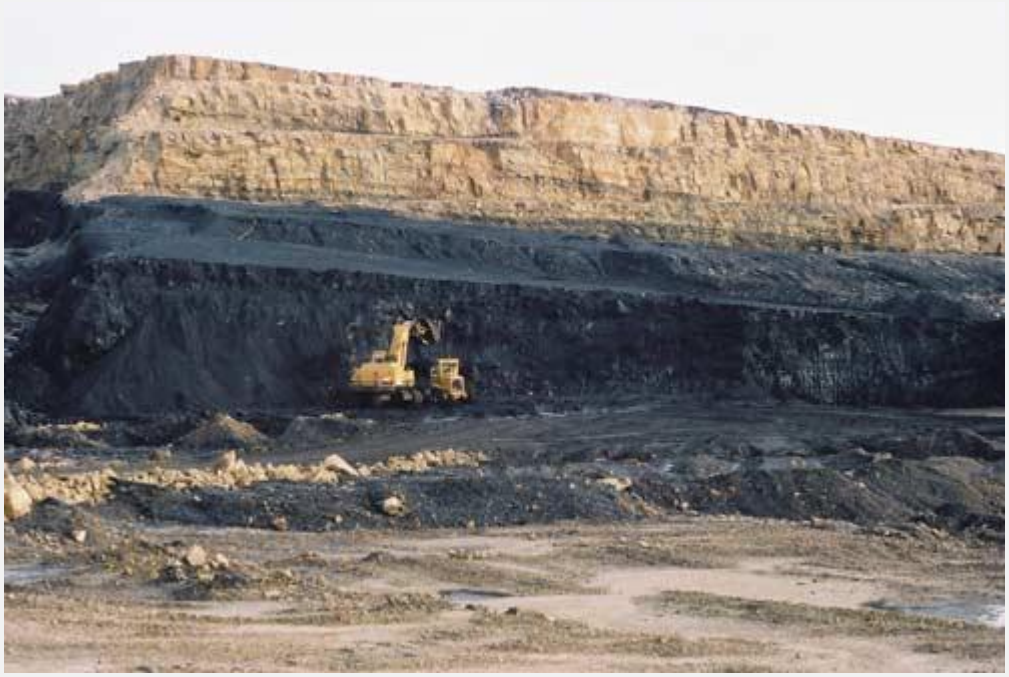
The average specific power consumption in the underground operations is around 17 KWH/Tonne of coal produced.

In the case of opencast mines, there is a huge consumption of HSD oil and lubricants for operation of the heavy earth moving, stripping and transport equipments. The associated complex process of high overburden waste removal and disposal adds to the woes and increases the fuel consumption substantially. In normal circumstances for every tonne of coal, 2 to 10 times of overburden/waste material has to be drilled with drilling rigs, blasted with high explosives, fragmented by secondary drilling and blasting, loaded with power shovels into load-haul, off-the-high way dumpers of varying capacities from 15 tonners to 200 tonners, hauled to the rejection stock pile, dumped and levelled by bull dozing. Each and every operation is highly fuel consuming.

The mined out coal is either transported to the coal stack yard or directly discharged into the crusher or washing plant bunker.

One cubic meter of mining over burden consumes over 1 Litre of HSD oil and 0.1 to 0.2L of lubricants. Oil consumption for one tonne of coal production averages from 1 to 1.8Litres of HSD. For 500 million tonnes of coal production per annum, the approximate HSD consumption is a whopping 700 Million litres of petroleum fuel inclusive of lubricants, which accounts for nearly 10 % of India's oil consumption.

Picture of Shovel Dumper combination extracting Coal.
Top rejection is the Overburden



Case Study of Energy Audit in Coal Mines and Washeries

This case study is about an energy audit of oil consumption in 3 coal mines and 2 coal washeries in Jharkhand. The findings of this study are briefly described in the following paragraphs.

In the Petrol, Diesel and Lubricant Audit (POL Audit), it was observed that there is spectacular energy saving potential in each and every activity mentioned above in the opencast mining operations. A saving potential of 50% of the consumption with little or no investment is possible. 50% of the reduction is achieved by implementing administrative systems and procedures and the rest by reducing the idle time of equipments conducting time studies. Total fuel switch over is possible to electrical energy by technology innovation.

For a production of 2.5 Million tonnes of Run-Off Mine coal the consumption to the tune of 55 Lac Litres could be brought down to less than 30 Lac Litres if the recommendations are followed. If the fuel switch-over takes place, the diesel consumption would be just 10% of the present consumption and bulk of the consumption would be electricity for operating the electrically driven equipment in place of diesel.

