

ECONOMIC MOTIVATION MECHANISM OF CONSUMER'S ENERGY SAVING BEHAVIOUR

Olha Komelina, Svetlana Scherbinina, Alina Chaikina*

1. Introduction

Today energy efficiency in housing and communal services (HCS) in Ukraine are among the top priorities of the state economic and energy policy. 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 is used in the country. Only in residential buildings it is consumed 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 HCS in Ukraine.

2. Theoretical background

Questions about energy conservation and efficiency were 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 were discussed in the works 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 substantiated 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 influencing consumer's energy saving behaviour, including current tariffs for housing and communal services will be considered and the mechanism of the economic motivation as a factor for improving energy efficiency in the HCS in Ukraine will be justified.

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 different utilities, for example, the industry's interests include maximizing income from the activities and the territorial structures are interested in improving the quality of public services while decreasing consumption of energy resources. Approval of interests is possible only with economic motivated 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 and private partnerships.

The economic mechanism of energy efficient conservation should be considered as part of the eco-

* © Olha Komelina; Doctor of Economics, Professor; Dean of Management and Business Faculty; Poltava National Technical Yuri Kondratyuk University; E-mail: <komelina@meta.ua>;

© Svetlana Shcherbinina; Senior Lecturer; Department of Economic Cybernetics; Poltava National Technical Yuri Kondratyuk University; E-mail: <ScherbininaSveta@mail.ru>;

© Alina Chaikina; assistant; PhD student; Department of Management and Logistics, Poltava National Technical Yuri Kondratyuk University; E-mail: <alinachaikina@ukr.net>.

conomic 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, energy transportation and consumers solvency, energy efficiency based on involving national and international experience [1].

In 2015 there was a significant raising of tariffs for housing and communal services in Ukraine, within the framework of the memorandum with the key creditor of country – the International Monetary Fund, namely the minimum fare for households was increased 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 per Cal; electricity tariffs for households rose twice within the year: first to 19%, then from 24.6% to 0,456 UAH per kW/h [2].

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

The average salary in Ukraine in February 2014 amounted to 3209 UAH (371\$), and in February 2015 – to 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 as high as in Ukraine, in Poland – 980\$, 6.6 times as high, in Germany 4100 \$, – 27.7 times as high as in our country, in the USA – 4400\$, – 29.7 times as high times. 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. Comparing the average pension in Latvia which is 330\$, it is 5.1 times as high as in Ukraine, in Poland – 482\$, i.e. 7.4 times as high as in Ukraine, in Germany – 860\$ (13.2 times as high), in the USA – 1163\$ that is 17.9 times as high as 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 [3].

Note that Ukrainian gas production in 2015 was planned at average of 19.5 billion m³. At the same time for everyday consumers' needs for "Teplokomenerho" and budget institutions need over 21.5 billion m³, this means that over 2 billion m³ will be missed. The price of Russian gas is 248\$, the price of gas that was embedded in HCS tariffs is 295\$ and the price of domestic gas is 23.5\$ (12.5 times as low as the previous price) as of 01.04.2015 [3].

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 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 [3]

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 [3]

Thus the current tariff for gas 7188 compared with an estimated 2,355.7 is 3.1 times as high.

The growth of debt for natural gas as for 01.11.2015 was 10.3 billion UAH, but with the debts of previous years totaled sum was 36.0 billion UAH, in particular the share of that of the population is 46.4% of the total debt. The growth of debt for electricity for 01.10.2015 was 2.2 billion UAH, but with the debts of previous years it has increased to 21.3 billion UAH, HCS share is 30.3%, population growth has reduced debt by 12,7% [4].

Thus, given the existing tariffs for HCS, and a tendency to their increase in the near future, comparing the rates of wages and pensions of ordinary citizens, realizing that the revision of existing tariffs and the use of Ukrainian gas production for the needs of population is an issue more political than economic and its solving requires knowledge of changes in the energy policy of the country, therefore, the improvement is now possible only on the basis 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 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 it is done in the private sector. For the main energy consumer – a resident of a multistory building, this opens the possibility for the introduction (gradually, especially in new buildings, reconstruction and overhaul of housing) of supplies in every apartment [5].

Some residents of apartment buildings alone try to increase the energy efficiency of their homes, investing heavily in thermo modernization of their apartments that has absolutely no effect on reducing energy consumption and in most cases, on the contrary, it only causes its multiplying.

