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**REASONS FOR INCREASED CONSUMPTION OF UTILITIES FOR THE MAINTENANCE
OF COMMON FACILITIES IN MULTI-UNIT APARTMENT BUILDINGS**

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Abstract

The purpose of this work is to analyze the causes of increased consumption of utilities for the maintenance of common facilities in multi-unit apartment buildings. When managing a multi-unit apartment building, consumers of utilities (resources) receive and pay only for the resources they consume, depending on the degree of the house improvement. Consumers pay for electricity, cold and hot water, as well as water disposal for individual consumption and utilities for the maintenance of common facilities. Consumers of utilities in a multi-unit apartment building are not interested in reducing consumption of utilities for the maintenance of common facilities, as they pay for these resources not according to the actual volume of consumption, but according to the standards established by the state authorities of the constituent entities of the Russian Federation. The difference in payment for the actually consumed utilities for the maintenance of common facilities and, according to the established standards and the current legislation, is entrusted to the managing organizations, without the right to compensate for the losses incurred. Such legislative regulation leads to loss-making activities of managing organizations and, in some cases, to their bankruptcy. Consequently, management organizations are forced to look for reasons for increased consumption of utilities for the maintenance of common facilities to minimize them in the future.

Keywords

Utilities – Consumption standards – General household needs – Managing organization

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Introduction

Due to the limited availability of natural resources and the high rate of their consumption, many countries have begun to set strict legal requirements for saving the consumption of such resources. In the Russian Federation, similar requirements were introduced in 2009 by the legislation on energy saving¹. This legislation began to implement two directions that allow reducing the volume of energy resources consumption:

First. Reducing individual consumption of energy resources while maintaining the corresponding beneficial effect of their use by stimulating a reduction in consumption. For this purpose, state support measures have been developed in the field of energy-saving and energy efficiency (encouraging the introduction of energy-saving equipment)², and a two-and three-tariff system for paying for electric energy has been introduced, which allows consumers to pay less for the same amount of consumption.

Second. A step-by-step transition to communal and individual instrumental metering of energy resources consumption was introduced, as well as the implementation of mandatory measures for resource conservation of utilities for the maintenance of common facilities (hereinafter – UMCF) in the management of multi-unit apartment building (hereinafter – MUAB), which are developed and approved by the state authorities of the subject of the Russian Federation³. Consumers who have the technical ability to install an individual meter, but did not install it, pay for the utility according to the consumption standard with a coefficient of 1.5, which significantly exceeds the volume of actual consumption (up to 30-35%).

In any country, owners, leaseholders, and tenants of real estate consume utilities (cold and hot water, electric and thermal energy, gas, solid fuel), and they are provided with a service for the export of consumer waste (the export of solid municipal waste in Russia). Utilities are consumed by them both for their own needs and general household needs (lighting of the house and entrance, apartment hall, operation of pumps, elevators and other equipment, sanitary, wet cleaning of entrances and stairwells, watering of green spaces, etc.). These utility costs are intended for the maintenance of the common facilities in MUAB (UMCF).

Regulatory causes of increased consumption of UMCF

When managing the MUAB, there is a system of paid contractual relations between the final consumers of utilities and the management organization, as well as between the management organization and resource-supplying organizations. In this system of

¹ Federal law N 261-FL "On Energy Saving and Increasing Energy Efficiency and Amendments to Certain Legislative Acts of the Russian Federation", November 23, 2009.

² Decree of the Government of the Russian Federation N 857 "On the peculiarities of the application of the Rules for the provision of utilities to owners and users of premises in apartment buildings and residential buildings" (together with the "Rules for calculating the amount of payment for utilities for heating"), August 27, 2012 y Order of the Government of the Russian Federation N 80-r "Strategy for the development of housing and communal services in the Russian Federation for the period until 2020", January 26, 2016.

