**Electricity Consumptions of Appliances (SORECO 1)**

**A Project study**

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**Chapter I**

**Project overview**

In this chapter it gives some background study of the system and explains the motivation for pursuing this work. In Additions it provides an overview of the approach taken as very as the results obtained.

**Background of the study**

Nowadays, society encourages the use of modern technology, namely smartphones, because they are easier to operate, faster to work, and more productive. Some companies build websites to help them stand out to customers. Everybody uses technology these days because it allows for faster and more advanced data and information sharing.

Approaching the online system is the most efficient, more powerful, flexible, and relevant today for the businesses or companies. Because through various needs such as consumption, consumers do not know how much they consume in a day. Every household today is sometimes practical in what they use such as gadgets, appliances and others that consume electricity, they make a way to reduce the bill or save the things they use that have to do with electricity. and in the corporation, they need to print information so that their customers know how to save money, calculate what they can use, and what else customers should know in an establishment. so, through this an electricity corporation can help their customers.

**Review related Literature and System**

**Foreign Literature**

According to Alexander Martin Tureczek and Per Sieverts Nielsen (2017) University of Denmark, Structured Literature Review of Electricity Consumption Classification Using Smart Meter Data Smart meters for measuring electricity consumption are fast becoming prevalent in households. The meters measure consumption on a very fine scale, usually on a 15 min basis, and the data give unprecedented granularity of consumption patterns at household level. A multitude of papers have emerged utilizing smart meter data for deepening our knowledge of consumption patterns. This paper applies a modification of Okoli’s method for conducting structured literature reviews to generate an overview of research in electricity customer classification using smart meter data. The process assessed 2099 papers before identifying 34 significant papers, and highlights three key points: prominent methods, datasets and application. Three important findings are outlined. First, only a few papers contemplate future applications of the classification, rendering papers relevant only in a classification setting. Second; the encountered classification methods do not consider correlation or time series analysis when classifying. The identified papers fail to thoroughly analyze the statistical properties of the data, investigations that could potentially improve classification performance. Third, the description of the data utilized is of varying quality, with only 50% acknowledging missing values impact on the final sample size. A data description scores for assessing the quality in data description has been developed and applied to all papers reviewed.

These statements it is related to our study about the electricity consumption of the appliances because the researchers need to understand the use of smart meter data in classifying electricity consumption. This concept will aid the researchers in developing an appropriate system then they are creating an easy way to classify the consumptions to their meters. Using the smart meter that use is easy identify the data base needs on their smart meter.

### According to [Rani Yesudas](mailto:Rani.Yesudas@anu.edu.au) and [Roger Clarke](mailto:Roger.Clarke@xamax.com.au), Rani Yesudas and [Xamax Consultancy Pty Ltd](http://www.rogerclarke.com/CNotice.html), (2015) Ottawa, Measures to Improve Public Acceptance of Smart Metering System. When building and developing a key infrastructure like a power grid, it is crucial to understand the needs of the stakeholders, in particular the end-needs. user's Smart metering technologies are regarded as a crucial component of grid modernization initiatives. It offers the utility a variety of chances to grow their company. The advantages for other market participants are also obvious. Residential customers, meanwhile, are being forgotten. Consumer resistance to smart metering initiatives is a problem all around the world. Smart meters are seen as an infringement on the rights and interests of consumers. The goals of smart metering systems should also take consumer wants into consideration to prevent such situations. It is necessary to develop strategies for gathering and incorporating their needs.

### It is related to our study about the electricity consumption of every appliance because this article explains the goals of smart metering system should also take consumer wants to consider. This article is also same in our ongoing proposal we want to develop a system that the consumer will now the consumption of appliances.

