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ENERGY SECURITY COMPONENTS OF AGGLOMERATIONS

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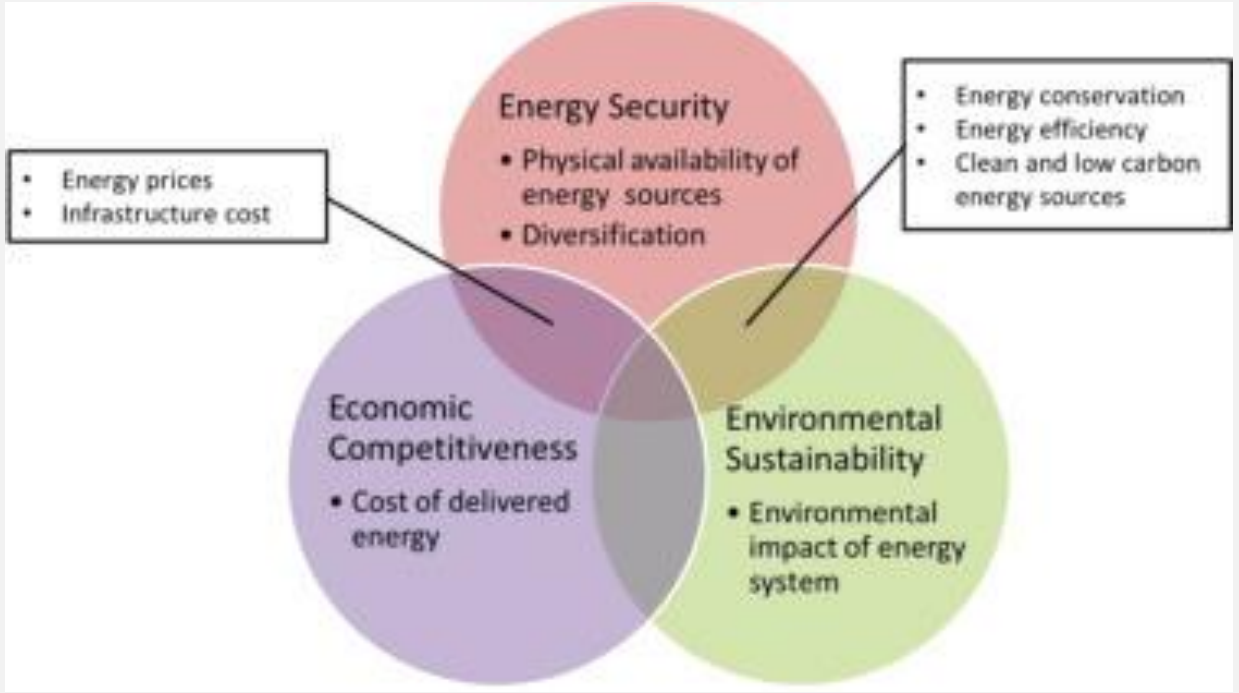
INTRODUCTION

- This work is designed to answer questions related to energy security, namely the energy security of remote places in the mountains. It is important to highlight the main components of energy security for sinter formations. The formation of energy security components makes it possible to analyze individual territories and implement changes in the legal framework, regulate the energy system, establish connections.
- Prospects for the priority development of agglomerations as a spatial form of localization of settlements are determined by the fact that, first, they are the core of the settlement system in the region, its supporting framework; secondly, agglomerations play the role of drivers of economic growth and areas with high economic potential, interaction between settlements, which causes a synergistic effect that will affect the sustainable development and the level of its logistics.

