# DSM RECOMMENDATION FOR GOVERNMENT OFFICES: MNE APPLICATION

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**Abstract:** The demand on electrical energy has been constantly increasing. That can cause more problems when it is not consumed optimally. In order to avoid the waste of the electrical energy, new consumption tendencies must be implemented. To implement these new tendencies we need to know consumers habits and the amount of energy needed. This paper shows a study that has been conducted on schools in Turkey that are affiliated to The Ministry of National Education, The energy consumption habit was defined by using load reduction and load scrolling methods of Demandside Management with the aim to reduce the peak demand and scrolling the load to the appropriate time. Energy consumption of a given school in a given city of Turkey was examined in different phases in order to define different levels of electrical energy consumption specific to each phase. Accordingly, new education curriculum was proposed to use optimum electrical energy.

**Keywords:** Energy consumptation, Demandside Management, DSM, load curve, load reduction, load scrolling.

## Introduction

Energy is one of the most important factors affecting the world economically, politically and socially. Electricity is widely used in developing technology and equipments that are offered to consumers in parallel. Electric energy systems consist of four main processes: production, transmission, distribution and consumption. The 1973 Oil Crisis, triggered by many changes from traditional past approaches to today's energy production and consumption habits, indirectly led to the idea of control by demand. In the second half of the 20th century, there were many scenarios in which the reserves of fossil fuels, such as oil and natural gas, will soon be exhausted (Onar, 2008). In this case, it is first thought that the energy to be produced should be met from renewable energy sources rather than from fossil fuels. In addition, several studies have been proposed to control or direct the behavior of the consumer. The concept of Demandside Management (DSM) first emerged in these years, and its first examples have been implemented in houses (Law, Alpcan , Lee , Lo , Marusic and Palaniswami, 2012). The method has various application methods such as peak demand reduction, filling low demand times, load scrolling, demand saving, strategic demand growth and flexible load shaping.

DSM consists of 3-step processes in the form of load survey, determination of the type of stability study on the load curve, and identification of the technologies recommended to the end user (Violette, 2007). As can be seen, the first stage of the process involves the detailed load curve analysis (Rahman, Rinaldy, 1993). For this purpose, information about the basic functions to be used, the load model, the consumer model, the relationship between the producer and the consumer, and the expected future production costs are collected (Matsumoto, Takamuki, Mori and Kitayama, 2000). It will also be possible to comment on the network uncertainty that needs to be addressed. Another advantage of DSM is that load management for multiple consumer groups can be performed at one time instead of managing the load of a single consumer during the process (Merkert, Harjunkoski, Isaksson, Saynevirta Saarela, Sand, 2015). Accordingly, various schedules and smart meters capable of remote reading and control have also been integrated into the system (Öztemür, Soysal, 2013). Thus, the spread of the DSM in the regions where industrial loads are present has also been opened up.

In addition to the above, it is also important at which times consumption is made. Accordingly, tables are prepared according to variable electricity prices. Today, well-formulated mathematical software models offer opportunities for energy management planning in the industrial sector as well as production. Thus, continuous, cost-effective and efficient systems can be created (Özil, 2006). The nationality of DSM programs to be prepared must be appropriate to the electricity production-consumption structure of the country (Mohsenian-Rad, 2014). Thus, adaptation to the special circumstances of the country will be easier.

  

Many theses and articles on DSM are in the literature. In the thesis study carried out by Olgun, the planning of electricity consumption and demand side management in the tourism regions of our country has been covered (2009). Olgun worked on supply chain management, demand forecasting methods and the application of an artificial intelligence based demand forecasting model (Olgun, 2009)

In his study of Güral, he reviewed energy demand forecasting for power systems planning (2010). Başaran made a demand-side analysis of the performance of the electricity sector (2011). Zehir designed the demand side management system for thermostat controlled loads of intelligent networks (2013) Energy balancing in intelligent networks was studied by Alagöz under variable production and variable demand conditions (2015). In the same year, Bektaş made a sample of three consumer applications in the demand side management of electricity by Bayesian game approach (2015).
The DSM activities included in these studies were made using DSM's varieties of consumption reduction and load scrolling operations. In addition, renewable energy sources within the application portion of DSM methods can be used to reduce fossil fuel use. The use of renewable energy sources increases efficiency in transmission and distribution networks and ensures efficient use of equipment in the grid. This facilitates the management of distributed production systems and reduces the amount of lost power (Eissa, 2011).

When all the literature is examined, no work has been done in our country regarding official departments and / or the education sector. As it is known, the education which has 2 semesters in our country can be 3 semesters in various countries of the world. This study is carried out in order to understand which of these two cases is appropriate for my country in terms of DSM and to examine the effect of our country on the cargo curve. A pilot school has been identified for DSM application to be used in the Ministry of National Education (MNE) and energy consumption curves have been obtained. From this point, it was determined that for the MNE schools in our country, 3 periods instead of 2 periods would be better in terms of regulation of the load curve.

## Material and Method

In this study, active and reactive consumption data of Konya province İnce Karalar Imam Orator School have been obtained for DSM study. For this purpose, a custom-made energy analyzer, communication devices that can use the RS485 communication protocol, and software and server material that can be recorded and interpreted by the modem are used as material.

Nowadays, the instantaneous changes in the networks are controlled from the virtual environment. The availability of control from the virtual environment and the absence of fossil resources increase the share of renewable energy resources in the system. The addition / removal of renewable energy to the system increases the flexibility of the supply-demand graph. Control of the supply oriented of the energy is possible by controlling the energy consumption habits of the users. All applications for users' energy consumption habits and the ability of the network users to respond to the energy claim are under the heading of the Requesting Party Management (RPM). Many methods are applied in the Party Side Management. Demandside Management: Methods such as peak demand reduction, filling in low demand times, strategic demand saving, strategic demand growth, load transfer and flexible load shaping can be applied (Strbac, 2008)

From these methods it is possible to avoid or shift to new investments with traditional load management methods, such as decreasing peak demand, filling in low demand times and load scrolling. However, demand savings, strategic demand growth and flexible load-shaping methods systematically reveal new ways of consumption and habits, as well as changing peak valley structure (Özil, 2015). The graphs of all the mentioned methods are given in Figure 1.

