THE ANALYSIS OF THE DEGREE OF FULFILLMENT OF TARGETS FOR ENERGY AND ENVIRONMENT IN THE EU SUSTAINABLE DEVELOPMENT STRATEGY

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Abstract: This paper seeks to assess the achievement of specific targets set in the SDDUE with reference to energy and environmental issues, mainly PC1-Climate change and clean energy of SDDUE. After recalling and commenting - in the first part – the concrete targets of EM within SDDUE, compared with the SE2020, in the second part of the paper we present the work methodology and results. The last part of the paper contains findings of the analysis.

Keywords: sustainable development, energy, environment, goals, strategy.

1. INTRODUCTION

Along with the underlying agreements that govern the functioning of the EU [1, 2, 3], there are currently two essential strategies (SE) during this economic and social space:

- EU Sustainable Development Strategy (SDDUE)
- Europe Strategy 2020 (SE2020)

The concrete targets (TI) undertaken in the two essential strategies (SE) on Energy and Environment (EM) are:

- In SDDUE [4]:
  - TISDD 1: 8% reduction in emission of greenhouse gas emissions (GHG) compared to 1990 levels.
  - TISDD 2: By 2010, on average 12% of energy consumption and 21% of electricity consumption must be ensured from renewable resources (RRE), taking into account the proportion increased to 15% by 2015.
  - TISDD 3: By 2010, 5.75% of transport fuels to represent biofuels, taking into account the proportion increased to 8% by 2015.
  - TISDD 4: Making a total saving of 9% of final energy consumption, over 9 years until 2017.
- SE2020 [5]:
  - TISE2020 (1): Reducing GHG emissions by 30% if conditions are favorable.
  - TISE2020 (2): Increasing the share of RES to 20%.
  - TISE2020 (3): 20% increase in energy efficiency.

It should be mentioned that some of the formulations included in the concrete targets (TI) in the two essential strategies (SE) require some clarification, as follows:

- In the GES are included: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hidrofurecabonus (HFCS), perfluorocarbons (PFCs), sulfur hexafluoride (SF6). Typically GHG emissions are expressed in CO2 equivalent, including the contribution of international aviation but excluding LULUCF. By LULUCFwe mean ”land use and forestry sector”. In SDDUE we do not specify the period (year) by which GES will be reduced by 8%.
- In the TISDD 2 by “average” we mean “EU level”', and “by 2015” we mean “including 2015”.
- In the TISDD 4, the phrase “over 9 years until 2017” implies that the range is [2008 ÷ 2016]
- We find a first discrepancy between the two SE referring to the target set for GES, which is more mobilizing for SE2020 (30%). Reference years are the same (1990 and 2020), except that the adoption year for SE2020 is 2010, and for the SDDUE is 2006. For SE2020, it clearly states that GHG reduction target of 20% is required.
- For TISE2020 (3) - 20% increase in energy efficiency, but it does not specify the referenceyear, whichseems to be 2005 - the year preceding the adoption of Directive 32/2006 EU [6].

We acknowledge that the enunciation of the three energy targets in SE2020 is much closer to the set of directives 20-20-20 [7], which are explained by the fact that SE2020 succeeds the set of directives mentioned. We state that in accordance with Directive 2012/27 / EU [8], the last EU directive on energy efficiency, the target was reformulated as follows: “an energy saving of 1.5% / year in the volume of sales to final consumers”,same target takenin Romania by law 121/2014 [9].

The wording in TISDD2 on population growth was not confirmed. In the period 2006-2015 the EU population has increased from 459.49 million inhabitants (2006) to 510.1 million inhabitants (2015) [10], representing an increase of 11.01% compared to just 15% - expected in SDDUE.

In this paper we limit the analysis to the fulfillment of targets in SDDUE, including an analysis of all strategies and regulations of targets aimed at two areas (energy, environment) is much larger, exceeding the volume of a work of this kind.

2. WORK METHODOLOGY AND RESULTS

We find that concrete targets assumed in the fields of energy and environment within SDDUE are expressed as a percentage, which justifies the definition and evaluation of progress towards them in the same way (weight, percentage). To a certain target (Ti) of SDDUE we assess the degree of fulfillment in [GTi (t)], the relationship:

$$GT_i(t)=\frac{T_i(t)}{T_i(t_R)}\,100\ [100\%] \quad i=\overline{1,n} \qquad (1)$$

where,
$T_i(t)$ – target or indicator value for the target (Ti) in year "t".
$T_i(t_R)$ - T_i value in refernce year, indicated in SDDUE
n – number of concrete targets of the SDDUE, on the EM fields

The information needed to calculate the "GT" indicator will be taken from the annual publication of Energy, Transport and Environment [11], according to which the indicators covered in the concrete targets enshrined in SE had, during the period of interest, evolutions that can be seen in figures 1÷4.

