

How costly is the "cheap" electricity in Jharkhand?

By : Sunil Sood

In Jharkhand, the tariffs for electricity have not been revised since 2003-04. The Electricity Board is still not split into separate companies as required under "The Electricity Act, 2003".

There are only 2 slabs for domestic consumers which accounts for 35 % of the electricity consumption:

0-200 units : Rs 1.35 per unit.
Above 200 units : Rs.1.70 per unit.

Just compare the average tariff of more than Rs.4 per unit in Maharashtra, Karnataka or even the neighboring West Bengal and you will think it is so cheap. But is it really so?

Yes, on the face it appears quite cheap. But how costly it is to the citizens and the poor citizen of the state; let us examine;

How costly it is to the citizens?

Due to frequent power breakdowns, people are forced to make arrangements for standby power supply through DG sets, Inverters, Emergency Lanterns or even candles depending up on affordability. Often 30-40 % electricity consumption is through the Inverters which also includes the losses in the inverter. An inverter of 800VA rating consumes about 18-20 watts even when the battery is fully charged. On full charging it consumes 180-220 watts and then slowly (depending on power cut period) it tapers down to 18-20 watts. Similarly, emergency lanterns need power to charge the battery. Those who use candles or Kerosene lamps pay in cash directly.

The frequent power cuts also force the people to set the thermostat of the refrigerators and air-conditioners to lower temperatures. This often causes avoidable losses.

Let us take an example of a resident who has purchased an inverter of 800VA rating:

1. The cost of Inverter : Rs.5,000/-
2. The Cost of Battery : Rs.10,000/-
3. The cost of Stand : Rs. 500/-

Total Cost : Rs. 15,500/-

Interest on the capital investment of Rs 15,500 : Rs.100/month (approx)

The battery will have to be replaced every 3 years. That means an expenditure of Rupees 10,000/- every 3 years.

Therefore the monthly cost of replacement of Battery: Rs 10,000/36 = Rs.278/-

The depreciation cost of Inverter : Rs 100/- per month

Assuming the losses in the inverter as 1 unit per day , the cost of losses :

= Rs 1.35 x 30 = Rs 40.50 per month, say Rs 50/-.

Thus the extra cost to be incurred per month works out to:

(100+278+100+50) = Rs 528/- per month

Assuming the expected electricity consumption of about 150 units per month

The extra charges per unit = 528/150 = Rs.3.52

Hence, effectively, the resident will be paying Rs 3.52 + 1.35 = Rs.4.87 per unit (Say Rs 5.00 per unit.

Similar calculations can be done for those who are buying emergency lanterns or candles.

So the resident has to make a choice- suffer due to frequent power cuts or pay the effective cost of Rs 5/- per unit which on paper is only Rs 1.35 per unit.

How costly it is to the state of Jharkhand?

The low rates of electricity could be justified if these were reflecting the cost of supply. But sadly, it is not true. Despite lower cost of coal, the cost of electricity



Reduce your electricity bill in 20 steps

- Step-1 : Realize why it is important to reduce your electricity consumption and that it is possible to do so without sacrificing comfort and safety.
- Step-2 : Appoint a member of your family (even a servant will do) as " Home Energy Manager". And explain his responsibilities.
- Step-3 : Let the Home Energy Manager start with maintaining a file of energy bills.
- Step-4 : Start taking readings twice a day.
- Step-5 : Understanding the bills and explaining to all the members of the family
- Step-6 : Set targets and introduce of incentive /penalty scheme
- Step-7 : Prepare action plan and allocate funds.
- Step-8 : Understand the best practices and consumption pattern of each item. Think of using them smartly e.g.- set thermostat of Fridge as per weather conditions..
- Step-9 : Identify and disconnect all unwanted fittings or block them permanently.
- Step-10 : Discontinue use of Incandescent Lamps including the so-called 'zero watt' bulbs.
- Step-11 : Take care of Ghost consumers- Do not use remote for switching off TVs/DVDs etc.
- Step-12 : Provide LED Lamps for areas where low illumination will suffice
- Step-13 : Provide CFLs for small rooms, bath rooms, toilets etc
- Step-14 : Provide T5 FTL or T8 FTL with electronic chokes in place of T12 FTL
- Step-15 : Replace old ceiling fans with 50 watt fans. Replace old A/C with Star rated one.
- Step-16 : Replace resistance type fan regulators with Electronic Step Regulators
- Step-17 : Select power scheme of your computer to automatically turn off monitor after 30 minutes and the hard disc after 1 hour of idle time.
- Step-18 : Adopt water conservation measures, reuse, recycling and rain water harvesting
- Step-19 : Provide Solar Water Heater/Gas Geyser in place of Electric Geyser.
- Step-20 : For further guidance- Contact: iaemp@yahoo.com

