STRENGTHENING SOCIAL AND ECONOMIC RESILIENCE IN THE CONTEXT OF CRISIS AND THE ACTUAL ENERGY CHALLENGES

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Abstract: *Research on energy resilience seeks to identify how increases in electricity costs influence income or "unbalance the budget" in the existing economic situation, a health crisis, an increase in inflation, a war situation at the country borders that also favored the energy crisis. The new conditions affect the social well-being of the population not only in Romania but also for other EU countries. The investigation carried out tried to highlight the changes in the behaviour of the population in order to achieve the reduction of energy consumption and implicitly the costs that for some income categories affect their budget. This study tries to demonstrate the need for sustainability, in order to maintain social welfare for all categories of the population affected by these price increases. The situation affects the entire population if we take into account the fact that 10% of the population investigated through qualitative analyzes mention that: "they do not have money for paying the bills", 14% "don't have money to eat" the residual income left after paying the bills is not enough for a satisfactory daily shopping basket in the conditions of an uncontrollable market, 7% cannot pay the bank rates and interest and 75% of the population are unable to reserves and consumes from the created deposits.*

Keywords: crisis, behavioural changes, sustainability, resilience.

1. Introduction

In the current context of the health crisis, the economy of many countries, including Romania, suffered a shock, thus highlighting the vulnerability of some systems such as the health, educational, economic, social, etc. The budget granted to these systems had to be supplemented, especially in the health field, in order to limit this virus and to increase the resilience of these services in a crisis situation.

The health system has become a subject of national interest and security, the education system, directly involved, was necessary to face the challenges of the digital transition. To these were added the public services, the chains of commercial units, which also had to adapt on the fly to the newly created situation. The return to normal conditions with economic recovery depended and still depend on epidemic episodes, which are repeated periodically, slowing down the process of return and recovery.

The social context imposed a new political approach, with public policies adapted to crisis situations, with a public budget divided according to the needs arising in the social context, which determined better collaborations between the private sector, the state and the authorities, to overcome the effects of the pandemic. The adequacy of the labor force at the level of demand and supply of the labor market was dependent on the evolution of the pandemic, a fact that also affected the level of investments.

The social policy assumed the realization of recovery plans with institutional, financial and normative measures for the population. Against the background of these crises, the EU faces a series of new challenges in the field of energy, following the war in Ukraine, which include negative aspects such as increasing dependence on imports, on fossil fuels (natural gas, oil and coal) from Russia, high energy and fuel prices, increasing global demand for energy, risks affecting the security of producing and transit countries. Added to these are macro-level changes such as climate change, decarbonisation, the share of renewable energy, transparency and good integration in energy markets. The EU aims to create an integrated

energy market by implementing an energy policy based on a set of measures to ensure the security of energy supply and the creation of a long-term energy structure (europarl.europa.eu/factsheets/ro/sheet/68/policy-Energy-policy).

In this context, the "REPoverEU" plan was proposed, which includes measures to reduce dependence on Russian fuels and urgently implements the European Green Plan. (cdep.ro/afaceri_europene/afeur/2022/fi_3519.pdf).

It is stated that this "REPoverEU plan is a plan for achieving:

- energy saving;
- the production of clean energy;
- diversification of own energy resources (commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_ro).

1. The resilience plan for Romania

It is mentioned by economic analysts that Romania will be able to obtain EUR 1.39 billion through REPower EU until 2026, having the possibility to use the financing. In this sense, Romania must present projects that state how this money will be used, which represents a great opportunity for the development of new production capacities from renewable sources to ensure long-term energy independence (bursa.ro/repower-eu- another-opportunity-for-the-development-of-the-national-energy-system-61294848).

The sudden jump in energy prices in the EU and around the world occurred in the second half of 2021 in the context of an economy affected by the pandemic (Covid-19) followed by a post-covid period of relaxation of travel restrictions. The price increase started in 2021 and continued in 2022 was accentuated by Russia's military aggression in Ukraine. In 2022, Russia unilaterally decided to stop the supply of natural gas to some EU countries, a fact that favored the increase in natural gas and implicitly electricity prices due to the way energy markets in the EU work. The sudden increase in energy prices in Europe led governments to introduce measures to protect consumers. Some of the measures, in response to the energy crisis, were the reduction of excise duties on petrol and diesel.

In Romania, the following measures were taken: on September 7, 2021, (Raluca Nicolae, 2022 economia.ro) the Parliament has passed a law that protects vulnerable consumers from rising energy prices. The allocated subsidies were for heating the home, for energy consumption, for energy-efficient household equipment and for the purchase of products and services that improve the energy performance of buildings or for connection to the energy network. On October 4, compensation is granted both for the supply of electricity and for gas. On October 31, the Romanian Parliament voted on the draft law for the mentioned measures and for charging an exceptional tax on producers (for revenues exceeding 91 euros/MWh for their financing, Raluca Nicolae, 2022, economia.ro). On January 11, 2022, the government announced a new form of production for household consumers with a monthly consumption of up to 300KWh with a VAT reduction to 5% as well as compensation for the green certificate and cogeneration bonus for consumption. On March 20, the government imposed a one-year cap on electricity and natural gas prices (Raluca Nicolae 2022, economia.ro). On April 11, the coalition government announced a series of subsidies and vouchers worth 3.5 million euros to help the vulnerable population (adevarul.ro). Low-income families and 4.7 million pensioners will receive food vouchers basic, as stated. On September 1, it was announced that the ceiling on energy prices would be maintained until the end of August 2023. On September 9, state aid amounted to 4 million euros (Raluca Nicolae 2022, economia.ro).

