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METHODS FOR ESTIMATING "FUEL POVERTY" IN PUBLIC ADMINISTRATION AND MANAGEMENT SYSTEMS

Abstract

The Ukrainian energy market has been analyzed region-wise in terms of consumption of fuel and energy resources by household sector. Critical aspects of improving energy security have been reflected in the context of the use of energy resources. The principal directions of the socially responsible market economy system have been offered in the light of the country's economic security in terms of overcoming "fuel poverty". Cognitive features of the "fuel poverty" phenomenon have been defined. Mathematical modeling of the "fuel poverty" index has been carried out using the following approaches: "after fuel cost poverty"; energy expenditure above 10% of disposable income; the Low Income – High Costs, where households with relatively high energy costs and low income are emphasized. A model of the final calculation of household energy costs has been developed for the purpose of optimal management. The graphical abstract of the obtained "fuel poverty" index solutions has been presented, with the upper left corner – low income – high costs – serving as a critical zone. The block diagram of improving the socially responsible market economy system in the light of overcoming "fuel poverty" has been offered.

Keywords	energy, needs, consumers, fuel poverty, market, fuel and energy resources, energy market pricing policy, energy market deregulation, system, management
JEL Classification	H12, J17, L94, P18, R11, R23

INTRODUCTION

In Ukraine, the formation of an energy policy aimed at transforming energy into an economically lucrative, flexible economy sector involves the creation of competitive domestic energy markets, minimization of dominance of one of the energy production methods or fuel supply routes, elimination of cross subsidization, abolition of the existing energy supply subsidy system, transition to market pricing (Analytical Report to the Annual Address of the President of Ukraine to the Verkhovna Rada of Ukraine, 2017). On its way to Ukraine's energy market deregulation and in the context of establishing economically justified rates for all consumers, including households, and curtailing domestic consumption of energy resources, Ukraine's social protection system is not able to provide effective protection of consumers against the side effects of Ukraine's energy market deregulation, namely, against a galloping increase in prices for fuel and energy resources and inefficient social policy that requires urgent changes and improvements. Therefore, the concept of energy security in terms of the availability of energy for domestic consumption is of high relevance and occurs widely in scientific works. As a matter of fact, although the process of ensuring energy security has been systemic until recently, it was characterized by using various approaches to its implementation and requires improvement. Since the strategic vision is

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the driving force of any process, the construction of a task system and the development of specific measures aimed at addressing the issue of "fuel poverty" in the social protection system are of paramount importance in terms of achieving sustainable solutions. The above insights require an informed choice of the most appropriate methodological approaches to evaluating the object data. As far as the management of objects of the energy and social and economic sectors are concerned, it should be borne in mind that the said choice should provide for a number of standardizations. The solutions obtained using the proposed approaches allow to build a socially responsible market economy system aimed at improving and raising social standards of living. The above is indicative of the fact that the area of research dedicated to the methodological approaches to estimasting "fuel poverty" is topical and necessary in terms of Ukraine's energy market deregulation.

1. LITERATURE REVIEW

The relevance of research into the search for reliable, stable energy supply of the economy and the public is emphasized by many researchers, namely, Sukhodolia and Smenkovskyi (2013) who have been investigating the creation of the necessary institutional framework for energy functioning in market conditions and the paternalistic expectations of the public. Gavkalova et al. (2011) focus on energy-saving solutions and ways to improve the state of energy saving of the public. Shevtsov (2008) explores the public energy supply policy and the introduction of non-conventional energy sources. Particular aspects of this range of problems from the perspective of overcoming non-monetary poverty have been considered by Poliakova and Novosilska (2015) who have studied the public poverty in terms of consumption. However, Vasyliev (2010) estimates the public poverty in terms of living conditions, with Shyshkin (2016) estimating the public poverty in terms of living facilities. The theoretical and practical aspects of the problems of overcoming fuel poverty can be found in the works of foreign specialists (Nussbaumer, Bazilian, Modi, & Kandeh K. Yumkella, 2011; Thomson, Bouzarovski, & Snell, 2017; Pye & Dobbins, 2015; Schuessler, 2014). The methodological aspects of measuring fuel poverty are considered in the investigations by Hills (2011), Boardman (1991).

The scientific refinements of domestic researchers reflect the problem of overcoming fuel poverty in Ukraine quite fragmentarily. In particular, in his work, Vashchenko (2013) focused on the procedural and institutional foundations for the formation and implementation of public policies aimed at combating fuel poverty within the framework of EU legal requirements. In their analytical refinement "Ukraine on the Verge of Fuel poverty: How to Protect Socially Vulnerable Groups", the specialists of the International Center for Policy Studies (Gazizullin, Lozovyi, & Eiklz, 2013) lay special emphasis on researching into the problems of protecting vulnerable energy consumers as part of the reform of the energy market.