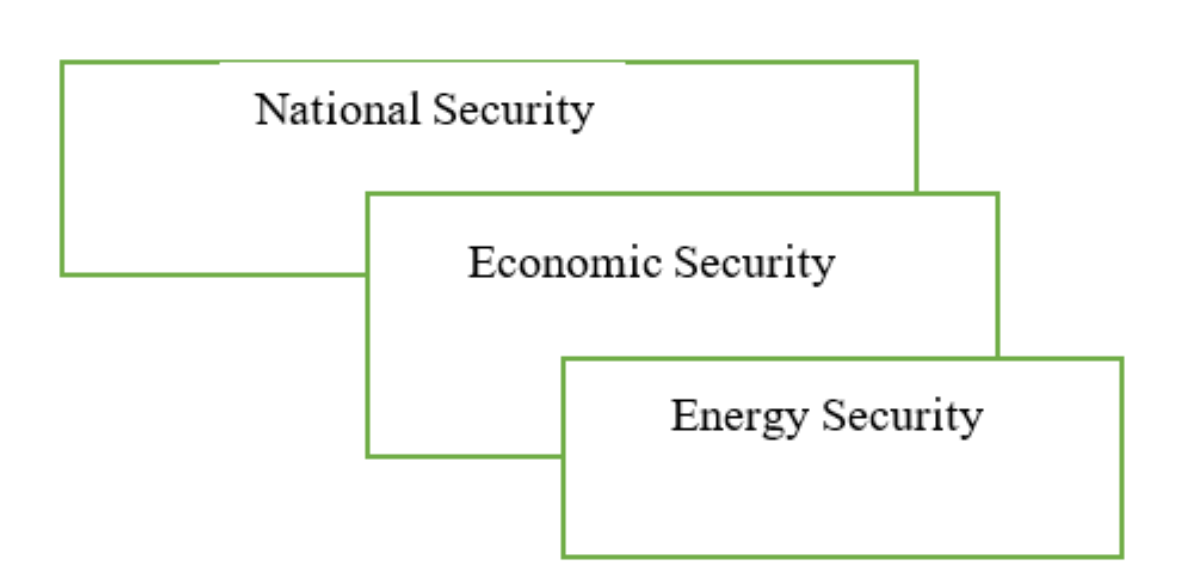
ENERGY SECURITY

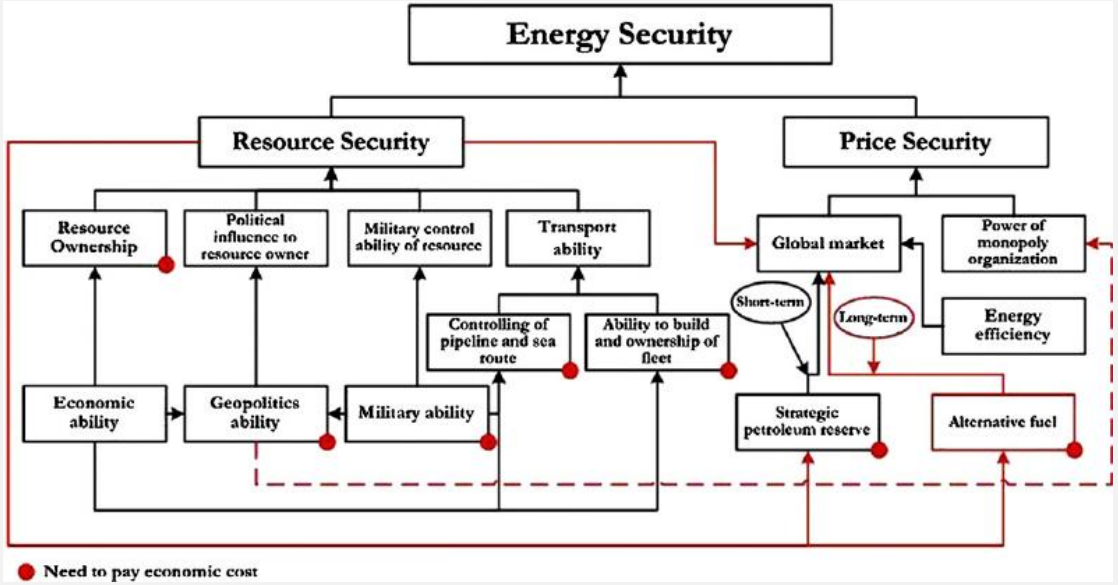
- The importance of the problem of energy security policy is based on the general social significance of energy, which consists of four main aspects of its use by the socio-economic system [5]:
- (1) functioning, i.e., ensuring basic human needs and energy supply of economic activity;
- (2) maintaining the existing level of infrastructure of modern society;
- (3) use of energy to ensure population growth, capital, and consumption;
- (4) ensuring the dynamics of changes in economic infrastructure, technical progress, and productivity growth.