  

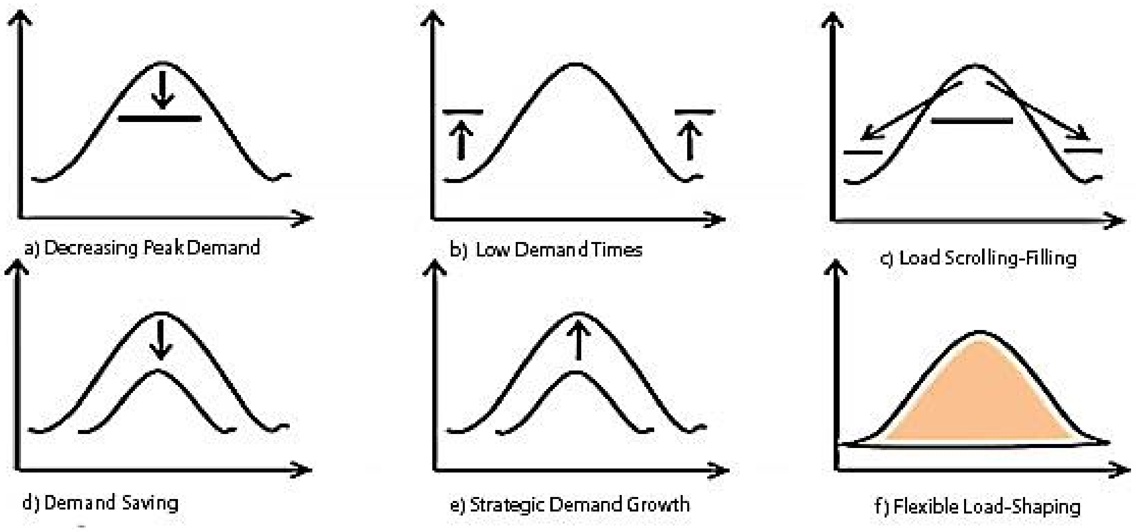


**Figure 1**: Demandside Management Strategies (Gellings, 1985)

It is used as the two most commonly used basic methods which are considered to be the most important of the DSM methods mentioned in the study. The first is the load reduction and the second is the load scrolling. With these methods, it is possible to reduce the peak demand and scrolling the load to the appropriate time. In this article monthly and annual load graph data of Ince Karalar school was obtained and the above mentioned methods were applied. The obtained load curves determined the energy supply of the building. DSM methods aim to achieve supply-demand balance of this energy.
The data obtained from the load curves are used to determine the periods when the load is peaked. Accordingly, the load determination scheme is given in Figure 2.

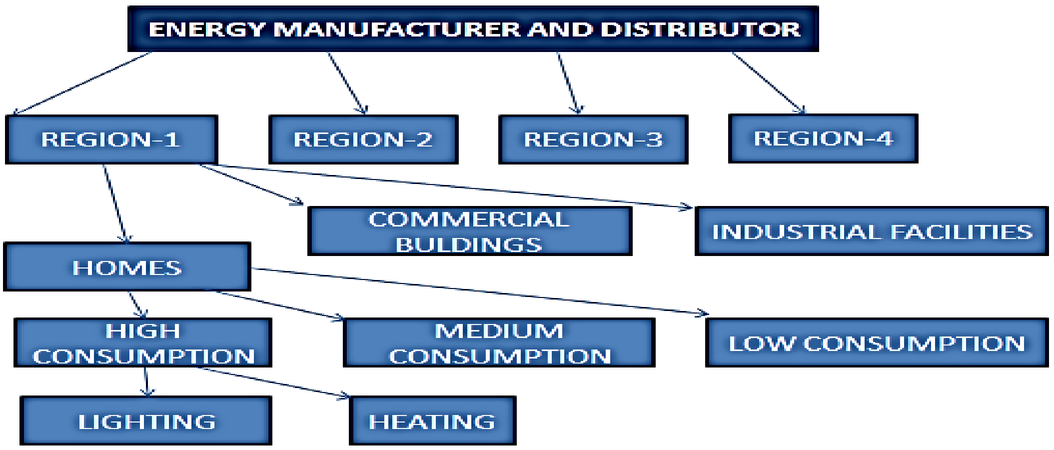


**Figure 2**: Load determination scheme

In Figure 2, the load determination scheme is categorized by manufacturer and consumer. These regions, which are classified later, are divided into three main divisions, namely residential buildings, commercial buildings and industrial facilities. Each of these is subdivided into high consumption, medium consumption and low consumption. Consumer units can be considered as the lowest step as heating and lighting.
The study was also used for lighting and heating departments, which are defined as the lowest unit of the load-allocation scheme for demand reduction and load scrolling methods from DSM methods.

## Decreasing PEAK(puant) Demand

In this study, lighting loads were investigated in order to reduce peak demand from DSM. Bulbs used intensively in lighting such as incandescent lamp, fluorescent lamp, led lamp and led panels. Within the scope of the study, Ince Karalar was chosen as the pilot school for Imam Orator Middle School DSM.