2. Resilience plans and measures regarding the quality of social assistance services in Romania

High energy prices are already affecting the industry. Large consumers of electricity and gas have "operated this year at break-even levels". Many companies are closing down, and the year 2023 could bring a significant wave of unemployed (mentioned Adrian Negoescu - economist analyst, 2022, www.digi 24.ro). Added to the mentioned perspective is inflation that exceeds the rate at which Romanians' incomes increase, affecting their purchasing power, so consumption. The economy of Romania is also affected by a possible recession in other countries. Thus, "in commercial terms, the German economy is entering a more serious recession and in this situation the commercial orders to the Romanian industry will decrease. The same is true for Italy, which are the main partners ofRomaniain the EU", (says Bogdan Glăvan - economist analyst, 2022 www.digi 24.ro).

Regarding social assistance, the implementation of the VMI reform is aimed at updating the legislative framework for the granting of benefits and social assistance services according to existing means, without increasing the risk of dependency (Press release August 26, 2022 - mmuncii.ro/j33/index. php/ro/communication).

3. Review of scientific literature. Relevant articles on the topic

Against the background of the crises faced by the EU during this period and the challenges in the energy field following the war with Ukraine include negative effects, as mentioned, by increasing dependence on imports, high energy and fuel prices which led to measures to increase population resilience of the EU energy sector/system and the country.

The need to optimize energy consumption and the use of resources in general, achieving savings, was also emphasized by Kardung and Colab (2019), who frequently explain the concept of resilience in this economic context of energy impoverishment, it is proposed to explain this concept used in many fields by researchers. In this sense, Nijkam (2021) in the work entitled "Resilience and regional convergence in the European Union", tries to present the concept in a new systemic vision, integrating five dimensions: economic, social/individual, institutional, environmental and geopolitical, by overcoming some conceptual and methodological barriers. In other works, the concept of resilience is defined starting from the fact that it is increasingly used lately in various fields from the individual to the societal level, being included in the policies of the EU and of some international institutions and companies (Cosmin-Mihai, 2022). Dinu (2012) presents in the work "Consumers' education and information from the perspective of their awareness and ecological behaviour" the practice of consumers who must be educated towards the economy, towards the ecological sense for the conservation of resources."Resilience in business" (Ana Maria Gardiner, 2020) is an article in which the author explains the term resilience as a state of resistance to the shock and the concept has been used mainly in human resources, psychology and psychiatry. It is assumed that these people, through defense mechanisms, do not let emotions take control and influence their decisions (Ioan-Cosmin, 2022).

Resilience in the economy, the resilience of the resources at our disposal has determined the awareness of the negative impact of excessive consumption patterns on the environment, which has led to the emergence of more and more ecological attitudes of the population (Yu, 2014) to preserve resources and saving up. Some specialized works in the financial field emphasize on national resilience, supply chains for example (Popa, 2013) or population resilience reflected in the community's ability to face risks, threats of crises caused by natural disasters, called economic disasters (crashes banking), disasters determined by the lack of control over nature (nuclear accidents, radiation, ionization) - called "act of God" and the people "atomic veterans" (Ellen Janosik, 1994). Stoican (2015) analyzed unemployment as an indicator of regional resilience capacity (Ion, 2015).

"Energy saving and clean energy in the building" (Chisăliță, 2022) refers to the quality of the internal environment in the context of energy rehabilitation of homes, which is not only

a problem of saving but also of health. "Climate resilience and energy performance" (Constantinescu, 2020) presents daring responses of renewable energy sources in the form of Voltaic Panels (PV) mounted on buildings in order to save energy but also for the climate resilience of buildings in the case of their own extreme climatic demands specific of the cold and the summery seasons for buildings included in the NZEB energy class.

The "Newsletter-News, analyzes and developments" magazine of the Ministry of Foreign Affairs, the Euro-Atlantic Center for Resilience no. 4(2022) presents the EU measures for managing the energy crisis and resilience.

Golovanov (2022) and Dumitru Ene (2022) in the articles: "Nuclear fusion energy" and "The role of nuclear energy in cogeneration - the challenges generated by climate change" show that in advanced economies nuclear energy is the largest source of electricity with low-carbon emissions, providing around 40% of total low-carbon production.

4. Description of the problems of data collection and analysis

In order to collect the data, a model was made between December 2022 and January 2023, which was built using the "snowball sampling" method, the respondents being asked to distribute the questionnaire to other people. The analyzed database includes 110 subjects, the main characteristics of the model, which is homogeneous and belongs to the same cohort, are based on gender (61 male subjects and 49 female subjects), on the environment of origin (urban 46 respondents and rural 64 respondents), age is between the limits of 19-62 years, and the average income of 3240.

Table 1. Classification of respondents according to gender, age and origins

Model volume	Sex				Age limit (years)	Average income	Origins			
	male		female				urban		rural	
	no.	%	no.	%	19–62	3240	no.	%	no.	%
110	1	55,45	9	44,54			46	41,90	4	8,20

The working hypotheses that "exist in an unconscious or non-specific form even when the researcher tries to study a reality as «objectively» as possible, without preconceived ideas" (Rotariu, 1991) are for this investigation:

H1- Energy poverty represented by high energy costs, low incomes and low energy efficiency constitutes a priori condition to affect the social well-being of the population called "social welfare";

H2- The high percentage of energy expenditure from low incomes, for a large part of the population, make the residual income indicate a poverty of the population below the officially considered threshold at the moment;

H3- Energy poverty through the consumption factor disrupts the indirectly productive sector (cultural, educational, health etc.) especially in rural areas, affecting the social structure, forms of communication and well-being of the population;

H4- The social indicator presents a degree of selection of natural energy sources (wind, photovoltaic cells, low consumption) the resistance of the population in the acquisition of these energy sources consist in high initial costs, in our country, according to income;

H5- Social prices for vulnerable consumers (so-called social tariffs, vouchers, social benefits, supplement for payment of expenses for the remaining energy, limitation of disconnections, etc.) can constitute measures of protection and social resilience.