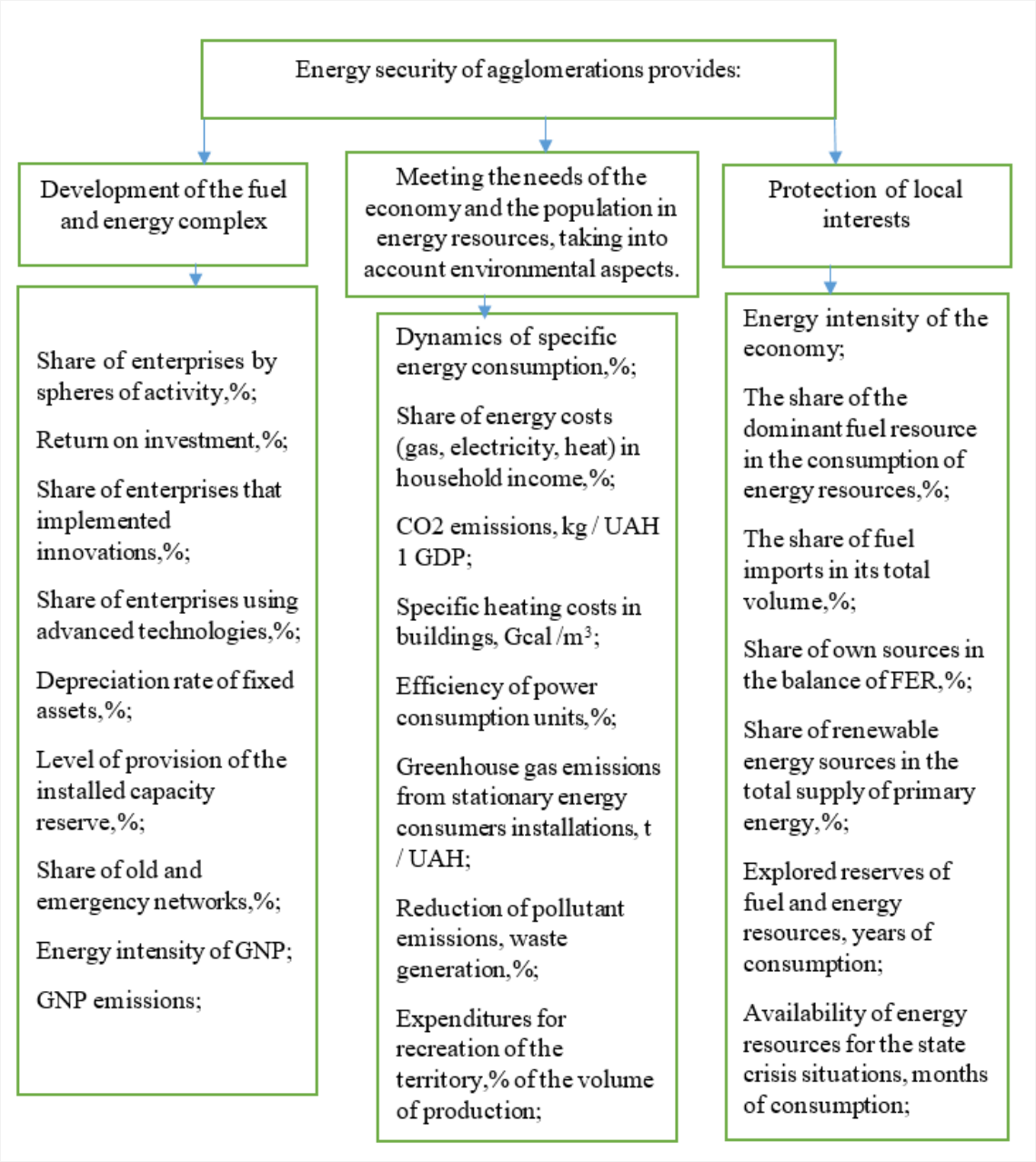
Energy security and the energy trilemma.