Recommendations based on Energy Audit (POL) in Coal Mines

1. There is only 40 % capacity utilisation observed. Low capacity utilisation leads to lower efficiency in production, productivity, idle time and higher fuel consumption
2. Haulage road maintenance within the mines and the road maintenance for the mine pit head to the destination point needs substantial improvement which would increase fuel efficiency
3. As we know, there is a standard fuel efficient most economical speed for vehicle at 50 KM/Hour. Similarly we have to stipulate the most economic speed for the heavy haul dumpers and adhere to the speed limits
4. Better quality productive maintenance, condition based monitoring are imperative.
5. Idle time study has to be done and remedial action taken.
6. Waste oil could be reused for blasting.
7. The Government should make the Energy / Fuel Audit mandatory.

Conclusions

To ensure energy security for the nation, much needs to be done. Indian mining operational standards are way below the standards of foreign counterparts.

50% of the fuel consumed could be saved without much investment or even technology by streamlining the operation and maintenance.

It is in true national interest to reduce the consumption of costly imported fuel. The problems of undue, unwarranted and avoidable wastages of fuel must be addressed through concerted efforts.

Bibliography: Environment – friendly utilisation of Coal - by NC Jha, Director (Technical) – Mining Engineers Journal - January 2010

About the author:

Mr. G. Harihara Iyer is a Life Member of the Indian Association of Energy Management Professionals. He is qualified in Mechanical Engineering, Mining Engineering, holding First Class Mine Managers Certificate of Competency in Mining, and a Certified Energy Auditor, with extensive experience in mining and mineral based industry in the country. He is also a recipient of several awards for outstanding professional contributions such as "Engineering Gold Medal" from Mining, Geological and Metallurgical Institute of India, Kolkata.

Coal and Mining Industry - A Business Overview

By Amit Gupta

Mining in India

The mining industry in India is dominated by state-owned companies, which contribute about 85% of the total value of mineral production.

Indian mines can be described as a mix of high and low degrees of mechanisation, with a high percentage lacking mechanisation compared with global standards. The non-coal mining sector comprises only about 500 surface mechanised mines.

The country hosts a wide range of natural resources, which include four fuel minerals (such as coal), 11 metallic minerals (such as iron), 22 minor minerals (such as copper), and 52 non-metallic minerals (such as clay). It is a significant producer of a number of ores and minerals. India figures at the top in the production of sheet mica, is the third largest producer of coal, the fourth largest producer of iron ore and the fifth largest producer of bauxite.

With its large coal reserves, India ideally should have become the top energy supplier in the world. However, coal production has been falling short of domestic demand even as import figures rise with each passing year. The Coal Mines Nationalisation Act of 1973 further compounded the situation by adversely affecting foreign investment in an attempt to supply coal at reasonable rates to strategic industries such as cement, power and steel.

Coal Mining in India

India has approximately 2618 operating mines, 88 percent of which are private. However, the Indian Government-owned mines contribute over 85 percent of the total value of mineral production. Nevertheless, trends point towards increased privatization in the mining sector in India.

Coal production, which is currently dominated by the state-owned Coal India Limited (CIL), was estimated at a little over 400 million tonnes in 2007. The coal sector did experience growth in April 2009 which was attributed to new projects and improved efficiency according to Coal India. India's total production for the month was 39.6 million tonnes, an increase of 4.6 million tonnes over the previous year. For the fiscal year ending March 2009, production saw growth of 7.7%, up from 6.3% in the previous year.

Demand for coal looks set to increase as power requirements continue to grow. India's ability to grow in line with the demand is reliant on continued investment in more efficient mining processes and technology, as well as streamlining the regulatory process.

The following table provides information on the coal reserves in different states of India.

Table: State's Coal Resources, 2007 (million tonnes)

State	Proven	Indicated	Inferred	Total
Andhra Pradesh	8,475.15	6,327.73	2,657.75	17,460.63
Arunachal Pradesh	31.23	40.11	18.89	90.23
Assam	314.59	26.83	34.01	375.43
Bihar	na	na	160	160
Chhattisgarh	9,972.77	27,035.14	4,442.57	41,450.48
Jharkhand	36,881.29	31,094.03	6,338.32	74,313.64
Madhya Pradesh	7,583.50	9,259.20	2,934.49	19,777.19
Maharashtra	4,855.70	2,821.66	1,992.17	9,669.53
Meghalaya	117.83	40.89	300.71	459.43
Nagaland	3.43	1.35	15.16	19.94
Orissa	17,464.55	30,239.15	14,295.56	61,999.26
Uttar Pradesh	765.98	295.82	0	1,061.80
West Bengal	11,453.98	11,810.16	5,070.70	28,334.84
Total	97,920.00	118,992.07	38,260.33	255,172.40

Mining in India has been kept as a government undertaking since 1950s. In the last few years, however, the economy has been liberalized, tariffs lowered, state enterprises privatized and the country opened to investment in mineral exploration. There is a need for upgraded equipment and technology in many of India's mines and modernization is underway, particularly in the coal sector. There exists considerable scope for augmenting the resource position by further exploration of known deposits and discoveries of new deposits, adopting state-of-the-art technology and modern methods like aerial reconnaissance or geophysical surveys.