The experience of many countries shows that only an integrated thermo modernization of existing housing stock is able to dramatically impact the reduction of energy consumption. The complex upgrading of the building, according to experts, may ultimately provide about 50% energy savings. International Energy Agency (IEA) claims that every dollar invested in energy efficiency, will result in 4\$ of economy, and such project will be paid off completely in about four years [6].

Therefore, to maximize economic and social impact from thermo modernization in existing housing stock 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 is needed.

Unfortunately, the process of creating JOAH by regions of Ukraine is very slow. Thus, in 2014 in areas under the regional program it was planned to create 14,249 JOAH and as to 01.01.2015 only 562 JOAH were formed, representing 3.9% of the planned number (Tab. 3).

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

Region	Planned indicator (units)	Actually created (units)	% implementation of planned indicator
Vinnitsya Region	170	50	29,4
Chernivtsi Region	32	6	18,8
Khmelnitsky 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
Zakarpattia 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 [3]

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 JOAH was in Odessa (0.5%), Dnipropetrovsk (0.7%), Kyiv (0.8%), Poltava (1.4%) and Ivano-Frankivsk (1.7%) regions.

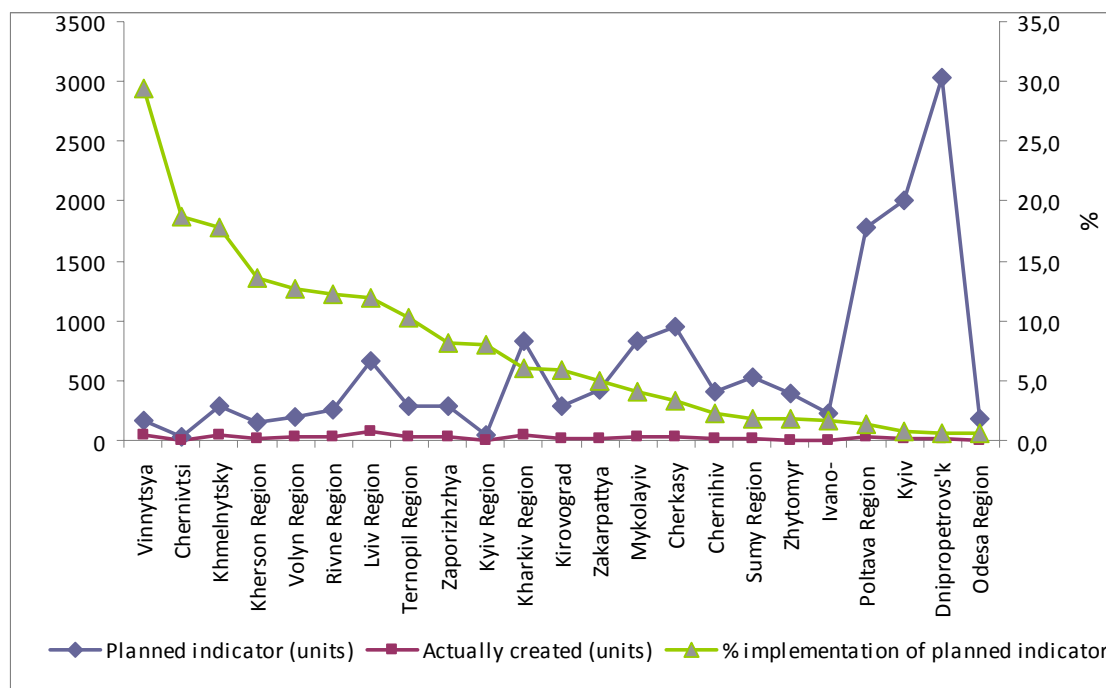


Fig. 1. Rating of creation JOAH in the Ukraine regions in 2014

* Source: developed by the author based on [3]

JOAH will not be effective until the mortgage works across the state with the number of loans of not hundreds, but thousands per year, otherwise the factor of uncertainty of citizens, fear of losing property and fear of absence of the possibility to recover the lost property will work in the future. Therefore, without the introduction of real working mortgage the investment in the housing sector would be ineffective because of the lack of effective mechanisms of refunding 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. Citizens with low annual aggregate income usually live in older homes built by outdated building codes, with worn communications, where it is necessary to carry out energy efficiency measures, which are impossible for such citizens to fund. In addition, there are significant problems with regulatory support operation of JOAH in Ukraine, which is virtually absent [7–10].