A range of outcomes of these studies suggests that the existing approaches to addressing the issue of overcoming "fuel poverty" rely on clarifying the cognitive features of this phenomenon. Apparently, acceptable solutions can be found only provided the final process state with a given degree of accuracy is known. Therefore, the current issue of developing methodological approaches to the actual calculation of the "fuel poverty" index remains unsolved. Similar approaches allow to investigate a set of factors affecting the phenomenon under study. This part of the problem can be solved by developing a procedure for synthesizing optimal solutions to overcome the "fuel poverty" phenomenon using the process management criteria based on obtaining an alternative description of the final state.

2. PURPOSE AND OBJECTIVES OF RESEARCH

The purpose of this research is to develop a methodology for studying the "fuel poverty" phenomenon in Ukraine's social and economic system, as well as to identify ways of addressing the issues of socially vulnerable consumers of fuel and energy resources in terms of deregulation of energy markets.
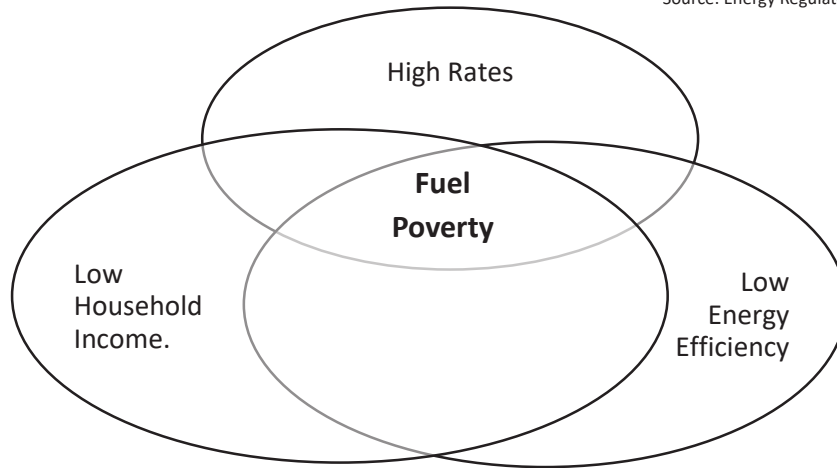
Figure 1. "Fuel poverty" model

For this purpose, the following challenges are to be met:

- to distinguish the components of Ukraine's social protection and energy market systems;

- to analyze the income behavior of the public in terms of Ukrainian regions and the expenditures of households on fuel and energy resources;

- to study Ukraine's energy market pricing policy;

- to investigate the household performance in terms of their number, size, area, average household income;

- to verify the signs of the "fuel poverty" phenomenon based on the scientific research analysis;

- to substantiate measures to overcome "fuel poverty" aimed at improving the social services office.

3. METHODOLOGY

The methodological basis of the research is official statistical information, analytical reports, and scientific papers. The following methods are used to process this information: abstraction, analysis, synthesis, description, interpretation, etc.

Features of the "fuel poverty" phenomenon occur where a household is unable to meet its basic energy needs, namely, maintain proper temperature levels in the premises, have enough energy sources for cooking, etc. Generally, a household with energy costs exceeding a certain percentage of income is considered energy poor. Thus, a number of European governments and international organizations working on poverty reduction use a 10% fuel poverty threshold. Fuel poverty criteria can be more complex and, other than spending on energy resources, consider factors such as consumption levels, prices for energy resources and energy efficiency of households. In general, any household carries a risk of ending up below the fuel poverty line due to three factors: low income, low energy efficiency, high rates and energy prices (see Figure 1).

Three factors of fuel poverty are inextricably linked. Thus, the heat efficiency of the building directly affects the total expenditures for heating: residents of a poorly heat-insulated household will pay more and carry a greater risk of ending up below the fuel poverty line. At the same time, they carry a risk of falling into a trap, since low incomes will not allow them to pay for heat insulation of the household or modernization of the energy generation/supply infrastructure, thus making them pay extra money for the energy consumed. Equally touchy is the habit of irrational utilization of energy resources caused by the current social assistance system and understated social rates.

Today, the greater part of the Ukrainian population is experiencing a high burden of utility costs. Thus, in 2016, 5.9 million households out of about 15 million Ukrainian households applied for subsidies for reimbursement of expenditures for liquefied gas and other household fuel. A further increase in natural gas rates by one third will bring about an increase in costs by to more than 10% of the household's disposable income for about 45% of the country's population.

The authors carried out the mathematical modeling of approaches to the definition of "fuel poverty". The John Hills' (2011) "after fuel cost poverty" approach consists in measuring the residual household income after subtracting fuel and upkeep costs and comparing it to the poverty threshold, which is mainly 60% of the average national income after subtracting fuel and upkeep costs.

$$AFCP_i = \frac{RI_i}{0.6 \cdot RI}, \qquad (1)$$

where RI_i is a residual income of the average household in the i-th region per year, RI is a residual income of the average Ukrainian household per year, $AFCP_i$ is a ratio of RI_i to 60% of RI – (poverty threshold).

$$RI_i = HI_i - FC_i, \qquad (2)$$

where HI_i is a net income of the average household in the i-th region per year, FC_i is an energy cost of the average household in the i-th region per year.

$$HI_i = IC_i \cdot AS_i, \qquad (3)$$

where IC_i is an income per person of the i-th region per year, AS_i is an average size of households in the i-th region.

