

# Electric power theft-A new fangled technique to dwindle it

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**Abstract**— Electricity has turned its way from Sumptuousness to an indispensable amenity. Without power all the progressions and deliberates remain null and void. This electric power alone can substantially thrive well for the betterment of the nation.

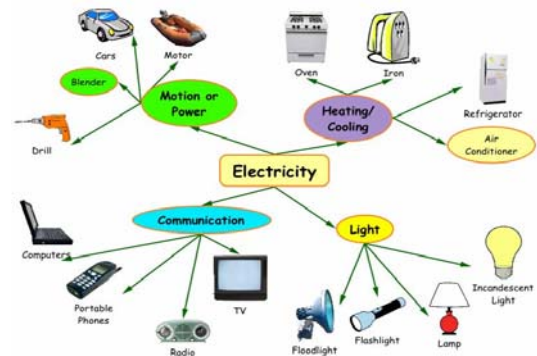
The right of entry to electric energy assured in a country symbolizes a sky-scraping watermark of progress it has achieved. As per the electricity act 2003 it aims at electrification of villages by 2007 and all the households by 2012.

This paper analyses how the theft occurs, the path adorned by it and a method to curb it by introducing a new elucidation. Our country can progress well with uninterrupted power supply only when firm supervisions and other necessitate steps are taken into contemplation.

## ELECTRICITY CONSUMPTION

In this developing nation consumption of electric power has become an imperative convention as without which supplementary things can by no means come about to occur. The demand for electric power has been increased in recent years owing to the prevailing shortage of power and losses. This criterion has to be solved and the causes pertaining to it has to be curbed so that efficient consumption can be made possible.

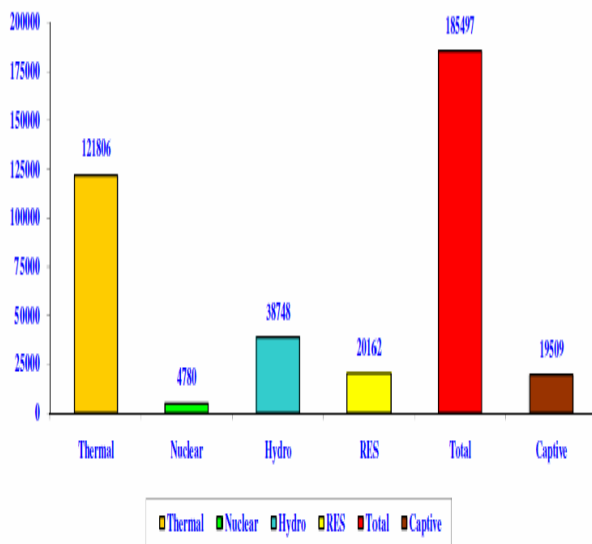
Uses Of Electricity In Our Daily Life



## ELECTRICITY SECTOR IN INDIA

The **electricity sector in India** has an installed capacity of 185.5 GW , that accounts to be the world's fifth largest sector. Thermal power plants amount to 65% of the installed power, hydroelectric about 21% and rest being a amalgamation of wind, small hydro, biomass, waste-to-electricity,

nuclear.



The chart depicted above pin points the fact that efficient utilization can be made by resolving proper scheduling of power involving zero percent theft. Because of the constraints arising due to electric theft the criterion of power supply meeting the demand has been confiscated.

**ELECTRIC THEFT AND ITS REASONS**

The theft of electric service is an issue that continues to plague utilities across the nation and abroad and it appears in many varieties, ranging from sophisticated electronic deception to simply never paying a legitimate bill.

Electricity theft is a problem encountered everywhere from agricultural operations to tenant housing to city buildings. Electricity theft makes up a hefty 25 per cent of the estimated 22 per cent total line losses. At today’s tariff rates, this translates into a staggering Rs5000–7500 crores. Unfortunately, the cases of electricity thefts are increasing, affecting the very viability of the power sector.

The Government of India calculates that between 3/4% and 1% of total energy is stolen. Electricity theft is an illegal activity that is dangerous and may result in a felony conviction and individuals will consign electricity theft in order to shun paying utility and electricity bills.

Because electricity is not turned off during a theft, it can be exceedingly dodgy for those involved and results in harm.

Electricity theft, an ongoing problem for all electricity providers, is punishable by jail time, a fine or both. Most cases of electricity theft occur when violators physically alter the internal mechanism of their electric meters, causing the electricity to bypass the meter and not be recorded.

As a result, violators are not charged for the total number of kilowatt-hours actually used, causing lost revenue for the electricity providers. In addition, tampering with live electricity inside a meter is dangerous and could result in a fire, shock or even death to the perpetrator.

Utility staff could also be injured when later repairing the meter.

**OCCURRENCE**

Tapping of the overhead lines



Theft is a general criterion. Across a main road from the slum is a line of pylons hauling mains electricity cables. Thick wires are supposed to be supporting most of the pylons that have impenetrable tangles of other much smaller wires sprouting off in different directions.