According to [Vipul Dhongade](https://aip.scitation.org/author/Dhongade%2C+Vipul)and [A. D. Shaligram](https://aip.scitation.org/author/Shaligram%2C+A+D) (N/A), The study on consumption of household appliances with SCADA platform. The rapid growth in consumption of residential sectors has increased concern towards limited energy resources and high electricity pricing. The recent trend has occurred for improvement in energy efficiency through Demand Side Management (DSM) in which intelligent monitoring systems plays a significant role to optimize energy use. In this paper, the consumption of household electrical appliances was studied using centralized Supervisory Control and Data Acquisition System (SCADA) with detailed analysis of power consumption. The consumption in residential sector has been increased to a very great extent due to continuous growth in population. A residential load mostly operates at specific time so consumption can be reduced by taking correct measurement feedback from intelligent monitoring system to the consumers to adjust peak and non-peak power usage. The deployment of SCADA system has benefits of more reliable data acquisition system, centralize server, powerful database and informative graphical user interface which not only provide real time data of consumption of each appliance but also create an opportunity to manage power consumption during high demand. The accurate consumption data can be useful to get future demand requirement; this essentially brings economic benefit to residential consumers and to optimize available appliances.

It is related to our study because this study proposes a system that help give detailed analysis of electricity consumption of appliances. This will help the researchers in many ways. This will give them insight for accurate details to be put into the system that is proposed. Furthermore, it will be a solid base for the program.

According to Vedran Lesic, Brock Glasgo, Tamar Krishnamurti, Wändi Bruine de Bruin, Matthew Davisand Inês Lima Azevedo (2019) N/A, comparing consumer perceptions of appliances' electricity use to appliances' actual direct-metered consumption.Many strategies for reducing residential energy consumption—including product labelling programs, subsidies for the purchase of efficient devices, behavioral programs that encourage efficient energy use, and others—rely on building owners and end users to make informed investment and operational decisions. These strategies may be ineffective if consumers are unaware of how much electricity is used by different devices in their homes and buildings. This study therefore compares consumers' perceptions of their appliances' electricity use to these appliances' actual direct-metered electricity consumption. Using an online survey, 118 homeowners from Austin, Texas were asked to estimate the energy consumption of six household devices which were monitored in the participants' homes. Homeowners were randomly assigned to assess their appliance-specific electricity use in terms of energy units (kWh/month) or energy cost units ($/month) for an average summer month. Consistent with previous studies, participants overestimated the energy consumed by their low energy consuming devices and slightly underestimated that of their most energy-consuming device. Results also showed that responses of the experimental groups estimating their consumption in energy units and energy cost units were similar, the accuracy of the two groups' perceptions was similar, and levels of confidence in the two groups were similar. These results suggest that targeted information campaigns focused on air conditioning energy consumption and device power reduction opportunities could improve consumer decision-making to save energy and reduce demand.

In the cited talks about the many strategies for reducing residential energy consumption, that includes for our research. This concept is related to our research that focuses on conditioning energy consumption.

According to [Vinh Tien Le](https://www.sciencedirect.com/science/article/pii/S0378778818339161" \l "!) and [Adrian Pitts](https://www.sciencedirect.com/science/article/pii/S0378778818339161#!) (2019) United Kingdom, A survey on electrical appliance use and energy consumption in Vietnamese households: Case study of Tuy Hoa city. The domestic sector is responsible for approximately a third of total energy consumption in Vietnam. However, research on the details of energy consumption in this sector is relatively poor and there is a lack of data on actual energy use in households. This study attempts to fill the gap by providing an analysis of appliance penetration, usage behavior, and actual energy consumption of Vietnamese homes. Data were collected from a survey of 60 households in Tuy Hoa City on the South-Central Coast of Vietnam in 2017. The result shows that the average energy consumption was 4492 kWh per household per year, in which electricity and [liquefied petroleum gas](https://www.sciencedirect.com/topics/engineering/liquefied-petroleum-gas) accounted for 74.4% and 25.6% respectively. The breakdown of current energy consumption revealed that cooling was the primary consuming end-use with 31.9% of the total, followed by cooking gas with 25.6% and kitchen appliances with 18.5%. Energy consumption for typical households with various ownership levels of [air conditioner](https://www.sciencedirect.com/topics/engineering/air-conditioner) were also predicted. The results of this study are therefore a valuable reference for policy makers, energy planners and Vietnamese households themselves to understand the existing energy consumption characteristics and identify potential ways to improve energy efficiency in dwellings.

Similar to our study, that given an research on the details of energy consumption that provides an analysis and understand the existing energy consumption for developing the system.