In our case, we subtracted all energy costs of the average household per year from the average annual regional household income per year. In fact, this is the so-called after fuel cost income. The same income was typical for the whole Ukraine for the relevant year. Further, we had this income divided by 60 percent of the same income for Ukraine. The result can be called an after fuel cost "fuel poverty" index. No region showed this index less than one. Although, in some regions, it was almost crit-

ical. In particular, this applies to Cherkasy region. According to this approach, however, households can be considered "energy poor" in those regions, where the said index is less than 1.6.

According to the Boardman's approach (Boardman, 1991), a household can be considered "energy poor" provided it requires more than 10% of its disposable income to be spent on fuel in order to maintain satisfactory heating conditions and all other energy services. This is the definition of the "fuel poverty" in terms of the coefficient of income, i.e., an energy-expenditure-above-10%-of-disposable-income approach.

We performed calculations using the following formula:

$$EA_i = \frac{FC_i}{HI_i}, \qquad (4)$$

where FC_i, HI_i are detailed in the previous approach, EA_i is a share of energy costs (Boardman's approach).

According to this approach, a household is considered energy poor provided it requires more than 10% of its disposable income to be spent on fuel (energy resources) to maintain satisfactory heating conditions and all other energy services. Understandably, the consideration of such a component as supporting satisfactory heating conditions requires considerable follow-up household surveys. In addition, the very households can be energy-saving. With this in mind, in our calculations, we had the annual average household's expenditures for all types of energy resources divided by its corresponding disposable income. If the index is greater than 0.1, it means that this household spends more than 10% of its disposable income on energy resources. Therefore, it can be considered energy poor. Since 2015, this fuel poverty has been clearly traced in Ukraine, when energy prices in UAH began to rise sharply, primarily for gas and heat energy. Since 2015, calculations have shown two regions, whose residents spend more than 20% of their disposable income on energy. These are Cherkasy and Kharkiv regions. However, there is a great disparity between Kyiv and other Ukrainian regions. The calculations performed in Kyiv show that the energy spending of this city's residents accounts for only 3-4 percent of their disposable income.

Another Hills' approach (Hills & John, 2011) – the Low Income – High Costs (LIHC) – consists in distinguishing households that have relatively high energy costs and low income. Apparently, this idea is more flexible than the previous ones. The corresponding index requires two threshold levels: one threshold for after fuel cost poverty, and another for energy costs, as defined on the basis of the mean expenditure of all households. In our case, the average level in Ukraine was taken as the threshold level of the after fuel cost poverty index, i.e., the average residual household income after subtracting energy costs. In addition, the average energy costs level in Ukraine was taken as the household energy costs threshold level. Accordingly, the average regional household was considered energy poor provided the corresponding residual income RI_i was less than the Ukraine's RI average, and the energy costs FC were greater than the Ukraine's average costs FC_i for the year of interest.

For comparison there, were used the average values of household indexes in different regions. This is because a detailed survey involving a large sample of households requires considerable financial expenditure, including the development of methods for classifying households by different types of buildings, walls, types of heating, etc., and thus the determination of expected energy consumption on the basis thereof.

4. RESULTS

The author developed a formula of the final calculation of household energy costs FC_i for the purpose of optimal management. The calculation of energy costs includes: 1) heat energy; 2) gas; 3) electricity; 4) peat; 5) coal; 6) firewood; 7) liquefied butane and propane. We analyzed the history of consumption of the aforementioned resources by the domestic sector in the period 2011–1016 in the context of Ukrainian regions, as well as carried out an analysis of prices for the relevant fuel and energy resources in the period 2011–2016, using such references as Main Inspectorate of the State Energy Inspection. Dynamics of Electricity Consumption by Regions of Ukraine (2016), Main Statistics Service of Ukraine. Results of Use of Fuel, Heat, and Electricity (2016), National Joint-Stock

Company Naftogaz of Ukraine. Use of Natural Gas (2016). We calculated the expenditures per household for all the aforementioned resources per year by region. Thus, the calculation was performed using the formula:

$$EC_i = W_i \cdot PW + G_i \cdot PG + E_i \cdot PE + \\ + T_i \cdot PT + C_i \cdot PC + D_i \cdot PD + B_i \cdot PB, \qquad (5)$$

where W_i, G_i, E_i, T_i, C_i, D_i, B_i are the volume of consumption of heat energy, gas, electricity, peat, coal, firewood, liquefied butane and propane, respectively, per household in the i-th region per year, and PW, PG, PE, PT, PC, PD, PB are the prices of the corresponding energy resources, whereas the price-consumption ratio was considered in measuring the energy costs (Ukraine is known to have a reduced rate for monthly consumption of up to 150 kWh, and an increased rate for monthly consumption from 150 to 800 kWh).