³ Decree of the Government of the Russian Federation N 646 "On the principles of formation by the executive authorities of the constituent entities of the Russian Federation of a list of measures for energy saving and energy efficiency concerning the common property of owners of premises in an apartment building". August 23, 2010.

contractual relations, the management organization purchases utilities from resource-supplying organizations and provide these resources to end-users. Consumers of utilities, in turn, pay the management organization for individual consumption according to the readings of meters and UMCF according to consumption standards⁴. The managing organization pays with the resource-supplying organization for the purchased volume of the utilities (electric energy, water supply, and sanitation) according to the indications of communal meters, which include both the volume of individual consumption and UMCF⁵.

The volume of individual consumption in the MUAB is determined by the totality of individual meter readings or the totality of normative consumption volumes if consumers do not have individual meters.

The actual volume of UMCF consumption, when calculating the management and resource-supplying organization, is determined by the calculation method⁶ using the following formula:

$$V_{umcf} = V_{cm} - V_{cons/m} - V_{cons/nm}$$

where:

V_{cm} – the volume of the utilities according to the indications of the collective (communal) meter for the billing period (billing month);

$V_{cons/m}$ – the amount of utility resource consumed during the billing period in residential premises according to the indications of individual (apartment) meters;

$V_{cons/nm}$ – the amount of utility resource consumed during the billing period in non-residential premises according to the indications of individual meters.

If the owners of non-residential premises have switched to direct contractual relations with resource-supplying organizations, the above formula does not take into account $V_{cons/nm}$.

Thus, at present, the definition of the volumes of UMCF consumed in MUAB in the provision of services and performing work related to the maintenance of the common property is made by legislation dependent on the volume of communal resources consumed by MUAB according to the indications of a communal meter and the total volume of individual consumption of individuals and legal entities of this MUAB (consumers).

⁴ Resolution of the Government of the Russian Federation N 354 "On the provision of utilities to owners and users of premises in apartment buildings and residential buildings" (together with the "Rules for the provision of utilities to owners and users of premises in apartment buildings and residential buildings"), May 6, 2011.

⁵ Decree of the Government of the Russian Federation N 124 "On the rules mandatory for concluding contracts for the supply of utilities" (together with "Rules mandatory for concluding a management organization or a partnership of homeowners or a housing cooperative or other specialized consumer cooperative agreements with resource-supplying organizations"), February 14, 2012.

⁶ Decree of the Government of the Russian Federation N 124...

A comparative analysis of methods for determining the volume of MCPAB consumption for calculations of a management organization with consumers of utilities and calculations of management organizations with resource-supplying organizations has shown that these methods are not balanced, radically differ from each other, use different indicators, and, accordingly, lead to different results. These circumstances give rise to unaccounted volumes of UMCF consumption (not paid by consumers) and as a result of losses of managing organizations. In other words, there is an inequality between the volumes of the utilities acquired by the managing organization from the resource-supplying organization and the volume distributed by the managing organization between the consumers of such resources. This inequality is shown in Figure 1.

$$V_{cm} - V_{cons/m} - V_{cons/nm} \neq \sum N \text{ UMCF}$$

MO – RSO
MO – Consumer

Calculation method
Normative calculation method

Figure 1
Communal imbalance in the UMCF provision

where $\sum N \text{ UMCF}$ – a set of standards for the consumption of UMCF.

Let's consider an example of calculating losses for a management organization when providing UMCF (hot water) in 2019 in single-staircase 16-storey building (Stroiteley Avenue, 4, Kemerovo).

The volume of hot water supplied to the MUAB according to the readings of the communal meters is 348.47 m³.

The volume of hot water, determined according to the indications of individual meters of citizens, is 207.99 m³

The volume of hot water determined by the consumption standard is 67.40 m³.

The volume of hot water on UMCF is 1.15 m³.

The price of 1 m³ of hot water is 96.31 rubles with VAT.

Thus, the loss of the management organization for the provision of UMCF (hot water) in one MUAB is 6,926.9 rubles monthly.

(348.47 cubic meters – (207.99 cubic meters+67.40 cubic meters +1.15 cubic meters))*96.31 rubles = 6,926.9 rubles.

Similar losses arise when the UMCF is provided for cold water, water disposal, and electricity.