The school has an energy analyzer, an RS485 communication device, and a system in which communication mode is installed. For this reason, the amount of electricity consumed by any school will be connected to be monitored and similar studies can be carried out. The study is the determination of the energy consumption systems used in the school building. The pilot school was identified as a consumption system, a lighting system and a heating system. However, examination of heat loads has not been studied in this study since the Department of Mechanical Engineering is interested. In the second part of the work, the lighting system is determined. The most important equipment that makes up the lighting and is effective in energy consumption are lamps. In the next step, the lamp types are compared and the ones that are economically for the duration of equal use have been determined. The amounts of power, unit prices and lifetimes are given in accordance with Table 1.

**Table 1**: Power, unit price and lifetime according to lamp types.

| Lamp Type | Power (Watt) | Unit Price (TL) | Life (h) |
|---|---|---|---|
| Incandescent Lamp | 100 | 0.75 | 750 |
| Fluorescent Lamp | 23 | 5 | 10000 |
| Led Lamp | 10 | 10 | 50000 |

According to Table 1, the longest life-length is the LED lamp. Therefore, how many of the other types of lamps to be used within the lifetime of the LED lamp can be calculated as follows:

$$\text{Number of lamps} = 50000/\text{Life} \tag{1}$$

Equation 1 calculates that 66.66 incandescent lamps, 5 fluorescent lamps, 1 led lamp are needed for the same job. Then the amount of energy that each lamp type spends in 50000 hours can be calculated in Equation 2 below.

$$energy = \text{power} * \text{time} \tag{2}$$

In Equation 2, the amount of energy consumed was calculated as 5000 kWh for the incandescent lamp, 1150 kWh for the fluorescent lamp, and 500 kWh for the led lamp for 50000 hours. In the next step, the saving rate is checked to determine which lamp type is economical. The saving ratio between the incandescent lamp with the highest energy consumption and the LED lamp with the lowest energy consumption can be calculated in Equation 3.

$$SR = \left(\frac{\mathrm{E}(Incandescent) - \mathrm{E(Led)}}{\mathrm{E(Incandescent)}}\right) * 100 \tag{3}$$

In Equation 3, the saving rate between the LED lamp and the incandescent lamp was calculated as 90%. Then the cost of energy amount calculated for 50000 hours of operation time according to lamp types can be calculated by Equation 4.

$$M(Energy\ cost\ to\ be\ consumed) = \mathrm{A}(Amount\ of\ energy\ to\ be\ consumed) * (\text{Current electricity price}) \tag{4}$$

In the above equation, the current electricity price is taken as 0.40 TL. The energy costs to be consumed according to this equation are calculated as 2000 TL for incandescent lamp, 460 TL for fluorescent lamp and 200 TL for LED lamp. In the next step, the hardware costs of the system must be calculated in addition to the cost of energy consumption. The previous steps calculated the number of lamp types to be used for a working time of 5000 hours. Accordingly, hardware costs can be calculated in Equation 5.

$$Cost\ of\ Hardware = \text{piece} * \text{Lamp price} \tag{5}$$

According to the types of lamps to be used, the hardware costs are calculated as TL 50 for incandescent lamps, 25 TL for fluorescent lamps and 10 TL for LED lamps. Finally the total cost is calculated according to lamp types. The total cost equals the sum of the cost of energy consumed and the cost of equipment. The total costs are calculated as 2050 TL for incandescent lamps, 485 TL for fluorescent lamps and 210 TL for LED lamps. The school selected as the pilot region as a result of the operations; The total savings rate was found according to the number of lighting fixtures used in classrooms, management, dining hall, technology room, corridor and wet floors for 50000 hours of operation. According to these calculations, it can be determined which lamp will use the least amount of energy. The aim of the process is to reduce the demand and reduce the demand from the DSM.

The study selected the pilot school and the appropriate lamp type was determined, then the amount of energy and total costs requested for İnce Karalar İmam-Orator Middle School for 5000 hours of operation were calculated.

From the DSM strategies to be implemented in MNE, new strategies should be developed in accordance with the load curves obtained as well as the application of armature replacement and mantle to reduce illumination and heating costs. To this end, a new academic calendar is proposed, in which a scrolling study from DSM methods is carried out. According to İnce Karalar İmam-Orator Middle School, which is determined as pilot region for the application of DSM methods, according to the MNE academic calendar, it regulates education and training periods. The semesters consist of four semesters determined by the MNE: 1st, 2nd, 3rd and Summer vacation. The load curves belonging to these periods were obtained from the İnce Karalar Imam-Orator Middle School where the selected monitoring system was installed. Periods are Summer Between July and September, 1st between October and January, between February and February, March and June. Accordingly, the consumption curves for the year and for all periods are given in Figures 3, 4, 5, 6 and 7 respectively.

## Load Scrolling

As a pilot school, İnce Karalar İmam-Orator Middle School is affiliated with the National Education of Ministry as of 07/02/2015.