According to the above methodology, it can be stated, when summarizing the results of calculating the indexes of the actual presence of the phenomenon of public "fuel poverty" and its level in Ukrainian regions, that the said phenomenon exists in the greater part of Ukraine, namely, 46% of Ukrainian regions have already ended up in the critical region, i.e., the region of high costs and low household income (top left corner on the graphs). The cause of current "fuel poverty" was not only low energy efficiency of households and their low income level, but also a rapid increase in prices for fuel and energy resources. The effect of this factor is confirmed by calculations given in Table 1 using the Boardman's approach that proved that fuel poverty occurs when the household's expenditures for fuel and energy resources exceed 10% of the household's disposable income. According to our calculations, since 2015, when Ukraine's energy market prices have skyrocketed, most of Ukrainian regions have passed a 10% milestone of expenditures for fuel and energy resources. Simply put, since 2015, the households of these regions have begun to spend more than 10% of their disposable income for energy. Therefore, according to the Boardman's approach (see Table 1), since 2015, the "fuel poverty" phenomenon has been observed in such Ukrainian regions as Dnipropetrovsk, Donetsk, Ivano-Frankivsk,

Kirovohrad, Lviv, Kharkiv (2016) and Cherkasy with the highest "fuel poverty" index value.

From the perspective of the Hills' approach stating that this phenomenon occurs when the residual income is compared to 60% of Ukraine's mean average income of the public after subtracting electricity, fuel and upkeep costs, we found that the higher the value of household income after subtracting energy costs (above 1.6), the richer the region will be considered and vice versa. Since such Ukrainian regions as Vinnytsia, Volyn, Zhytomyr, Transcarpathian, Ivano-Frankivsk, Kirovohrad, Luhansk, Mykolaiv, Poltava, Rivne, Ternopil, Kherson, Khmelnytskyi, Cherkasy, Chernivtsi, Chernihiv had the average household residual income after subtracting energy costs less than Ukraine's average residual income as a whole (< 1.6), this approach allows to consider these Ukrainian regions energy poor (see Table 1).

According to the third approach, i.e., when comparing the household with the threshold of Ukraine's average residual income and the energy costs of the average household in a given region to the threshold of Ukraine's average household energy costs (see Table 1), it can be seen that such regions as Dnipropetrovsk, Zaporizhzhia, Ivano-Frankivsk, Kyiv, Luhansk, Poltava, Khmelnytskyi, Cherkasy are energy poor since their average household income is less than the average national income, and energy costs are higher than Ukraine's average.

Notwithstanding the foregoing, it should be noted that if the comparisons had been based on the standard fixed and accurately surveyed and calculated household energy costs with due regard for all energy efficiency specifications of the house, that could be considered standard, instead of using the average national income or the average national energy costs, the calculations would be accurate, and the "fuel poverty" index would be much higher.

Since the critical "fuel poverty" level indexes have been typical for the three approaches suggested in this research (see Table 1), it can be argued that Ivano-Frankivsk, Luhansk, Poltava, Kharkiv, Khmelnytskyi, and Cherkasy regions are energy poor, where households are unable to meet their

basic energy needs, namely, maintain proper temperature levels in the premises, have enough energy sources in domestic services, with energy costs exceeding a certain percentage of the household income.

Therefore, a part of Ukraine's population ended up on the threshold of fuel poverty due to the following factors:

- low income: according to household income estimates, 52% of households featured limited consumption of non-food products and services, with bulk of disposable income thereof spent on food in 2016;

- low energy efficiency: the country's housing stock has poor energy efficiency, with losses of heat supplied to multiple-occupancy buildings accounting for approximately 70% due to a lack of proper heat insulation of buildings and energy management;

- high rates and resulting prices for the public. For example, gas rates for the public cover only 20-30% of the cost of services. However, the rate increase is necessary to continue the energy market reforms.

Therefore, guarantees for the protection of vulnerable consumers should be included in the energy and social programs of the relevant members of the Energy Community (Shyshkin, 2016). The adverse economic effect of price jumps on these consumer groups can be reduced as a result of an objective reestimate of those eligible for assistance, which will allow the government to save more money to be channeled to the protection of target groups in the case of an increase in energy prices.

The authors carried out the implementation of resulting solutions into graphic abstract (see Figures 2, 3).

Experience shows that one of the prerequisites for achieving success is the construction of an integrated effective management system with efficient mechanisms of redistribution of the resources received among different social groups. According to Pavlyuk (2010), the provision of social assistance and social services to appropriate beneficia-

Table 1. Results of numerical simulation of the "fuel poverty"