The main reasons for the increased consumption of UMCF can be attributed to the method of calculation of the standard of UMCF⁷ Thus, the standard for the consumption of communal services for cold water supply, the standard for the consumption of communal services for hot water supply or the standard for the consumption of hot water for general household needs (cubic meters per month per 1 sq. m of the total area of the premises that are part of the common property in an apartment building) is determined by the following formula:

$$N_B^{OH} = 0,09 \times \frac{K}{S^{OH}},$$

$$S^{OH} = S^{cf}$$

where:

0.09 – consumption of cold (hot) water for general household needs (cubic meters per month for 1 person);

K – the number of residents living in apartment buildings, for which the standard is determined;

S^{cf} – total area of the premises included in the common facilities in apartment houses (square meters).

The total area of premises that are part of the common facilities in an apartment building is defined as the total area of the following premises:

inter-apartment staircases;

stairs;

corridors;

vestibules;

halls;

lobbies;

⁷ Decree of the Government of the Russian Federation N 306 "On approval of the Rules for establishing and determining standards for the consumption of utilities and standards for the consumption of utilities for the maintenance of the common property in an apartment building", May 23, 2006; Decree of the Government of the Russian Federation N 491 "On approval of the Rules for the maintenance of the common property in an apartment building and the rules for changing the amount of payment for the maintenance of residential premises in the event of the provision of services and work on the management, maintenance, and repair of common property in an apartment building of inadequate quality and (or) with interruptions exceeding a specified duration", August 13, 2006 y Decree of the Government of the Russian Federation N 1380 "On the issues of establishing and determining standards for the consumption of utilities", December 17, 2014.

pram storage rooms;

security (conciierge) premises.

The above list of common property is closed⁸. It should be noted that this list does not include basements, attics, switchboards, workshops, machine rooms, and other rooms that, when calculated, can significantly affect the final indicator of the UMCF standard (it will increase).

The coefficient of consumption of cold and hot water for general household needs is set regardless of the building project (standard, individual), the technical condition of the MUAB, the climatic conditions of operation and is the same in calculations for all MUAB. Adjustment of this coefficient is not possible, because only the calculation method is used for calculating the standard of UMCF, and the method of analogs is not applicable.

Understanding the consequences of municipal unbalance when providing UMCF, some subjects of the Russian Federation began to take into account the areas of premises that are actually located in the MUAB, but are not included in the above list of common facilities and do not correspond to the explanations of the Ministry of Construction of the Russian Federation⁹. However, the state housing supervision authorities most often challenge such calculations in court, and the courts rule in favor of the housing supervision authorities. These powers are granted to the housing supervision authorities by federal legislation¹⁰. They have the right to check the requirements:

to the composition of standards for UMCF consumption;

to the conditions and methods of establishing standards for the consumption of UMCF;

to the validity of the size of the established standard for the consumption of UMCF.

To eliminate controversial situations and bring the consumption standards of UMCF to actual consumption volumes, it is recommended to perform the following procedure:

1. The managing organization should create lists of common facilities in the MUAB (with digital indicators) for each group of MUAB and offer these lists to the general meetings of owners of premises in such MUAB for its subsequent approval¹¹.

2. It is necessary to choose an authorized person at the general meeting of owners of premises who will have the right to apply to the state cadastral registration and state registration of rights.

⁸ Decree of the Government of the Russian Federation N 306...

⁹ Letter of the Ministry of Construction of Russia N 12368-A4/04 "On certain issues arising when calculating the amount of payment for utilities to maintain the common property in an apartment building", April 11, 2017; Letter of the Ministry of Construction of Russia N 47256-OL/06 "On payment for housing and utilities", December 10, 2019 y Letter of the Ministry of Construction of Russia N 42868-OD/04 "On the determination of the standard for the consumption of utility services for electricity supply for general house needs", December 29, 2015.

¹⁰ "Housing Code of the Russian Federation" N 188-FL, December 29, 2004 y Decree of the Government of the Russian Federation N 306...

¹¹ Decree of the Government of the Russian Federation N 491...

3. After the approval of the composition of the common facilities by the general meeting of the owners of the premises, the person authorized by the general meeting applies to the state cadastral registration and state registration of rights with an application for entering information on the composition of the common facilities in the cadastral registration documents on the MUAB and the unified state register of real estate¹².

