

ECONOMIC MOTIVATION MECHANISM OF CONSUMER'S ENERGY SAVING BEHAVIOUR

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1. Introduction

Today energy efficiency in housing and communal services in Ukraine is among of the top priorities of the state economic and energy policy. Housing and communal services (HCS) is a complex set of industries that provide maintenance and operation of housing, providing services to the population and other consumers of water, gas, heat and electricity. HCS consume more than a third of the total energy that used in the country. Only in residential buildings consumes more than half of total consumption of thermal energy. So reducing consumption of energy resources considering the implementation mechanism of economic motivation is the urgent task of effective functioning of housing and communal services in Ukraine.

2. Theoretical background

Questions about energy conservation and efficiency was examined by such scientists as O. Suhodolia, O. Ruban-Maksymets, S. Shulzhenko, M. Bilenko, T. Nechayev, V. Zhovtyansky, A. Prakhovnik, A. Segal, B. Chirkin, M. Gniduy. Problems of sustainable development and ways of reforming housing and communal services discussed in the work of J. Jalila, A. Voronina, E. Grinevich, E. Strokan, O. Tishchenko. For example, G. Djana examines the socio-economic aspects of energy conservation in the context of state energy saving policy. Such scientists as Y. Kostin, L. Taranyuk, K. Mitsobuchi, K. Martinez identified a number of factors that have an impact on the implementation of energy efficiency measures. D. Bikulov formulated financing mechanism of energy saving projects in utilities. O. Holovatenko, E. Cherevykov substantiates the basic principles of public-private partnership in the HCS.

3. Set of the Problem.

The aforementioned research and development are important, but the problem of energy efficiency in housing and communal services requires further study, particularly from the perspective of the consumer. The main factors that influence on consumer's energy saving behaviour, including acting tariffs for housing and communal services will be consider and will be justify mechanism of the economic motivation as a factor for improving energy efficiency in the HCS in Ukraine.

4. The basic material and results.

The hierarchy system of power management utilities in Ukraine consists of four levels (bodies): national, regional, sectoral (utilities) and territorial (consumer). Economic priorities of territorial and sectoral structures of HCS have differ utilities, for example the interests of the industry include maximizing income from the activities, and territorial - improving the quality of public services while decreasing consumption of energy resources. Approval of interests is possible

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only with economic motivation utilities for the implementation of energy efficiency measures, such as internal or external prompting producers and consumers of utility services to work on initiating and promoting energy efficiency on the basis of public-private partnerships.

The economic mechanism of energy efficient conservation should be considered as part of the economic management mechanism of sector as a whole and integral mechanism for implementing energy conservation in the region, based on the principles of legislative and regulatory support, public investment and financial support for energy efficiency, pricing that reflects the true cost of production, transportation energy and solvency consumers, energy efficiency based on involving national and international experience [1].

In 2015 in Ukraine there was a significant raising of tariffs for housing and communal services, within the framework of the memorandum with the key creditor of country - the International Monetary Fund, namely the minimum fare for households was increase by 3.3 times up to 3600 UAH per thousand cubic meters of fuel consumption below 200 cubic c. m. of gas; heat tariffs for the population by 72%, to UAH 537.2 UAH G.cal.; electricity tariffs for households rose for the year twice: first to 19%, then from 24.6% to 0,456 UAH per kW / h [9].

The Government's arguments concerning the necessity of raising the tariffs to the European level should be considered together, particularly with reference of the level of salaries and pensions.

The average salary in Ukraine in February 2014 amounted to 3209 UAH (371\$), and in February 2015 - 3633 USD (148\$), in dollar terms the average wage decreased by 2.7 times. For comparison, the average wage in Latvia is 823\$, that in 5.6 times more than in Ukraine, in Poland - 980\$, more than 6.6 times, in Germany 4100 \$, more than in our country in 27.7 times, in the USA - 4400\$ in 29.7 times more. The average pension in Ukraine in February 2014 amounted to 1528 UAH (176\$), and in February 2015 - 1,587 USD (65\$), also decreased in 2.7 times. Comparable to the average pension in Latvia is 330\$, in 5.1 times more than in Ukraine, in Poland - 482\$, more than in Ukraine in 7.4 times, in Germany - 860\$ (13.2 times more), in USA - 1163 \$ that is in 17.9 times more than in the country. Thus, the estimated share of expenditure on housing in Ukraine (the average salary) is 48%, compared to 16% in Poland, 12% in Germany and 10% in the USA [8].