The coal sector has been partially opened for private investment. Many coal blocks have been allotted to interested private companies with the condition that the coal produced could be used only for captive consumption in power plants, steel, cement and fertilizer plants or any other utilities.

The Ministry of Coal has the overall responsibility of determining policies and strategies in respect to the exploration and development of coal and lignite reserves, sanctioning of important projects of high value and deciding all related issues. The Ministry supervises Public Sector Undertakings, namely, Coal India Ltd. (and its subsidiaries), Neyveli Lignite Corporation and Singareni Collieries Company Limited.

Expected Market Demand for Coal and related Mining Equipment

Increased mining activity at Coal India coupled with replacement demand for aged heavy engineering and mining machinery is expected to boost demand for mining equipment. The $60 billion anticipated investment in power generation between 2007 and 2012 is expected to create significant market opportunity for mining and material handling equipment providers.

Ten per cent of the cost of setting up of new thermal power plant is material handling equipment. The Coal Ministry estimates that an investment of $21 billion in opencast mining and $5 billion in underground mining will be required to attain the target production level by 2025.

Likewise, the Indian Planning Commission estimates that demand for coal will be around 800 million tons by 2011, and this will greatly exceed supply. In 2007, projected shortfall in coal supply is 50 million tons. Foreign Direct Investment (FDI) is permitted in coal sector in captive mines with no Foreign Investment Promotion Board (FIPB) approval requirement for foreign equity less than 50 percent.

Higher equity is allowed with FIPB approval depending on end-use. Current policy allows FDI in coal and lignite mining for captive consumption for power generation (100 percent), steel and cement (74 percent).

In coal processing (washing and sizing), 100 percent FDI is allowed. The Investment Commission estimates $30-40 billion investment opportunity over next ten years to explore and develop new coal mines, manufacture and sell state-of-art mining equipment and technology and create related infrastructure for off-take of mined coal. Most Important Mining Equipment includes:

- Long wall loaders and draglines
- Excavators, shovels and coal/rock cutters
- Feeder crushers and special stage loaders
- Continuous mining technology
- Jumbo drills and long wall machinery
- Hydraulic/friction props and chocks
- Mineral screening, washing, crushing and grinding equipment
- Underground communication and safety systems
- Coal beneficiation, washeries and gasification plants
- Coal Bed Methane
- Underground coal gasification
- Mine safety equipment

Looking at the growing market demand, it can be concluded that the mining industry in India holds significant potential for business opportunities.

About the author: Amit Gupta is a consulting professional, a member of IAEMP and an active editorial board member of "The Urja Watch.".

IAEMP NEWS

A Brief Report On
IAEMPS' participation
In the Bharatiya Vigyan Sammelan and Expo 2009

Green Technologies for Sustainable Development

Dear All,

The Bharatiya Vigyan Sammelan and Expo 2009 were held at Devi Ahalya Vishwavidyalaya, Indore, M.P. from Dec 1 to 3, 2009**.**

The Mela was organised focusing on the theme of sustainable living thru environment, energy and agriculture technology.

IAEMP participated in this Expo. We were accommodated in MPUVN stall and got cooperation from Indore Office Head Mr. SL Bajaj - Executive Engineer MPUVN and his staff.

We introduced our HEMP just as launched in Indore. Approximately 250 hits of presentations were done before the public of Indore and guests comprising Ministers, Scientists, Higher officials from Indore Municipal Corporation, Engineering and Management Institutes, and Industries.

IAEMP attracted lot of public attention. We have received a certificate of participation in the event.

K. D. Bairagi
Phones: 9907270259, 9406626398

Why should you join IAEMP?