4. The authorized person submits copies of cadastral registration documents to the state authorities of the subjects of the Russian Federation for the subsequent calculation of standards for the consumption of UMCF.

The validity of this approach is determined by the requirements of the Rules for establishing and determining standards for the consumption of UMCF¹³, which provide that the Scp is determined following the information specified in the passport for an apartment building. The introduction, following the established procedure, of all premises and their areas, referred to the composition of common property, in the technical documentation for MUAB, will allow these indicators to be brought to actual parameters, and not to generalized ones.

A significant increase in the volume of consumption of communal resources for the maintenance of common facilities also occurs due to the lack of a methodology for identifying them.

Reasons for increased consumption of UMCF due to the lack of methodologies for their detection.

The reasons for exceeding the actual volume of UMCF consumption from the established consumption standards are:

1. Uncertainty of the readings of communal meters of utility resources (V_{cm}):
instrumental error;
a gap in the dates of taking readings from a communal meter and individual meter;
the ability to change the readings of the meter when taking such readings.
2. Uncertainty of individual meter readings of utility resources ($V_{cons/m}$, $V_{cons/nm}$):
instrumental error;

¹² Order of the Ministry of Economic Development of Russia N 943 "On establishing the procedure for maintaining the Unified State Register of Real Estate, the form of a special registration inscription on the document expressing the content of the transaction, the composition of the information included in the special registration inscription on the document expressing the content of the transaction, and the requirements for its completion, as well as requirements for the format of a special registration inscription on the document expressing the content of the transaction, in electronic form, the procedure for changing information about the location of the boundaries of a land plot in the Unified State Register of Real Estate when fixing a register error", December 16, 2015.

¹³ Decree of the Government of the Russian Federation N 306...

- interference in the operation of the meter;
- using a faulty meter;
- the deliberate decommissioning of the meter;
- the end of the terms for checking the meter.

Consumers provided individual meter readings and these readings were selectively checked by the management organization using the "walking round" method (control metering). The results of this check are shown in Table 1.

Transferred for payment as of the 26th day, kW	Deviations were detected when checking as of the 29th day, kW	Total transferred for payment as of the 31st day, kW
15,665 (66%)	7,981 (34%)	23,646

Table 1
Results of checking the readings of individual consumer meters

The generalized results of the study showed that 34% of the consumed volume will not be paid by consumers and these values will increase the amount of UMCF when the management organization pays the resource supplier because consumers did not provide reliable information about the readings of an individual meter.

3. Rounding up the readings taken by consumers.

For example, MUAB – 700 apartments, all apartments are equipped with individual meters. The consumer takes the readings of the meter by rounding them down to a comma. A total of 350 cubic meters is consumed, but not paid by consumers per month by rounding to 0.5 cubic meters, and the managing organization must pay the resource supplying organization for a given volume of utilities, and this is in the absence of funds in circulation for the managing organization.

$$R_{cws} = 700 \times 0.5 \times 35.4 \text{ rubles} = 12,390 \text{ rubles}$$

$$R_{hws} = 70 \times 0.5 \times 145.15 \text{ rubles} = 50,802 \text{ rubles}$$

where:

R_{cws} – the cost of cold water supply.

R_{hws} – the cost of hot water supply.

In this case, the management organization will have to pay 63,192 rubles per month to the resource-supplying organization at its own expense in the structure of the fee for UMCF.

4. Non-simultaneous removal and transfer of readings of individual meters of all consumers of MUAB.

5. The inefficiency of the methods of collecting and transmitting data according to the indications of individual meters.

The results of the analysis of methods for transmitting individual meter readings and their impact on the volume of UMCF are presented in Table 2.

