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AN ENERGY CONSERVATION SCHEME BASED ON TARIFF MODERATION

B. Bhavadharani[1], P. Rashika[2], B. Priyanga[3], C.K. Shankar[4]

[1,2,3]UG Scholar, Department of Electrical Electronics Engineering, Sree Sakthi Engineering College, Coimbatore, Tamil Nadu, India.
[4]Assistant Professor, Department of Electrical Electronics Engineering, Sree Sakthi Engineering College, Coimbatore, Tamil Nadu, India.

Abstract:- *In this work, we recognized domestic building activities that are relevant for an energy related control. Nowadays energy consumption in residential building is very high. So the people must reduce their consumption. To reduce the energy consumption, several methods are used. Such as providing feedback including more details in the electricity bill, self reading of meters, interactive tools, home display featuring various data including consumption, comparisons and visualization. In the existing tariff structure the energy is not conserved and also the electric utility has to face severe loss in providing satisfactory service to the consumer, because of providing hundred units for free as defined in tariff structure. The focus of the paper is to reduce the energy consumption for the domestic users by using our proposed tariff rate structure. In our proposed system there is no loss to the electric utility in the financial perspective as there is a provision for incentive as well as penalty to the consumer based on their electricity consumption. This system will motivate as well as force the consumers to reduce their energy consumption.*

KEYWORDS: Electric utility, tariff, energy, domestic, consumers, consumption.

INTRODUCTION

With the advent of competitive electricity market, the distribution side of the electricity industry has to face challenges in providing satisfactory electricity to the consumers. Electricity consumption system for the domestic users is in practice, but there is no reduction in consumption. Buildings are of responsible for up to 40% of energy use. To reduce the energy consumption the several methods used are providing feedback including more detailed electricity bills, self reading of meters, interactive tools, home display featuring various data including consumption comparisons and visualization and the tariff rate structure. These methods provide less amount of reduction in energy consumption. But our proposed system will motivate the consumer to reduce large amount of energy and also there is no loss to the distribution side of the electricity industry.

LITERATURE SURVEY

The recent evolution of the electricity business regulation has given new possibilities to the electricity provides for formulating dedicated tariff offers. A key aspect for building specific tariff structure is the identification of the consumption patterns of the customers exhibiting similar patterns. The evaluation of the electricity distribution regulation has given electricity provides new possibilities of formulating dedicated tariffs. Clustering techniques are extremely useful for assisting the distribution service provides in the process of electricity customer classification on the basis of the load pattern shape [1]. Normally customer class load profiles are used in distribution network. They are used for some purposes such as load flow calculation, state estimation, Planning calculation and tariff planning etc. This paper represents, introduce to utilize AMR data for customer classification of load profiling. The AMR provide accurate data of automatic updation. Previous methods have some of error such as sampling error, Geographical Generalization, profile drift, customer reclassification, and outliers. The above limitation was solved by AMR Measurements. If will collect he data continuously and update all the times. Holidays are modeled as Sundays. This method should attain better results in non – residential customer [2]. This paper reviews that a new set of metrics is introduced to building occupant for conserve the energy efficiently and energy use predictability. First, the effect of goal setting and feedback on energy use in the residential sector was studied. Otherwise a better understanding of how different approaches of motive energy conservation such as advanced metering technologies, Web-enabled technologies was developed. The commercial building occupant energy-use behavior resulted in slower adoption. The three metrics such as energy-use efficiency, entropy and intensity. This will enable the segmentation and classification of individual building occupants based on their energy use patterns [3]. In this paper, we recognized office worker activities that are relevant for