Indian Association of Energy Management Professionals (IAEMP) is a unique organization. We have a unique slogan-*'Conscience Keepers to Nation on Energy Matters';* a unique mission to work for India's Energy Independence and unique members; who spend their own time and money to promote energy conservation and efficiency-starting from their homes. IAEMP, since its inception has been growing on its own merit. We never sacrificed our principle for getting sponsorships or funds. The selfless work by many of our members has created a sort of revolution which was never seen before. We practice, what we preach. If you are also one who genuinely likes to contribute please join our movement. For more details about us and to join please visit our web site: www.iaemp.org or send a mail to iaemp@yahoo.com

HEMP NEWS

1. Ms. K.Jaylakshmi to edit the "HEM news'

Ms. K. Jayalakshmi has very kindly consented to be the Editor of "HEM News" from the February 2010 issue onwards. A journalist with 15 years in the field, Ms. Jayalakshmi is a science writer and an environmentalist. Passionate about preserving the planet, and its biodiversity, she recognises the role that energy plays in sustainability. She has been lending a hand to organisations working in the area of energy and environment. Editorial Board of 'The Urja Watch' welcomes her in the sister publication of IAEMP.

2. 'Teaching the Teachers' on new year!

Shri K.D.Bairagi conducted an awareness programme on HEM for teachers at Ordnance Factory Government Higher Secondary School, in Ordnance Factory Estate, Itarsi Dist. Hoshangabad, Madhya Pradesh.

The Principal of the school accepted his proposal and invited him on the first day of January 2010 in the evening after the school time. She gathered around 25 teachers and lecturers of the school. He gave a presentation of IAEMP-HEMP and advised them to work as Home Energy Managers of their home.

How he felt starting the New Year with a noble activity? Let us hear from him- "*Overall I felt great by the admirable words of thanks from all the participants. The principal requested me to come again for a longer duration with audio-visual presentation for students too. I got great satisfaction & good experience by this activity. Thanks to Shri Sunil Sood Ji and associates who made me do it*" – say Bairagi.

Subscribe for 'HEM News'

"HEM News" is now available at a yearly subscription. For 12 issues, the subscription is Rs.500/- only. A complimentary CD containing presentations and literature on home energy management is sent free to all subscribers. For mode of payment please refer page 19. For any queries please contact: Sunil Sood, National Convener, Home Energy Management Programme;
E-mail: sunilsolar@yahoo.co.in; Mobile:09386778963

INSTALL A POWER PLANT AT HOME!*

By Sunil Sood, National Convener, HEMP

I have a Power Plant installed at my Home! It is not coal based or Solar PV/Wind. It is based on energy conservation and efficiency principles. The power plant is equivalent to a 3 kW avoided peak capacity (or 5 kW peak considering T & D Losses) and saves me about 700 units per year. You can do it too. Here are the details:

Sl. No.	Measures Adopted	Avoided peak capacity	Energy Saved Per year	Remarks
A.	**Energy Conservation Measures**			
1.	We switch off TV, DVD, Mobile Chargers etc from mains.	10 watts	75 units*	* Estimated
2.	Switch off Mosquito mats during day time	5 watts	25 units*	
3.	Use Electric Iron Smartly(Not ironing hidden portions, switching off 1 minute before),	750 watts#	25 units*	# We avoid Ironing when Pump is ON
4.	Thermostat Settings of Fridge as per requirement and season (Lower settings when the fridge is empty. Off during winter nights)	100 watts	100 units*	
5.	Use of LED Lamps to delay use of tube lights (2 hrs per day)	32 watts	25 units*	
6.	Using Fans at appropriate speeds/ Avoid unnecessary running	30-50 watts	40-50 units*	
B.	**Energy Efficiency Measures**			
1.	Change Over to 5 Star Rated Fridge of 190 Litres capacity against 80 Litres capacity	50 watts	Nil**	**No savings but more than double capacity
2.	Change over to 4 Star Slim Tube CRT TV 21 “size from ordinary CRT TV of same size (6 hours of use)	(- 15 watts)	(- 33 units)	Slim Tube TV consumes more energy
3.	Use of 50 watt Fans with Electronic Regulator (2 fans total use 16 Hrs/Day) instead of regular fans/regulator	20-50 watts	100-120 units	For 300 days/year
4.	Use of T5 Tube lights in place of T12 tube light with ordinary choke (2 nos- total use 10 hours per day)	5 watts	18 units	T5 FTL gives much higher illumination
5.	Use of CFLs for Stair Case/ Bathrooms/ Study Room etc (4 nos of 8 Watts – total use 15-20 Hrs/day	60 watts	100 units	Compared to Incandescent of 25 watts
C.	**Renewable Energy Measures**			
1.	Use of 100 Litres per day capacity Solar Water Heater (Partly used by other tenants)	2000 watts	~200 units	Our need is less as we are only 2 persons
	Total	Approx. 3000 watts	~700 units	

Note: I do not recommend Solar Home lighting/ Inverter as the electricity savings are negligible hence not worth the amount spent. However, Solar Lantern in place of Emergency Lights is encouraged. Solar Lanterns are also encouraged as a gift item.