supply is not much lower comparing to other states. That is the reason, a huge amount of subsidy (more than Rs2,000 crores) has to be provided to the Jharkhand Electricity Board to keep it running. Considering the size of the state and the maximum demand of hardly 850 MW (Compare it with 10-12000 MW in Maharashtra!) , it is pretty high. Even if 50 % of this amount (after allowing for agriculture subsidy and life line consumption) was saved by having a proper tariff, preventing theft, promoting conservation and efficiency, a huge amount of Rs 1000 crores could be spared for social sector to address the problems of `naxalism', malnutrition, sanitation, drinking water, health etc.

How long a poor state can afford this?

What is the Solution?

The low tariff structure for electricity is not in the interest of the State. The Jharkhand State Electricity Regulatory Commission should allow a substantial increase in the tariff for domestic consumers in line with other states and prepare a suitable Incentive/ Penalty mechanism for the consumers as well as for the supplier. IAEMP can help the Commission to design a very effective mechanism which will actually help the citizens in bringing down their effective electricity cost. On the other hand the distribution companies would get benefitted with increased revenue. The State would be benefitted with reduced burden of subsidy which can be diverted to address more pressing social issues.

Beware of Electrical Leakage in your Home!

(Based on inputs from Mr P.A.Johny and Mr Nitin Sharma)

What is Electrical Leakage?

Any site may have water pipes that leak small amounts of water from various points. Water seeps out, slowly dripping onto the ground 24-hours per day. Similarly buildings may also have electrical energy leakage at various points; this is small amounts of electrical energy which leaks past switches, power points and appliances etc.

Instead of all of the energy going through the lights and appliances, as it should, a small portion of electrical energy may leak wastefully to ground, or across to other connections, 24-hours per day. This happens because of the advanced age of the insulation and/or due to built-up of dust and contaminants etc which conduct electricity.

Older buildings have a small degree of natural leakage, however it's when this situation escalates to become excessive at certain points, that's when problems start to happen.

The Dangers of Electrical Leakage

You pay for leakage in your electricity bills, and this useless energy waste can cost huge on your total bill for a large business site. This is bad enough, however there is also a much more sinister side to the story. Electrical leakage, like old age, is a progressive condition and only gets worse with time, not better. Any flowing electricity causes heat (this is why lights, electrical cables and motors get hot) therefore any leaks will also generate heat. When this heat becomes excessive it leaves carbon deposits in its tracks and carbon is an electrical conductor too, therefore you have more and more energy leakage and consequent escalations in heat generation as time goes by. It's a situation that is self-generating. The irony of the situation is that people can slowly become accustomed to the condition and you can often hear someone comment "There's that burning smell again, we'll have to do something about that one day".

In reality, however, the hot leakage often causes a fire or short-circuits or serious black-out long before someone fixes the problem, and as leakages progress 24-hours per day, the problem often happens overnight, at which time it causes maximum damage. It is such type of wastage which is mostly ignored.

How do we detect the leakage?

Leakage of current is due to defective insulation (insulation failure) of the electrical equipments or the installations. Due to the earthing system only current is leaking when there is an insulation failure. If there is no equipment-earth no leakage of current from that equipment, but it is dangerous to human as metal parts of the equipment may be at higher potential when the insulation failed (this state is not a current leakage it is only an insulation failure). To protect us, equipment should be properly grounded (to make the potential at the equipment body equal to zero - with equipment earth definitely current will flow to ground when there is a fault).