**Foreign System**

According to Lucas Pereira1, Donovan Costa, and Miguel Ribeiro (N/A) Portugal, A residential labeled dataset for smart meter data analytics. Smart meter data is a cornerstone for the realization of next-generation electrical power grids by enabling the creation of novel energy data-based services like providing recommendations on how to save energy or predictive maintenance of electric appliances. Most of these services are developed on top of advanced machine-learning algorithms, which rely heavily on datasets for training, testing, and validation purposes. A limitation of most existing datasets, however, is the scarcity of labels. The SustDataED2 dataset described in this paper contains 96 days of aggregated and individual appliance consumption from one household in Portugal. The current and voltage waveforms were sampled at 12.8 kHz, and the individual consumption of 18 appliances was sampled at 0.5 Hz. The dataset also contains the timestamps of the ON-OFF transitions of the monitored appliances for the entire deployment duration, providing the necessary ground truth for the evaluation of machine learning problems, particularly Non-Intrusive Load Monitoring. The data is accessible in easy-to-use audio and comma-separated formats.

The connection and the relation of the study according to authors between in our study is that we both want to develop or create a system that will help on how to know or have an idea in how many kilo - watts they consume, and how to save energy or predictive maintenance of electric appliance. this system that we can do is a big help on how to manage an appliance to reduce their electricity.

According to [Robert J. Meyers](https://www.sciencedirect.com/science/article/abs/pii/S0378778809002758" \l "!), [Eric D. Williams](https://www.sciencedirect.com/science/article/abs/pii/S0378778809002758#!), and [H. Scott Matthews](https://www.sciencedirect.com/science/article/abs/pii/S0378778809002758#!) (2010), N/A, Scoping the potential of monitoring and control technologies to reduce energy use in homes. This scoping study takes a broad look at how information technology-enabled monitoring and control systems could assist in mitigating energy use in residences by more efficiently allocating the delivery of services by time and location. A great deal of energy is wasted in delivering services inefficiently to residents such as heating or cooling unoccupied spaces, overheating/undercooling for whole-house comfort, leakage current, and inefficient appliances. We construct a framework to estimate different categories of inefficient energy services and the result of our initial estimate is that over 39% of residential primary energy is wasted. We next discuss how monitoring and control technologies could manage home energy use to reduce waste. Technologies considered here include programmable thermostats, smart meters and outlets, zone heating, automated sensors, and wireless communications infrastructures. The level of energy services delivered is assumed to remain unchanged, with all energy savings being realized through better management. A final discussion on barriers to adoption of these systems speculates that a lack of consumer awareness of the technologies, high costs due to lack of economies of scale, and difficult user interfaces are currently the major hurdles toward adoption.

It is related to our study because both looking for way to scoping the potential of monitoring and control technologies to reduce energy use in their homes. we also want to develop a web-based tool that tracks appliance electricity consumption for SORECO customers. Enable individuals to be able to calculate their electricity usage in a simple method.

According to [Stephan Koch](https://ieeexplore.ieee.org/author/37533687400), [Dominik Meier](https://ieeexplore.ieee.org/author/38099038900), [Marek Zima](https://ieeexplore.ieee.org/author/37272971200), [Martin Wiederkehr](https://ieeexplore.ieee.org/author/37592290800), [Goran Andersson](https://ieeexplore.ieee.org/author/37272976300) (2009), Romania. An active coordination approach for thermal household appliances — Local communication and calculation tasks in the household. In this paper, an approach to the coordinated operation of a multitude of household appliances with thermal inertia is presented, which can be used for power system control tasks. Appliances under consideration are cooling and heating devices, e.g., refrigerators, freezers, or electric water boilers, which are characterized by an intermittent (duty cycle) operation. A recently developed coordination algorithm for a large group of these thermostat-controlled appliances equipped with a two-way communication interface uses centrally computed switching impulses based on anrdquo offer to be switched for a certain pricerdquo from the appliances. The price calculation on the local level requires an accurate prediction of the next switching instant triggered by the thermostat. This paper develops a framework for the communication within the household and to the outside, modeling and prediction approaches for the appliance duty cycles, and a switching price calculation method. Furthermore, the impact of the coordinated control on the appliances and requirements on the in-house communication system are discussed.

