



## PREVENTING ELECTRICITY THEFT USING FREQUENCY CONVERTER METER

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**Abstract:** One of India's leading issues of growth is electricity theft. So, we try to research this issue, and from the previous data collection in India, most of the rural areas steal electricity which badly impacts the board of electricity. As per the Central Electricity Authority, over 27 percent of all power produced in India is either lost due to dissipation from wires or theft. That's about 261,130 Gigawatt/hour of power annually- enough to light up New York for nearly two years. We don't have any solution for it except punishment and penalty. So, we have a solution for it by just changing the frequencies of power with the help of the supply meter. It includes a small frequency converter (cyclo-converter) built into the meter and it has a fixed single mode of changing ratio, by which people are not able to make any change. We get the benefits from the load factor in the generation station. Our interpretation of these various results is that we will be able to stop the electricity stolen

**Keywords:** Electrical theft, cyclo-converter, frequency variable meter, 60Hz Generation

### I. INTRODUCTION:

It is very difficult to imagine the future without electricity. The energy sector plays a major role in the growing economy of India. With the advancement of technology, electricity is a crucial part.

Electricity theft leads to lost government revenue and because of this government is unable to maintain the existing system or is not sufficient to invest in new power generation projects. Over major private electricity generation, companies face the same problem in terms of revenue. Because of this leading problem in India, private players cannot participate in electricity generation.

Many solutions are adopted with the research on this major issue, but these do not practically fit in this existing system or are not economical. In all the research so far, it has been found that how to catch electricity thieves or the particular location where the losses are occurring, we want to bring some change in this system, that we are trying to stop it completely, that is no one can easily steal electricity.

We are presenting a "frequency meter variable" that mainly depends on the cyclo-converter which is fitted to the household energy consumption meter. The basic process of our frequency variable meter is to change the upcoming 60Hz frequency which is not in this existing (system) generation process in India, the existing generating station is working on or generating power at 50Hz. First, we have to generate power at the 60Hz frequency. Frequency variable meter covers this

60Hz frequency to 50Hz which is installed in the energy meter after converting this frequency all the equipment works efficiently but if we use this 60Hz frequency for our home appliances then the unfavorable effect may be observed which results in damage or burnout of equipment because existing appliances work on 50Hz.

How do we prevent electricity theft by the use of a frequency variable meter?

Most of the electricity theft occurs in the transmission line. In the existing system, local people steal electricity directly through transmission lines by conductors and used this electricity without any problem. But by

Applying the frequency variable meter model to the existing grid system, if any individual wants to steal electricity, then he/she is unable to use this power /electricity directly because this is in 60Hz and appliance installed in home works on 50Hz. By implicating this frequency variable meter, we are now able to solve this big issue of electricity theft in India.

### II. DATA

The study associated with 28 states of India and the other union territories was excluded due to the data limitations. Our data collection depends on the previous research papers and articles. They all depend on electricity theft.[2]

While how do we measure electricity theft?

In India basically, it is measured with the help of the transmission and distribution losses (T&D loss) while they both are different because they are not able to calculate the electricity consumption by the stolen, they compare with the transmission and distribution losses. They do have not a particular indicator for the measuring theft of electricity. The method of stolen electricity is many types like the bypass consumption meter, direct hanger on the conductors (tapping), burning of the electric meter, and many more. But our experiment will reduce all the methods of the stolen.[2]

Golden and min (2012) still use T&D losses as a measure of power theft as the line

losses stemming from India's inefficient systems were about 12percent and the component of theft was greater than fifty percent of total T&D losses. Therefore, following the previous literature, this study will also use T&D losses as an indicator of power theft in various states of India.

what is the effect on the consumers of the T&D losses on the stolen electricity?

If the rate of the T&D and stolen is increase day by the day the asking rate of the tariff increases. The effect of electricity stolen is faced on both ends as generators (distributors) and consumers who fairly use electricity by paying the bills.[4]

### III. EXISTING SOLUTIONS:

Several approaches to detect electricity theft have been proposed. the predominant direction in research and development is employing artificial intelligence and in particular machine learning methods to detect customers that steal electricity. Previous theft detection schemes have been proposed in literature but all have some drawbacks of their own.

Presently the advanced theft detection technique includes

*“Digital / smart energy meter”* [7]

*“Power theft detection alert system using IoT”* [8]

### IV. PROPOSED SOLUTION:

The proposed solution depends on the frequency conversion effect. We use a mini cyclo-converter that changes the upcoming 60Hz to 50Hz.

Step by step description of the solution: -

First, the main process is to generate the electricity at the 60Hz frequency for that we Take the example of the German generation stations because of the German generating station are working on the 60Hz frequency in that we want to change the 50hz generator which already installed or used in India if we take the example for the new establishing generating

station then no problem rises but if we want to replace our old generating station we get to pay much more as compare to the losses so we are proposing this model for the new establishing generation station and the field or the grid by that we are shift on this model with day by day process so, it is our first step toward this model installation.

