

**I. Mazur**  
*Candidate of Economic Sciences, Associate Professor,  
 King Daniel of Galicia Ivano-Frankivsk University of Law*

## ANALYSIS OF THE ENERGY SECURITY OF THE NATIONAL ECONOMY: THEORETICAL AND APPLIED ASPECTS

The conceptual approach to assessment of energy security of the national economy is based on criteria and components according to certain types of energy resources have been grounded (tab. 1).

To characterize the state of the energy security for certain types of energy resources it is proposed to use the components for gas, coal, crude oil, biomass and wastes, gasoline and fuel, electricity, heat, secondary energy resources, peat. Components of the energy security or the aggregated criteria are formed from the partial indicators-determinants for individual

energy resources and for criteria of the energy security.

Using the model of additive reduction and using the share of consumption or supply of a particular type energy resource as ratio ( $w_i$ ), general indicators of the criteria ( $E_j$ ) and components ( $Dt_i$ ) for the energy security of the national economy are constructed of the determinants for certain types of fuel and energy resources ( $d_i^j$ ) by the formulas (1) and (2).

The functional model of the components ( $Dt_i$ ) and energy security of the national economy will take the following form:

Table 1

**The Integrated System of Components and Criteria for Estimation  
 of Energy Security of the National Economy**

Energy security of the national economy (ESNC)	Criteria ( $E_j$ )				
Components ( $Dt_i$ )	Energy Efficiency ((EE)	Energy Eavailability (EV)	Reliability (R)	Energy Independence (EI)	Economic Stability (ES)
$Dt_e$	$dt_e^{EE}$	$dt_e^{EV}$	$dt_e^R$	$dt_e^{EI}$	$dt_e^{ES}$
$Dt_h$	$dt_h^{EE}$	$dt_h^{EV}$	$dt_h^R$	$dt_h^{EI}$	$dt_h^{ES}$
$Dt_p$	$dt_p^{EE}$	$dt_p^{EV}$	$dt_p^R$	$dt_p^{EI}$	$dt_p^{ES}$
$Dt_g$	$dt_g^{EE}$	$dt_g^{EV}$	$dt_g^R$	$dt_g^{EI}$	$dt_g^{ES}$
$Dt_o$	$d_o^{EE}$	$d_o^{EV}$	$d_o^R$	$d_o^{EI}$	$d_o^{ES}$
$Dt_{op}$	$dt_{op}^{EE}$	$dt_{op}^{EV}$	$dt_{op}^R$	$dt_{op}^{EI}$	$dt_{op}^{ES}$
$Dt_c$	$dt_c^{EE}$	$dt_c^{EV}$	$dt_c^R$	$dt_c^{EI}$	$dt_c^{ES}$
$Dt_{ser}$	$dt_{ser}^{EE}$	$dt_{ser}^{EV}$	$dts_{er}^R$	$dt_{ser}^{EI}$	$dt_{ser}^{ES}$
$Dt_{bw}$	$dt_{bw}^{EE}$	$dt_{bw}^{EV}$	$dt_{bw}^R$	$dt_{bw}^{EI}$	$dt_{bw}^{ES}$

a) for additive reduction:

$$Dt_i = (dt_i^{EE} + dt_i^{EV} + dt_i^R + dt_i^{EI} + dt_i^{ES}) \div 5,$$

$$ESNC = \sum (Dt_i \cdot w_i),$$

$$E_j = \sum (dt_i^j \cdot w_i), \quad (1)$$

$$ESNC = \frac{EE + EV + R + EI + ES}{5}.$$

b) for multiplicative one:

$$Dt_i = (dt_i^{EE})^{1/5} \cdot (dt_i^{EV})^{1/5} \cdot (dt_i^R)^{1/5} \cdot (dt_i^{EI})^{1/5} \cdot (dt_i^{ES})^{1/5},$$

$$ESNC = \prod (Dt_i)^{w_i},$$

$$E_j = \prod_{i=1}^n (dt_i^j)^{w_i}, \quad (2)$$

$$ESNC = EE^{1/5} \cdot EV^{1/5} \cdot R^{1/5} \cdot EI^{1/5} \cdot ES^{1/5}.$$

In construction of models energy security of the national economy, based on the differentiation of partial indexes for industries and regions, as a proportion, it is necessary to use the multiplication of the share of resource in consumption or in supply of fuel and energy resources at a region's or industry's fraction in total energy resources consumption in the country ( $w_i g_i$ ).