Note that Ukrainian gas production in 2015 is planned at average of 19.5 billion m³. At the same time for everyday consumers' needs for "Teplokomenerho" and budget institutions is need over 21.5 billion m³, this means that will be missing over 2 billion m³. Price of Russian gas - 248\$, the price of gas that was embedded in HCS tariffs is 295 \$ and the price of domestic gas is 23.5 \$ (in 12.5 times less than the previous price) as of 01.04.2015 [8].

Tab. 1: Cost of Ukrainian gas production per thousand m³ without transportation and VAT*

Pure price	510 UAH	23,5\$
The price for Ukrainian gas from with investment allowance without rent	610 UAH	28,1\$
The price for Ukrainian gas with the rent (70%) and investment allowance	1037 UAH	47,7\$

* Source: developed by the author based on [8]

Tab. 2: Market tariff for gas (calculation)*

	Scope, billion m ³	Price for thousand m ³ , UAH
Ukrainian gas with VAT	19,5	1111,9
Russian gas (by 248\$)	2,0	6457,9
Tariff for transportation to the consumer		746,5
Gas-mix price		1609,2
The market rate with transportation		2355,7

* Source: developed by the author based on [8]

Thus the current tariff for gas 7188 compared with an estimated 2,355.7 in 3.1 times more.

The growth of debt for natural gas for 01.11.2015 was 10.3 billion UAH, but with the debts of previous years totaled sume was 36.0 billion UAH, in particular the share of the population is 46.4% of total debt. The growth of debt for electricity for 01.10.2015 was 2.2 billion UAH, but with the debts of previous years arrised to 21.3 billion UAH, HCS share is 30.3%, population growth has reduced debt by 12,7% [10].

Thus, given the existing tariffs for housing and communal services, and a tendency to their increase in the near future, comparing the rates of wages and pensions of ordinary citizen, realizing that the revision of existing tariffs and use of Ukrainian gas production for the needs of population issue more political than economic and solving it requires knowledge of changes in the energy policy of the country, so improvement is now possible only on the base of economic motivation of energy saving consumer behaviour and improving energy efficiency in HCS in Ukraine.

Motivation for energy saving consumption of thermal energy could be realized with the provision of opportunities for residents of multi-storey buildings to manage their energy consumption. In terms of district heating mainly vertical and breeding coolant-pipe heating systems, heat consumption by apartment management is very complicated due to technical reasons or the high cost of accounting, through mass installation of devices in every apartment of the heat meters almost unreal.

Significant reduction of heat losses at the stage of consumption can be achieved in the case where the consumer will be able to influence on the consumed quantity of thermal energy and pay for the actual energy consumption, as its done in the private sector. For the main energy consumer - a resident of a multistory building, this opens the possibility of the introduction (gradually, especially in new buildings, reconstruction and overhaul of housing) of supplies in every apartment [2].

Some residents of apartment buildings alone trying to increase the energy efficiency of their homes, investing heavily in thermo modernization of their apartments that absolutely have no effect on reducing energy consumption and in most cases, on the contrary, it only cause multiplies.

The experience of many countries shows that only an integrated thermo modernization of existing housing stock is able make dramatically affect the reduction of energy consumption. The complex upgrading of the building, according to experts, may ultimately provide energy savings of about 50%. International Energy Agency (IEA) claims that every dollar invested in energy efficiency, will result as 4\$ of economy, and such project will pay off completely in about four years [11].