energy control of applicant and building system using sensors that are commonly installed in new or refurbished office buildings. We thought-about desk-related activities and folks count in workplace rooms, structured into table and space cells. Recognition was performed using finite state machine (FSMS) and probabilistic layered hidden Marko models (LHMMS).Then the present building simulation results that compare different control strategies [4]. We proposed to infer occupancy states from consumption time series data using a hidden markov model framework. Occupancy is characterized in this model by magnitude; duration and variability. We show that user may be grouped according to their consumption pattern into group that exhibit quantitatively different dynamics that may be exploited for program enrollment purposes. Other program target consumers who are inefficient in their consumption due to long term choices, such as utilizing inefficient appliances or having poor home thermal insulation [5]. In this paper discussed about energy consumption in residential building. This approach simple algorithm for detecting and voltage and current measurements at the main circuit panel of the home. Three data sets were collected with a prototype system (from a power strip in a laboratory, a house, and an apartment unit).The overall accuracy of the paper was 82%. Our goal is to track each appliance in the house by using a few measurements points as possible to reduce installation costs. A signature data base provides the training data for the classifier [6]. This paper outlines the background, development, and assessment of a prototype enterprise energy information system (EEIS) that supports strategic energy-management by providing comprehensive energy monitoring .and also targeting integrating with energy modeling software and business databases. The main processes are (i) data collection (ii) data analysis (iii) Reporting (iv) Action. Energy data are captured automatically from utility meter (or) energy drives. Data Analysis in two categories. They are routine, investigative [7]. The customer is willing (or) interested to know how much amount he has save in energy bills and is also ready to make statistical changes in the buildings or Energy management plus to be an efficient consumer. The customers are more willing take up energy conversion measures if they are one of the top energy consumers in the groups. The effectiveness in billing through comparison groups could be achieved by groupies' customers in homogeneous groups (customers of similar house characteristics) rather than from us heterogeneous group. Distributed graph in billing is more logical alternatives for grouping such as grouping based on geographical area and grouping bill data are suggested to have an effective billing scheme [8]. The differential effects of two forms of feedback on energy consumption were examined in two units of a metallurgical company. One Unit: Employees received information about energy conservation and they also set goals and they received feedback for their own conservation behavior. Second Unit: The same procedure is followed, and they also get information about the performance of first unit. The result cleared showed to the employees in the comparative feedback condition saved more energy than first unit (Social identify theory – 1st unit Social comparisons theory) – 2nd (half a year). To save energy, western industrial organization are investing in innovation physical technologies, it will reduce consumption. Energy wasting behavior was measured with a MMR (Multi moment Recording). 79 Object were observed, 35 object for shutting off machines, 33 object for turning off station light, 33 object were remaining set of energy wasting behavior [9]. To conserve energy, the people should have a goal setting on their conservation. In the present article article the effect the effect was made to provide a both a difficult goal & feedback about performance in relation to the goal. 8o family reduce to set a goal to reduce their residential electricity consumption (Several weeks during summer) half of them by 20% difficult goal half by 2% easy goal half a week about their daily consumption. 20 more family served as control feedback can provide information about the type, extent and directed of errors. Families that agreed to take part in the scheme were randomly assigned to one to 5 groups. 2 groups asked to reduce their electricity consumption by 20% (a difficult goal. 2 group 2% (easy goal). Both group were provided with feedback about their performance on the conservation task. 5th group were not asked to set any goal & were not given any feedback [10]. This article outlines, the research conducted by social psychologist to reduce residential energy consumption. Homeowners summer electricity consumption may be expected from their energy connected attitudes. To reduced the energy consumption, they examined three studies. Appliances used in the houses are turned on and off the homeowners are don't about their amount of energy are used or consumed by these devices. Show they provide utility bill with clear information about their energy consuming behavior. The letter is focused the homeowner's attention on air conditioning, they were told that in the summer the largest use of electricity was due to air conditioning [11]. Monitoring and reporting of building use may induce occupant to conserve energy. The goal of this study was to provide building occupants with personal electricity utilization data contextualized with different social frames of reference. They provide 3 study group and a control group from the building occupant. The only group that significantly reduce their electricity use when compared to the control group. Study group can view peer network utilization. Most effort to reduce energy use in building focus on improving building infrastructure. Such as upgrading boilers, adding insulation, replacing windows and replacing lights, office equipment and appliances [12]. The paper, shows a series of programs run by a company called OPOWER to sent a Home Energy Report letters to the home utility customers, this scheme will comparing their electricity use with their neighbors. This paper also provide energy conservation