It is mentioned, for example, "that a lot of assumptions are used in the construction of any questionnaire". Such hypotheses can be tested empirically in the research or can remain open and appear as a result of an investigation (Rotariu, 1991). The interview used is of opinion and guarantees certain validity and fidelity for the working tool used and structured

on themes having a scale, or using a three-point attitude scale. Table2 shows the effects on the budget after the winter of 2022–2023.

Table 2. Degree of budget impact in percentage after winter 2022–2023

Percentage representation of the degree to which the budget was affected (as a percentage)	No.	Percentage %	Cumulative percentage
0	3	2,7	2.8
1	2	1,8	4.7
5	4	3.6	8.5
6	1	.9	9.4
7	1	.9	10.4
8	1	.9	11.3
10	12	10.9	22.6
11	1	.9	23,6
12	1	.9	24.5
15	1	10.9	34.9
18	1	.9	35.8
20	14	12.7	49.1
25	19	17.3	67.0
30	16	14.5	82.1
35	3	2.7	84.9
40	4	3.6	88.7
45	3	2.7	91.5
50	6	5.5	97.2
60	1	.9	98.1
70	2	18	100.0
Total	106	96.4	
Missing system	4	3.6	Missing system
Total	110	100.0	

Table 3. Energy consumption costs can unbalance families' budgets

Budget imbalance	No.	%
yes	56	50.9
no	31	28.2
don't know	23	20.9
Total	110	100,00

Table no. 3 shows that 50.9% of the respondents indicated imbalances in the budget as a result of energy consumption, and 28.2 did not specify this, which indicates reduced consumption or higher incomes. The percentage of 20.9% of respondents who mentioned that they do not know, are either indirect consumers or have low consumption and did not notice these increases in bills that would affect the budget.

Reducing energy consumption in households representing the resilience capacity of the population and can be achieved by changing the behaviour of consumers, by reducing consumption by household users who can be used at reduced capacity, by reducing heat and water consumption using sustainability methods (e.g. vouchers) (Table 4).

Table 4. Ways to reduce energy consumption and budget costs

Ways to reduce energy consumption through behavioural changes	Behavioural modes	No.	%	Cumulative percentage
	replacing some consumers	45	40,9	40,9
	reducing consumption	55	50	90,9
	cessation/interruption of consumption	10	9,1	100,0
Use of household energy consumers	at full capacity	40	36,4	36,4
	at reduced capacity	66	60,0	96,4
	stop/take out of service	4	3,6	100.0
Reducing heat and hot water consumption	to initial parameters	51	46,4	46,4
	low consumption	57	51,9	98,2
	by stopping/interrupting	2,6	5,5	100,0
Reducing energy consumption by using vouchers	yes	48	43,63	43,6
	no	32	29,0	72,7
	don't know	30	27,3	100,0
Total		110	100,0	

From table no. 4 it appears that within the ways of reducing energy consumption through behavioural changes, 50% are represented by consumption reduction. When using domestic energy consumers, the largest share of 60% is the reduction of operating capacity. The reduction of heat and water consumption also has increased weights on the 51.9% reduction in consumption. It can be mentioned that in rural areas the use of green mass is much higher than in urban areas (in the form of firewood or pellets). The use of vouchers, for electricity to which food vouchers worth 250 RON are added, is a way of resilience of the population in this period of crisis, economic recession. 43.6% of the respondents chosen this method of sustainability, by vouchers.

Table 5. Ways to reduce energy consumption in the agricultural and industrial sector

Reducing energy consumption in agriculture	Criteria	No.	%	Cumulative percentage
	Same level	49	44,54	44,5
	reduced	57	51,81	96,4
	stop/replace	4	3,63	100,00
Reducing energy consumption in industry	consumers/producers	49	44,5	44,5
	workers/unemployment	51	46,4	90,9
	doesn't know	10	9,1	100,0
	same quality	13	11,81	11,8
	decrease in quality	73	66,4	78,2
	product replacement	24	21.8	100,0
	Total	110	100,0	

Table 5 shows that the greatest share in the reduction of energy consumption in the agricultural sector is represented by the reduced consumption of 51.81% and in the industrial sector, the impact of workers has the largest share 46.44% and the decrease in the quality of products 66.4%. The percentage of 9.1% of respondents who answered that they do not know represents the fact that their activities are aimed at other sectors.

Table 6 highlights the impact of energy and fuel reduction in indirectly productive sectors such as culture, education and health.