ENERGY SECURITY WITHIN THE STRUCTURE OF STATE NATIONAL SECURITY



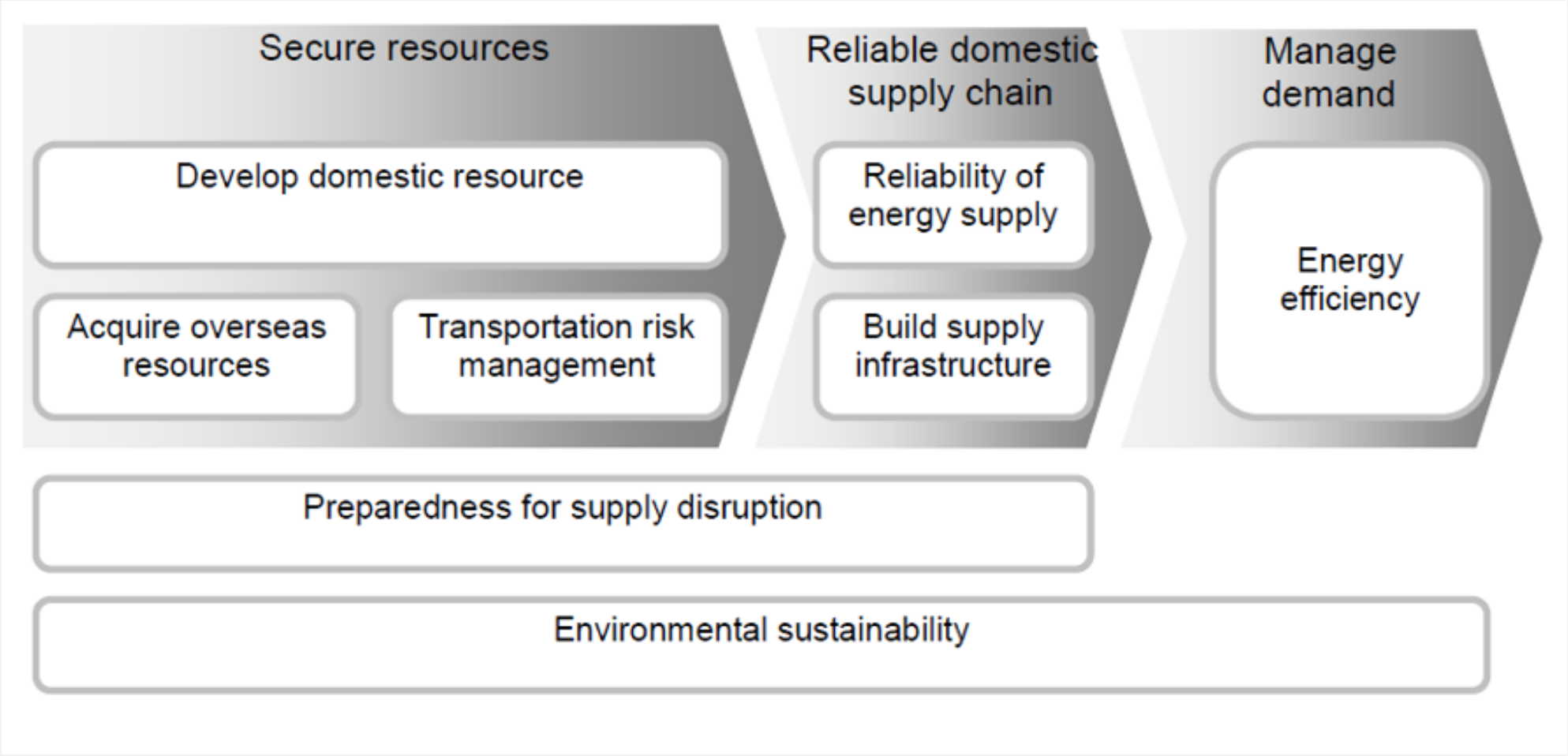


Energy security is the state's ability to ensure efficient use of its fuel and energy, to optimize diversification of sources and resources to ensure the livelihood of the population and volatility of prices for fuel and energy resources or to create conditions for rapid adaptation of the national economy to new prices for these resources