tips. The neighbour comparisons were directly influenced by academic work showing that providing social norms information induces people to conserve energy. This program was motivated by similar evidence on the power of social norms in a variety of domains, including voting, retirement savings. The Home energy Reports are contains several page letters with two keys components [13]. In the residential buildings, Personal decisions influence electricity and water consumption faculty dormitories give a wonderful venue for controlled study of the impact of feedback. It will give feedback and incentive, this will encourage students to conserve resources. High resolution: An automated data monitoring system was developed that will provide dormitory resident with real time web-based feedback on energy and water. Low resolution: utility meters were manually read for 20 low resolution dormitories [14]. Improved feedback on electricity consumption could give a tool for client to raised management their consumption and ultimately save energy. The choice of appliances and of their duration and mode of use is important to reduce electricity consumption Feedback may be improved in the various ways. The improved feedback can help to repair the problem associated with electricity conservation. Improved feedback reduces consumption by up to 20% [15]. In this paper, used normative message detailing the household energy conservation. And the descriptive normative message that detailing average neighborhood usage. It is also adding a injunctive message (social approval are disapproval). We performed a field experiment which examining the effect of normative information on household energy consumption. Normative message households received information about how much energy they had consumed in previous week. Household can be divided into two categories at each observation period. Households that consumed less than the average received a message displaying a positive valence emoticon (☺). If consume more than the average received a message displaying a negatively valenced emoticon(☺).All message were clearly identified with the university logo and a telephone number were also used [16]. In this paper we installed the smart electricity meter. The meter was connected behind the electricity meter but it is not used for billing purpose. It provide two main areas one is to sense deployment to detect occupancy and improve energy efficient in house and commercial building and the other is to analyse electricity consumption data to observe and influence user's energy consumption behavior [17]. In modern energy aware buildings, lightning control system are put in place so to maximize the energy efficiency of the lightning system without affecting the comfort of the occupants. This involves utilizing a set of presence sensors, with actuator, to determine when to turn on/off or dim lightning when it is deemed necessary. Such system are installed using standard tuning values statically fixed by the system installer. This lightning control system is composed of a user switch to turn on left one or more light. Here PIR sensor is used to detect movement in a space the control system activating the lightning system [18]. Buildings are the largest consumers of electricity that buildings consume about 70% of the electricity. Energy use in buildings of HVAC (Heating Ventilation Air Conditioning) system used to maintain comfort for occupants. Here used PIR sensor to identify the movement. If the room is occupied or not. PIR sensor are connected directly to the local lightning. A magnetic reed switch door sensor and a PIR sensor module, it enabled high accurate occupancy detect [19]. Heating, cooling, ventilation accounts for 30% energy usage and for 50% of the electricity usage in the U.S. As a result we found that the rooms are often over-conditioned needlessly. Temperature and CO_2 levels are two main conditioning factors to consider for HVAC control strategies. Temperature requires only a binary indication if a room is occupied, which could be implemented using a PIR sensor. In CO_2 ventilation shows functions of the number of occupants, this cannot be effectively controlled via PIR. This is very problematic. HVAC control strategy must utilizes an occupancy monitoring system it is capable of detecting number of occupant in real time [20]. This paper reviews electricity consumption feedback literature. The feedback be received as quickly as possible to the time of consumption; be related to a standard, be clear and meaningful and where possible both direct and indirect feedback to customized to customer. Feedback can reduce electricity consumption in homes by 5 to 20 percent .Direct feedback is the effect it can have on appliance purchasing decision, as customer notices from feedback that certain appliances are heavy energy consumption. Feedback could present usage pattern in formats most helpful to individual household. 2 types of comparison, 'historic' and 'normative' [21]. In view of the vitality use examples of the customers in the business structures they are ordered by gathering them dependent on sectioning their utilization by human's workdays, non-workdays, work hours and non work hours for effective arrangement of the building tenants by ascertaining their vitality use effectiveness, entropy and power. Building tenants with low vitality use proficiency and high vitality use power is focused for decrease of in general vitality utilization and overhauling the gear which empowers preservation of vitality by decrease of misfortunes and legitimate use of electrical hardware [22] .

