

Characteristics of application of different time rates for electricity consumed in industrial enterprises

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Abstract. The article analyzes the graphs for the period of electricity consumption in industrial enterprises using a system of time-varying tariffs. Residents and settlements, industrial enterprises, manufacturing enterprises, factories, and several electricity-consuming organizations will be able to pay for electricity consumption at reduced prices because of the application of time-varying tariffs during non-peak hours of the day. If a consumer consumes electricity at night, he can pay for each kWh consumed at a price 1.5 times lower than during the day. Consumers pay less for electricity, which lowers the cost of production. This, in turn, will allow power generating and power supply organizations to ensure the long-term operation of the network and transformers, reduce the load period and provide consumers with quality electricity.

1 Introduction

In any economic system, a certain system of tariffs is used to carry out financial settlements between the energy supplier and energy consumers, that is, to pay for the consumed electricity.

When determining electricity tariffs, the following basic requirements must be taken into account:

- definitions represent all accumulated funds associated with the development, transmission, distribution, and planned deductions (deductions) of electricity and the development of a specific power system;

- tariffs provide a reduction in costs associated with the production and use of electricity;

- definitions are differentiated by regions of the country by seasons, days of the week, and hours of the day;

- definitions contain incentives to reduce congestion during peak hours and increase load during evening hours;

- the purpose of the definitions is clearly defined;

- definitions should be as simple as possible for metering and metering energy [1-11].

The purpose of applying the stratified definition of "semi-intensive" and "night" time in

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the electricity system is to significantly reduce electricity bills. One of the most pressing issues today is the uninterrupted electricity supply to consumers without quality losses and interruptions.

2 Research methods

The methodological provisions are based on theoretical and practical research results, in a broad generalization of practical experience in assessing the total energy intensity of products, scientific works of TIAME, and the Scientific and Technical Center of JSC "Uzbekenergo". Practical research was carried out using standard and specially developed techniques, and the reliability of the results was evaluated by verifying the research results.

3 Results and discussion

Residents and settlements, industrial enterprises, plants and factories, and several organizations consuming electricity will be able to pay for electricity at reduced prices due to the application of time-stratified tariffs during non-peak hours of the day.

Time-stratified tariff is a type of periodic payment for electricity consumed and operates on its own tariff rate system for the following periods of the day.

The night period is from 22:00 to 00:00 and from 00:00 to 06:00;

The busy period is from 06:00 to 09:00 and from 17:00 to 22:00.

The semi-intensive period is the payment for electricity consumed from 09:00 to 17:00. In a time-stratified three-rate tariff system, the amount paid during the peak period is 150%. The amount to be paid during the day is 100%. The amount of the nightly payment is 50%.

In the electricity market, tariff policies are applied in different ways to regulate, as a result, high prices can lead to the destruction of the monopoly, prices will be the same, and suppliers will not cover the costs of the power plant. Foreign energy markets do not provide a clear development of investment; investment processes in market models are long overdue due to clear initial reforms in the electricity generation process.

The form of tariffs, taking into account the electricity in order to cover the costs of electricity generation, will greatly help solve the formation problem. Moreover, power plants are one of the most optimal management methods for generating loads to increase the cost of electricity. By saving electricity, it is possible to motivate consumers and increase the supply of quality and reliable electricity. Subsequent requirements are very high and will be one of the key factors in regulating the balancing of tariff policy.

The consumer is ready to change the tariffs for electricity at any time, only when it is an economic benefit for suppliers and consumers in this direction. Nevertheless, the transition to time-stratified tariffs requires serious legal production. Determining and approving the norms of electricity consumption cycles in manufacturing enterprises is socially justified.

Residents and settlements, industrial enterprises, manufacturing enterprises, factories, and several power consuming organizations will be able to pay for electricity consumption at reduced prices due to the application of time-varying tariffs during non-peak hours of the day.

In the process of determining the electricity consumption of JSC "Quartz", located in Quvasoydistrict of Fergana region, the maximum daily (max) and minimum (min) electricity consumption in 2020 and the maximum (max) and minimum (min) electricity consumption in 2020 were used power graphs were created in Figure 1.

The graph of the day with the highest (July 27) and minimum (October 15) electricity consumption in 2020 is shown in Figure 1. The hours of minimum electricity consumption during these days are from 13:00 to 14:00 (15.10.2020, 3 266,796 kWh), and the hours of

maximum consumption of electricity from 13:00 to 14:00 (as of 27.07.2020, 5,499,708 kWh). The average hourly electricity consumption on these days varies from 3,374,613 kWh on the day of minimum electricity consumption to 4,993,125 kWh on the day of maximum electricity consumption. Electricity consumption in the enterprise is mainly due to the daylight hours.

