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RESOURCE EFFICIENCY OBJECTIVES AND ISSUES FOR A GREEN ECONOMY

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Abstract

The main objective of this paper is a theoretical-methodological grounding and analysis of the resource-efficiency objectives and policies required for the implementation of the Sustainable Development Strategy in the EU and Romania, as well as for the transition to a resource efficient, greener and circular economy. We first outline some of the most important conceptual and theoretical issues by considering resource-efficiency as a paradigm behind the green (and circular) economy. The concept of resource efficiency expressed by the resource productivity (RP) indicator has a clear environmental and economic dimension, so it is considered an appropriate indicator of sustainable development. The objectives are shown to be strategical also in the European Union and in Romania, since the principal objective of the Roadmap to a Resource-efficient Europe (COM/2011/0571 final) is improving economic performance while reducing pressure on natural resources by boosting resource-efficient production. Moreover, in the data and graphs presented further in the paper, we try to compare the level and evolution of some key statistical indicators, in Romania and in EU-27, to enable us to check the main trends as well as whether these trends may be considered consistent with the objectives of a resource-efficient economy. Since in Romania the trend had as negative effect the increase, instead of a decrease in the gap towards the EU-27 average level of resource productivity, it must be reversed and aligned to the EU average. The recommendation is to implement programs and policies promoting higher resource-efficiency and a green economy ultimately.

Key words**:** *sustainable development, resource-efficient, green economy, resource decoupling, resource-productivity*

INTRODUCTION

The main concerns raised by sustainable development principles, such as:

- framing social and economic development within the carrying capacity of ecosystems;
- decoupling economic growth from environmental degradation;
- the long-term preservation of the viability of the overall system and its environmental, economic, institutional and social components,

have become even more stringent nowadays, in view of a transition towards a green economy.

We may still consider that a green economy is the ultimate outcome of a sustainable economic development, since a green economy generates increasing prosperity while preserving the natural ecosystems that sustain our societies and our economies.

Creating a more energy and resource-efficient society that uses resources responsibly and organizes industrial processes as to minimize waste should reflect objectives of sustainable economic development in all major areas**.**

Therefore, sustainable development involves carrying out a green economic growth which is no longer confined to reducing pollution, but requires, among other principles and paradigms, structural changes in the processes and in manufactured products, as well as in the type and amount of resources used.

The main objective of this paper is a theoretical-methodological grounding and analysis of resource-efficiency objectives and

policies required for the implementation of the SDS (Sustainable Development Strategy), as well as for the transition to a resource efficient, greener and circular economy in the European Union and in Romania.

MATERIALS AND METHODS

The methodology used below is based on:
• Relevant literature review;
• Clarification and definition of the main methodological and operational concepts;
• Figures and graphic models displaying the nature and direction of dependence;
• Analysis and synthesis of the strategic objectives for a sustainable and resource–efficient economic development in the European Union
• Adjacent calculations, with data indicators and graphics, for a dynamic comparative analysis of the trends of main indicators.

RESULTS AND DISCUSSIONS

Conceptual and theoretical issues

The concept "resource efficiency" means using the Earth's limited resources in a sustainable manner, while minimizing impacts on the environment. It allows us to create more with less and so deliver greater value with less input [13].
As we have pointed out in a previous paper, water is one of the most important and scarce environmental resources, with some particular characteristics that raise serious challenges for a good management and sustainable development [11]. But water is not the only priceless natural resources that we rely on for a sustainable socio-economic development.
All stages of the resources' life cycle – extracting natural resources, transforming them into goods, and subsequent processes of recycling and disposal – put pressure on the environment. Yet this systemic relationship is the very essence of the continuous economic process of production and consumption.
Since we depend on the natural resources of the earth, it appears necessary to require a new economic system that respects the integrity of ecosystems. Green economy aims at sustainable management of environmental resources, based on the belief that our biosphere is a closed system with finite resources and a limited capacity for self-regulation and self-renewal [1].
In this respect, the resource nexus is as well a conceptual model that illustrates the interconnections between and among different resources (Figure 1); in other words, it visually displays that one (or more) resource is used as an input to produce another resource [2].