Only the way, to stop or reduce the leakage of current, is to pinpoint the location of insulation-failure and find out the defective equipment/wiring installations and rectify the defects. It is not so easy. If the wiring is properly wired with separate circuits (each circuit with separate phase and separate neutral) with circuit fuses or MCBs and an ELCB (Earth Leakage Circuit Breaker) is installed then we can identify the fault with little bit effort as detailed below:

Now a days all the installations are provided with Earth Leakage Circuit Breakers (ELCBs) which trips (switch off) the installation when there is a leakage of current (if the leakage current exceed the set value). Usually for domestic purposes the value may be 30 mA and for industry it may be 100 mA. If the ELCB trips that shows there is a leakage of current, then switch OFF all the circuit MCBs (or remove all the circuit fuses) and switch ON the ELCB then switch ON the circuits one by one. The ELCB will trip again when a faulty circuit is switched ON. By this we can identify in which circuit current is leaking. Switch OFF all the equipments/appliance connected to that faulty circuit and switch ON again the ELCB. If the ELCB is tripped, rewiring or rectification of that circuit is required.

If the ELCB is not tripped now, it shows that major portion of the wiring of that circuit is OK; then switch ON the equipments/appliance on by one, when a faulty equipment is switched ON the ELCB will trip. Now we can rectify the equipment. There may be single fault or multiple faults.

If there is no separate circuit wiring and ELCB is not available it is very difficult to locate the fault.

Are branded Air-Coolers energy inefficient?



The branded air-coolers look good aesthetically but how is their energy performance in comparison to conventional GI body air-coolers? Preliminary findings of experiments conducted on both the designs do not reveal a favorable verdict for the branded ones as far energy efficiency is concerned. A design deficiency has been observed in some of the modern air-coolers. The centrifugal fan and the circulation pump are run by the common motor. Thus, even if we do not want the water circulation, the pump keeps running on bye pass mode circulating at least 20 -30 % water though the cooling pad. Thus, the humidity keeps increasing causing discomfort. Further, this also causes wastage of power which could have been avoided by switching off the pump if the same was provided separately.

Also, the manufacturers should think of providing electronic regulators for fans to save energy. The typical reading for such coolers showed power consumption of 165,176 and 189 watts at 3 different speeds. In comparison to the substantial decrease in air quantity at 3 speeds, the corresponding decrease in power consumption is too less because the regulators are of conventional resistance type. It is also felt that the Axial Flow Fans with bigger diameter but slower speed are better option from the view point of energy efficiency although this increase the overall size of the air cooler.

HEM team will conduct detailed experiments this summer to conclude its findings.

My experiences with a 5 Star Rated Refrigerator (Contd from.... 1)

But I found another set of instructions temperature control dial as follows:

- Winter : 1-2 (i.e. near "Cold")
- Monsoon : 3-4
- Summer : 5 (i.e. near 'Coldest')

Now I was confused how to set the temperature control dial as it was winter month and the refrigerator was full. If I follow the instruction sheet then I should set the thermostat at "Coldest" and if I follow the instruction display close to the dial, then I have to set it 1-2 point.

When a consumer makes a conscious decision to buy an energy efficient appliance, he would naturally like to check whether it is performing as per the promise. For example, when we buy a certain bike for its fuel economy, we like to check the actual mileage and compare the same with what is claimed by the manufacturer. In case of vehicles it becomes very easy to check the fuel efficiency on road or actual conditions; but how to check the same for refrigerators became a bit difficult task specially when, the test conditions were not known. I was also wondering how the indicated electricity consumption figure of 249 units per year could be valid for all climatic zones in the country. What should be the allowable variations to account for the weather?

So, I decided to take readings on my own. I connected the refrigerator through an electronic meter to record the actual consumption and also took temperature readings of 'Freezer' and 'Vegetable' compartments. Some of the typical readings are shown in the box.

Place of Use: Ranchi, Jharkhand, The appliance is installed in the Dining-cum Drawing Hall taking care of instructions in the Owner's Instruction Sheet.