Data transfer method	Number of apartments	%
Sent by consumers personally over to the management organization	51	65%
Transmitted over the Internet	4	5%
Readings not transmitted	23	29%
Subtotal	78	100%

Table 2
The results of the analysis of methods for transmitting readings of individual electric energy meters

From the indicators shown in the table, it is possible to conclude that if the readings of individual meters are not transmitted, the volume of consumed electricity will be charged based on the average monthly consumption for the last three months. At the same time, one should take into account the influence of the accrual "on average" on the value of UMCF, the parameters of such influence are given in Table 3. Calculations were made based on the following initial data: 23 apartments did not transmit the data of meter readings. The readings of individual meters were checked in these apartments. Actual consumption significantly exceeded the data calculated based on average consumption in 16 of these apartments.

Number of apartments that did not transmit meter readings	Power consumption according to the data as of the 26th day, kW ("on average")	Power consumption according to the data as of the 29th day, kW	The deviation from the actual consumption, kW	The share of total UMCF, %
16	3,138	6,371	3,233	41%

Table 3
The effect of calculating "average" on the value of UMCF

These calculations show that determining the amount of UMCF by subtracting from the total amount of utility resources received for the entire house – the total amount of individual consumption does not correspond to general household expenses. The absence of indications of individual meters will be compensated with a share of UMCF.

Conclusion: the calculation "on average" is not enough for the full display of the actual consumption, which leads to an increase in the proportion of UMCF.

One of the reasons is not a complete database for calculating the average – if there is no information for three full months, the arithmetic mean is taken from the volume for two or one months and divided by three, which leads to an artificial underestimation of the volume consumed.

6. Late transmission of individual meter readings.

The results of the study of the consequences of late transmission of meter readings by consumers are shown in Table 4.

Data transfer period	Number of apartments	Power consumption as of the 26th day, kW	Power consumption according to the data as of the 26th day, kW	Deviation, kW	The proportion of the total potential UMCF, %
up to the 10th day	20	4,566	7,836	3,270	41%
from 11th to 20th day	9	1,809	2,859	1,050	13%
subtotal	29	6,375	10,695	4,320	54%

Table 4

The percentage ratio of potential UMCF from the terms of readings of individual meters

According to the housing legislation¹⁴, consumers must provide the management organization or its payment agent with meter readings before the deadline for issuing a payment receipt, i.e. before the first day of the current month for the past month. Only 41% of consumers comply with this requirement. The managing organization must pay for the utilities of the resource supplying organization by the 20th day of the current month. By this date, consumers will not have time to pay for utilities. Accordingly, UMCF will increase by 13%.

7. The norms of consumption of UMCF established by the authorities of the Russian Federation are underestimated.

According to the established procedure¹⁵, the experts of the OOR Residential and Municipal Maintenance Department carried out a counter-calculation of the norms for the consumption of electric energy to maintain the common property in the apartment blocks, established in the Chelyabinsk Region, and carried out their comparative analysis. The results of the study are shown in Table 5.

¹⁴ "Housing Code of the Russian Federation" N 188-FL...

¹⁵ Decree of the Government of the Russian Federation N 306...

The norms of electricity consumption	Counter calculation kWh/sq.m	%	Approved standard of kWh/sq.m
Apartment buildings not equipped with lifts and electric heating and electric heating installations for hot water supply	3.05	127%	2.4
Apartment buildings equipped with lifts and not equipped with electric heating and electric heating installations for hot water supply	6.31	112%	5.65
Apartment buildings not equipped with lifts and electric heating and electric heating installations for hot water supply and equipped with pumping equipment	4.46	131%	3.4
Apartment buildings equipped with lifts and not equipped with electric heating and electric heating installations for hot water supply and equipped with pumping equipment	7.69	158%	4.57

Table 5

The comparative table of standards of consumption of electric energy for the maintenance of the common property in the MUAB, calculated by the computational method (by experts) and approved by the administration of the Chelyabinsk region

Conclusions: The methodology for calculating the standards of consumption UMCF assumes a different result with the same initial data.

Materials and methods

The research was conducted in two directions:

regulatory influence on increasing the consumption of UMCF (Requirements and methodology for determining the volume of consumption of UMCF in contractual relations between consumers and the managing organization, as well as between the managing and resource supplying organizations);

the identification of the causes of increased consumption of UMCF when implementing regulatory requirements.