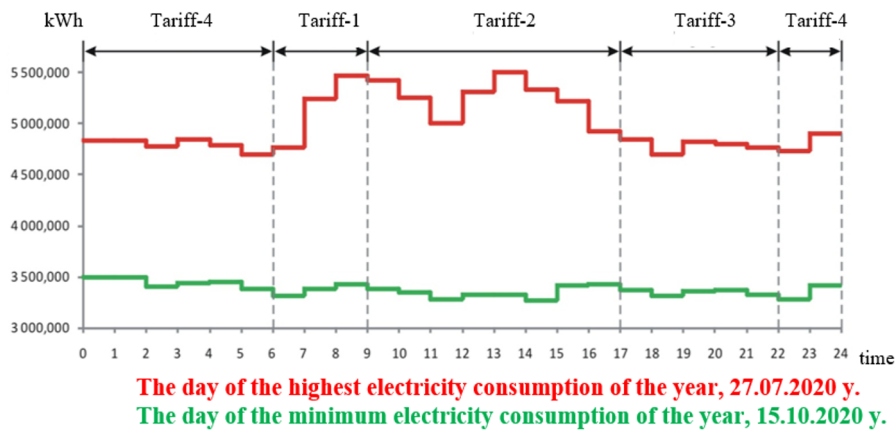


Fig. 1. Schedule of maximum (max) and minimum (min) days of electricity consumption in "Quartz" JSC

The company's electricity consumption in 2020 was 39,772,362,582 kWh. If we divide this electricity consumption by tariff rates, the consumption for each tariff rate will be as follows (%) Table 1:

Table 1. Electricity consumption of enterprise in 2020

Types of tariffs	kWh	%
Tariff-1 (morningpeak)	5 065 390.620	13
Tariff-2 (daytimeperiod)	13 607 270.532	34
Tariff-3 (eveningpeak)	8 100 923.844	20
Tariff-4 (nightperiod)	12998777.59	33
Total annual consumption:	39 772 362.582	100

If we look at Table 1 in the example of 4 periods of time-stratified tariffs, the amount of electricity consumed in these periods is as follows.

Here Tariff-1+Tariff-3=33%

Tariff-2=34%

Tariff-4=33%.

The months with the highest (July 3,570,946,896 kWh) and lowest (October 2,688,790,254 kWh) electricity consumption in July 2017 are shown in Figure 2. On a monthly basis, the day with the lowest electricity consumption is October 14 (80,990,730 kWh), and the day with the highest electricity consumption is July 26 (119,835,018 kWh). The average daily electricity consumption of the month consuming the least electricity is 2,688,790,254 kWh, while the average daily electricity consumption of the month consuming the most electricity is 3,570,946,896 kWh.

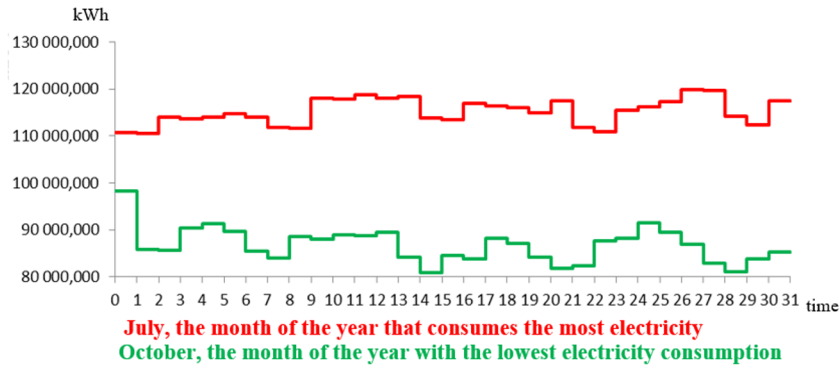


Fig. 2. The schedule of months with highest and lowest electricity consumption of year in JSC "Quartz"

If the consumer consumes electricity at night, he can pay for each kWh of electricity consumed at a discount of 1.5 times compared to the daytime period. The fact that the consumer pays less for electricity makes the product cost cheaper. For electricity generating and supplying organizations, it contributes to the long-term operation of the network and transformers, reducing the load period and providing consumers with quality electricity [12-20].

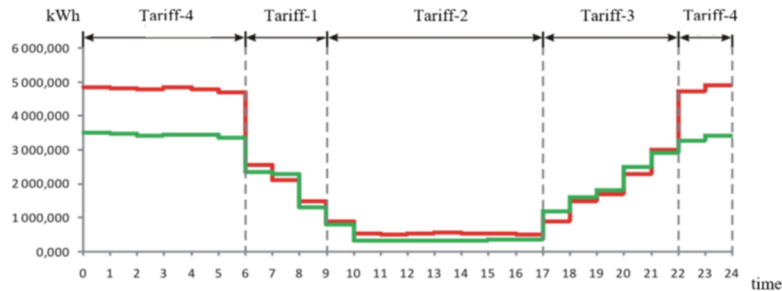


Fig. 3. Electricity consumption as a result of application of time-varying tariffs in industrial enterprises

It is observed that the amount of electricity consumed in time-stratified tariffs is as follows.
Here Tariff-1+Tariff-3=20%
Tariff-2=2%
Tariff-4=78%.

In the process of applying time-varying tariffs, electricity consumers will be able to make payments for tariff periods. These periods provide an opportunity to save consumers' financial resources.

4 Conclusion

If a consumer consumes electricity at night, he can pay for each kWh consumed at a price 1.5 times lower than during the day. Consumers pay less for electricity, which lowers the cost of production. This, in turn, will allow power generating and power supply organizations to ensure the long-term operation of the network and transformers, reduce the load period and provide consumers with quality electricity.

If the electricity consumption of the enterprise (tariff-4) is 78% at night, it will be one of

the enterprises that contribute to the smooth operation of the energy system. Also, the cost of products produced by this company differs from the cost of products produced by other companies.

In addition, there is no increase in the load on the transformer during the production process at this enterprise. As a result, the condition and service life of the transformer is also much higher.

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