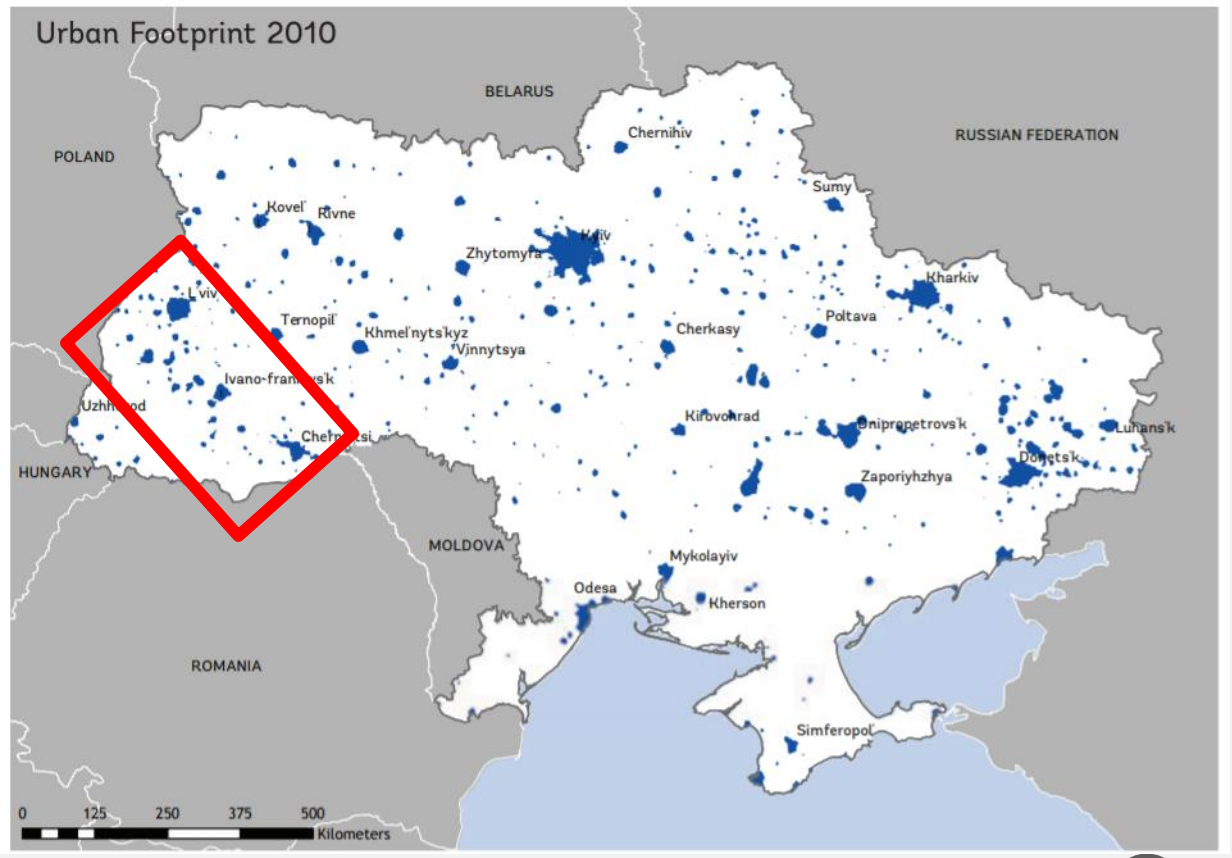
CRITERIA FOR ASSESSING THE ENERGY SECURITY OF AGGLOMERATION SPACE

COMPONENTS OF ENERGY SECURITY

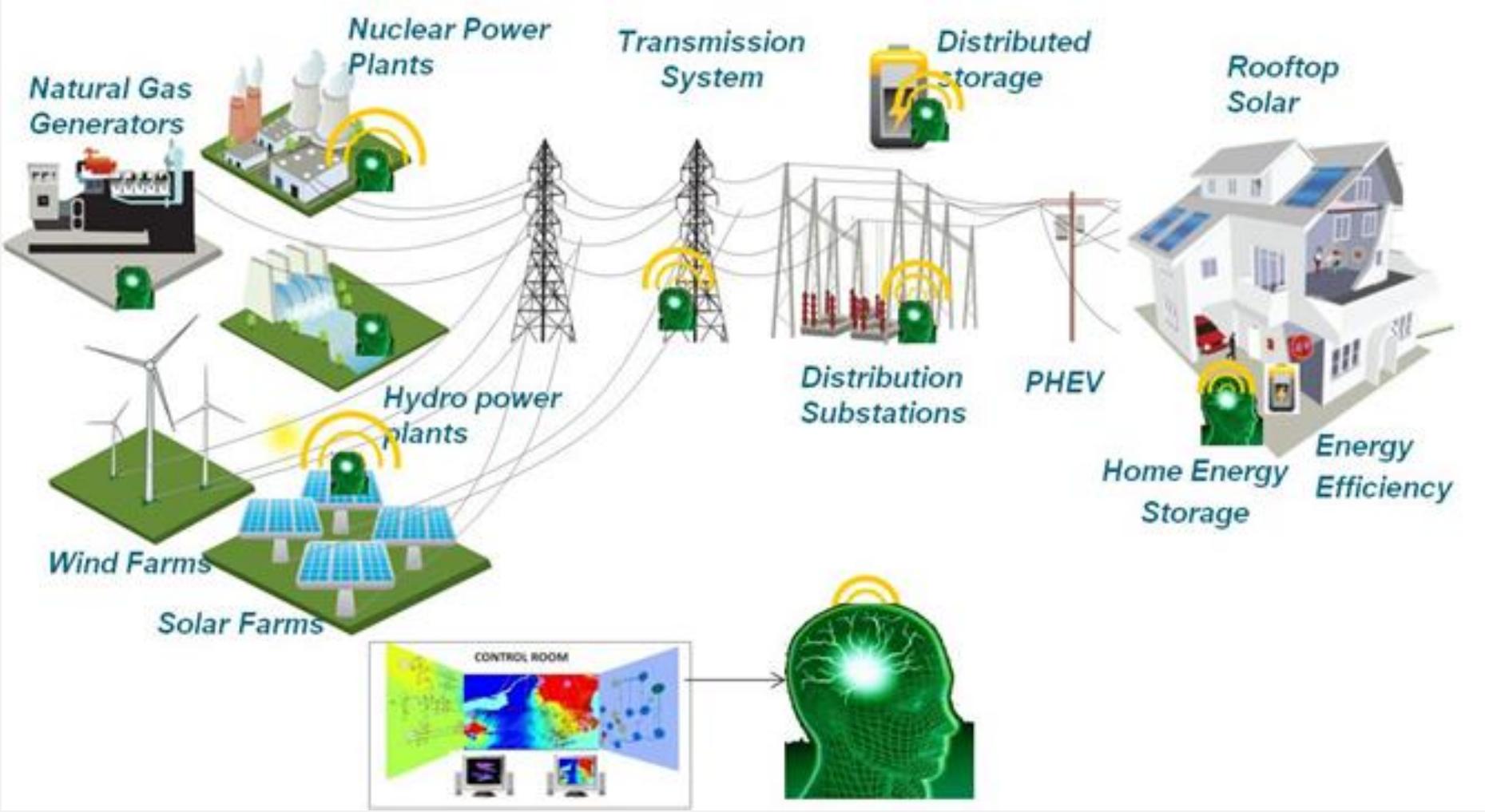


UKRAINIAN AGGLOMERATIONS, WHICH ARE THE OBJECT OF OUR INTEREST IN THIS STUDY

Agglomeration	Rank 2013	Rank 1989	Population 1989	Population 2013	Change 1989-2001	Change 2001-2013	Oblast	Region	# Cities
Kyiv	1	1	2946438	3171833	0.5%	7.2%	Kyiv	Central	11
Kharkiv	2	2	1818712	1620927	-8.8%	-2.2%	Kharkiv	Eastern	7
Donetsk	3	3	1783774	1506202	-8.9%	-7.3%	Donetsk	Eastern	8
Dnipropetrovsk	4	4	1648499	1369202	-9.2%	-8.5%	Dnipropetrovsk	Southern	4
Odessa	5	5	1170209	1074570	-7.4%	-0.8%	Odessa	Southern	2
Lviv	6	6	821698	765901	-6.9%	0.2%	Lviv	Western	4
Alchevsk	7	8	479787	447975	-1.3%	-5.4%	Lugansk	Eastern	3
Lugansk	8	7	504538	432483	-6.8%	-8.0%	Lugansk	Eastern	2
Sevastopol	9	10	368565	354565	-4.2%	0.4%	Sevastopol	Southern	2
Gorlivka	10	9	479181	353497	-13.6%	-14.6%	Donetsk	Eastern	3
Cherkasy	11	13	310702	303168	1.6%	-3.9%	Cherkasy	Central	2