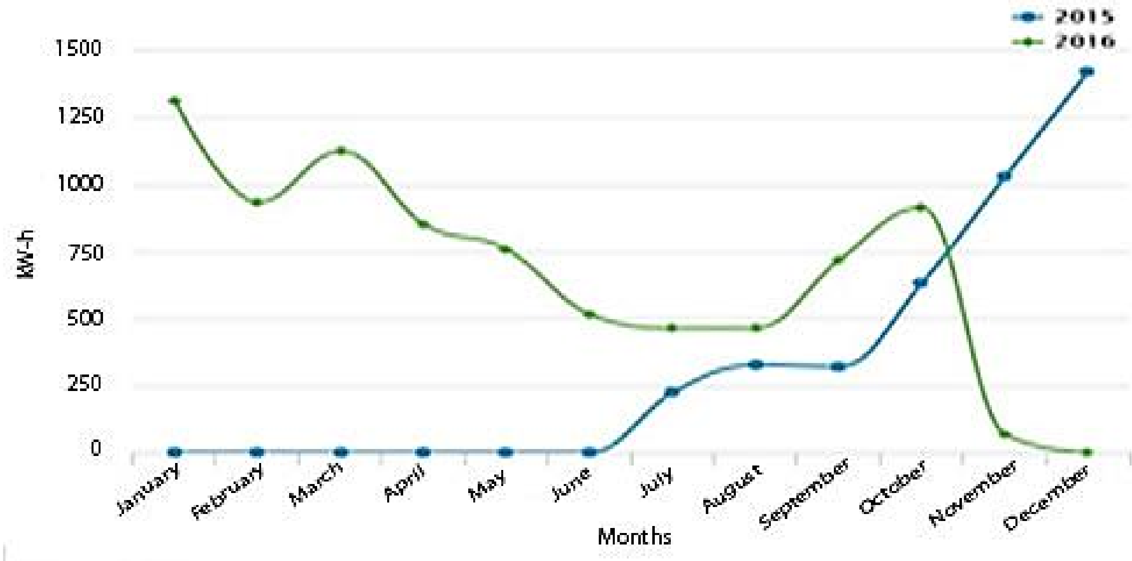


**Figure 3**: Total Consumption Amount by Months for 2015-2016

As seen in Figure 3, the consumption rate of the Incekaralar Elementary School, which is included in the monitoring system as of 07.02.2015 and examined until 11/01/2016, has a minimum consumption of 1480 kWh per month and a minimum of 240 kWh.

  

**Table 1**. Max-Min Energy Consumption Amounts of Ince Karalar Elementary School by Month

| Months | Max. Energy Consumption (kWh) | Min. Energy Consumption (kWh) |
|---|---|---|
| July 2015 | 19.04 | 2.04 |
| August 2015 | 18.159 | 2.45 |
| September 2015 | 16.178 | 5.945 |
| October 2015 | 44.874 | 8.24 |
| November 2015 | 62.774 | 10.895 |
| December 2015 | 78.84 | 19.95 |
| January 2016 | 67.457 | 16.595 |
| February 2016 | 52.52 | 11.56 |
| March 2016 | 65.950 | 3.425 |
| April 2016 | 84.973 | 8.958 |
| May 2016 | 40.924 | 8.124 |
| June 2016 | 27.24 | 12.654 |
| July 2016 | 15.0 | 15.0 |
| August 2016 | 15.0 | 15.0 |
| September 2016 | 27.65 | 12.654 |
| October 2016 | 42.824 | 27.534 |

Graphs related to academic calendar of 2015-2016 academic year were obtained for application of DSM strategies in 2-semester education system applied in MNE. Periods; I. Period October to February, Intermediate February, II. The period covers from March to July, summer vacation from July to October.

**Table 2**. Max - Min Energy Consumption Quantities of İncekaralar Elementary School by Periods

| Periods | Max. Energy Consumption (kWh) | Min. Energy Consumption (kWh) |
|---|---|---|
| First semester | 78.28 | 8.24 |
| Break holiday | 52.52 | 11.56 |
| Second semester | 65.950 | 3.425 |
| Summer holiday | 27.65 | 15.0 |

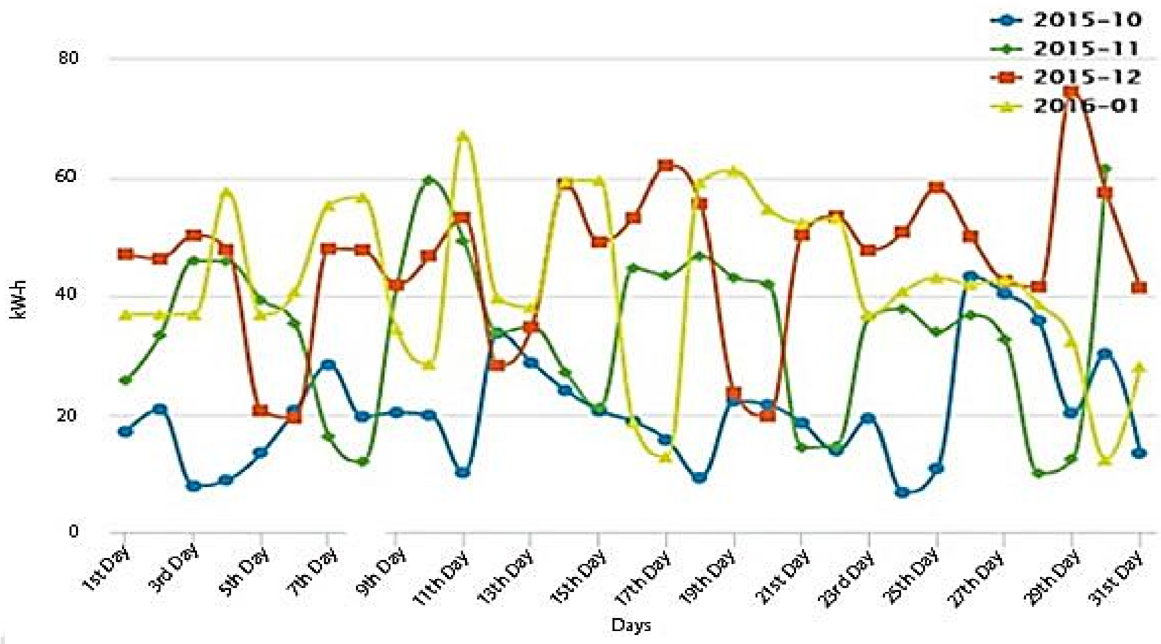


**Figure 4**: First Period Total Consumption Amount

As can be seen in Figure 4, the consumption amount is 78.28 kWh maximum and 8.24 kWh minimum according to the First Period days.

