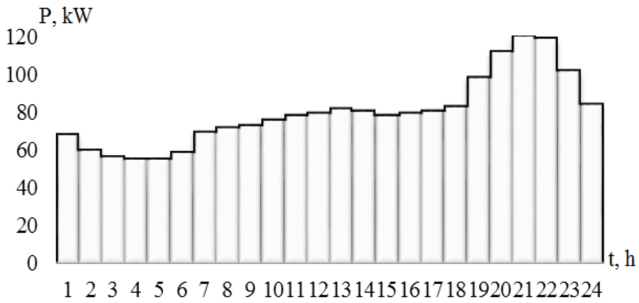

Figure 9. Origin load curve

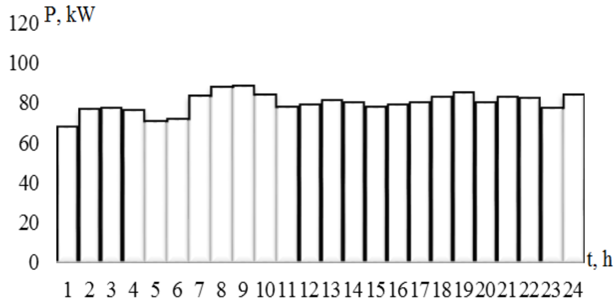

Figure 10. Straightened load curve

If consumer is in the second price bracket, it should pay for the electricity according with two-zone or three-zone tariff. All tariffs are given in table 1.

Table 1. Electricity tariffs

The indicator	Unit of measure ment	Validity	From 01.01.2018 to 30.06.2018 Price (tariff)
Tariff, differentiated by time zones			
Two-time zone			
Daytime zone	rub/kWh	07:00 - 23:00	2,78
Nighttime zone	rub/kWh	23:00 - 07:00	1,91
Three-time zone			
Peak zone	rub/kWh	07:00 - 10:00, 17.00 - 21.00	2,98
Half-peak zone	rub/kWh	10:00 - 17:00, 21.00 - 23.00	2,42
Nighttime zone	rub/kWh	23:00 - 07:00	1,91

Based on the results of the calculations it can be concluded that the application of the developed method leads to the action of consumer with a more even load curve, so that the consumer has an economic benefits if it is not in the first price bracket. All results are shown in table 2.

Table 2. Calculation results

Price bracket	2 (two-zone)		2 (three-zone)		3	
Load curve	Before	After	Before	After	Before	After
Total, rub	8492,7	7168,2	8339,4	7315,9	7455,6	6204,1
Benefit, %	15,6		12,3		16,8	

The most common price brackets among municipal consumers and small organizations are the second and the third. Moreover, the second price bracket is divided into a two-zone and three-zone tariffs. When the load curve is aligned a significant benefit is came for each price bracket. It indicates the ability of enterprises or municipal consumers to save on electricity. The greatest benefit of 16.8% is came when using the third price bracket.

4. Conclusion

As a result, authors proposed correcting mechanisms for market relations. It is suggests to add two intermediate rungs “aggregator” and “analyzer”, which allow to implement dynamic demand response as part of the concept “demand response” in “smart grid”.

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