It is related to our study because same goal for helping customers anyone utilizing our web-based tool to track appliance electricity is will be able to determine how many kilo-watts they use each day. And the study conducted of the purpose of the study conducted. It has the same goal to let the web-based help customers that can be an addition or advantage for customers.

According to [Il-Young Joo](https://ieeexplore.ieee.org/author/37086133782) and [Dae-Hyun Cho](https://ieeexplore.ieee.org/author/38239739300)i (2017), N/A Distributed Optimization Framework for Energy Management of Multiple Smart Homes With Distributed Energy Resources. This paper proposes a distributed optimization algorithm for scheduling the energy consumption of multiple smart homes with distributed energy resources. In the proposed approach, the centralized optimization problem for home energy management is decomposed into a two-level optimization problem, corresponding to the local home energy management system (LHEMS) at the first level and the global home energy management system (GHEMS) at the second level. The controllable household appliances (e.g., air conditioner and washing machine) are scheduled in the LHEMS within the consumer's preferred appliance scheduling and comfort level, while the energy storage system and power trading between households are scheduled in the GHEMS. In the simulation study, the proposed distributed algorithm shows almost equivalent performance to the centralized algorithm in terms of the electricity cost and the consumer's comfort level. The impact of different network topologies on the proposed algorithm is also analyzed, and the result provides insight into the selection of the optimal network configuration in view of the consumer's electricity cost saving.

It is related to our study because same goal for helping customers on how to save energy on electricity. And also, we want to develop a web-based tool to track electricity usage among SORECO customers. And also the advantage of this web-based is that we can help a lot of people, especially the customers.

According to Whirl pool corp. (2003) United States, Electronic system for power consumption management of appliances. An electronic system for power consumption management of one or more domestic appliances is routinely informed on actual energy tariff through a network control unit or through a predetermined time-table stored in the system. A user interface of the electronic system is provided where the user can set his preference concerning the switch-on time of each appliance and/or function thereof and read the related estimated energy consumption and/or energy cost of the appliance working program.

It is related to our study because they shared the same object as ours which is, this system they will be able to know how much they are spending on appliance. they can now manage an appliance to reduce their electricity bill

**Local Literature**

# According to [Eddie Seva See](https://www.researchgate.net/profile/Eddie-Seva-See) and [Mary Ann Musni See](https://www.researchgate.net/profile/Mary-Ann-See) (2010), Albay, Philippines, Electric Energy Utilization in the Households of Albay Province, Philippines: Contexts, Conservation Practices, and Future Efficiency Strategies.

This paper describes and analyzes the behavior of the households in Albay Province, Philippines on the energy use, practices and their contexts, and the appropriate efficiency use strategies. The study employed secondary analysis of data from 616 participants. It employed both qualitative and quantitative techniques in analyzing the data, namely “insight, intuition, reasoning, imagination and discernment” and “comparisons with discourses of experts, peer-accepted references, data from related literature” and centrality measures, gauges of dispersion and other related quantitative tools and standardized regression modeling. The research findings showed that the households in the province already observed electrical energy conservation measures primarily to lessen electrical bill/cut down on expenses. There are, however, considerable potentials for more efficient electrical energy utilization practices among such households based on the proportion of the households which do not yet practice conservation measures, namely scheduling of appliance use (100%), not overheating/overcooling rooms (84.9%), scheduling home energy audit (84.7%), selecting energy efficient appliances (84.4%), scheduling computer games only on weekends (76.9%), air dying of clothes instead of electrical drying (66.2%), using electric fans only when people are around (63.8%) and using fluorescent lamps instead of incandescent lamps (55.8%). It was further found out that the electricity utilization-conserving practices in the households “behaved” or manifested a distinguishable trend with respect to family energy consumption, educational qualification of the household heads, and number of children Future efficient electric energy utilization strategies comprise the continued observance of the now existing measures but to include the proportion of households that does not practice them yet by addressing the detected quantitative behavior between conservation practices and household contexts, and some creative behavioral (human) and technological approaches. The researchers recommend the training of and dissemination of information to the households regarding the findings of this study on electrical energy conservation measures.