**Table 6: The efects of energetic consumption in culture, education
and medical sectors**

	Criterii	No.	%	Cumulative percentage
How energy reduction affects the didactic education sector	yes	53	48.2	48,2
	no	40	36,4	84,2
	doesn't know	17	15,4	100,0
	school attendance	56	50,9	50,9
	the absence of teaching staff	29	26,4	77,3
	the quality of the didactic act	25	22,7	100,0
How reducing energy consumption influences the cultural act	is maintained at the same level	46	41,8	41,8
	are reduced	54	49,1	90,9
	are interrupted at time intervals	10	9,1	100,0
How it influences energy reduction in the medical sector	hygiene	20	18,2	18,2
	Medical equipment/equipment	67	60,9	79,1
	the quality of the medical act	23	20,9	100,0
	Total	110	100.0	

From table 6 it appears that the largest share was given by the respondents who answered affirmatively, 48.2% considering that the didactic process is affected, 15.4% answered that they do not know whether the didactic process is affected or not, on the grounds that they do not carry out activities in that sector. A high weight also recorded the school attendance at school 50.9%, school absenteeism registering quite high rates. Thus, in the 2021–2022 school year, the number of students/preschoolers enrolled in mainstream education, per day, decreased by 1,165 in the urban environment and by 104 in the rural environment, registering an increase in the total number of absences in the first semester of the year 2022 compared to the school year 2020–202, thus 245,977 absences in primary education of which 170,964 were unmotivated, secondary school 593,185 respectively 356,184 unmotivated, and in high school 359,176 absences of which 112,632 were unmotivated. At the level of Iași county, 1,442,751 were registered, of which 811,140 were unmotivated (https://www.bzi.ro>absenteeism-si-abandon-lacote-alarmante-inscolile-din-Iasi-tot-mai-putini-elevi-Imanage-to-get-pass-marks-4398873).

According to the respondents, cultural activities suffer reductions (49.1% mentioned this perspective) and the medical sector will be more affected by the technical part/medical equipment that consumes energy (60.9% mentioned this criterion).

Table 7 shows how the use of the personal car, the individual consumption, effects the preference for the use of cheaper fuels and green energy.

Table 7: Preferences for green energy consumption

	Criteria	No.	%	Cumulative percentage
The use of a personal vehicle	is the same level	63	57.3	57.3
	lower	41	37.3	94.5
	has been stopped/interrupted	6	5.5	100.0
Economical fuels	on liquefied gas	51	46.4	46.4
	diesel	43	39.1	85.5
	benzine	16	14.5	100.0
Green energy	Wind power	29	26.4	26.4
	photovoltaic panels	72	65.5	91.8
	reduced use	9	8.2	100.0

A fairly large share of respondents (57.3%) stated that they use the car at the same level and that they would prefer liquefied gas to save money, which they consider to be a fuel of the future (46.4%). From the discussions with them, it emerged that they would also be open to electric cars, but the problem that arises is the rather high prices for their purchase, the lack of charging stations (9%).Despite of the high fuel costs the purchase of cars this year incresedwith 70% compared to 2021. However, those interviewed mention that "all diesel and gasoline are from the future". In the purchase of electric cars, China is in first place, followed by the United States, which shows a 7 percent increase in electric cars this year compared to last year. Regarding green energy, a large percentage registers photovoltaic panels 65.5% of the respondents, mentioning when they were interviewed, the high prices at the initial purchase that make these panels not yet have the necessary opening for purchase. Renewable resources in the EU have increased by almost 5% in 2021 compared to 2022, according to the European Statistical Office (Eurostat). The share of renewable electricity sources, gross consumption increased after the recovery of the economy by only 0.1 percentage points, from 37.4% in 2020 to 37.5% in 2021. Wind power and hydroelectric power accounted for more than two-thirds of the total electricity generated from renewable sources (37% and 32% respectively with the remaining one third coming from solar energy 15%), solid biofuels (7%) and other renewable sources (8%). It is stated that the fastest growing source was solar energy, which in 2008 represented only 1% of the electricity consumed in the EU. In 2021 more than three quarters of the gross electricity consumption in Austria (76.2%) and Sweden (75.7) was generated from renewable sources. These Member States The EU is followed by Denmark (62.6%), Portugal (58.4%), Croatia (53.5%), Latvia (51.3%), Spain (45.9%), Germany (43.5%) and Romania(42.4). At the opposite pole, the lowest share of electricity from renewable energy sources was in Malta (9.7%), Hungary (13.7%), Luxembourg (14.2%), Czech Republic (14.5%) and Cyprus (14.8%) (agerpres.ro/economic-extern/2023/01/27eurostat-production-of-electricity-from-sources-of-renewable-energy-in-the-union -European-is-increasing-1049687). Other forms of reducing energy consumption and solutions for the future offered by our country are:

- replace old cars that generates high emissions and high consumption;
- the decarbonization plan proposed by C.E. Oltenia;
- the adoption of advanced technology;
- reducing losses in distribution networks;
- intelligent medium and low voltage energy distribution systems;
- encouraging the exploration of resources in the Black Sea, an important element for securing independent energy. (energy.ee.europa,eu/system/files/2020-04/ro_final_necp_main_ro_0.pdf)

Table 8: The motivations in the choice of domestic users

Criteria in the choice of home users	No.	%	Cumulative percentage
Romanian brands	30	27,3	27,3
Expensive products	71	64,5	91,8
Cheap products	9	8,2	100,0
Technical quality	49	44,5	44,5
Low consumption	55	50,0	94,5
Grant	6	5,5	100,0
Total	110	100.0	

Table 8 shows that the largest share of responses is recorded by the expensive products criterion 64.5% and low consumption products 50%.

The Cluster analysis used in this research involves the creation of homogeneous groups of people according to the degree of impact on the quality of life in the conditions of the energy crisis after the end of the pandemic and in the situations where inflation and the "speculation of war" affect a large part of the population. The research also focuses on the perception of how the energy crisis affects different sectors of activity and socio-economic life in general. The cluster analysis resulted in two cluster groups: cluster 1 with a lower degree of damage compared to the energy crisis and cluster 2 with a higher degree of damage.