Ukraine by region / year	After fuel cost poverty approach compared with 60 percent of the mean national income					10% ratio approach (energy income ratio)					Low income – high costs				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Ukraine	1.666666667	1.666667	1.666667	1.666667	1.666667	0.046304	0.043154	0.046978	0.125955	0.130667	FALSE	FALSE	FALSE	FALSE	FALSE
The Autonomous Republic of Crimea	1.392301494	1.447938	–	–	–	0.028936	0.025438	–	–	–	FALSE	FALSE	–	–	–
Vinnytsia	1.369448069	1.365868	1.247643	1.391823	1.403079	0.035226	0.032269	0.0373	0.110074	0.115232	FALSE	FALSE	FALSE	FALSE	FALSE
Volyn	1.431862017	1.426543	1.308122	1.436753	1.484784	0.048678	0.046694	0.049023	0.113284	0.113514	FALSE	FALSE	FALSE	FALSE	FALSE
Dnipropetrovsk	1.753149034	1.745981	1.652003	1.654195	1.621768	0.062318	0.055066	0.059004	0.163543	0.162687	FALSE	FALSE	TRUE	TRUE	TRUE
Donetsk	1.861919507	1.855484	1.823258	1.702498	1.39693	0.051994	0.047935	0.043798	0.161648	0.168047	FALSE	FALSE	FALSE	FALSE	TRUE
Zhytomyr	1.34202358	1.281638	1.185606	1.269896	1.303959	0.051508	0.051402	0.047037	0.14328	0.137619	FALSE	FALSE	FALSE	FALSE	FALSE
Transcarpathian	1.510578542	1.490021	1.297678	1.437085	1.502357	0.035287	0.033313	0.039835	0.13327	0.118768	FALSE	FALSE	FALSE	FALSE	FALSE
Zaporizhzhia	1.728680105	1.707339	1.621662	1.635473	1.704567	0.047873	0.04202	0.048246	0.124551	0.115978	FALSE	FALSE	TRUE	FALSE	FALSE
Ivano-Frankivsk	1.520068984	1.494833	1.296186	1.402921	1.429694	0.046773	0.044587	0.054714	0.177919	0.185824	FALSE	FALSE	FALSE	TRUE	TRUE
Kyiv	1.764786115	1.688931	1.594555	1.566448	1.607301	0.044921	0.060097	0.052971	0.17862	0.171589	FALSE	FALSE	TRUE	TRUE	TRUE
Kirovohrad	1.187148167	1.178447	1.065826	1.129995	1.170311	0.043968	0.041598	0.049788	0.146994	0.138603	FALSE	FALSE	FALSE	FALSE	FALSE
Luhansk	1.452907786	1.457587	1.432057	1.704641	1.228043	0.055267	0.050967	0.07345	0.14801	0.152697	TRUE	TRUE	TRUE	FALSE	FALSE