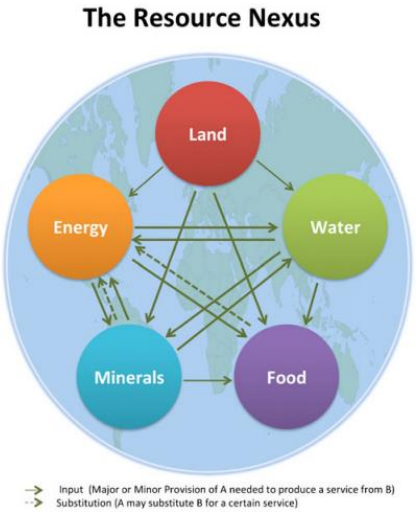

Fig. 1. The global resource nexus model
Source: [2]

We find the global resource nexus model (Figure 1) as very suggestive for a green (circular) economy model and especially for our topic, since the importance of the sustainable management of natural resources and of their increased resource-efficiency is highlighted and may be better acknowledged.
More efficient production processes and better environmental management systems can significantly reduce pollution and waste, and save water and other resources. Therefore resource-efficiency is a paradigm behind the green (and circular) economy, a system that optimizes the flow of goods and services to get the most out of raw materials and cuts waste to the absolute minimum.
The need for higher resource-efficiency has clearly been outlined by the EU's Thematic Strategy on the Sustainable Use of Natural Resources [3]. Also, as previously analysed in [13], we observe that resource-efficiency, enabling the decoupling of resource use and

environmental impacts from economic growth and measured by the resource-productivity indicator, underpins all the valuable ideal concepts of economy and development: sustainable development, the green economy and the circular economy, as well as the strategies dedicated to their objectives.

Besides the economic significance, the issue of resource efficiency expressed by the resource productivity (RP) indicator has a clear environmental dimension, so it is considered an appropriate indicator of sustainable development. Resource productivity describes the relation between economic outputs in monetary terms (Y – numerator) and a physical indicator (M or R – denominator) for material or resource input.

The concept 'resource productivity' may be analysed in a welfare perspective and is understood to involve a quantitative dimension (e.g. the quantity of output produced with a given input of natural resources) but also a qualitative dimension (the environmental impacts per unit of output produced with a given natural resource input).

In the sustainable development framework, total resource consumption (material flows, energy and land) is an appropriate description of the long-term environmental disturbance potentials and its reduction turns out to lead reliably to a de-escalation of most environmental problems, although not proportionally. Breaking the link between material use and economic growth (called the decoupling effect) means a dematerialization of economic development, or the relative or absolute reduction in the quantity of materials required to serve economic growth.

In the recent relevant literature [14], the decoupling is considered in two distinct effects: the resource decoupling, which could be referred to as increasing resource productivity; the impact decoupling, referred to as increasing eco-efficiency.

From a strategic viewpoint, in raising the resource productivity resource decoupling seeks to alleviate the problem of scarcity and respond to the sustainability challenge of intergenerational equity by reducing the rate of resource depletion, while also reducing costs. Besides that, resource decoupling may be expected to simultaneously reduce the environmental impacts of certain resources.

Issues and objectives for a resource-efficient economy

The EU's Thematic Strategy on the Sustainable Use of Natural Resources [3] has the objective of achieving a more sustainable use of natural resources by reducing the negative environmental impacts generated by the use of natural resources while ensuring economic growth. Moreover, at present, a resource-efficient economy is required expressively in Europe. The Europe 2020 Strategy and its flagship initiative on "A Resource Efficient Europe" [4] set the EU on the path to a systemic transformation.

Resource efficiency covers a wide range of resources, with the materials that are normally measured (minerals, fossil fuels, metals) being a proxy for the wider set. Smarter use of these resources will nearly always translate into fewer greenhouse gas emissions, less pollution and a better environment.

A resource-efficient economy is very close to advanced concepts such as the 'green economy' or the 'circular economy'; both promote great resource-efficiency gains through a systemic transformation in the way resources flow through the economy and society, arguing that there are business and job opportunities to be had by revolutionising recycling and re-use.

For being faced with growing global competition for resources, European policies have put increasing focus on the goal of 'dematerialising' economic output, i.e. reducing the quantity of resources used by the economy [8].