The profile of the respondents in cluster 1 with a lower degree of damage to the energy crisis is 69.1% male, 61.8% rural, over 25 years old with an income between 2000–4000 RON. The population with a higher proportion of males, explains the use of the car at the same 100% level with a higher percentage, compared to cluster 2 formed by a higher proportion of females. Likewise, water consumption is maintained at the same level (52.7% of respondents from cluster 1). The behaviour inclined to reduction occurs in the case of domestic users (for 50.9% of the respondents). It can be noted that the budget was affected in the winter of 2022–2023 to the extent of 25.1% more in cluster 1 than in cluster 2. However, the respondents felt less affected, the budgets being less unbalanced.

In cluster 2, as can be seen in the table below, 62.5% are women from rural areas 56.3%, over 25 years old with an income between 2000–4000 lei, a fact that explains less the use of cars 83.3% of respondents, for personal needs; household users are used at reduced capacity in a higher percentage than men in cluster1, at 70.8%; culster 2 shows a lower inclination to purchase branded products, 50.0% of respondents, compared to men in cluster1 and a lower consumption of heat and water, 52.7% of respondents, compared to cluster 1.

utilizatorii casnici sunt folosiți la capacitate redusă într-un procent mai mare decât bărbații din cluster1, de 70,8%; prezintă o mai mică înclinație în achiziționarea de produse de firmă 50,0% dintre respondenți, față de bărbații din cluster1 și un consum mai mic la căldură și apă 52,7% dintre respondenți, comparativ cu cluster1.

Below are the two clusters:

Figure 1. Budget unbalance

Clusters		
Input (predictor) Importance		
■ 1.0 ■ 0.8 ■ 0.6 ■ 0.4 □ 0.2 □ 0.0		
Cluster	1	2
Label		
Description		
Size	53.4 % (55)	56.6 % (48)
Inputs	The use of the car for personal needs is at the same level (100.0%)	The use of the car for personal needs decreased (83.3%)
	Budget imbalance no (38.2%)	Budget imbalance yes (75.0%)
	High-performing domestic energy users are used at reduced capacity (50.9%)	High-performing domestic energy users are used at reduced capacity (70.8%)
	Factor in the purchase of household appliances technical quality of the products (58.2%)	Factor in the purchase of household appliances low energy consumption (66.7%)
	Type of household products purchased quality brands (78.2%)	Type of household products purchased quality brands (50.0%)
	Heat and water consumption considered to be at the initial parameters (52.7%)	Heat and water consumption considered to be low consumption (58.3%)
	By what % did energy affect the budget in winter 2023 vs winter 2022 (25.16%)	By what % did energy affect the budget in winter 2023 vs winter 2022 (22.69%)
	% allocated to energy and heat (22.80%)	% allocated to energy and heat (24.15%)

Table 10. The profile of the respondents from the two clusters according to the gender, place of residence, age and income

Cluster	Sex	No.	%	Place of residence	No.	%	Age	No.	%	Income	No.	%
	Male	5	71.4	urban	4	57.1	<25years	7	100,0	2000-4000	3	42.9
	Female	2	28,6	rural	3	42.9				4000>	4	57.1
	Total	7	100.00	**total**	7	100.0				**total**	7	100.0
1	Male	38	69.1	urban	21	38.2	<25 years	39	70,9	>2000	8	14.5
	female	17	30.9	rural	34	61.8	25 years+	16	29,1	2000-4000	5	45.5
										4000>	2	40.0
	Total	55	100.0	**total**	55	100.0	**total**	55	100,0	**total**	5	100.0
2	Male	18	37.5	urban	21	43.8	<25 years	30	62,5	>2000	3	27.1
	female	30	62.5	rural	27	56.3	25 years+	18	37,5	2000-4000	6	54.2
										4000>		18.8
	Total	48	100.0	**total**	48	100.0	**total**	48	100.0	**total**	8	100.0

Table 11. Statistics for income and age

Cluster			Age	Income
	N		7	7
			0	0
	median		21.00	5714.29
	standard deviation		1.528	4256.927
1	N		55	55
			0	0
	median		24.96	3977.07
	standard deviation		7371	2557.794
2	N		48	48
			0	0
	median		25.19	2870.58
	standard deviation		7482	1195.844

From table 11, it can be seen that the average age is 24 years with an orientation to the right being greater than 21 years and a median deviation of 7371, in cluster 1 and in cluster 2 it is 25 years with an orientation also to the right and with a standard deviation of 7482. The average income is 5714.29 for the entire population group, in cluster 1 is 3977.07 and a standard deviation of 2557.794 and in cluster 2 it is 2870.58 with a standard deviation of 1195.844.

Table 12. The profile of the respondents from the two clusters according to the income and age

Cluster	Income	No.	%	Cumulative percentage	Age	No.	%	Cumulative percentage
	2000-4000	3	42.9	42.9	<25	7	100.0	100.0
	4000>	4	57.1	100.0				
	total	7	100.0					

1	>2000	8	14.5	14.5	<25	39	70.9	70.9
	2000-4000	25	45.5	60.0				
	4000>	22	40.0	100.0	25+	16	29.1	100.0
	total	55	100.0		total	55	100.0	
2	>2000	13	27.1	27.1	<25	30	62.5	62.5
	2000-4000	26	54.2	81.3				
	4000>	9	18.8	100.0	25+	18	37.5	100.0
	total	48	100.0		total	48	100.0	

The cluster analysis resulted in three homogeneous groups of people depending on their perception of how the energy crisis affects different sectors of economic or social activity. The three cluster groupings present different degrees of pessimism regarding the resilience process in the conditions where the looming energy crisis is accompanied by the inflationary phenomenon of 15.5% recorded in 2023 (media sources) and, as I stated, "speculation" that reaches high levels. Many of the respondents stated that 7% of their residual income is paid for bank interest. 14% stated that they have no money for food. 10% that they cannot pay the bills and 75% that they cannot accumulate reserves. The three resulting cluster groups by degrees of pessimism are: Cluster 1 – the least pessimistic; Cluster 3 – the most pessimistic; Cluster 2 – medium level of pessimism.