Lviv	1.685533213	1.674366	1.537712	1.627269	1.729543	0.042728	0.039726	0.042888	0.151819	0.127397	FALSE	FALSE	FALSE	TRUE	FALSE
Mykolaiv	1.481126082	1.450952	1.277311	1.362529	1.396924	0.043424	0.042461	0.048663	0.146251	0.147161	FALSE	FALSE	FALSE	FALSE	FALSE
Odesa	1.580384103	1.720685	1.463852	1.680441	1.76487	0.032811	0.028572	0.034846	0.083771	0.082982	FALSE	FALSE	FALSE	FALSE	FALSE
Poltava	1.433380854	1.425428	1.314251	1.329823	1.360497	0.051433	0.047898	0.05642	0.178423	0.173708	FALSE	FALSE	FALSE	TRUE	TRUE
Rivne	1.497756142	1.512586	1.40134	1.49072	1.497829	0.048982	0.045185	0.05022	0.13733	0.143738	FALSE	FALSE	FALSE	FALSE	TRUE
Sumy	1.423232376	1.393353	1.264106	1.376398	1.382964	0.046713	0.04482	0.052114	0.135174	0.144372	FALSE	FALSE	FALSE	FALSE	FALSE
Ternopil	1.378693608	1.328299	1.149222	1.26915	1.268715	0.039226	0.036731	0.046918	0.152473	0.155486	FALSE	FALSE	FALSE	FALSE	FALSE
Kharkiv	1.621962145	1.605871	1.450237	1.4633	1.266995	0.052095	0.049164	0.054522	0.116494	0.249337	TRUE	TRUE	TRUE	FALSE	TRUE
Kherson	1.322294477	1.35714	1.156217	1.367873	1.403094	0.035447	0.032155	0.040711	0.104948	0.096587	FALSE	FALSE	FALSE	FALSE	FALSE
Khmelnytskyi	1.429623876	1.424396	1.270298	1.397825	1.443329	0.045135	0.042446	0.050819	0.153774	0.134625	FALSE	FALSE	FALSE	TRUE	FALSE
Cherkasy	1.223226225	1.183929	1.068541	1.009454	1.054677	0.053168	0.064064	0.067846	0.249611	0.235732	FALSE	TRUE	FALSE	TRUE	TRUE
Chernivtsi	1.334880916	1.355026	1.149991	1.290153	1.331947	0.039269	0.036818	0.047121	0.129707	0.118797	FALSE	FALSE	FALSE	FALSE	FALSE
Chernihiv	1.335722599	1.150981	1.136008	1.228009	1.212445	0.047015	0.157134	0.053752	0.126617	0.13792	FALSE	TRUE	FALSE	FALSE	FALSE
Kyiv	3.55719167	3.55929	3.686773	4.219958	4.470624	0.031673	0.0297	0.011654	0.030139	0.030117	FALSE	FALSE	FALSE	FALSE	FALSE
Sevastopol	1.643449937	1.793614	–	–	–	0.043869	0.039435	–	–	–	FALSE	FALSE	–	–	–
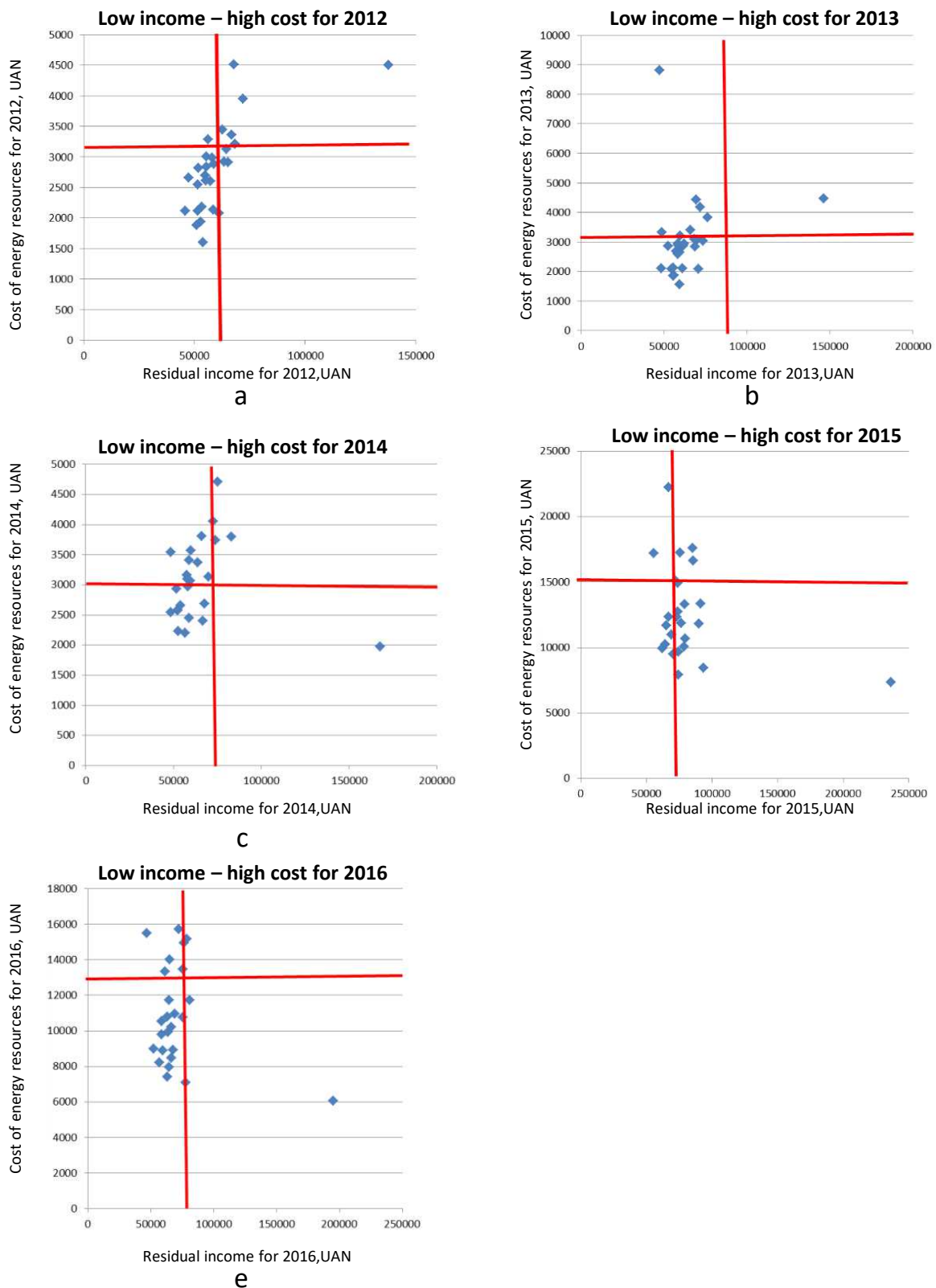
Note: a, b, c, d, e – annual simulation diagrams.