For example, the Roadmap to a Resource Efficient Europe [5] emphasises the risks associated with rising resource prices and the burdens on ecosystems that result from escalating demand for resources. The Roadmap defined medium and long term objectives and the means needed for achieving them taking into account progress made on the 2005 Thematic Strategy on the Sustainable Use of Natural Resources and the EU's strategy on sustainable development.

The strategic Roadmap to a Resource-efficient Europe should be seen in the context of the

worldwide efforts to achieve a transition towards a green economy.

The principal objective of the Roadmap is improving economic performance while reducing pressure on natural resources by boosting resource-efficient production [5]. Mainly by technological and managerial eco-innovation, higher and sustained improvements of resource efficiency performance are within reach and can bring major economic benefits, so that all the strategies for sustainable development should be effectively underpinned [12].

It is important that governance and monitoring of progress will take place in the framework of the Europe 2020 strategy and will integrate the relevant elements of the EU Sustainable Development Strategy in order to ensure overall coherence. Although some key benchmarks are already provided in the Europe 2020 headline targets of 20% greenhouse gas emission reduction (30% if the conditions are right), 20% renewable energy sources, and 20% improvement in energy efficiency, the EU needs more tools to monitor progress on resource efficiency.

The European Resource Efficiency Platform (EREP) is setting targets and guidelines to increase resource productivity and eco-efficiency in the most sensitive and important sectors or national economies. To emphasize its focus and concern on the methodological issues and trends of the resource productivity indicator, EREP has also subsequently endorsed a target in its recommendations:

"We call upon the EU to set a target for a substantially increased decoupling of growth from the use of natural resources, in order to improve competitiveness and growth as well as quality of life. The target should aim to secure at least a doubling of resource productivity as compared with the pre-crisis trend "[9].

Furthermore correlated to a resource-efficient economy, but even more demanding for an increase in resource productivity is the concept and model of circular economy. The strategic approach *Towards a circular economy: a zero waste program for Europe* [6] promotes a fundamental transition in the EU, away from a linear economy for resources to be not simply extracted, used and thrown away, but put back in the loop so they can stay in use for longer. This approach also sets out measures driving a more efficient use of resources and waste minimization.

In the Analysis of an EU target for resource productivity accompanying this latest strategy [6,7], it is claimed that the EU should set ambitious, credible targets as soon as possible to improve the overall resource productivity of the EU economy, with a view to achieving the EU 2020 objective of overall decoupling of resource use and environmental impacts from economic growth.

In the data and graphs presented further in the paper, we shall try to compare the level and evolution of some key statistical indicators, in Romania and in EU-27, to enable us to check the main trends as well as whether these trends may be considered consistent with the objectives of a resource-efficient economy.

As illustrated in Figure 2, the EU's resource consumption has declined in the period 2000 to 2012, although the financial crisis of 2008 and subsequent economic recession in Europe also have contributed clearly to this trend.

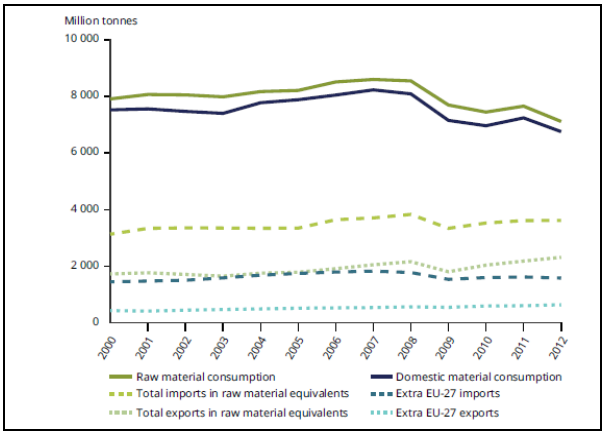

Fig. 2. EU-27 domestic material consumption and raw material consumption, 2000–2012 Source: European environment | State and Outlook 2015 [8]

In the recent report *European environment | State and Outlook 2015* [8] are synthesized also some trends and prospects of the resource productivity in the European Union:

- *5–10 year trends:* there has been some absolute decoupling of resource use from economic output since 2000, although the

economic recession contributed to this trend;

- 20+ year outlook: European economic systems remain resource intensive, and a return to economic growth could reverse recent improvements.