Figure 2. Energy consumption impact on sanitar, cultural and educational systems
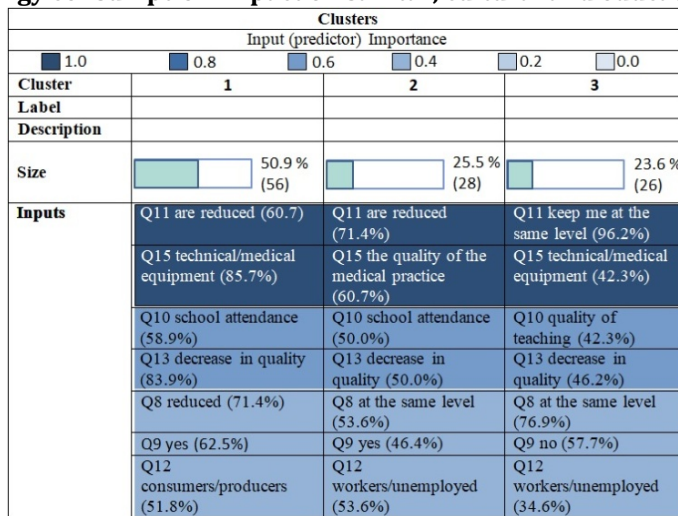
Table 13. Description of clusters from point of view of age, residence and income

Cluster	Variables											
	Sex	No.	%	Place of residence	No.	%	Age	No.	%	Income	No.	%
1	male	17	65	urban	9	34.6	<25 years	22	84.6	<2000	4	15.4
	female	9	34.6	rural	17	65.4	25 years	4	15.4	2000-4000	9	34.6
	total	26	100.0	total	26	100.0	total	26	100.0	4000>	13	50
										total	26	100.0
2	male	15	53.6	urban	10	35.7	<25 years	15	53.6	<2000	6	21.4

	femal e	13	46.4	rural	18	64.3	25 years	13	46.4	2000-4000	11	39.3
	total	28	100.0	total	28	100.0	total	28	100.0	4000>	11	39.3
										total	28	100.0
3	male	29	51.8	urban	27	48.2	<25 years	39	69.6	<2000	11	19.6
	femal e	27	48.2	rural	29	51.8	25 years	17	30.4	2000-4000	34	60.7
	total	56	100.0	total	56	100.0	total	56	100.0	4000>	11	19.6
										total	56	100.0

Differences in behaviour according to socio-demographic characteristics are achieved by applying the chi-square association test, which verifies whether there is an association between the behaviours of people in a state of energy crisis and the income category. Statistical method that allows categorical evaluation in a data set.

The crosstab used in this research is an analytical tool also known as contingency table analysis often used in categorical data analysis (nominal measurement scale). The cells of the table report the frequency of the number of respondents in each cell. Cross-tabulations describing row and column variables or tables in sequential form. Column variables are called Bennere and row variables Stubs. In the research presented, the working hypotheses were verified using the Chi-square association test (chi-square).

Table 14: Association between personal income and budget imbalances

Categories	Budget imbalance							
Income	Yes	No	Don't know	Total	Chi-square Test	Values	df.	Asymptotic significance (2-sided)
<2000	16	5	0	21	Person chi-square	15.929*	4	0.003
2000-4000	28	17	9	54	Lichelihood Ratio	18.953	4	0.001
4000>	12	9	14	35	Liner-by-Liner Asociation	14.339	1	0.000
total	56	31	23	110	N of Valid cases	1		

The null hypothesis assumes that there is no significant association between a certain type of behaviours and income category. If Sig.>=0.1. then the null hypothesis is not rejected. If Sig.<0.1 the null hypothesis is rejected. In the case above. Sig.=0.003<0.1, the null hypothesis is rejected for an assumed risk (significance threshold) of 10% being able to state that there is a significant association between the person's income category and the unbalanced budget. The energy factor unbalances the budget and implicitly the well-being of the family in the case of small budgets. Hypothesis confirmed in the current context of inflation of 15.5% and speculation existing after the pandemic and the war situation in Ukraine.

Table 15: Association between individual income and household users

Categories	Mode of use of home users							
Income	At full capacity	At reduced capacity	Stop/ deactivate	Total	Chi-square Test	Value	df	Asymptotic significance (2-sided)
<2000	8	12	1	21	Person chi-square	1161*	4	0.885
2000-4000	19	34	1	54	Lichelihood Ratio	1197	4	0.879
4000>	13	20	2	35	Liner-by-Liner	.021	1	0.884

					Asociation			
Total	40	66	4	110	N of Valid cases	110		

In this case Sig=0.885>0.1

The null hypothesis is not rejected as a result there is no association between household users as a mode of use and budget although the behaviour of the respondents is to use them at reduced capacity for all income categories.

