

Prepaid Electricity Billing System

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Abstract

Electricity is the basic needs of our life. We cannot imagine one moment of our life without electricity. Prevention of electricity theft and saving of electricity is required to use the electricity continuously. In this paper, we proposed the prepaid electricity billing system replacing the existing postpaid billing system. It is necessary that peoples also contribute to save electricity and resources used to generate the electricity. With use of proposing scheme the peoples will use the electricity as they required. The proposed system uses any type of communication media like GSM, optical fiber, Microwave etc. for establish the communication link in between power meter of customer and a centralized system (server).

The present electricity billing system is manual method. With this system the total billing consume more time and it requires more manpower. The amount of electricity consumed by user is recorded at user side only. So the utility cannot get the knowledge about actual power demand of customers. The consumption of electricity for each user is not recorded in the any level of electricity distribution network and any central system (server). The Figure 1 shows the representation of Electricity Distribution Network (EDN). There are mainly three parts of EDN. ^[1]

- A. Generation of electricity
- B. Transmission of electricity
- C. Distribution of electricity

Introduction

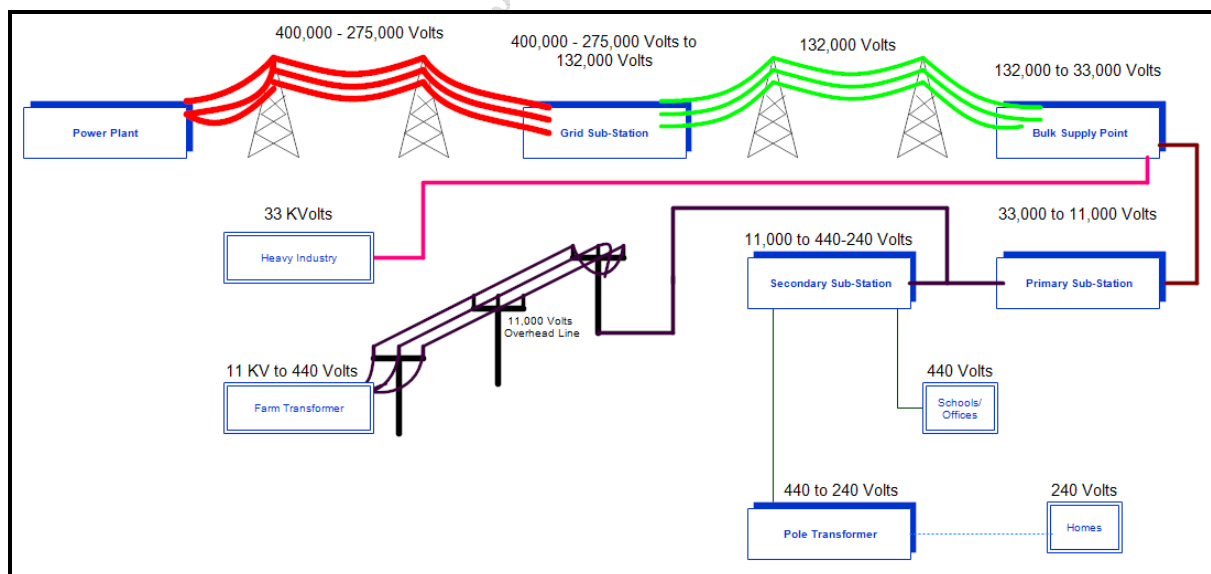


Figure 1. Representation of Electricity Distribution Network (EDN)

Proposed Architecture

Here we proposed to do some necessary modification for prepaid electricity billing system. We know that our electricity distribution network is made on hierarchical manner. In which power plant, transmission elements, distribution elements and customers are lie on its particular hierarchical level. We proposed that one centralized System (Server) is connected with all of the elements of EDN using the communication link as shown in Figure 2. Each element keeps record of the consumption of electricity by its each lower level. Also it has circuit breaker for each lower level to connect and disconnect the lower network from it.

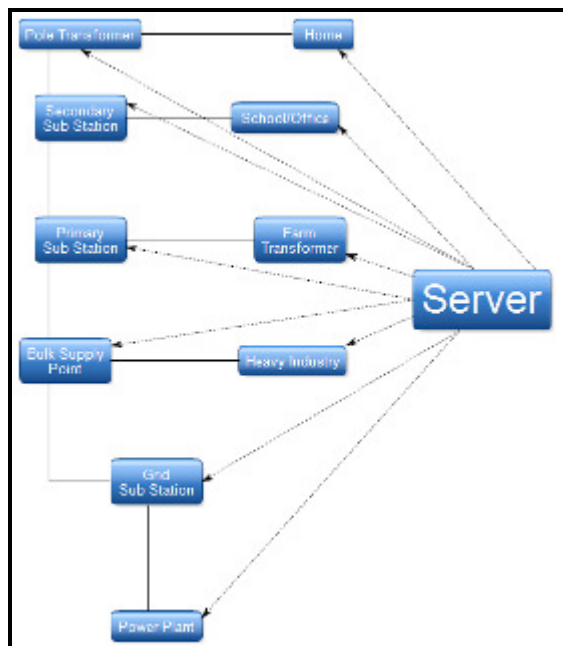


Figure 2. Modified Architecture of Electricity Distribution Network (EDN)