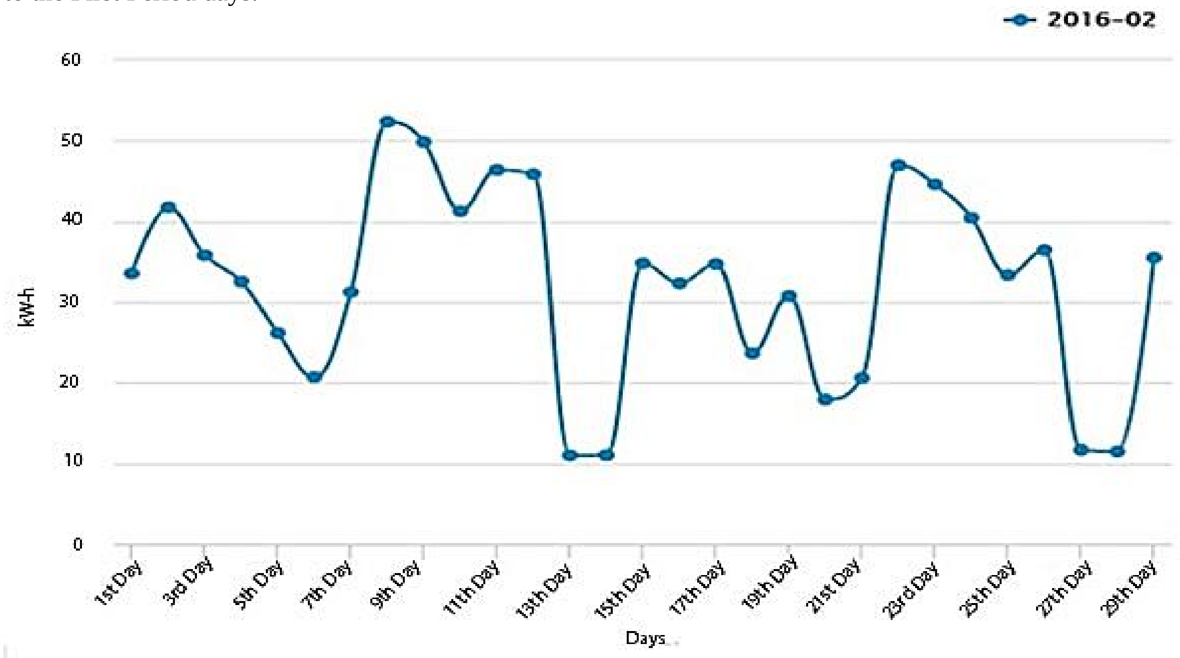


**Figure 5**. Semester Holiday Total Consumption Amount

In Figure 5, during the break-in period covering February, the consumption per day is maximum 53.056 kWh - minimum 16.988 kWh.

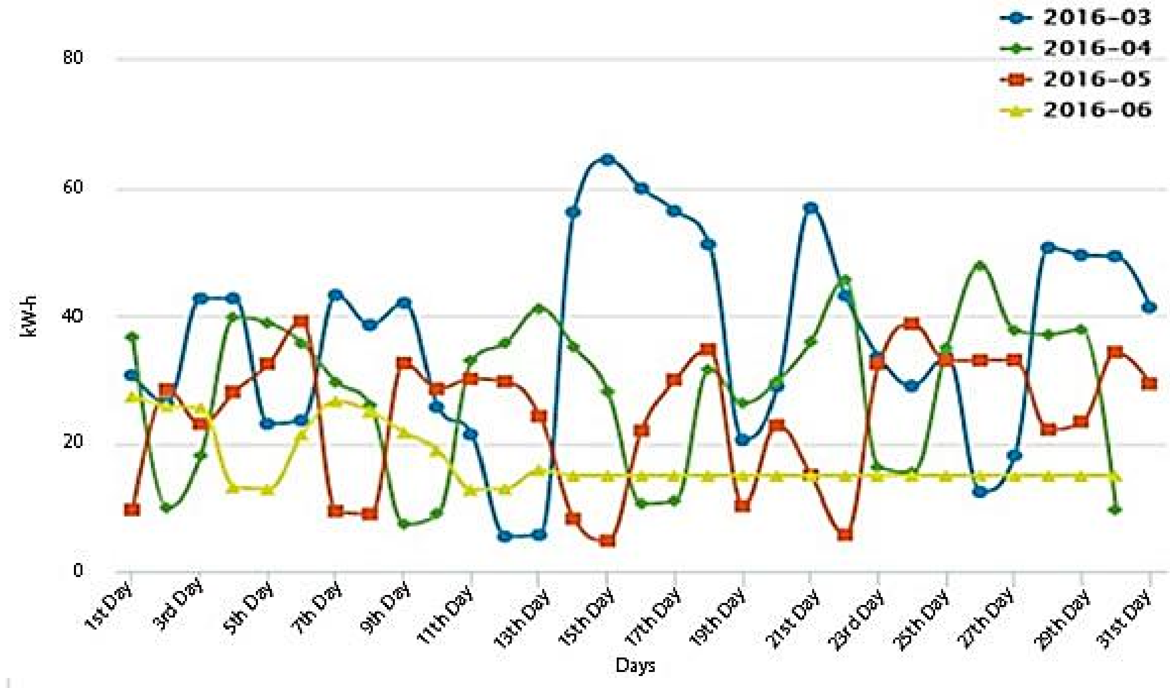


**Figure 6**. Second Period Total Consumption Amount.

In Figure 6, Consumption in the period covering March-June months is a maximum of 65,950 kWh and a minimum of 3,425 kWh per day.