It is related to our study because article talks about the practices of every household regarding to their consumes in electricity. This is helps to Albay household to measures their electricity consumptions using to their practices.

According to Renz Chester Rosales Gumaru (2019) Pasay, Philippines, A Comprehensive Study of Electricity Consumption of People in Each Region in the Philippines. Electricity is one of the most important sources of energy in our everyday lives. We use it every day in different situations and circumstances. However, it is also the most used and most expensive energy that we always use. This study will determine which region in the Philippines consumed the most and least electricity. It will also study the relationship between the different distributor of electricity and electricity consumption. This study will help the society in solving the problem of dealing will high cost of electricity. Knowing which regions are the most and least consuming in terms of electricity will surely help the government identify why that particular regions consume a lot, or consume less. This study will also determine if there are changes every month in the most and least consuming electricity regions. The researchers also explore different and various problems and factors contributing to the consumption of electricity of each region in the Philippines. And the researchers also seek if there is a significant difference in the consumption of electricity between regions in the National Capital Region, and I n province. This study will surely help and contribute a lot to a developing country like the Philippines, especially the country is known for consumption of too much electricity.

This statement related to our study because they studied to help customers to solve their problem about dealing high cost of electricity. And this investigation will also ascertain whether monthly variations exist between the locations with the highest and lowest electricity use. The researchers also look into a wide range of issues and elements that affect how much electricity that used.

According to Maria Criselda B. Loyola, Jeremiah O. Joson, and Lance Bryan D. Salvador (2020) Malayan Colleges Laguna, Cabuyao City, Philippines, Individual Load Monitoring of Appliances for Home Energy Management System. Home energy management starts with a monitoring system for the user to become aware of how much energy he/she consumes over a period of time and a controlling system that maximizes energy efficiency. There are two methods of load monitoring used in analyzing loads in residential installations and one of them is Intrusive Load Monitoring (ILM). This study was aimed to create an energy management system focusing on individual load monitoring of household appliances through ILM implementation. Wireless network technology was also utilized for data transmission and access, using Raspberry Pi 3B+ and SenseTecnic cloud host. The notification feature of the system, done through a cloud-based communication platform Twilio, is 100% successful in performing its function. Energy consumption behavior model equations for specific types of appliance loads were generated using regression analysis. All equations have relatively good fit, with R squared of 85% - 94%, and low standard error, except for the equation representing the variable load with sporadic consumption pattern. Nonetheless, there is 99% confidence in the accuracy of the energy consumption behavior. On the other hand, electric consumption of the entire smart meter costs PHP34.051 only for a month of operation. This only suggests that the system will not significantly contribute to the entire household electric energy consumption cost.

It is related to our study because this study discusses how to implement a monitoring system that allows the user to see how much energy they use over time, followed by a controlling system that maximizes energy efficiency. In order to analyze the loads in residential installations, two different load monitoring techniques are used.

According to [Joseph J. Pastorfide](https://ieeexplore.ieee.org/author/37086261791), [Juan Franco M. Revilla](https://ieeexplore.ieee.org/author/37088739643), [Chantel Kim D. Santos](https://ieeexplore.ieee.org/author/37088739830), [Jennica Tsubasa F. Takada](https://ieeexplore.ieee.org/author/37088742558) and [Daryl Alden S. Viray](https://ieeexplore.ieee.org/author/37088726328) (2013) Manila, Philippines, Usage prediction of appliances in filipino households using Bayesian algorithm. The standby power accumulated after some time contributes to the wasted energy of a household and can be noticeable in a home's power consumption. In this study, the group aims to devise a standby power management system that is able to adapt constantly with one's changing lifestyle. To know the appliances available in households, a survey with 230 respondents was conducted and the most common appliances were taken into consideration. The power measurements of the appliances were also recorded using a power meter. The data log was conducted by members of different households for the activation of the appliances, the users, and the occupancy of the household. The mentioned factors from the usage log were then used on the Bayesian algorithm, which was used to calculate the probability of usage of the appliances. This learning prediction, in addition, to a power management system will minimize the power consumed by appliances in standby mode, thus saving energy and income.