** Complete report is available in ‘HEM news’, Januaray,2010 issue.*

UPCOMING EVENTS

PV Expo 2009 Tokyo, Japan February 3-5, 2010
Tel: 81 3 334985-76
Fax: 81 3 334985-35
E Mail: pv@reedexpo.co.jp
www.pvexpo.jp

Solar Energy 2010 Berlin, Germany February 16-20, 2010
Tel: 49 5121 206260
Fax: 49 5121 2062626
E Mail: info@messen-profair.de
www.messen-profair.de

PV+Solar India Expo 2010 Mumbai, India March 1-3, 2010
Tel: 91 22 26730 869
Fax: 91 22 26730 547
www.electronicstoday.org

Enertech World Expo 2010 Mumbai, India March 3-6, 2010
www.chemtech-online.com/events/enertech

International Conference on Renewable Energy:
Generation and Applications
ICREGA'10 Al Ain, UAE March 8-10, 2010
www.engg.uaeu.ac.ae/icrega10

Power & Electricity World Asia Singapore April 5-9, 2010
http://www.terrapinn.com/2010/asiapower/

POWER-GEN India & Central Asia New Delhi, India April 21-23, 2010
www.power-genindia.com

Clean Energy Council Conference Adelaide, Australia May 3-5,
www.cleanenergycouncil.org.au/cec/mediaevents/cec_conference_2010

.

ADVERTISE IN 'THE URJA WATCH'

We seek advertisement of your product/services. The tariff plan is given below:

Type of ad	Single Issue	4 Issues	12 Issues
Full page	Rs. 500	Rs. 1500	Rs. 4000
Half page	Rs. 300	Rs. 900	Rs. 2400
Quarter page	Rs. 200	Rs. 600	Rs. 1600
Box	Rs. 100	Rs. 300	Rs. 800

ADVERTISE IN 'HEM News' – Get noticed in over 1000 Institutions!

'HEM News' dedicated to Home Energy Management published every month contains 4 pages of A3 size. Present circulation is 3,000 copies. Do you have a genuine energy saving/renewable energy product to offer? Are you into providing services in these fields with special focus on Home and Commercial energy consumers? If yes, we recommend you to place an advertisement in "HEM News' to promote your products and services.

The tariff plan is given below:

Type of ad	Single Issue	4 Issues	12 Issues
Full page (A3 Size)	Rs. 5000	Rs. 15000	Rs. 40000
Half page	Rs. 3000	Rs. 9000	Rs. 24000
Quarter page	Rs. 2000	Rs. 6000	Rs. 16000
Box	Rs. 500	Rs. 1500	Rs. 4000

We send 1,000 copies free of cost to all the Libraries/Institutions.

Mode of Payment:

Demand Draft payable at Bangalore or at par cheque of ICICI, HDFC, SBI etc. in favour of "Indian Association of Energy Management Professionals".

Advertisement material along with cheque / DD may be sent to :

Indian Association of Energy Management Professionals
Golden Square, 102, Eden Park,
20, Vittal Mallya Road,
Bangalore-560001

Advertisements may also be sent by e-mail to iaemp@yahoo.com. The amount payable may also be deposited electronically to IAEMP SB account no. 0883101060759, Canara Bank, Sarakki Layout Branch, Bangalore

Share your experience

Do you have an area of expertise in energy management? Have you solved a difficult problem or have an interesting case study? Do you want to share a joke with others? Or just have a word of appreciation for this issue. Share your knowledge with others and promote yourself too, by writing to **The Urja Watch.**

You may also tell us about upcoming energy-related events in your area. Be sure to mention the title of the event, organizers, dates, venue, city, and contact information to get more details of the event.

Please note the following points while making your submissions:

- Articles must be original, in electronic version, 500 words or less. If you are using material from external sources, please acknowledge them.
- Please include contact information (full name, title/organization, phone numbers, and email ID) with your submission.
- Articles should be in MS word, single spaced, with easily readable font, preferably Arial size 12. Photos should be of high resolution.
- Please e-mail your submissions to The Editor, "The Urja Watch" at tellsubi@gmail.com
- There are no deadlines for submissions. You may submit articles anytime.
- We reserve the right to edit, rewrite or reject any article.

We Need Your Feedback Too!

Please write your views and suggestions to the editor at: tellsubi@gmail.com
Letters must include the writer's name, address, phone and email ID.

We appreciate your feedback and thank you for your support.