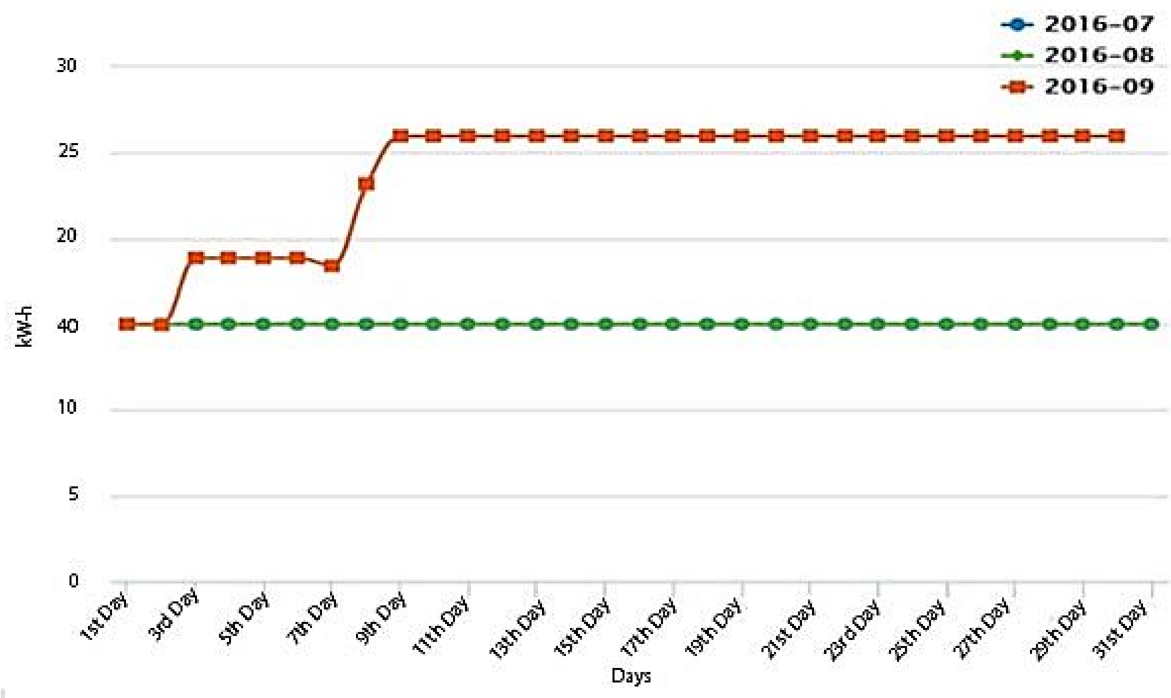


**Figure 7**. Summer Vacation Total Consumption Amount.

In Figure 7, Consumption in the period covering the period July to September is maximum 27,658 kWh and minimum 15,012 kWh.

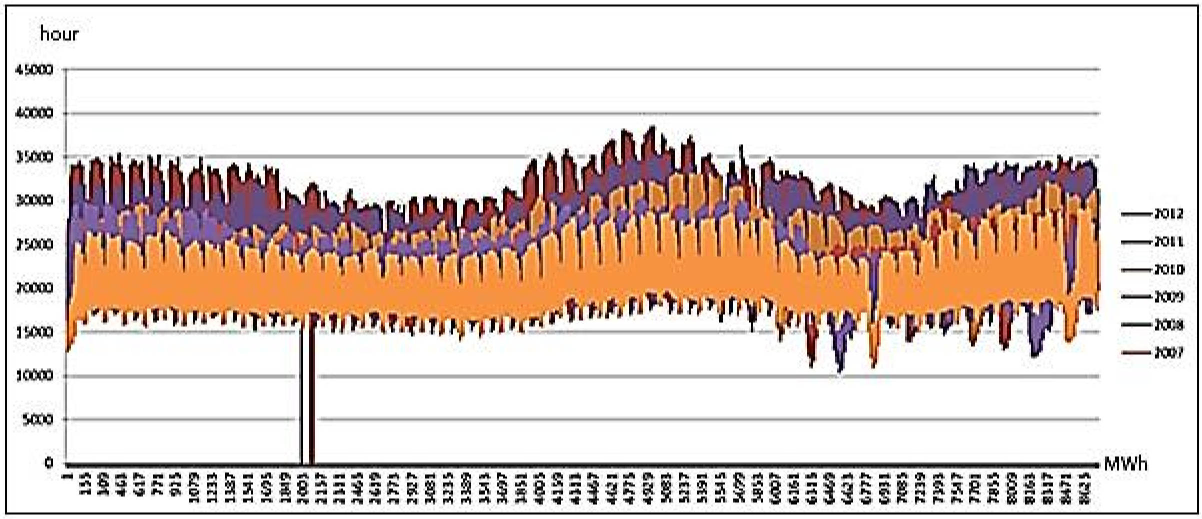


**Figure 8**: Turkey's load curve between 2007 and 2012.

In the graph in Figure 8, there are data obtained from National Load Dispatch Center obtained between 2007-2012. According to this, the months of high power consumption and the months of low power consumption are determined on a monthly basis. National Load Dispatch "and the energy consumption amounts according to the year 2007 are given in Table 2. This is seen as the summer months when the highest energy consumption was due to the use of cooling systems in June, July, August and September. Since the month of the maximum month is July, this month is set as a holiday this month using the puant request reduction method in DSM methods. Also, since the consumption amounts of the January and February months are lower, these months are determined as the education period. The DSM method applied for these months is the load scrolling method. The yearly / monthly energy consumption curves and the annual energy consumption curve of Turkey were used for the pilot scrolling method in the pilot study. Which of these two graphs should be vacated during the peak days is determined by the common peak times of the energies in the two graphs. The training periods of these months are reported as the energy usage of the two graphs in common. The 3-semester academic calendar recommended under the DSM application is given in Table 2. The proposed new academic calendar reduces the peak time from the DSM methods in the load curves of the Pilot of İnce Karalar İmam Orator Middle School and provides strategic growth when energy use is little used. Thus it is thought that İnce Karalar will contribute to reducing the fluctuation in the annual / monthly load curves of Imam Orator Middle School. Monthly / annual active consumption curves of Imam Orator Middle School were used in the study. It is thought that the consumption amounts of 26522 schools in Turkey are close to each other. It is foreseen that the fluctuation in Turkey's annual load curve can be somewhat corrected by switching to the new academic-supported education system recommended for all 26522 schools connected to MNE.