It is related to our study because they create a power meter was also used to capture the appliances' power measurements. The members of various households kept a data log of when their appliances were used, who was using them, and how many people lived in each home.

According to [Dominic Joseph R. Enriquez](https://ieeexplore.ieee.org/author/37087758028); [Marcel Lowell G. Villanueva](https://ieeexplore.ieee.org/author/37088444014); [Samuel Matthew G. Dumlao](https://ieeexplore.ieee.org/author/37085725148); [Rosula S.J. Reyes](https://ieeexplore.ieee.org/author/37448367200) (2017) Quezon City, Philippines. Wireless power consumption monitoring and analysis system using Winter's forecasting method. The Philippines is one of the rising economies in Southeast Asia. However, it is facing a power crisis where there is a continuous increase in an already huge demand in electricity given the limited and scare supply from different power sectors. Consumers are called to be aware of their power consumption and make necessary efforts towards the smart and efficient use of it. As a response, the proponents developed an appliance-level system that monitors and analyzes power consumption. The monitoring subsystem was implemented through a portable hardware black box which includes the power meter sensor, an Arduino microcontroller clone board and a ZigBee shield for wireless transmission to a microcomputer. The Raspberry Pi microcomputer served as a temporary local server for the sync node and the gateway for the data to be stored in an online database. From this, the analysis subsystem retrieves the consolidated data to undergo both retrospective and Winter's forecasting technique. All necessary information, figures and graphs will be presented to the user for interpretation through a simple web application. Overall, the study fulfills its vision of giving people the power over their utility bills by being a tool for raising awareness towards responsibly reducing power consumption to a more efficient use.

It is related to our study because the advocates created a system at the appliance level that tracks and examines electricity usage. Through a straightforward web application, the user will be given access to the relevant data. By serving as a tool for increasing awareness toward responsibly reducing power use to a more efficient use, the study achieves its goal of providing people control over their electricity expenditures.

**Local System**

According to the study of (2016) Metro Manila, Philippines. A New convenience: the MpbileAP. Electricity consumers can now check their latest bills on their smartphones as AboitizPower introduces the MobileAP. The MobileAP is an online application that makes waiting time for the printed bill to be delivered to the consumers’ doorsteps so yesterday. With this new app, not only can the consumer check the latest bill, he can also check out the previous 12 months of electric consumption thru a chart that shows kilowatt consumption and its equivalent monetary value.

This study stated above is related to our study, because we also want to build a web-based electricity consumption of appliances for the SORECO customers. For them to have an easy way to compute their electricity consumption on their own. So that they can also calculate the appliances watts they consume per day, weeks or month.

According to [Lorafe Lozano](https://www.sciencedirect.com/science/article/abs/pii/S0960148119304380" \l "!), [Edward M. Querikiol](https://www.sciencedirect.com/science/article/abs/pii/S0960148119304380#!), [Michael Lochinvar S. Abundo](https://www.sciencedirect.com/science/article/abs/pii/S0960148119304380#!) and [Luzvisminda M. Bellotindos](https://www.sciencedirect.com/science/article/abs/pii/S0960148119304380#!) (2019), Cebu, Philippines. Techno-economic analysis of a cost-effective power generation system for off-grid island communities: A case study of Gilutongan Island, Cordova, Cebu, Philippines. Off-grid, rural island communities seldom have access to electricity and for those that do, the quality and availability are unsatisfactory. Gilutongan Island is one of the many off-grid islands in the Philippines with very limited access to electricity. Residents are provided with electricity from 6:00 p.m. to 10:30 p.m. through a 194-kVA diesel generator, paying US$ 0.14 per bulb and US$ 0.16 per outlet. Payment for electricity is collected on a daily basis with collections usually amounting to US$ 74.32 per day. With consumption totaling to 276 kW for 4.5 h, this roughly translates to a cost of US$ 1.21 per kWh. Using Hybrid [Optimizations](https://www.sciencedirect.com/topics/engineering/optimisation) Model for Electric Renewables (HOMER), this paper presents a techno-economic analysis of a proposed cost-effective [power generation system](https://www.sciencedirect.com/topics/engineering/power-generation-system) for the island, aiming to provide electricity access to the residents 24 h a day with reduced energy cost. Two options are considered: diesel-solar hybrid and solar only. Considering location constraints of the island, the hybrid system proves to be more effective, reducing cost of energy by 70% to US$ 0.3556 per kWh. Determining the load profile of the island is imperative in creating the system, dictating its size and capacity, which in turn affects its sustainability.