Sl. No.	Date	Control Dial Position	Average Room Temp Deg.C	Freezer Temp Deg.C	Veg.Comp. Temp. DegC	Electricity Consumption kWh/Day
1.	27/12/09	ON	12-15	-10	7	0.3
2.	31/12/09	1	12-15	-11	6	0.4
3.	02/01/10	2	12-15	-12	6	0.4
4.	06/01/10	5	12-15	-15	2	0.6
5.	12/03/10	2	22-25	-10	6	0.6
6.	01/04/10	3	25-27	-10	7	0.9
7.	15/04/10	3	30-31	-9	7	1.2
8.	17/04/10	5	32-33	-13	6	1.6

The readings reveal lot of variations in electricity consumption depending on the season and dial settings. Most of the readings are for the period of winter and early summer. Projecting these figures for peak summer and monsoon period, my estimate

is that the refrigerator will consume not less than 400 units per year as against the indicated figure of 249 units per year. This means the variation of about 60 % from the figure given in the Label. This is the case of a small family of 2 members. Naturally, the variation will be much higher for bigger family. This can be collaborated from the 'Standing Losses' (or No Load) test carried out by me as described in the following paragraph.

Our house was locked from 4th April evening to the morning of 12th April, 2010. During this period, I had left the refrigerator ON and connected through meter. The readings revealed that the fridge consumed 0.6 units per day on an average even when it was not being used. The temperature control dial during this period was set at middle position. This represents the standing (or No Load) losses during this period.



Overall, I feel that the Star Rating system on its own will not ensure efficiency gains. A well informed consumer may use non-star rated refrigerator more efficiently, while ill-informed consumer of most efficient appliance may actually end up using it in most inefficient manner. The authorities also need to ensure that the manufacturers include the complete details about installation and clear instructions on how to use the appliance for specific purposes. It should be mandatory for

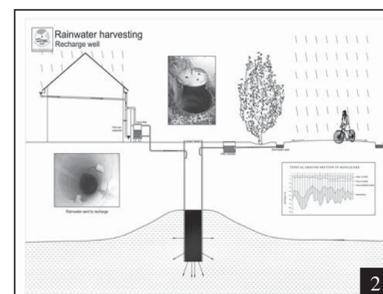
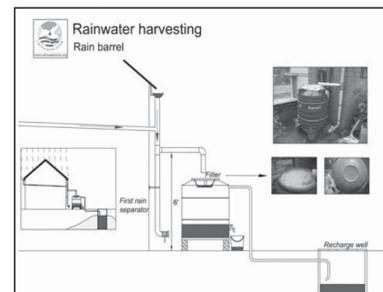
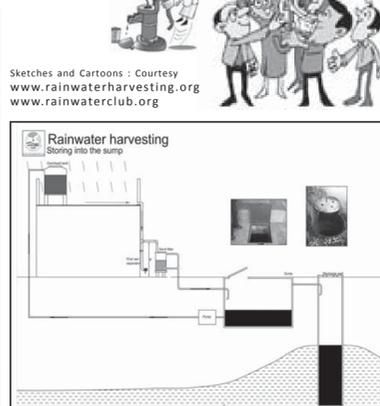
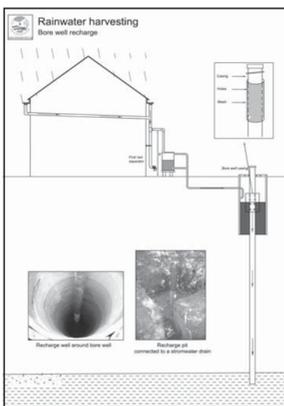
the manufacturer to obtain a written undertaking from the consumer that he has been trained by the manufacturer/dealer on how to use the appliance effectively and efficiently. The manufacturers should also be asked to specify the possible maximum variations especially under "No Load" Conditions so that it becomes easier for the consumers to verify the claims of the manufacturer. There is also a need for consumer education programmes aiming to provide more in-depth knowledge of the appliances they use. This will not only improve end use efficiency but will also help in ensuring the longer life of appliances.