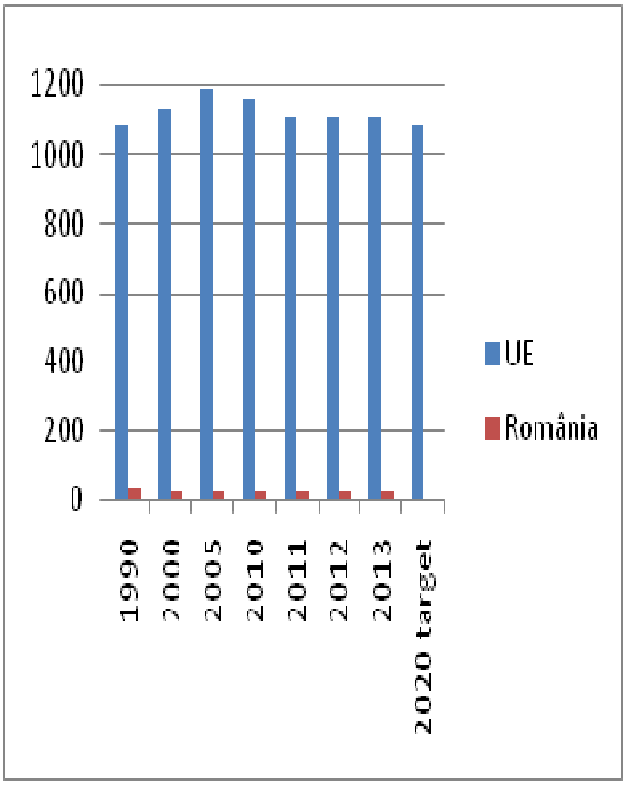

Fig. 1. Final energy savings [mil toe]
Source:Realised by the author based on the data from Energy, transport and environment, 2015, http://ec.europa.eu/eurostat/en/web/products-statistical-books/-/KS-DK-15-001

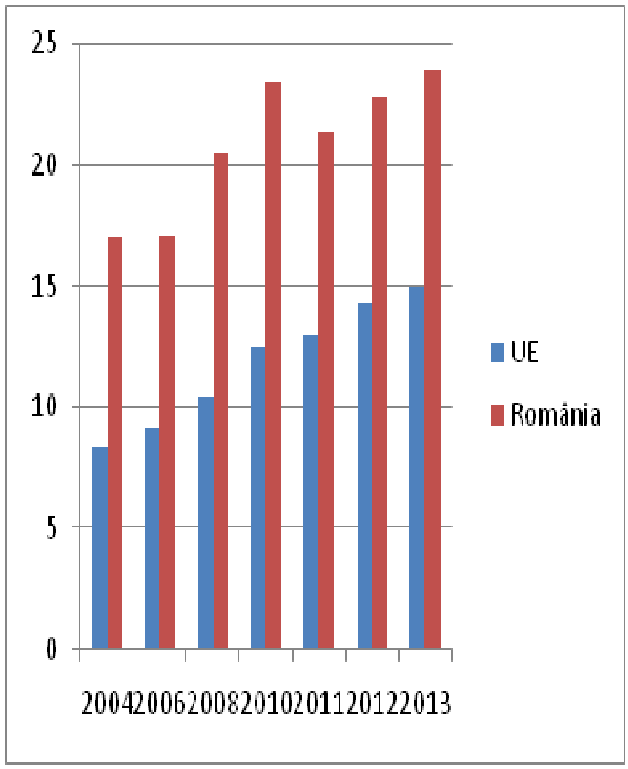

Fig. 2. Share of energy from RRE in gross final consumption of energy EU 28 [%]
Source: Realised by the author based on the data from Energy, transport and environment, 2015, http://ec.europa.eu/eurostat/en/web/products-statistical-books/-/KS-DK-15-001