Table 16: Association between people's income and heat and water consumption

Categories	Heat and water consumption							
Income	To the initial parameters	Low consumption	Stop/deactivate	Total	Chi-square Test	Value	df	Asymptotic significance (2-sided)
<2000	9	10	2	21	Person chi-square	9820*	4	0.044
2000-4000	23	31	0	54	Lichelihood Ratio	7950	4	0.093
4000>	19	16	0	35	Liner-by-Liner Asociation	2142	1	0.143
Total	51	57	2	2	N of Valid cases	110		

Sig.=0.044<0.1

In this case, the null hypothesis is rejected, so there is a correlation between the heat and water consumption and the family budget. In almost all cases, low consumption is recorded even for income >2000 RON, the boilers are taken out of operation.

Table 17. Association between people's income and the use of the car for personal needs

Categories	Use of the car for personal needs							
Income	At the same level	Decreased	It has been stopped/interrupted	Total	Chi-square Test	Value	df	Asymptotic significance (2-sided)
>2000	9	11	1	21	Person chi-square	9000*	4	0.061
2000-4000	27	23	4	54	Licheliood Ratio	9322	4	0.054
4000>	27	7	1	35	Liner-by-Liner Asociation	5882	1	0.015
total	63	41	6	110	N of Valid cases	110		

Sig.=0.061<0.1

In this case the null hypothesis is rejected. It can be mentioned that there is association between income and car use that is reduced for all income categories and even stopped for periods of time for those with low and especially middle incomes 4%.

Table 18: Association between people's income and the purchase of household appliances

Categories	Motivating factors in the purchase of household appliances							
Income	The technical quality of the products	Low energy consumption	Guarantee	Total	Chi-square Test	Value	df	Asymptotic significance (2-sided)
>2000	7	13	1	21	Person chi-square	5617	4	0.230
2000-4000	22	30	2	54	Lichelihood Ratio	5685	4	0.224
4000>	20	12	3	35	Liner-by-Liner Asociation	1608	1	0.205
total	49	55	6	110	N of Valid cases	110		

Sig.=0.230>0.1

In this case the null hypothesis is not rejected. It can be mentioned that the purchase of household users is not associated with income or did not emerge from the applied test but those with low energy consumption are sought by respondents from all income categories.

Table 19: Association between people's income and the purchase of household appliances by manufacturers

Categories	Type of household products purchased							
Income	Romanian products	Quality products	Cheap products	Total	Chi-square Test	Value	df	asymptotic significance (2-sided)
>2000	4	15	2	1	Person chi-square	833*	4	0.586
2000-4000	15	33	6	4	Lichelihood Ratio	232	4	0.520
4000>	11	23	1	5	Liner-by-Liner Asociation	631	1	0.202
total	30	71	9	10	N of Valid cases	10		

Sig.=0.586>1

In this case the null hypothesis is not rejected as a result there is no correlation between income and the type of producers for household products. The majority are inclined towards quality products and less towards the cheap ones or those of Romanian origins.

As can be seen from the application of the association test. there are associations on certain categories of income and energy consumption that is more or less aware as a factor of increasing the quality of life comfort. The confirmation or refutation of the working hypotheses is presented as follows:

H1. Hypothesis confirmed by cluster 2 from presentation set 1 (Fig. 1). Chi-square test Tables 14 .15. 17 and 18.

H2. Hypothesis confirmed by cluster 2 presentation set 1 (Fig.1). Chi-square test Tables 14. 15. 17. 18.

H3. The hypothesis is confirmed cluster 3 and 1 from presentation set 2 (Fig .2) Chi-square test Tables 14. 15. 17. 18.

H4. The hypothesis is confirmed for 65% of respondents who mentioned photovoltaic panels and 26.4% wind energy.

H5. The hypothesis is confirmed for 43.6% of the respondents and 27.3% answered that they do not know and 29.15 answered negatively because they do not meet the criteria to receive vouchers or are unsatisfactory with their current consumption.

5. Conclusions

The results of this research highlight the existence of a relationship between social well-being and energy consumption in the conditions of the existence of an economic crisis, one can even speak of a recession according to some specialists on the background of a pandemic and a border war that encourages speculation and an uncontrolled product market. The use of green energy much encouraged by the EU is experiencing some difficulties. The connection to the renewable energy sources to the electrical networks requires special measures at the energy system level to maintain the operation of the energy systems whilethe increase of AC frequency, as some specialists say, would cause congestion in the network. These shortcomings led the decision-makers to include in the 10-year RET development plans investment measures that would provide "the necessary support for the evacuation of the energy produced in the wind-type power plants in the areas of Dobrogea and Moldova, but also in Banat and southern Muntenia".

The issue of internal markets was raised, which in the secondary plan can contribute:

- encouraging energy storage capacities, a fact that favors securing the energy factor with impact on the Internal Market on energy prices;

- supporting the "Research-Innovation initiative adopting technologies with functionality in areas such as the Internet of Things, Blockchain Decentralized Storage and Smart Applications."

- encouraging the implementation of consumption and dispatch measures (Demand Response). This implementation involves adjusting prices in such a way as to change the behaviour of the consumer at peak hours by shifting the load towards off-peak hours.

- aggregation - encouraging customers to participate in organized electricity markets directly or through aggregation if they have a power approved by the connection certificate of more than 500KW (energy.ec.europa.eu). An important aspect is the fact that the energy resilience of Romanians is represented by 3.5 million households in the rural area that use solid fuels as a heating source, approximately 2.8 million families use firewood (a fact also reflected by the research, the majority of respondents being from rural areas). The annual consumption of firewood and biomass by households is approximately 14 million, the annual consumption of gas amounts to approximately 35.2 million MWh. Recommendations regarding the economy focusing on reducing the pressure on the gas component increasing the cooling temperature in the houses by setting a lower heating temperature (reducing by 1ºC higher you can reduce electricity consumption by 10ºC), installing smart devices that could reduce consumption of 15%, installing solar panels, improving the insulation of houses will reduce energy consumption and are often subsidized by the state. Replacing boilers with heat pumps that make a long-term difference will ensure resilience. In conclusion, an important role is played by the sustainability program, which can be diversified and extended to larger population groups.