Here we use the three tier architecture which is well known computing model of client/server. Its three tiers are the data server tier, application server tier and presentation client tier. The three tier architecture of client/server is shown in Figure 3. [2], [3]

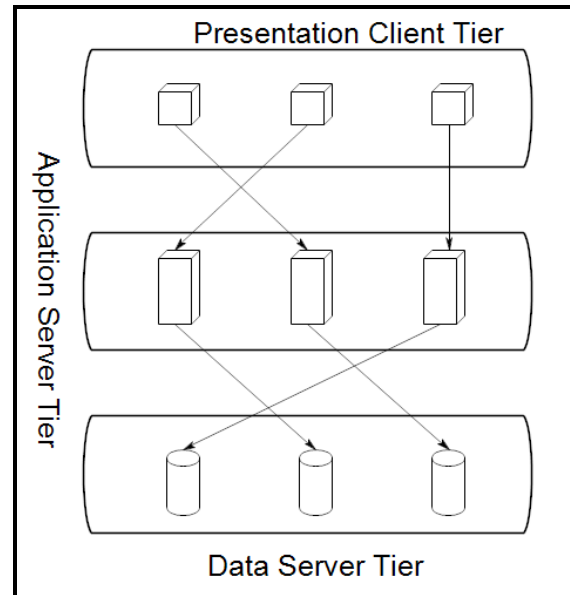


Figure 3. Three Tier Architecture

The security of data is higher in this architecture because the data cannot be access without going in middle tier (Application server tier).

Prepaid Electricity

Since the last decades of the past century, scientists, researchers, government and people have been worried about energy conservation. People spend much more power than what they actually need and that results in a huge loss of energy. Moreover, the continuous increase in the universal energy prices has resulted in a huge economical loss. Thus we are proposing a prepaid electricity billing system so people can buy specific Amount of energy to use it only when they need. The Figure 4 shows the Flowchart for prepaid electricity billing system.

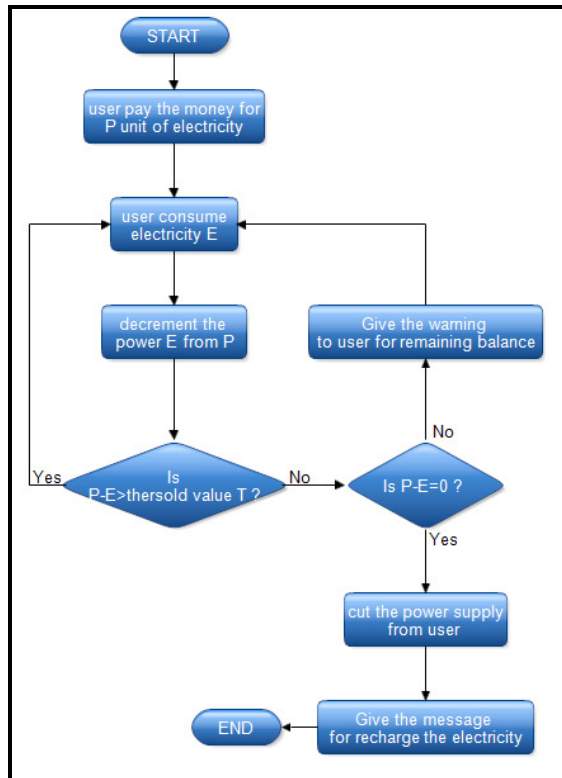


Figure 4. Flowchart of Prepaid Electricity Billing System

The warning message for next recharging of electricity is sent to customer after decreasing the balance of customer beyond the threshold amount of power.

Now you are thinking that someone can use the electricity from his neighbor by connecting his service line to his neighbor's service line. Yes it can be happened, the utility can identify the thief. Also the amount power decreased from the account of customer is only that the customer consume.

The electricity consumed by thief is added in its upper hierarchical level element. The server continuously checks the consumption account of customer and delivered power accounts of transmission and distribution elements. If the sum of power consumed from the same level of element is not match with power delivered by its upper level element, the utility knows that the electricity is being theft by someone. It can easily identify the tempered area and can take require legal action.

Conclusion

So with this proposed solution we can save the electricity and also prevent the theft of electricity. Also the peoples aware of the consumption of electricity.

References

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- [3] Three Tier Software Architectures, Carnegie Mellon Software Engineering Institute, <http://www.sei.cmu.edu/str/descriptions/threetier.html#34492>