The proliferation of connections makes the pylons look a little like over-decorated Christmas trees. These little wires run across the road siphoning off power from the transmission lines to homes and businesses located in the slum, which is a maze of little alleyways with children and animals running around.

Most households here seem to have an illegal connection to the grid. In many instances there are several unauthorized connections - and on occasion a legal one as well.

Tampering the meter to change the accuracy of the reading scale



Anytime a meter has any holes or metal on the plastic cover, it is a sign of electricity theft. Individuals who are taking off electricity may also need to pry open the meter box in order to put on access to electricity.

Another sign of electricity theft is that the wires around the meter box have been cut or tampered with and all the meters have both plastic and metal tags, connected by wires that hem in the meter. Gray tag means that the meter is

operating properly through an electrical company while red tag means a meter has been disconnected.

If the wires are cut around the tags, it may be a sign that electricity theft is taking place. Many individuals who steal electricity also may insert foreign objects into the meter. Certain objects can force a meter's gears to slow down, which will cause the meter to not count the electricity properly. For example, strong magnets are often used that would stop the meter from turning.

Clustered connection of cables



Theft of electrical power occurs by altering, slowing, resetting, swapping, or disconnecting an electric meter. Theft also may occur by rewiring circuits to avoid an electric meter, or by tapping into another customer's electrical lines.

The charlatan might use devices to program the shoplifting of power only during certain periods of the day or week.

The impostor may rewire their property to illegitimately use power from cheaper sources of power, or from meters that are billed at lower rates. The charlatan risks electrocution and detection. Field employees of the power company are trained to spot problems that result in persons not being billed for all the electricity they use.

By the usage of external equipments to tap the power for household applications, this forms the major threat of the theft and its corollary remains high.

## DETECTION OF THEFT

To check for in electric theft we may analyze in a ken path to evaluate the theft. There are several methods to detect and investigate if a theft has incurred in the power system or not. Some of the common practices for theft are.

### *Using the mechanical objects*

A subscriber can use some mechanical objects to prevent the revolution of a meter, so that disk speed is reduced and the recorded energy is also reduced.

### *Using a fixed magnet*

A subscriber can use a fixed magnet to change the electromagnetic field of the current coils. As it is well known, the recorded energy is proportional to electromagnetic field.

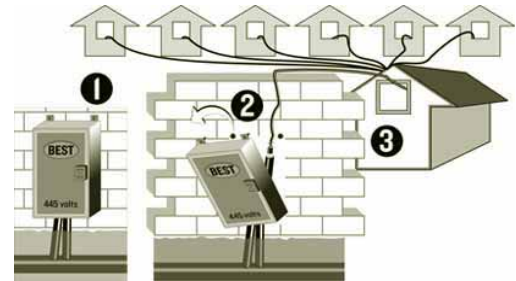
### *Using the external phase before meter terminals*

This method gives subscribers free energy without any record.

## **Switching the energy cables at the meter connector box**

In this way, the current does not pass through the current coil of the meter, so the meter does not record the energy consumption.

Although all of the methods explained above may be valid for electromechanical meters, only the last two methods are valid for digital meters.



## MINIMIZATION OF THEFT

### POWER LINE COMMUNICATION

The Power Line Communication is the most economically viable technology for transferring Meter data to DCU. This employs the technique of communicating the data over existing Electrical Lines which carry LT power to the site.

PLC is a kind of communication technology, which uses Medium Voltage (MV) and Low Voltage (LV) distribution network as the communication media to implement transmission of data, voice and real time image.

The components involved in PLC are

1. The Power Line Carrier Unit that provides signal transmission and reception.
2. There is a Coupler used for "clamping" around a live wire thus injecting the communication signals into the power line.
3. PLC modem.

The monitoring system mainly has the following functions

1. Remote meter-reading.
2. Data acquisition.
3. Thread PLC transmissions

### AUTOMATIC REMOTE READING

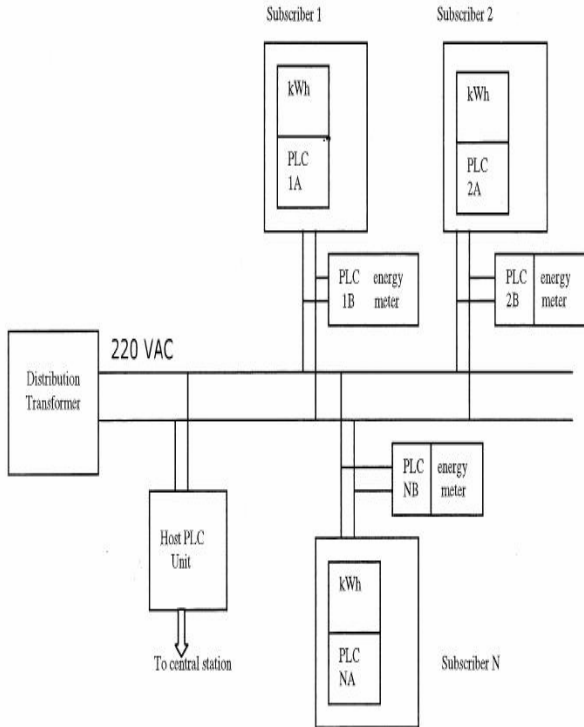
#### AMR

To automate the process of measurement through digital communication techniques.