Figure 2. The "fuel poverty" modeling outcomes for Ukraine's regions as a result of high energy costs and low household income
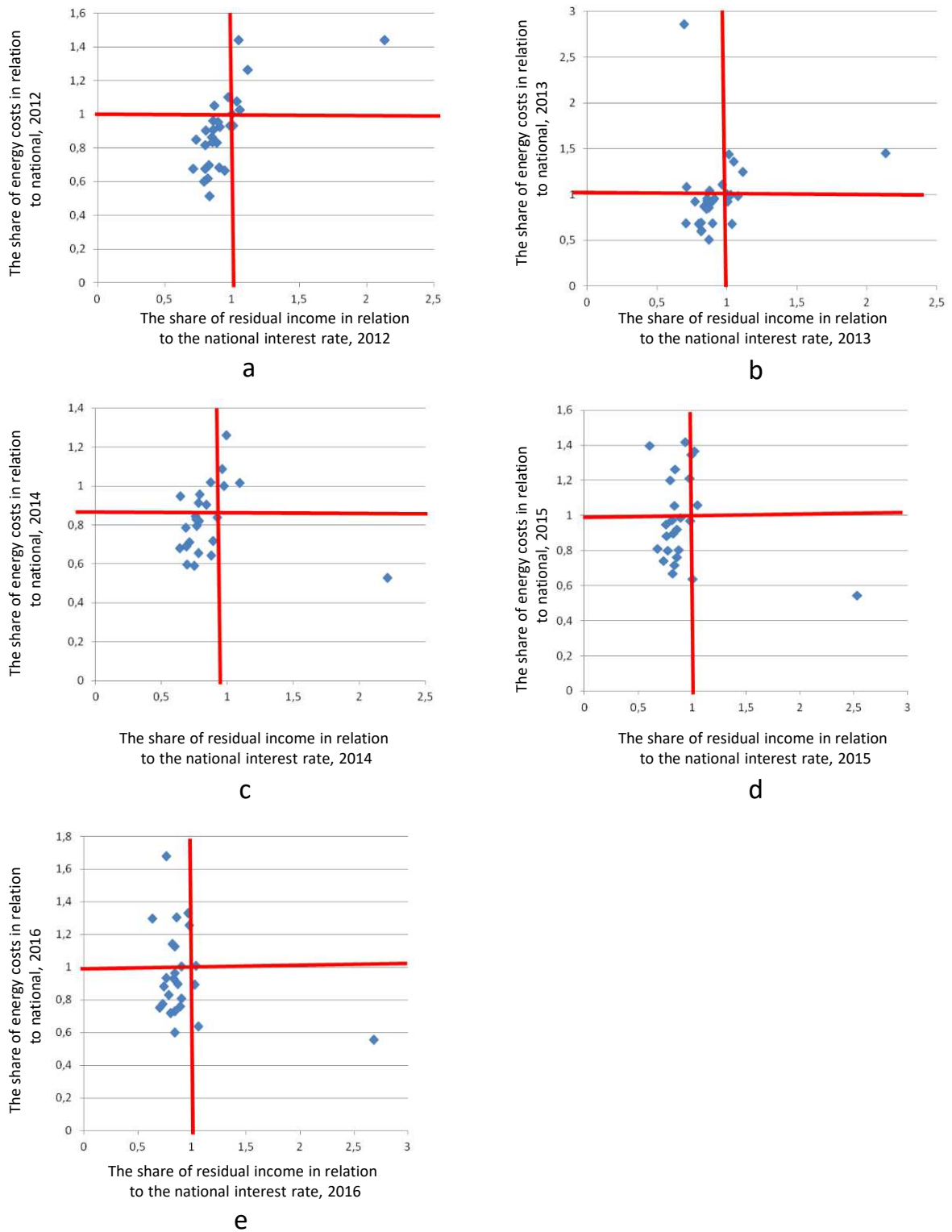
Note: a, b, c, d, e – annual simulation diagrams.