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.

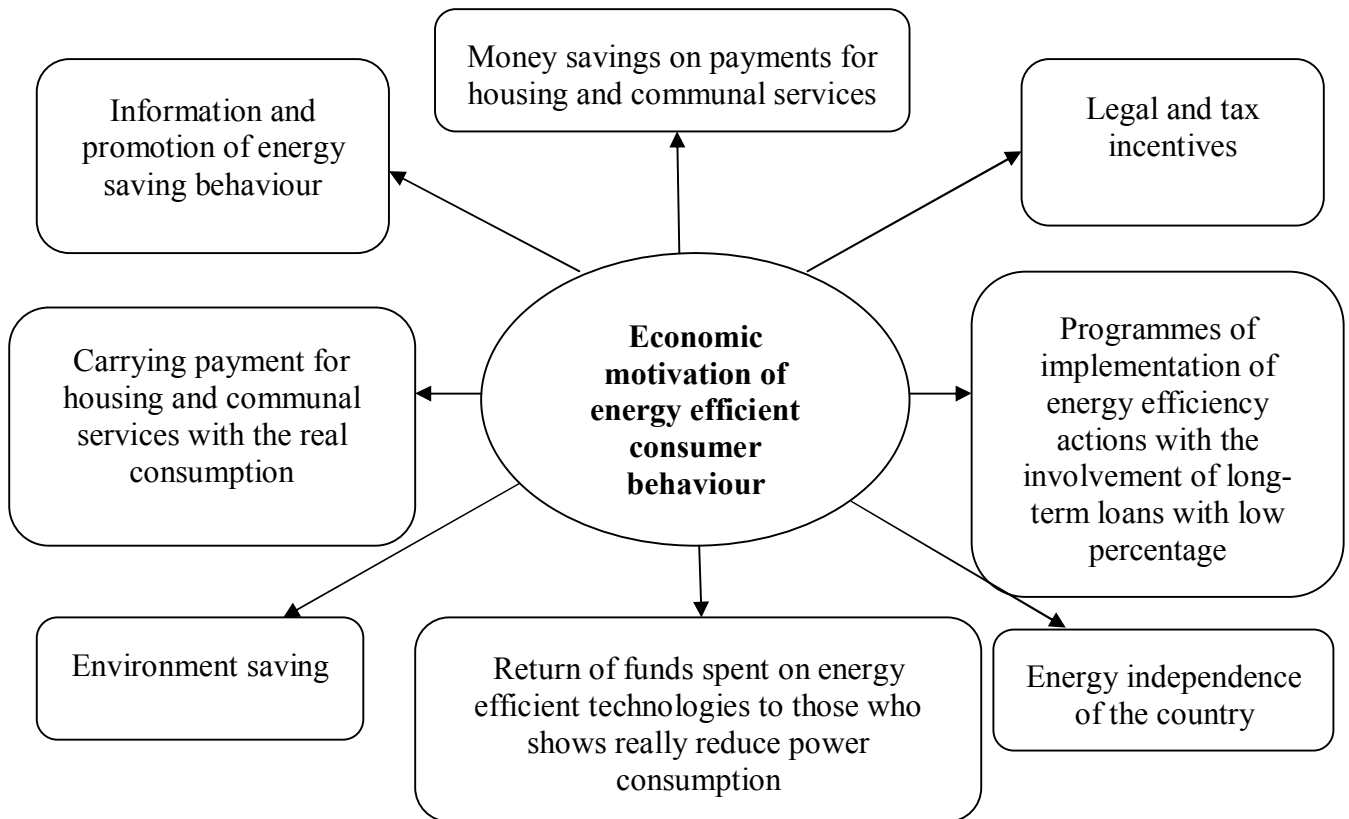


Fig. 2. The motives of improving energy efficiency

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

Absence in residential buildings of consumption accounting devices leads to significant differences between the established consumption rates and actual consumption. The established norms are 30–40% higher than actual consumption. Implementation of government programs of gradual equipping with housing facilities for accounting and regulation of water and heat consumption would save over 25% of energy. The complex effects of metering and regulation will be about 65% [11].

5. Conclusions

Thus, the formation of energy saving consciousness in the society and the 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 them. Obtaining optimal result from energy efficiency measures in existing housing is possible only in the public-private partnership: construction companies, JOAH and local authorities. The main motive of 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.