In order to decide on the use of the DSM methods, it is firstly decided whether the total load can be reduced for the months by looking at the graphical values of the lighting load curves examined. The calculations made for a single school that is desired to be reached here can be expanded and the whole Turkey curriculum can be corrected. Air conditioning and heating loads must not be included in the calculation to avoid fluctuations in the load charts Calculations in October are considered to be lighting values, and in the load graphs obtained over the following months, only the lighting loads are roughly divided. Here are the minimum load curves for these months since August and July are holidays.

When the method is determined for the results obtained;
Pnew(i)=Pold(i) ----------DSM It had been not apply.
Pnew(i)≥Pold(i) ---------- Puant demand Reduction, Demand Saving, or Load scrolling Fill methods were used.
Pnew(i)≤Pold(i) ---------- Low demand Growth, Strategic Demand Growth methods were used.
The academic calendar prepared in the direction of the suggestions is given in Table 3 and Table 4 on which sub-method of DSM can be applied in which months.

**Table 3**: Recommended academic calendar.

| Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 522871 | 539964 | 530222 | 517898 | 506032 | 586828 | 59907<br>6 | 592538 | 583873 | 511105 | 577964 | 588513 |
| | | Vac | | | | Vac | | | | Vac | |
| 1.term | 1.term | | 2.term | 2.term | 2.term | | 3.term | 3.term | 3.term | | 1.term |

Puant demand reduction, Fill low demand times and Load scrolling are applied from DSM methods.

  

**Table 4** : DSM Methods according to the months.

| **MONTHS** | **DSM METHOD** |
|---|---|
| September | Load Scrolling- Filling Low Demand Times |
| October | Load Scrolling - Decreasing Peak(Puant) Demand |
| November | Load Scrolling |
| December | Load Scrolling - Decreasing Peak(Puant) Demand |
| January | Load Scrolling - Decreasing Peak(Puant) Demand |
| February | Load Scrolling - Filling Low Demand Times |
| March | Load Scrolling |
| Aprıl | Load Scrolling - Decreasing Peak(Puant) Demand |
| May | Load Scrolling - Decreasing Peak(Puant) Demand |
| June | Load Scrolling - Decreasing Peak(Puant) Demand |
| July | -- |
| August | Load Scrolling - Filling Low Demand Times |

The important factor in the selection of methods is to reduce the fluctuation amount of Turkey's annual load curve with the National Education Academic Calendar which is applied in Turkey today.

• In the academic calendar, there is no holiday in the July recommended calendar, so no DSM Method is applied in this range.

• In April, May, June, October, December and January, which is the course period in the academic calendar and determined as the lecture period in the proposed calendar, it is aimed to decrease the consumption amounts in order to save savings.

• It is aimed to fill the low demand times since August and February which are holidays in the academic calendar are the course period in the proposed schedule.

• However, because the first 2 weeks of September are determined as the lecture period in the recomended calendar since the second 2 weeks is the academic period according to academic reinforcement, the method of applying the low demand times is determined as the method.

DSM applications have a relationship with tariffs. Here, the aim is to save money, as well as to minimize the cost of the consumer. This can be achieved by controlling the peak value. There are two ways to keep the peak value under control. The first balances the distribution within the same group and the second shifts the usage capacity between different groups of subscribers. Because the system operator always has to meet the demand point with the capacity in the system. For this reason, it is possible to create tariff structures using DSM methods for systems where requests are not distributed properly. These tariffs consist of four main components: energy cost, demand cost, subscription cost and counter cost. But in tares, six are separated among themselves; Fixed tariff, block tariff, step tariff, usage time tariff, unmeasured tariff and load factor (Öğünlü, 2006). These tariffs are explained below in order.Fixed tariff; Is calculated by multiplying the amount of energy consumed by the energy cost per unit, in accordance with the result obtained.

The main reason for this constant invoice type is that the cost per unit of energy in each case is constant. Block tariff; This tariff, which has two types, lists increasing block tariffs and decreasing blocks. As the amount of energy consumed or demanded increases, the unit cost of energy is increasing. On the other hand, in the decreasing block recipe, the unit cost of the energy decreases as the demanded quantity increases. Step schedule; Whatever the total consumed energy, when all consumption exceeds a certain level, the unit energy cost is recalculated. The difference of this equation from the block definition reflects the unit price given after a certain threshold value of consumption to all units. Usage time specification: The unit price varies according to the time consumed. Puant time is also less in demand than unit cost of consumed energy is different from unit cost of energy in the period. Unmetered tariff; It is reflected on the invoice without measuring according to the installed power of the subscriber. It is usually applied to consumption groups such as street lamps that use fixed capacity. Load factor order; The maximum demand amount, the capacity factor, the maximum capacity of the unit price, and the unit energy cost per unit capacity.

These tariffs can be thought of as sub-units of savings and incentive programs used to provide flexibility in invoicing. The management of these programs; Direct load control and indirect load control (Talukdar, 1984).
In direct load control programs, the subscriber's instantaneous control of the request and, if a certain value has been exceeded, allows the subscriber to load with the required signal. Indirect load control programs are the means by which the subscriber's request is adjusted. This does not interfere with the load of the subscriber, the subscriber may go to the load of his choice.