Therefore, to maximize economic and social impact from thermo modernization in existing housing stock needs involvement of investing the energy efficiency of residential buildings in the public-private partnership: business building complex, joint owners of apartment houses (JOAH) and local authorities.

Unfortunately the process of creating joint owners of apartment houses (JOAH) by regions of Ukraine is very slow. Thus, in 2014 in areas under the regional program was planned to create 14,249 joint owners of apartment houses (JOAH) and due to 01.01.2015 was formed only 562 joint owners of apartment houses (JOAH), representing 3.9% of the planned figure (tab. 3).

Tab. 3:Rating for the creation of JOAH in 2014*

Region	Planned indicator (units)	Actually created (units)	% implementation of planned indicator
Vinnysya Region	170	50	29,4
Chernivtsi Region	32	6	18,8
Khmelnysky Region	280	50	17,9
Kherson Region	148	20	13,5
Volyn Region	198	25	12,6
Rivne Region	253	31	12,3
Lviv Region	668	80	12,0

Ternopil Region	281	29	10,3
Zaporizhzhya Region	283	23	8,1
Kyiv Region	50	4	8,0
Kharkiv Region	830	50	6,0
Kirovograd Region	289	17	5,9
Zakarpattya Region	417	21	5,0
Mykolayiv Region	827	34	4,1
Cherkasy Region	950	31	3,3
Chernihiv Region	406	9	2,2
Sumy Region	531	10	1,9
Zhytomyr Region	396	7	1,8
Ivano-Frankivs'k Region	233	4	1,7
Poltava Region	1785	25	1,4
Kyiv	2000	15	0,8
Dnipropetrovs'k Region	3039	20	0,7
Odesa Region	183	1	0,5
Total	14249	562	3,9

* Source: developed by the author based on [8]

During this period the highest indicator in Ukraine on the number of JOAH creation was in Vinnytsia (29.4%); Chernivtsi (18.8%); Khmelnytsky (17.9%); Kherson (13.5%) and Volyn (12.6%) regions.

The lowest indicator of creating joint owners of apartment houses (JOAH) was in Odessa (0.5%), Dnipropetrovsk (0.7%), Kyiv (0.8%), Poltava (1.4%) and Ivano-Frankivsk (1.7%) regions.