The research materials were the monitoring data of the housing stock, which is under the management of the MC Zhilischnik LLC in Kemerovo. MUAB with a large range of fluctuations in the readings of UMCF from month to month were selected. The data obtained as a result of checking the readings of individual meters at the end of the reporting month by the "walking round" method were processed on selected houses. The influence of the following factors on UMCF was analyzed:

timing and period of transmission of meter readings;

data transfer methods;

the effect of calculating "average" on the value of UMCF;

the impact of payment default on UMCF;

lack of registration of consumers at their place of residence.

When analyzing the selected houses, it was concluded that the UMCF is highly dependent on the date of taking and transmitting readings from individual meters of citizens.

Careful attention was paid to the apartments in which the citizens live without registration. In these apartments:

- if there is no meter, it is not possible to charge utilities according to the standard;
- if there are meters, the readings are not transmitted by such citizens.

The date of transmission of meter readings was taken into account. Readings are transmitted at the time of payment for utilities.

The reliability of meter readings was carried out with the consent of citizens by the "walking round" method.

Results

In the course of the study, regulatory requirements were identified, the implementation of which leads to a significant increase in the UMCF. Recommendations were given for the state authorities of the constituent entities of the Russian Federation on the elimination of controversial situations with housing supervisory authorities and bringing the consumption standards of UMCF to the actual consumption volumes. This is achieved by entering information about the composition of the common facilities in the cadastral records of the MUAB.

The factors influencing the growth of UMCF volumes in the provision of utilities are determined.

Estimated indicators of these factors are given, which will help to determine priorities when planning activities to identify and minimize the reasons for the growth of UMCF.

Similar studies have not been conducted in the scientific community.

Discussion

The current regulatory regulation of the volume of UMCF consumption when purchasing utilities from resource-supplying organizations is currently conflicting and not effective. The economic interests of organizations that manage MUAB are violated. The method of determining the standards of UMCF consumption by the calculation method does not allow obtaining unambiguous indicators of the consumed volumes of utilities used for the maintenance of the common property in the MUAB. The refusal to determine the standards of UMCF consumption by the method of analogs is erroneous since the actual volume of consumption can only be determined by meters, consumed resources.

The main problem of further research is that economic entities do not keep records of the data necessary for such research in their activities.

The current legislation contains rules that restrict the conduct of research in connection with the need to obtain the consent of the consumer to enter his/her premises to verify the accuracy of taking readings of meters.

Since 2020, "intelligent accounting systems" have been developed, but only in terms of electricity consumption (capacity). These systems will eliminate a significant number of problems associated with the collection, processing, and transmission of readings of electric energy meters. Consumers of utility resources will be excluded from the chain of taking, transferring, and storing meter readings, which will significantly reduce the number of reasons for the growth of UMCF volumes¹⁶.

Conclusion

The growth in the UMCF consumption leads to loss of activities of management companies. The basis for unprofitability is the method of determining the volume of UMCF consumption in the calculations between the management organization and the resource-supplying organization¹⁷. Since this technique was introduced by a regulatory legal act of the federal level, then it is subject to mandatory execution. The study was conducted within the framework of such mandatory requirements. The main reasons for the growth in the UMCF consumption have been determined, which will allow minimizing the risks of unprofitable activities in the future. The presence of indicators of growth in consumption volumes makes it possible for any management organization to conduct a similar study of the MUAB under its management. These indicators are:

reliability of readings of communal meters;

timing of metering of communal meters;

availability of individual meters, compliance with the terms of their verification, their performance and integrity;

reliability of readings of individual meters;

timing of removal and transfer of individual meters;

correct rounding of meter readings;

method for collecting and transmitting data on individual meter readings;

payment terms;

the moment when payment obligations are fulfilled.

¹⁶ Federal Law N 522-FL "On Amendments to Certain Legislative Acts of the Russian Federation in connection with the Development of Electric Energy (Power) Metering Systems in the Russian Federation", December 27, 2018

¹⁷ Decree of the Government of the Russian Federation N 124...

The results of the study are aimed at preventing the growth of volumes of UMCF consumption and have a practical use.

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