Now we are facing the next problem with the distribution system in which we want to change the transformers from 50Hz to working on the 60Hz frequency. By which we get the benefit as *“Higher frequencies can use physically smaller and cheaper transformers; so, 60 Hz would be preferred over 50 Hz.”* [9]

Now our main component is used here to convert the upcoming frequency to the required rate of the frequency means the cyclo-converter meter is situated at our house or the industrial consumption meter after the conversation energy we can able to use this power and it is safe for our equipment.

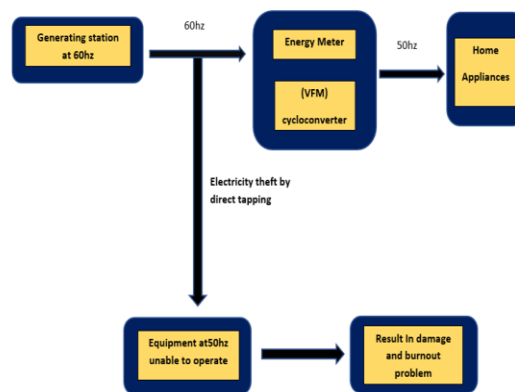


Fig: 1 flow chart of complete process of model

### V. HYPOTHESIS:

60hz frequency brings many changes to our present system. Our all appliances and transformer are 50hz. When we generate electricity at 60hz we have to set up a new electricity power generation plant or change the transformer from 50 to 60hz. In 60hzs the transformers are small in comparison to 50hz transformer, so it reduces the cost of transformers also.

Appliances in India are of 50hz and we supply the electricity at 60hz so no one can steal electrical at all because the appliances of 50hz can't work on 60hz of electricity or they get burnt or get damage.

There is no need for change in transmission lines that were already set or already in use for 50hz frequency of electricity because 60hz electricity also travels through the 50hz transmission line. We have to give total information or explanations about 60hz electricity to the people, they have to aware or have knowledge about that what is the difference between 50hz and 60hz, why they can't use 60hz in their households, and why the VFD meters are necessary to set at

the house. There will be chances of life losses if people will not get aware of 60hz electricity. Once we transmit electricity of 60hz then we can save a large amount of electricity, once we saved the electricity that means we can save coal as well as money, so it is economically good.

In India there is no 60hz power generation plant so, if we want to implement this idea, we have to establish a new plant or generate electricity at 60hz. We use cyclo-converters in meters to change the frequency from 60hz to 50hz for households or industrial use, where the government has to declare that cyclo-converters or frequency variable meters are government property. Private companies can't sell this or people can't purchase this for their use.

The government has to introduce the new rules and regulations for this model means if we are setting up our model in any country so the government needs to issue new guidelines. People have awareness of the 60Hz power, fear will have to be created among the people regarding the 60Hz, talk about how they get damaged to use the direct energy by tapping it is dangerous for their equipment and appliances.

Rules for the industries are to stop making the 60Hz device and stop the import of elements that work on the 60Hz. Availability of the frequency converters in the market only VFD for the motor controlling are available after the government permission.

If any person uses the 60Hz 220v supply direct from the tapping the device which they use to has a no anymore

If you are asking whether you can use an appliance rated at 220V, 50Hz, (where the supply is 220V, 60Hz) then the answer is that it depends upon whether the appliance includes a motor. If the appliance does not include a motor, then yes, it will work fine for some days. If the appliance does include a motor (for example a washing machine, refrigerator, fan) then the motor will operate at a 20% higher speed than it is rated for, which is probably not okay, and the motor would burn out.

## VI. ECONOMIC IMPACT OF 60HZ IN INDIA:

There are some changes in the economy of India if we switch from 50hz frequency to 60hz. For any particular utility or grid if 60hz frequency has to supply then the size of the transformer is reduced resulting in less manufacturing cost with greater efficiency and reduced hearing loss. For the proposed approach companies invest less in the manufacturing of transformers and make more revenue compared to the installed system. If all the existing systems need to be changed, there is a greater efficient system in developed countries. In developed countries, there is an efficient and reliable power system. The major part of the economy of developed countries id depends on the energy sector. If the existing system of the future needs to be changed the future,

then the economy would rapidly increase with advanced technology and no electricity theft problem will arise.

## VII. RESULT:

As we produce the 60Hz power on the 230volt so we get our required units of the power and for the conversion of the power to the 50 Hz we used a cyclo converter for the both single-phase and the three-phase. [5] For the protection purpose, we use here a frequency overload tripping device by the performing of our model we can say that we get a positive result to reduce the electricity theft.

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