PROPOSED METHOD

Energy Conservation system for the domestic users is in practice to reduce the energy consumption by using the star rated equipment and high efficient equipment. But the energy is not conservated because of using a high efficient equipment. High

efficient equipment consumes high amount of energy and the cost is also high. Buildings are responsible for up to 40% energy use. To reduce the energy consumption, the several methods are used such as providing feedback including more detailed electricity bills, Self reading of meters, Interactive tools, Home display featuring various data including consumption, comparisons and visualization and the existing tariff rate structure.

With the advent of competitive electricity market, the distribution side of the electricity industry has to face challenges in providing satisfactory electricity to the consumer. The focus of this paper is to reduce the energy consumption for the domestic users by using our tariff rate structure. This is because of the market scenario, the electricity providers have been given new degree of freedom in defining tariff structure (that is free of 100 units). This scheme provides loss to the distribution side of electricity providers. But in our proposed system there is no loss to the distribution side of the electricity industry because we provide incentive as well as penalty to the consumer based on their electricity usage. The consumed unit is the input is given by the user and it will calculate using our tariff rate structure to generate the output. The penalty and incentive is find by comparing average of consumed units and individual consumed unit for houses. At last the bill amount will generate.

In the existing tariff rate structure (the free of 100 Units scheme) is not motivate the consumers to reduce their consumption. But in our proposed system, it will forced the consumer to reduce their energy consumption.

BLOCK DIAGRAM

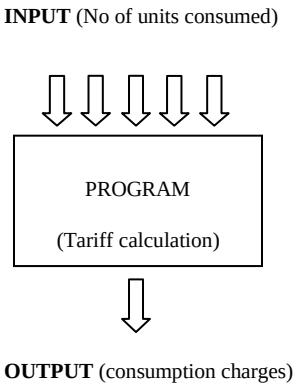

Figure: 1

OLD TARIFF CHART

Table: 1

Tariff	Category of consumers & slabs	Energy charges (Rs/unit)	Fixed charges for two months (Rs)	Energy charges after Govt's subsidy(Rs/unit)	Fixed charges for two months after Govt's subsidy(Rs)
	Domestic, Handloom, Old age homes, Consulting rooms, Nutritious Meals centers etc.				
	Consumption up to 100 units bi-monthly				
	(100 units free scheme) 0-100 units	2.50	30/service	0	0

#I-A	Consumption above 100 units and up to 200 units bi-monthly				
	(100 units free scheme) 0-100 units	2.50	30/service	0	20/service
	101-200 units			1.50	
	Consumption above 200 units and up to 500 units bi-monthly				
	(100 units free scheme) 0-100 units	2.50	40/service	0	30/service
	101-200 units			2.00	
	201 to 500 units	3.00		3.00	
	Consumption above 500 units bi-monthly				
	(100 units free scheme) 0-100 units	2.50	60/service	0	50/service
	101-200 units	3.50		3.50	
	201 to 500 units	4.60		4.60	
	Above 500 units	6.60		6.60	
	For handlooms in residence, 0 to 200 units bi-monthly is free. (Above 200 units bi-monthly, the corresponding slab in the domestic tariff is applicable)				

RESULT & DISCUSSION

For a consumer who consumed 100 units the consumption charges as per the old tariff would be zero whereas In new tariff structure proposed by us the consumption charges would be based on the difference between his consumption as per the new tariff and a percentage of average number of units consumed in this cluster this tariff structure provides incentives and penalties based on the consumption pattern of the consumers. This proposed structure is expected to bring about active participation of consumers in energy conservation.

CONCLUSION

This paper demonstrated to reduce a energy consumption to the domestic users. Our proposed tariff rate Structure will force the consumer to reduce their energy consumption and also there is no loss to the distribution side of electricity industry. Because we provide incentive as well as penalty to the consumer based on their electricity usage.

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