Kramatorsk	12	11	359593	297665	-8.4%	-9.6%	Donetsk	Eastern	4
Sieverodonetsk	13	12	343124	281903	-9.8%	-8.9%	Lugansk	Eastern	4
Rivne	14	14	255523	274902	7.0%	0.5%	Rivne	Western	2
Ivano-Frankivsk	15	15	223660	235515	2.0%	3.2%	Ivano-Frankivsk	Western	2



DISTRIBUTED GENERATION OR DISTRICT/DECENTRALIZED ENERGY



ENERGY SECURITY INDICATORS

- **Energy Security Price Index (ESPI)**
- $ESPI = \sum_f \frac{E_f}{TPES} ESMC_{pol-f}$ with $ESMC_{pol-f} = \sum_c r_c \, \omega_{cf}^2$
- **Energy Security Import Index (ESMI)**
- $ESMI = \sum_f \frac{M_f - X_f}{TPES} \times 100$ for all f where $M_f > X_f$
- **Energy Intensity (EI)**
- $EI = \frac{TPES}{GDP}$
- **Composite Energy Security Index (ESI)**
- $ESI = \sum_f \frac{M_f - X_f}{GDP} ESMC_{pol-f}$ for all f where $M_f > X_f$

CONCLUSION

- Overall, one can conclude that in case of an energy price increase, economies with high energy intensity must spend more of their resources for energy and will thus face a greater welfare loss than economies with low energy intensity. The three indicators – ESPI, ESMI, and EI – can be combined towards a composite energy security index (ESI).
- In this study, we have made an overview of the criteria for assessing the energy security of the agglomeration area that we apply to the area, including located in mountainous areas, for Ukraine it may be Chernivtsi agglomeration, which has the largest electricity use among mountain agglomerations in Ukraine, but the smallest among their total. Given the dependence of local energy security and national, we focus on the economic strengthening of areas with complex geopolitical location. Therefore, based on the indices and components of energy security presented in this paper, we propose to conduct a detailed analysis of energy security and safety of specific mountain agglomerations, those that are being developed and those that have great potential. Far-going plans of revitalization and development of remote regions should take into account the costs of deployment of the new energy systems, or the reconstruction of the old ones.