References:
1. Bănică, A. and Muntele, I. (2015). *Reziliența-repere conceptuale. Implicații la nivel teritorial*. Iași: Terra Nostra.
2. Chisăliță, D. (2022). *Economisire energiei electrice și energia curată în clădiri*. Brașov: Transilvania.

3. Mihai, I.-C., Cîmpean, P.-D., Popescu, S. and Vasilescu,A.-C. (2022). *Reziliența Strategică a Uniunii Europene inclusiv în domeniile tehnologic și digital : scenariu de viitor și contribuții ale României. Studii și strategie politică SPOS 2021 nr. 2*. Bucharest: Institutul European.
4. Constantinescu, D. (2020). *Reziliența climatică și performanța energetică*. Bucharest:"Ion Mincu" University Publishing House.
5. Dinu, V. (2012). Consumers´ education and information from the perspective of their awareness and ecological behaviour. *Amfiteatru Economic*, [e-journal] 14(31), 5–6.
6. Ene, D.D. (2022). *Rolul energiei nucleare în congenerarea – provocările generate de schimbările climatice. Agenția nucleară pentru deșeuri radioactive*. [online] available at: Mesagerul-Energetic-225-Noiembrie-Decembrie-2022_Compressed.pdf.
7. Gardiner, A.M. (2020). *Reziliența în business. De ce este importantă și cum o construim? Publicat în Afaceri. Analize. Educație Finnciară*. [online] available at: financiainteligence.ro/rezilienta-in-business-de-ce-este-importanta-si-cum-o-construim.
8. Golovanov, N. (2022). *Energia de fuziune nucleară. Agenția nucleară pentru deșeuri radioactive. World Energy Council Comitetul Național Român-Mesagerul energiei Buletin Informativ al Comitetului Național Român l Consiliului Mondial al Energiei*. [online] available at: Mesagerul-Energetic-225-Noiembrie-Decembrie-2022_Compressed.pdf.
9. Ion, F. (2015). *Rata șomajului ca un indicator al rezilienței regionale. Studii și cercetări de calcul economic și cibernetică economică*. Bucharest: SCCECE.
10. Janosik, E.H. (1994). *Crisis Counseling A Contemporary Approach*. London Boston: Jones and Bartllet Publishers Inc.
11. Kardung, M., Costenoble, O., Dammer, L., Delahaye, R., Lovie, M., van Leuwen, M.G.A., M´Barek, R., von Meije, H., PiotrowskiS., Ronzon, T.B., Verhoog, A.B., Verkerk, H., Vrachioli, M., Wesseler, J.H.H.and Zhu, B.X. (2019). *Framework for measuring the size and development of the bioeconomy*.[online] Avaiable at:http://biomonitor.eu/wp-coment/uploads/2020/04/seliverable-1.1pdf .https://doi.org/10.101b/j.jenvp.2022 .09.
12. Nijkamp, P., Pascaniuc, G.C., Constantin, L.D., Neamțu B. (2021). *Reziliență și convergență regională în Uniunea Europeană*. Iași: "Alexandru Ioan Cuza" University Publishing House
13. Popa, V. (2013). The Financial Supply Chain Management: A New Solution For supply chain Resilience. *Amfiteatru Economic*, [e-journal] 15 (33), 98–112.
14. Rotariu, T. (1991). *Curs de Metode și tehnici de cercetare sociologică*, ediția a II-a. Cluj Napoca: "Babeș -Bolyai" Un iversity Publishing House.
15. Stoican, C. (2015). Reziliența populației: o perspectivă socială asupra strategiilor de securitate (Population's Resilience: A Social Perspective on Security Strategies) Impactul transformărilor socio-economice și tehnologice la nivel national, european si mondial. *SSRN*, 1 (1).
16. Yu, X. (2014). Is environment ´a city thing´ in China?Rural-urban diferences in environmental attitudes. *Journal of Environmental Psychology*, [e-journal] 38, 17–28 [online] available at: https://doi.org/10.1016/j.jenvp.2013.12.009.
17. Ministerul Afacerilor Externe (2022). Centrul Euro-Atlantic pentru Reziliență, Newsletter-Știri. analize. și evoluții, 4. [online] available at: cdep.ro/afaceri_europene/afeur/2022/fi_3519.pdf
18. ***commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_ro
19. *** bursa.ro/repower-eu-inca-o-oportunitate-pentru-dezvoltarea-sistemului-energetic-national-61294848
20. ***Comunicat de presă 26 august 2022: mmuncii.ro/j33/index.php/ro/comunicare
21. *** https://www.bzi.ro>absenteism-si-abandon-lacote-alarmante-inscolile-din-Iasi-tot-ai-puțini-elevi-reusesc-sa-obtina-note-de trecere-4398873
22. *** agerpres.ro/economic-extern/2023/01/27/eurostat-producția-de-electricitate-din-surse-de-energie-regenerabila-in-uniunea-europeana-este-in-crestere-1049687
23. *** energy.ee.europa.eu/system/files/2020-04/ro_final_necp_main_ro_0.pdf