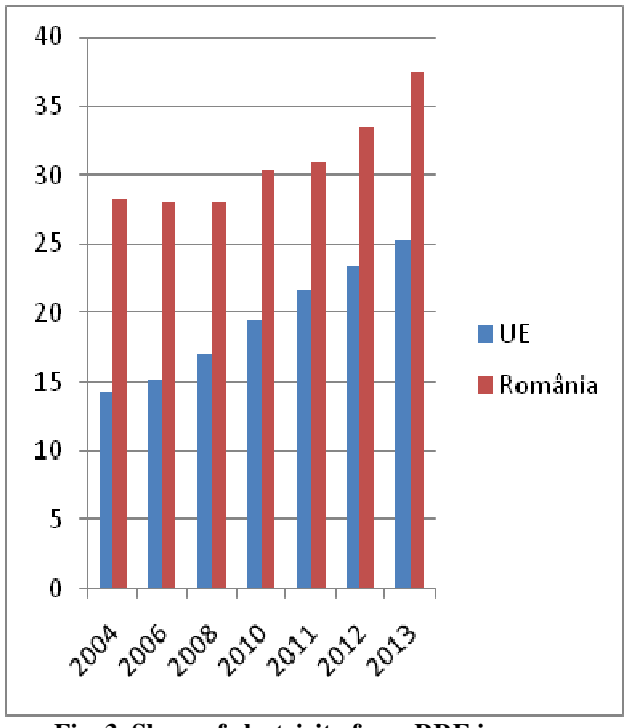

Fig. 3. Shere of electricity from RRE in gross electricity comsumption [%]
Source: Realised by the author based on the data from Energy, transport and environment, 2015, http://ec.europa.eu/eurostat/en/web/products-statistical-books/-/KS-DK-15-001

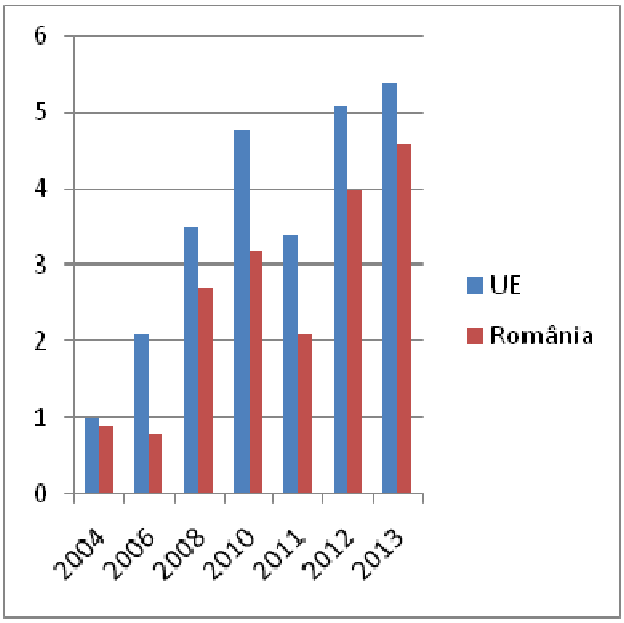

Fig 4 Shere of RRE sources in transport
Source: Realised by the author based on the data from Energy, transport and environment, 2015, http://ec.europa.eu/eurostat/en/web/products-statistical-books/-/KS-DK-15-001

For comparison, in figures 1 ÷ 4, it was highlighted the developments in Romania (RO) with respect to GES, in [11] in states that:

- In UE28, GHG emissions (with international aviation but without LULUCF) amounted in 2012 to 4682.9 million tones of CO2 equivalent, which means a decrease of 17.9% compared to 1990. Without the international aviation it would have been 19.2% (statistics relate to 2012).
- In RO, GHG emissions decreased in the same period by 52%.

Based on the above data we calculated indicator values GT with reference to specific IT units in the EM field included in the SDDUE. Values obtained are shown in Table 1.

Table 1 – values of GT indicator

Target code	Subtarget	Values of GT [%]in mentioned year
TISDD1	With international aviation	203 – by 2012
	Without international aviation	218 – by 2012
TISDD2	Energy consumption from RRE	105,5
	Consumption of EE from RRE	89,3
TISDD3	-	83,5 – by 2010
TISDD4	-	The reduction is 5.6% between 2008 and 2013, which in a linear evolution corresponds to

Source: Realised by the author based on the data from SDDUE,http://strategia.cndd.ro/dbimg/27_fisiere_fisier.pdf

3. CONCLUSIONS

The bulk of concrete targets assumed under SDDUE for energy and environment fields were made or there is real prospect of being realized. Exceptions:

- EE consumption growth target of RRE, whose degree of achievement (until 2010) was 89.3%
- The target regarding the use of biofuels in transport whose degree of achievement (until 2010) was 83.5%

SDDUE target assumed in GHG emissions has proved to be too modest to the needs of limiting the effects of climate and even in relation to real possibilities. Thus, the degree of achievement of this target is extremely high. With the adoption, in 2010, of SE2020, this strategic error has been corrected, adopting the EM package targets of 20-20-20 and recommendation aiming at reducing GHG emissions even by 30%. This target is designed to ensure mobilizing essential desideratum premise enshrined in international conventions on climate change [12], set to "reaching a global average temperature of Earth's surface that does not rise by more than 1.5 ° C from the pre-industrial period".

We specify that the SDDUE development took into account the 2 ° C level - accepted internationally in 2005. Without the valuation of the GT indicator, the information given in the second part of the thesis that, except TISDD4, Romania is ahead UE28 with respect to all other targets. Thus, we consider it is necessary to review the strategies (European, national) of EM fields with a periodicity of (4-5) years.

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