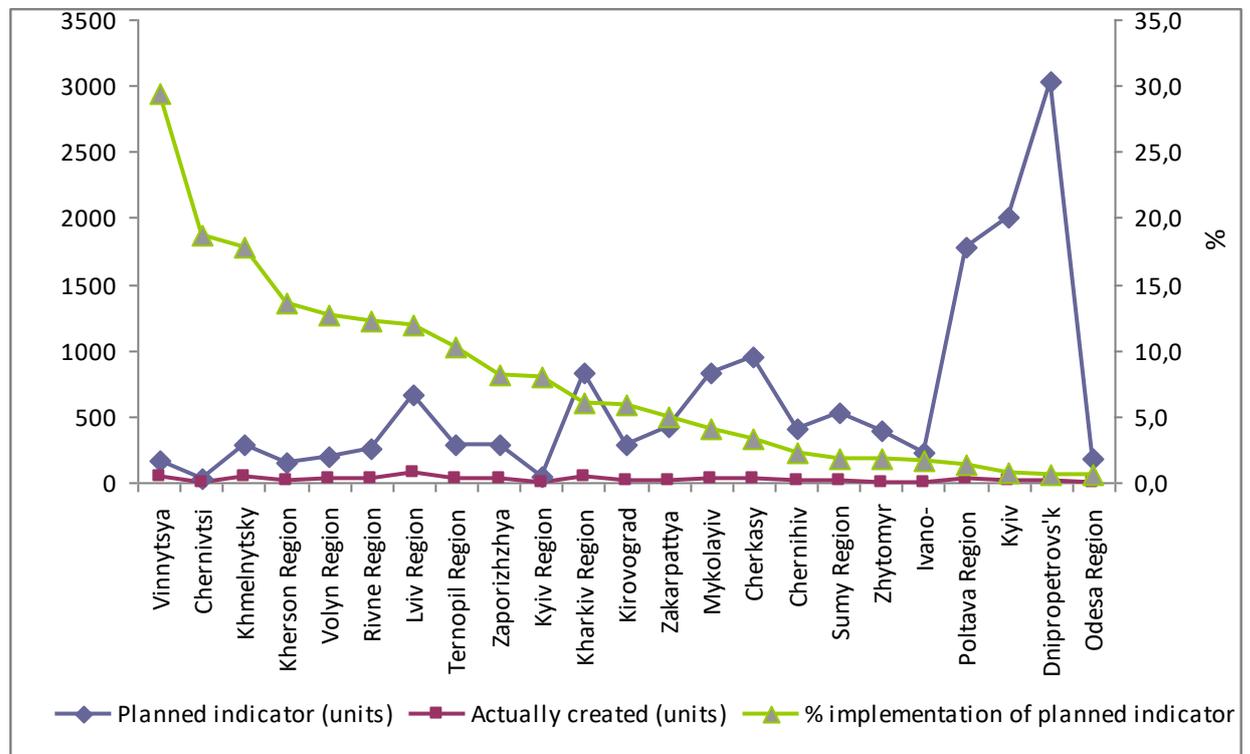


Fig. 1. Rating of creation JOAH in the Ukraine regions in 2014

* Source: developed by the author based on [8]

Joint owners of apartment houses (JOAH) won't be effective until the mortgage will work across the state with the number of loans not hundreds, but thousands per year, otherwise factor of

uncertainty citizens will work in the future, fear of losing property and fear of absence of the possibility to recover these lost property. Therefore, without the introduction of real working mortgage investment in the housing sector would be ineffective because of the lack of effective mechanisms refund and insurance risks.

The situation is complicated by the fact that not all the apartments in Ukraine today are privately owned, and JOAH are created mainly in new buildings where there are no problems in terms of energy efficiency. In older homes built by outdated building codes, with worn communications, where it is necessary to carry out energy efficiency measures, usually lived citizens with low annual aggregate income that makes it impossible for citizens funding these energy efficiency measures. In addition, there are significant problems with regulatory support operation of JOAH in Ukraine, which is virtually absent [4-6].

A reasonable attitude towards energy efficiency, its awareness and interest in economical use of energy resources is the main condition for increasing the energy efficiency in existing housing stock in Ukraine. Motives for energy efficient consumer behaviour are shown in Fig. 2.