On the other hand, the latest Eurostat data show that Romania has a productivity of resources equal to 33% of the European average. The Romanian economy consumes 59% more raw materials than in other European countries, and this, together with the fact that labour productivity and capital are low in our country, puts us in the last position in the top of resource efficiency [10].
Checking this status and the resource-efficiency level and trend in Romania, our time-series computations and analysis, showed that the evolution of the Romanian economy in recent years has been indeed inconsistent with the principles of sustainable development and with the objectives of increasing resource efficiency [13].

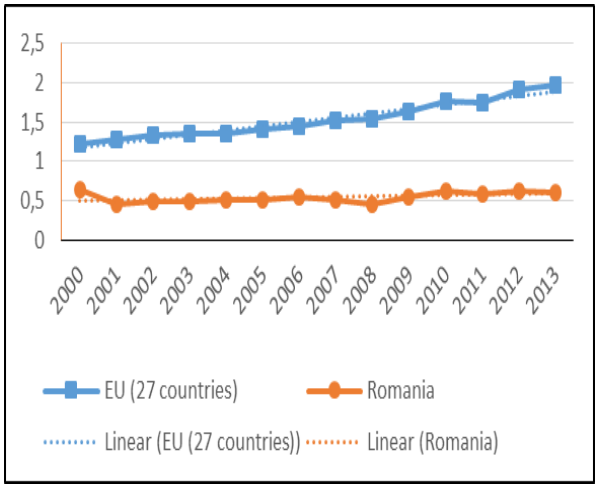

Fig. 3. Evolution and trends of the RP in EU and in Romania, 2000-2013 (Purchasing Power Standard per Kilogram)
Source: Own computation, based on data from Eurostat, accessed in March 2015

As evident from Figure 3, the average level of resource productivity (RP expressed in PPS/kg) in the EU-27 has grown quite significantly (60%) in 2013 as compared with 2000. On the contrary, in Romania, the RP expressed in PPS/kg in 2013 was 4.6% lower than in 2000, and this was quite a recovery after the drop of 28% in the RP level of 2008. Although when expressed in PPS/kg, the RP level in Romania was rather stable in the 2000-2013 period, with a flat trend (Figure 3), the gap towards the EU-27 average level of resource productivity has widened in recent years, since in 2000 RP in Romania was of 52.4% of the average RP in EU-27 while in 2013 it represented only 31.1% of the average RP in EU-27, in PPS/kg.
A possible explanation to be further explored, is that economic recession may have brought, in EU and Romania as well, some negative economic issues but also some positive effects or opportunities of cutting resource-intensive production. These issues have been more or less powered and acknowledged by the public and private stakeholders in the national economy.

CONCLUSIONS

In the framework of sustainable development, resource-efficient and green/circular economy approaches, the resource productivity has become a lead indicator in measuring progress and signalling the sensitive issues.
As a conclusion on the strategic importance of the resource productivity, we may underline that increasing resource efficiency, namely the resource productivity of the European Union by 15-30% is essential to deliver the resource efficiency agenda established under Europe 2020 Strategy for a smart, sustainable and inclusive growth and moving towards a greener/circular economy.
A realistic target to increase resource productivity, endorsed by the EU Member States would focus political attention and tap the currently overlooked potential of a greener economy to create sustainable growth and jobs and increase the coherence of EU policy.
In Romania so far (by 2013) the scenario of a sustainable, resource-decoupling economic growth seems to not have come truth in reality, since the overall resource productivity has remained low, and has even decreased as compared to the pre-accession level (in 2012 as compared to 2006). The trend had as negative effect the increase, instead of a decrease in the gap towards the EU-27 average level of resource productivity (Figure

3), so it must be reversed and aligned to the EU average.

But then the EU is already forecast to increase its resource productivity by 15% between 2014 and 2030 under a business- as- usual scenario. Using smart policies to promote the transition to a green and more circular economy, as called for by the European Resource Efficiency Platform, it would be possible to double this rate.

Therefore, our future research will outline, analyse and recommend the best policies and good practices leading to increased resource efficiency and sustainable economic growth, ultimately to promoting a green economy in Romania.

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