1. Smart automated process instead of manual work.
2. Accurate information from the network load to optimize maintenance and investments
3. Customized rates and billing dates.
4. Streamlined high bill investigations.
5. Detection of tampering of Meters.
6. Accurate measurement of transmission losses.
7. Better network performance and cost efficiency.
8. Demand and distribution management.
9. More intelligence to business planning
10. Better company credibility.

Some of the other methods for minimization of electrical power being stolen are by using Bluetooth energy

meter, by using talking energy meter. Thus by employing automated measurement this can be eradicated effectively.



## FINDINGS AND SUGGESTIONS

Having analyzed the losses incurred due to theft our next step is to minimize this menace. This can be encountered by using the data acquisition modules and other communication devices that has its escalating key positives.

But in a country like India, the implementation of this system is tedious. Supplying these devices to every subscriber is tremendous task and cannot be made feasible as,

- The installation cost remains high
- The devices can be tracked easily
- The devices when subjected to climatic or other conditions will not suit well and henceforth arises the problem of replacement
- Regular monitoring is a stringent task
- Skilled technicians are essential to monitor this measurement

So, in order to choose an alternative for this we shall discuss the reasons for theft and a proper solution for it

## REASONS

- People in urban as well as rural areas are for twenty-four power demand and they cannot go in for any other source equivalent to electric power.
- They require un-interrupted power supply. But because of the losses and theft this can't be made to the mark
- When the cost per unit of power is at a sudden hike both in Low Tension (LT) and High Tension (HT), this also contributes for the theft of electricity.
- Subscribers are unable to meet their demand as the power supplied is low.
- Because of the frequent power cuts, the job is left undone. This causes the *demand for power*.

## ALTERNATIVE SUPPLY

Accepting the thoughts and mind set of the people, the best solution for this is supply occurrence due to nuclear power generation. The maximum demand can be easily met and the chance of power theft can be eradicated in a better way. The key positives of Nuclear energy includes

- Nuclear power is safe.
- One of the main reimbursements of nuclear power is that it is an extremely reliable source of power because most nuclear reactors have a life cycle of 40 years which can be easily extended further for 20 more years.
- The availability of nuclear power is spirited compared to other sources of power like oil and gas since the cost of the nuclear fuel is a small part of the total reaction and therefore even if there is a slight vacillation in the market the entire reaction need not be affected.
- The source of nuclear power is uranium and this is available in profusion in the crust of the Earth with major deposits being uncovered in Canada and Australia.
- Therefore since the source of nuclear power is readily available now and also for centuries to come, this form of power is virtually inexhaustible.
- The nuclear power is generated at a place which is known as the nuclear power station and this is a compact building which is as big as the area occupied by a football stadium.
- The biggest fear associated with nuclear power is the fear of radiation and this can only be overcome by educating the people about the method of radiation and its behavior. People would be astounded to know that radiation has been a part of our environment ever since its existence and that radiation in moderate

amounts can even be advantageous to our health. Therefore, radiation need not be feared from but can be channeled appropriately to serve mankind in a positive way.

- The main benefits of nuclear power are that it is good, scientific as well as environment friendly because of which it is being supported by many ecological organizations and environmentalists who were previously biased against it.
- Reduces greenhouse gas emissions. Proponents of nuclear power argue that, as no coal or fossil fuels are burnt, no carbon dioxide is released into the air.
- Although the initial cost of building nuclear plants is high, the running costs are relatively low.
- One reason the costs are low is that nuclear plants need only a small amount of uranium to produce a lot of energy. In fact, if the cost of uranium doubled, costs would only be increased by 7%. 1 truck of uranium produces as much energy as 1000 trucks of coal.

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## DEMAND VS SUPPLY

1. Demand  $\neq$  Supply  $\rightarrow$  Involves other liable practices such as theft and other sorts.

2. Demand  $=$  Supply  $\rightarrow$  every attainment can be adorned by the benefactor who uses power.

We are in the first step. To go in for the second step we need another energy resource that can serve the cup for us. This can be done only by implementing nuclear power generation as the resources projected for its usage is lofty.

## CONCLUSION

Energy plays a vital role in each division that is adorned to a corporation or a firm or any institute or household purpose. Proper Utilization has to be made while handling electric energy as there is no alternative that can easily supplement this power.

Appropriate awareness should be provided regarding this in the minds of the young and the old to effectively treat and manage it. Certain Code of Ethics can be made mandatory by the Government in order to dwindle this theft of power and minimize the losses. A most awful situation can rise when power is to be demanded from nearby states or nations. To curb these menace new innovations that can supplement this energy production can be developed in a large scale depending upon the milieu.

## REFERENCES

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