The study stated above is related to our topic, because we also want to build a web-based electricity consumption for the customers of SORECO. So that they can have idea on how many watts they consume every appliance they have in their house.

According to [Amir-Hamed Mohsenian-Rad](https://ieeexplore.ieee.org/author/38277417700) and [Alberto Leon-Garcia](https://ieeexplore.ieee.org/author/38270617400) (2010), N/A, Optimal Residential Load Control With Price Prediction in Real-Time Electricity Pricing Environments. Real-time electricity pricing models can potentially lead to economic and environmental advantages compared to the current common flat rates. In particular, they can provide end users with the opportunity to reduce their electricity expenditures by responding to pricing that varies with different times of the day. However, recent studies have revealed that the lack of knowledge among users about how to respond to time-varying prices as well as the lack of effective building automation systems are two major barriers for fully utilizing the potential benefits of real-time pricing tariffs. We tackle these problems by proposing an optimal and automatic residential energy consumption scheduling framework which attempts to achieve a desired trade-off between minimizing the electricity payment and minimizing the waiting time for the operation of each appliance in household in presence of a real-time pricing tariff combined with inclining block rates. Our design requires minimum effort from the users and is based on simple linear programming computations. Moreover, we argue that any residential load control strategy in real-time electricity pricing environments requires price prediction capabilities. This is particularly true if the utility companies provide price information only one or two hours ahead of time. By applying a simple and efficient weighted average price prediction filter to the actual hourly-based price values used by the Illinois Power Company from January 2007 to December 2009, we obtain the optimal choices of the coefficients for each day of the week to be used by the price predictor filter. Simulation results show that the combination of the proposed energy consumption scheduling design and the price predictor filter leads to significant reduction not only in users' payments but also in the resulting peak-to-average ratio in load demand for various load scenarios. Therefore, the deployment of the proposed optimal energy consumption.

The study stated above is also related to our study because our web-based electricity consumption, will also help the users to decrease the electricity consumption they have, when they start to compute their electricity watts they consume per day. Because they will have the idea of how many prices it will cost every appliance, they use in their house hold.

According to Marvin R. G. Garcia, Hannah R. B. Chan, Benilda E. V. Comendador, Grant B. Cornell, Christopher D. Celestial, and Arc E. P. Mercolesia (2013), Philippines Smart Home Electricity Management System Using Cloud Computing (SHEMS). The paper promotes Smart Home Electricity Management System using Cloud Computing (SHEMS). Through the Internet it can collect on-line data power consumption, and can manipulate the power supply of the connected electrical appliances. In addition, it can generate daily, monthly and yearly reports on cost and kilo-watt per hour usage of each appliances/load connected to the system. Thus, it enables the consumer or establishment to keep track the real-time power consumption which allows users to save electrical energy.

The study stated above is related to our topic because by using our web-based electricity consumption of appliances they will be able to know or have idea in how many kilo-watts they consume per day, weeks or months. And by that it enables the consumer or establishment to keep track the real-time power consumption which allows users to save electrical energy.

According to [Kristine Mae E. Galera](https://www.sciencedirect.com/science/article/pii/S1877050917329769" \l "!) and [Orven E. Llantos](https://www.sciencedirect.com/science/article/pii/S1877050917329769#!) (2017) Iligan Philippines Mobile Web Energy Monitoring System Using DFRduino Uno. Energy consumption in residential households is very important to consumers. The rise in electricity prices have deemed to consumers the need to conserve energy, with less to no information on their energy consumption patterns. A step to towards energy conservation is a real time energy monitoring system which provides feedback to the consumers; thus, the consumer will be able to identify the opportunities to adjust and identify how to conserve energy. This paper presents a real time energy monitoring system that is cost-eﬀective and reliable, it can be used to analyze and evaluate the output voltage or generated energy from a household appliance. A hardware device is used to gather energy data passed and stored to a database through cloud-based RESTful API resources. These resources are then used by the mobile web application for displaying real-time and historical energy readings. The developed monitoring system have an accuracy rate of 94% in getting the correct energy consumption through testing. The results of user’s feedback during testing provides insights to supplementary features which shows the usefulness of the energy monitoring system.