At the end, I would request the concerned authorities to invite suggestions for improvements in the Labeling programme for the benefit of every one.

It is time to plan for Rain Water Harvesting in your Home

By 2025 at least 3.5 billion people—about half the world's population—will live in areas without enough water for agriculture, industry, and human needs... Worldwide, water quality conditions appear to have degraded in almost all regions with intensive agriculture and in large urban and industrial areas.

—World Resources Institute, October 2000



Sketches and Cartoons : Courtesy www.rainwaterharvesting.org www.rainwaterclub.org



HEM News

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A monthly newsletter on "Home Energy Management Programme" of IAEMP

"Arrogance of a Switch"

I am an electric switch. I am sure you all know me. You all probably remember to put me off at your residence but do not bother about me in your work place, because the bill is not paid by you! Very clever of you!

I am very powerful. I control use of more than Rs 3,50,000/- crores worth of electricity. My one signal can waste or save crores of Rupees . It is only on getting my clearance that the lights, fans, coolers ,ACs ,motors and home appliances etc start and stop working. Sometimes, people delay using my services and land up in huge electricity bills. For example, once a person delayed using my services to put off the water pump. He not only wasted precious water but also increased his electricity bill unnecessarily. Some persons are quite lazy and don't want to take trouble to use me to put off the TV and use the remote instead. Their laziness costs them huge money since, TV on remote keeps consuming power.

There are also cases of people being lazy to use me for switching off Geysers and ACs and leave them on thermostats. This causes standing losses and substantial increase in Bills. Ignorant people! They are not aware of my importance! Every time they neglect me, I surely and severely punish them. I am not for forgiveness. Let us take another example, Most of the people use Mosquito Mats to get sound sleep in the nights but there are people who don't bother to take my help to put off the mats in the daytime. They think it is too small a matter to bother about .The result! they drain out more than Rs.250/ per year on single mat. The same people argue with the vegetable vendors and petty shopkeepers to save a few Rupees!

I am found everywhere, but Census-2001 has reported that more than 44% of Indian Households in rural areas do not have my presence. Can you believe it? Actually, it is because they have no access to electricity. Now, I am not bothered whether my presence in 44 % households is there or not since there is no electricity connection .But I would certainly like to point out that all electrical and electronic appliance manufacturers are surely loosing huge business. If these manufacturers could pool their resources to provide electricity connection to such homes how much business they can generate for themselves is unimaginable! But why should I bother-it is their loss!

I will tell you a real life story which is quite funny but sad. An agricultural worker not having any work in his village had just landed up in a city where he had one of his relations working in a company. With the recommendation of his relation he got a job as a helper on the first day of landing itself .Since he had no place to stay, he was temporarily allowed to stay in the office. Next day, the security guard reported to the manager that the new employee had left the lights of the office ON throughout the night. Being very much conscious about such things, the manager scolded him and asked him why he didn't put the lights off. ? Do you know what he said ? "Sahab , mujhe malum nahin tha light kaise bujate hain" (Sir I don't know how to put off the lights).As a matter of fact he was not aware about our presence and how to use us! Actually even though his village had electricity, the supply was too erratic and infrequent. Hence in the whole village no one had installed us for putting off lights.

Now I will tell you another story, in one of the offices you know what they did? They had put one only of our brothers to put on and off a dozen tube lights at a time. You now what used to happen? Even if only one person is working they had to switch on all the lights. They thought that they are smart and will save money in wiring and our cost; but they didn't know how much they were wasting on unnecessary use. If they think they are smart let them think what for me.

There are however some really intelligent people. They use timer or sensor to make best use of my services. Some hoteliers will have Key tags to make fool-proof arrangements to avoid wastage during non occupancy. In some places they will put us outside the room so that the attendant is able to put me off during non-occupancy of the inmates. They are intelligent people and I would love to see that their tribe increases. Actually I also have some self interest in that. If my use is in the intelligent hands my working hours get reduced and I don't get over heated. This way I have longer life.

But, forget my self interest: I am not bothered about it. You do whatever you want, but I will not spare you and forgive you if you dared to misuse me. I will surely teach you a lesson with increased electricity bills, power cuts, low voltages and even shocks!