Figure 3. The "fuel poverty" modeling outcomes for Ukraine's regions as a result of measuring the residual household income after subtracting fuel and upkeep costs and comparing it to the poverty threshold, which is mainly 60% of the average national income after subtracting fuel and upkeep costs: a, b, c, d, e – annual simulation diagrams

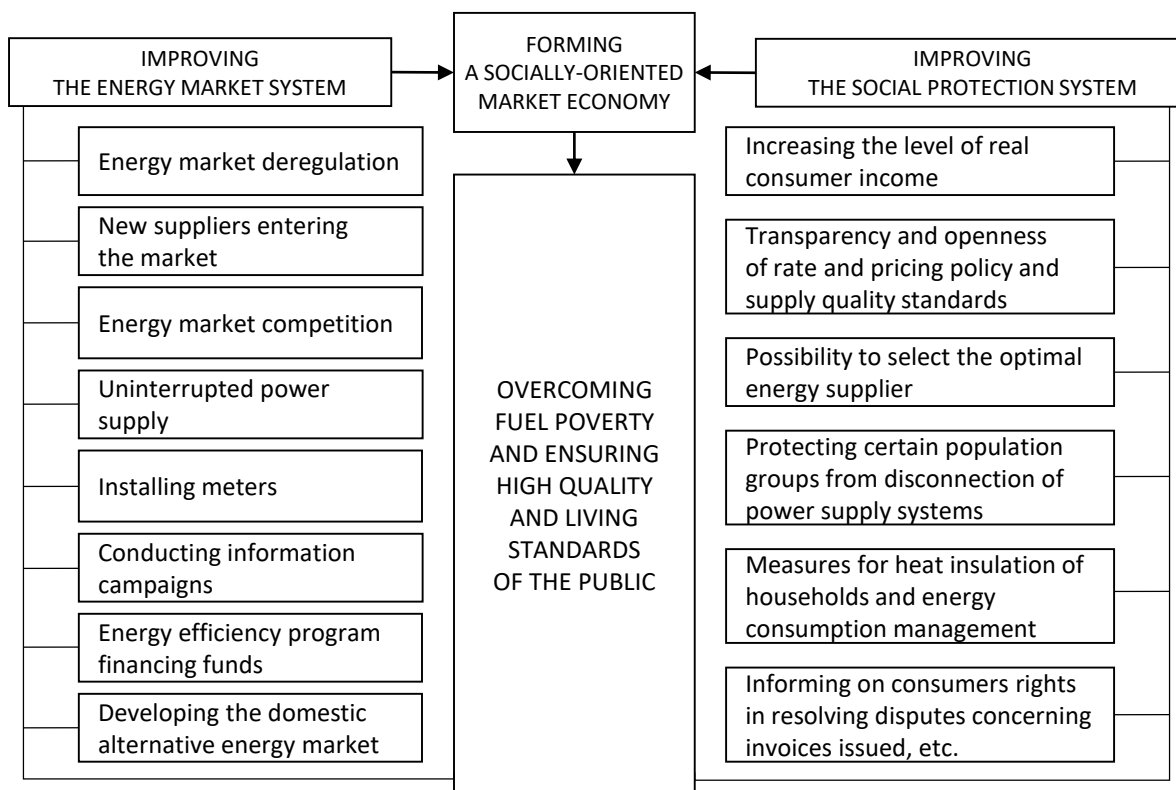| IMPROVING THE ENERGY MARKET SYSTEM	FORMING A SOCIALLY-ORIENTED MARKET ECONOMY	IMPROVING THE SOCIAL PROTECTION SYSTEM
Energy market deregulation		Increasing the level of real consumer income
New suppliers entering the market		Transparency and openness of rate and pricing policy and supply quality standards
Energy market competition	OVERCOMING FUEL POVERTY AND ENSURING HIGH QUALITY AND LIVING STANDARDS OF THE PUBLIC	Possibility to select the optimal energy supplier
Uninterrupted power supply		Protecting certain population groups from disconnection of power supply systems
Installing meters		Measures for heat insulation of households and energy consumption management
Conducting information campaigns		Informing on consumers rights in resolving disputes concerning invoices issued, etc.
Energy efficiency program financing funds		
Developing the domestic alternative energy market		

Figure 4. System for overcoming "fuel poverty" in the aspect of constructing a socially-oriented market economy in Ukraine

ries – vulnerable social and other groups – helps not only prevent individual citizens and their families from ending up below the poverty threshold, but also impede the decline in aggregate demand, thus limiting the potential depth of the recession and post-crisis economic conditions and increasing the potential for economic recovery.

Flexibility underlying EU directives gives Ukraine the opportunity to take advantage of a large array of schemes and mechanisms providing social assistance to vulnerable consumers. The positive experience of financing improvements in energy efficiency of residential buildings and the effect on low-income households are given in Energy Efficiency Schemes for Low-Income Households (2010).

The Energy Community Treaty is based on the principle of encouraging measures promoting the consumer right protection through the use of market-oriented tools and/or those that do not damage the market. These measures include

non-rate support methods (based on subsidies and targeted payments), as well as various non-financial remedies. The Ukraine's social protection system is quite manifold and provides for various financial measures aimed at population protection (rates, subsidies, payments). However, the system coverage is too broad, and the system itself has insufficient targeting. Therefore, the optimal set of regulatory and social measures to be taken as a basis of the social action plan relies on the assessment of the actual level of vulnerability of Ukrainian consumers. The existing financial measures should be supplemented by non-financial measures based on this estimate. The social action plan wording should also result from extensive consultations with stakeholders and the assessment of ability of the Ukrainian government to enable operation of the new protection system (Gazizullin, Lozovyi, & Eiklz, 2013). The system of overcoming "fuel poverty" in terms of constructing a socially-oriented market economy in Ukraine should address management measures given in Figure 4.

CONCLUSION

1. The essence of the "fuel poverty" category has been reported and it has been found that the characteristic features of fuel poverty are the inability of certain social groups and strata to meet their needs in energy resources in the context of the energy market deregulation; immaturity of the public needs for energy resources and the level of their implementation that affects the level and extent of fuel poverty; forced deprivation of people of the opportunity to meet their energy needs, which are necessary to maintain the lifestyle inherent in a specific society in a given period.

2. The level of "fuel poverty" in Ukrainian regions has been estimated, the system of measures has been developed to overcome fuel poverty, as well as the principal objectives of ensuring energy security have been determined on the basis thereof.

3. Based on the analysis inference can be drawn that in a number of Ukrainian regions, households are already "energy poor" and require an effective and reliable energy supply, introduction of energy efficient housing service technologies, as well as implementation of improved household energy efficiency programs.

4. The proposed methodological approaches to estimate the "fuel poverty" can be implemented in the standard scheme of information management systems in terms of constructing a socially-oriented market economy in Ukraine. These approaches enable prompt detection of vulnerable domestic consumers in the energy market for the managerial decisions to be taken by public social protection authorities.

5. A mechanism for responding and overcoming "fuel poverty" should serve as a pivotal basis for optimal public administration and consider the interrelation of the social status and the actual results of the energy market reforming. The interrelation of management measures of such systems presented by us can contribute to the development of a program to improve the living standards of the Ukrainian population towards constructing a socially-oriented market economy in Ukraine.

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