References

1. Yudin, M. A. (2011), "Economic mechanism of energy saving technologies implementation motivation in the housing and communal sector" [Ekonomichnyi mekhanizm motyvatsii vprovadzhennia enerhozberihaiuchykh tekhnolohii u zhytlovo-komunalne hospodarstvo], *Economics and region*, Vol. 4 (31), pp. 109–114 (ukr)

2. Economy. UNIAN News Agency [Ekonomika. UNIAN Informatsiine ahenstvo], available at: <http://economics.unian.ua/realestate/1117267-u-minregioni-hochut-sche-pidvischiti-tarifi-na-poslugi-jkg.html> (ukr)
3. Analysis of tariffs for housing and communal services [Analiz taryfiv na zhytlovo-komunalni posluhy], available at: <http://www.slideshare.net/Batkivshchyna/ss-46682628> (ukr)
4. Consumption and production of electricity, coal and gas reserves in Ukraine [Spozhyvannia ta vyrobnytstvo elektroenerhii, zapasy vuhillia ta hazu v Ukraini], available at: <http://www.slideshare.net/tsnua/ss-54983455?related=1> (ukr)
5. Doroshenko, V. V. (2011), "Problems and suggestions on an effective energy saving motivation mechanism forming in heat supplying" [Problemy i propozyzii z formuvannia efektyvnoho mekhanizmu motyvatsii enerhozberezhennia v teplopostachanni], Construction and Urban Economy, Vol. 3, pp. 173–182 (ukr)
6. Energy efficiency – the key to ensuring energy independence of Ukraine [Pidvyshchennia enerhoefektyvnosti – zaporuka zabezpechennia enerhetychnoi nezalezhnosti Ukrainy], available at: http://nbuviap.gov.ua/index.php?option=com_content&view=article&id=745:pidvishchennya-energoefektyvnosti&catid=8&Itemid=350 (ukr)
7. Official site of the Ministry of Regional Development, Construction and Housing and Communal Services of Ukraine [Ofitsiinyi sait Ministerstva rehionalnoho rozvytku, budivnytstva ta zhytlovo-komunalnoho hospodarstva Ukrainy], available at: <http://www.minregion.gov.ua/zhkh/zhitlove-gospodarstvo-reformuvannya-zhitlovo-komunal-nogo-gospodarstva-127749/upravlinnya-vikoristannya-ta-utrimannya-mayna-bagatokvartirnogo-budinku-47825/dinamika-utvorennia-osbb-pp-sez-zhbk-860406/rejtingovi-pokazniki-stvorennia-osbb-za-2014-rik-86504> (ukr)
8. Minregion: "The law expired at the stage of its adoption" (2012) [Minrehion: "Zakon zastariv na etapi pryiniattia"], Housing and communal services of Ukraine, Vol. 3 (46), p. 60 (ukr)
9. Official site of the National Council on the establishment and operation of Joint owners of apartment houses [Ofitsiinyi sait Natsionalnoi rady z pytan stvorennia ta zabezpechennia funkcionuvannia obiednan spivvlasnykiv bahatokvartyrnykh budynkiv], available at: http://minregion.gov.ua/index.php?option=com_k2&view=itemlist&task=category&id=372:nac-zionalna-rada-z-pitan-stvorennia-ta-zabezpechennia-funkcionuvannya-ob-ednan-spivvlasnikiv-bagatokvartirnix-budinkiv&Itemid=248&lang=uk (ukr)
10. Does the President no longer support JOAH? (2012) [Prezydent bilshe ne pidtrymuie OSBB?], Housing and communal services of Ukraine, Vol. 3 (46), pp. 61–62 (ukr)
11. Lir, V. E. (2014), "Reforming of Housing and Communal Services: system solutions of local purpose" [Reformuvannia zhytlovo-komunalnoho hospodarstva: systemni rishennia lokalnoho pryznachennia], Economics and Forecasting, Vol. 1, pp. 37–52 (ukr)

Summary

The question of raising tariffs for housing and communal services was studied in the article. It was also studied the income levels in Ukraine in the context of raising tariffs to the European level. Analyzed present gas prices are compared with the calculated rate that takes into account the use of Ukrainian gas production for the needs of the population. The 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; economic mechanism of motivation; motives of improving energy efficiency.

JEL classification: O320

UD classification: 332.83

Date of acceptance: 28.09.2015