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For any clarifications please contact:

Mr K.D.Bairagi, Mobile no.:
09907270259; E-mail:
iaemp@yahoo.com

Editorial



K. Jayalakshmi

Scarcity and waste are two ends of the consumption spectrum that we need to avoid. Today, the waste we generate threatens to bury us very soon unless we take measures.

My experiences with a 5 Star Rated Refrigerator

By : Sunil Sood

I purchased a 5 Star rated refrigerator on 25th Dec'09 as shown in the photograph. The details of the refrigerators are as follows:

Brand	:	Samsung
Model/Year	:	RA 19F/2009
Type	:	Direct Cool
Gross Volume	:	190 Litres
Storage Volume	:	182 Litres

The appliance is affixed with a Label as shown in the close up view displaying 5 Stars and a power saving guide indicating the electricity consumption of 249 units per year . However, at the

bottom most portion of the label a note in fine prints says that the electricity consumption mentioned is "Under test conditions when tested in accordance with relevant standards. Actual electricity consumption will depend on how the appliance is used". However, I did not find any information on the label as to how the appliance should be used. Hence, I referred the 'Owner's Instructions' sheet supplied with the refrigerator. Nowhere, it

was clearly mentioned as to how the appliance should be used so that it doesn't consume more electricity than the mentioned figure of 249 units per year. The Standard test conditions also were not mentioned.

The Fridge is provided with a temperature control However, I found the following vague and funny instructions about the temperature control:

DIAL at "Normal" point (2 No.)

- To maintain optimum temperature for food storage set the control dial at the 'Normal' position.

DIAL at "Coldest" point

- When setting the control dial at the "Coldest" position, the refrigerator becomes coldest.
- When large quantities of food is stored. For quick ice making set the control at the "Coldest" position.

DIAL at "Cold" point

- When setting the control dial at the "Cold" position, the refrigerator becomes warmer.
- When small quantities of food is stored.

I also found an instruction regarding energy consumption which stated that- "To save energy consumption, do not set the refrigerator temperature lower than necessary".

I failed to figure out what is the meaning of "Optimum Temperature" and How the setting of 'Cold' and 'Coldest' could be related to only the quantity of the food storage and not the weather conditions.

(Contd.... 3)

LCG Energy Consultants Pvt. Ltd. - Committed to work for a Cleaner & Greener Planet

LCG Energy Consultants Private Limited a newly formed company incorporated under the Companies Act, 1956 on 30th March, 2010 is promoted by a multi-disciplinary group of highly experienced energy experts, engineering professionals and entrepreneurs with the noble intentions to make the Planet Earth a cleaner and greener place to live in. The promoters belonging to all parts of the country believe that it is possible to do so by creating a culture of being Lean (consuming modestly), Clean (being efficient in use of energy and resources) and Green (using renewable energy). That is how the name of the company was decided with the first three letters of the name i.e. L, C and G standing for being Lean, Clean and Green respectively.

The company intends to offers its services in the following core areas of expertise:

- ◆ Energy & Resources Management Services
- ◆ Renewable Energy Projects
- ◆ Environment Management Services
- ◆ Sustainable Habitat

Besides the core areas of expertise, the company intends to promote energy saving products and systems through chain of 'Green Shops' to be established by the company throughout India.

For more details about the company Mr K.D.Bairagi Executive Director may be contacted on mobile no.09907270259

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4

Best HEMP campaigner of the month

Mr B.R.Sathyakeerthi, Karnataka State Coordinator, IAEMP was adjudged as the Best Campaigner



for the month of March, 2010 to promote Home Energy Management Programme. He is one of the most dedicated members of IAEMP involved with almost all activities of the association right from welcoming the new members and updating accounts to providing back-up support to update the association web site and conduct of awareness/training programmes on HEMP.

Mr Sathyakeerthi presently working with M/s Tata Consulting Engineers, Bangalore may be reached at keerthibankapur@yahoo.com Mobile No. 0984437759 for awareness /training programmes on Home Energy Management Programme in the state of Karnataka. 1