DSM is grouping these controls. These are the main dwelling places. Usage timetable, price quotation and reimbursement schedule and direct load control are applied in the dwellings. Direct load controls are mostly applied on water heaters, residential air conditioners, pool water pumps, storage heating devices. The second group is related to commercial enterprises and industrial enterprises. In this group, cut-off energy, diminutive load, real-time pricing, price quotation and reimbursement are applied.

According to this information, Table 5 provides the tariffs that can be used when the tariffs of DSM methods proposed in Table 3 and Table 4 are combined.

**Table 5**: Usable tariffs according to the months.

| Months | Use-time tariff |
|---|---|
| September | Use-time tariff |
| October | Decreasing block tariff |
| November | Fixed Tariff |
| December | Decreasing block tariff |
| January | Decreasing block tariff |
| February | Use-time tariff |
| March | Fixed Tariff |
| April | Decreasing block tariff |
| May | Decreasing block tariff |
| June | Decreasing block tariff |
| July | Fixed Tariff |
| August | Use-time tariff |

In Figure 9, below, the Energy Consumption Graph for the İnce Karalar Schools and the recommended energy consumption for the academic calendar are given.

  

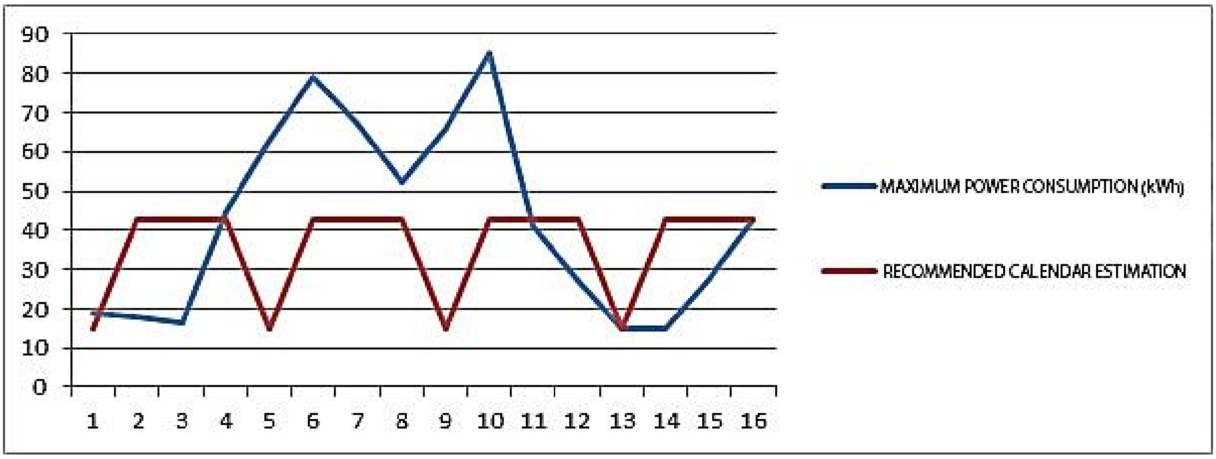


**Figure 9:** Old Academic Calendar Energy Amount and Suggested Calendar Energy Comparison

At present, when the applied academic calendar graph subfield is calculated, A1 = 344848 kWh. When calculating the area for the proposed calendar, it is calculated as A2 = 230308 kWh. According to the results obtained, the saving amount was calculated as 114466 kWh. 33,19% energy saving is achieved. Budget saving for the school is 472055,22.

## Conclusion

In this study, the effect of the DSM and schools on the burden curves of the countries, which are regulated by the MNE, is examined. In addition, a new academic calendar is proposed by going out of there. It is recommended that the 2-semester education system applied in MNE, the interim holidays and the summer vacation periods are changed. Thus, it is foreseen that the DSM Administration, which will be implemented by the Ministry of National Education throughout Turkey, can be prevented from fluctuations in the Turkey freight curriculum in Figure 8. The education curriculum of MNE which can be recommended for this purpose consists of 3 semesters considering the annual load curve. Training periods I. Period December, January, February; II. Period April, May, June; III. Period August, September, October months; March, July, November were offered as holiday months. It is thought that the application of 3 periods in education can greatly correct the annual load curve. In order to correct this trend, peak demand reduction and load scrolling methods were used effectively.

For the demand saving method from DSM methods, the lamp types which are saving from the lighting equipments are calculated and suggested. The other DSM methods used in the study are the methods of filling in peak demand reduction time, filling in low demand times and scrolling the load, including a new academic calendar proposal. The proposed academic calendar was formed by the holidays for the appropriate peak periods in Turkey's annual energy consumption chart and the placement of training periods for the periods with the least amount of energy consumed. It has been determined that energy saving is 33.19% between the current academic calendar and the proposed academic calendar. While this result is the savings that can be obtained from a single school, it is thought that the fluctuation in the Turkey freight curriculum can be reduced when considering Turkey general. In addition to correcting the load curves, lower energy levels can be achieved with appropriate tariff methods.

It is envisaged that 26522 schools in Turkey as of 2015-2016 academic year and approximately the energy consumption amounts of each school are thought to be close to each other and that the DSM and Turkey will contribute to the improvement of the fluctuation that occurs in the curriculum.

## Acknowledgement

This work is a part of the project award number (KU-BAP-2016/014) funded by Kırıkkale University Science Research Project Unit (SRP). The authors also, acknowledge with thanks Science Research Project Unit, Kirikkale University for technical support.

  

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## ABBREVIATIONS

| | |
|---|---|
| MNE | : The Ministry of National Education |
| TL | : Turkish Lira |
| DSM | : Demandside Management |
| Vac | : Holiday (Vacation) |
| SR | : Saving rate |
| P | : Power |
| E | : Energy |
| Max. | : Maximum |
| Min. | : Minimum |