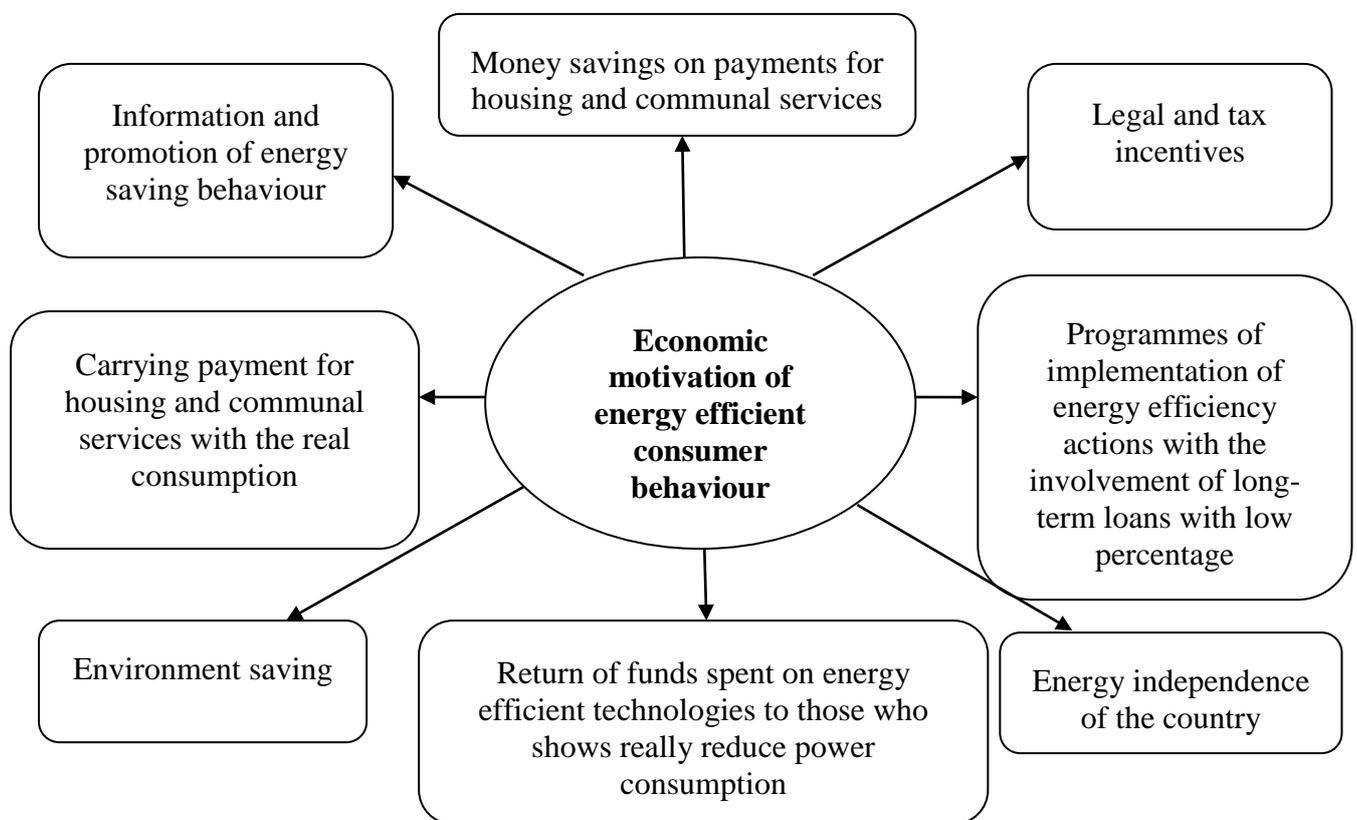


Fig. 2. The motives of improving energy efficiency

Raising utility rates (current and expected) is one of the most pressing problems for the population at the moment. Therefore, the main motive energy efficient behaviour of the population is saving money for the payment. Tariffs and prices for energy services must meet the real economically reasonable cost.

Absence in residential buildings accounting devices of consumption leads to significant differences between the established consumption rates and their actual consumption. The established norms of 30-40% higher than actual consumption. Implementation of government programs gradual equipping housing facilities for accounting and regulation of water consumption, heat would save over 25% energy. The complex effects of metering and regulation will be about 65% of heat energy [7].

5. Conclusions.

Thus, the formation energy saving consciousness in society and influence on the behaviour of consumers must be continuous. An important part of the information campaign should be to clarify national goals in the field of energy efficiency and the importance of citizens' efforts to achieve it. Obtaining optimal result from energy efficiency measures in existing housing is possible only at the public-private partnership: construction companies, JOAH and local authorities. The main motive energy efficient behaviour of the population will be saving money due to payments for energy, but the main barrier to the implementation of energy efficiency measures in the household is the need for capital expenditures.

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Summary

The question of raising tariffs for housing and communal services was studied in the article. Also was studied the income levels in Ukraine in the context of raising tariffs to the European level. Analyzed present gas prices compare with the calculated rate that takes into account the use of Ukrainian gas production for the needs of the population. Rating of creating joint owners of

apartment houses (JOAH) in 2014 in Ukraine regions was determined. The mechanism of economic motivation of energy efficient consumer behavior was investigated. Motives of improving energy efficiency from the perspective of the consumer were generalized.

Keywords: housing and communal services (HCS), tariffs for housing and utilities, joint owners of apartment houses (JOAH), economic mechanism of motivation, motives of improving energy efficiency.

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