The study stated above is related to our topic because we also want to build a web-based electricity consumption per appliances they have in their house hold.so that they will be able to have an idea on how many kilo-watts they consume per day, weeks, months. They will be able to know how much does it cost per appliances they use in their household.

**Importance of the study**

This study shall be beneficial and favorable to the following;

**To the Employees (SORECO 1).** This system shall allow them to upload some downloadable documents and they can also manage the Web-Based Electricity Consumption of Appliances (SOREC01).

**To the customers.** This system shall allow themto compute how many watts they consume in every appliance. And they can

**To the future researcher.** It can be preference for their own study regarding on having web base electricity consumption of appliances.

**Statement of the Problem**

This study aims to develop web-based electricity consumption specially it seeks to answer the following;

1. What is the existing process?
2. What are the problems encountered in the existing system?
3. What are the features of the proposed system?

**Objectives of the study**

1. To develop (a web-based electricity consumption that will help the costumers of SORECO to compute their own electricity watts consumption).
2. To know the difficulties encountered by corporation employees in computation of consumption using the existing system.
3. To determine the features of the system.

**Scope and delimitation**

This study focuses on energy consumption calculators that make it easier for the customers to figure out how much electricity will require to run various electrical gadgets and appliances. And assist in reducing energy bills. Elegant and simple method for estimating power consumption in units and cost for each appliance. And also, focuses to the advisory and downloadable documents of the electricity corporation, so that customers can also know how they can use the system correctly. And important information is also included for new updates on the increase in electricity or anything else consumers should know. This system will be using a database for employee of corporation so that they can manage it.

We delimit the payment of the customer’s monthly bills; hence the coverage of our system is only for SORECO I.

**Definition of Terms**

**Appliances.** a device or piece of equipment designed to perform a specific task, typically a domestic one.

"Electrical and gas appliances".

**Bayesian algorithm.** is a set of rules for using evidence (data) to change your beliefs.

**Calculation Tasks.** (Using variables) and exercise GIPSY input syntax

**Consumers.** are people or organizations that purchase products or services.

**Discernment**. describes a wise way of judging between things, or a particularly perceptive way of seeing things.

**Electric power consumption (kWh per capita).** measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants.

**Energy monitoring system**. is a device that connects to the electricity meter in your home.

**Granularity.** the condition of existing in granules or grains, refers to the extent to which a material or system.

**Household.** for use in maintaining a home, especially for use in cooking, cleaning, laundering, repairing, etc., in the home.

**Installations.** the act or process of making a machine, a service, etc., ready to be used in a certain place: the act of installing something

**Kilowatt-hour** (kWh). is a unit of energy equivalent to one kilowatt (1 kW) of power expended for one hour (1 h) of time. The kilowatt-hour is not a standard unit in any formal system, but it is commonly used in electrical applications.

**Leakage current.** is the current that flows through the protective ground conductor to ground.

**Microcontroller clone board**. is an integrated circuit (IC) device used for controlling other portions of an electronic system, usually via a microprocessor unit (MPU), memory, and some peripherals.

**Monetary Board.** approves the volume/value of notes and coins to be issued annually, upon the recommendation of the Currency Management Committee (CUMC).

**Monitoring technology**. means any hardware, software, or application utilized in conjunction with a computer.

**Network configuration.** is the process of setting a network's controls, flow and operation to support the network communication of an organization

**Overheat.** the state or condition of being overheated; excessive heat, agitation, or vehemence.

**Price Calculation**. If you calculate a number or amount, you discover it from information that you already.

**SenseTecnic cloud host.** designed to streamline the development of IoT applications.

**Thermostat.** is a regulating device component which senses the temperature of a physical system and performs actions.

**Notes**

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