# Paradigm Shifts in Developing a Sustainable Economy

Audit role from an environmental perspective

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The paper contains a short presentation of a documentary and applicative research results on recent, confirmed paradigm shifts in the economics: the sustainable economy and the new developments designated as eco-economy and circular economy, including concepts and definitions, and also policy and strategic programs (EU and national). The main contribution of the article consists of presenting the support that the external audit can bring to enhance the new evolutions in the economy and the implementation of the related projects thereof. A specific audit mission with the Ministry of Environment of Romania is described as an applied case study.

Keywords: Sustainable economy, eco-economy, circular economy, performance audit of environment programs

The paper contains a short presentation of a documentary and applicative research results on recent, confirmed paradigm shifts in the economics: the *sustainable economy* and the new developments designated as *eco-economy* and *circular economy*.

The inspiring idea of this paper, although tacit, is dual: the chemical industry is massively implied in producing daily commodities (through the chemical processing), and the connection between the chemical industry and the economy is a transformational one (from natural raw materials to the products of different utility).

The paper includes, as a first point of interest, a concise presentation of up to date concepts and definitions, accompanied by policy and strategic programs (at EU and national levels). Then, the main contribution of this article consists of presenting the support that the external audit can bring to enhance the new evolutions in the economy and the implementation of the related projects thereof.

A real audit mission, conducted at the Ministry of the Environment (Romania), is described as a specific case study (including specific issues such as the audit approach and objectives, the relevant findings – and the causes thereof, the recommendations to align the current state (situation) to the new requirements and regulations).

The paper has a linear structure, composed of two sections.

The introductory part (Section 1) is dedicated to the *development of the sustainable economy*. It presents a short overview on recent, confirmed development in the economics: *eco-economy* and *circular economy*. First, the general perspective, the context, and the main coordinates of the new economic paradigms (eco-economy, circular economy) are described, together with concepts and definitions, as resulting from the *policy and strategy documents* (Governments' and professional). on one side, accompanied by *policy and strategic programs* (at both EU and national – Romania levels) in the field, promoted (and adopted) by political instances (governments) and by international professional organizations of consolidated reputation, as well,

Another focus of the article is on the *evaluation of the sustainable economy systems*, which is the subject of Section 2.

The contribution that the external audit can bring to sustain the new evolutions in the economy and the implementation of the related projects thereof is presented and discussed by means of a case study: the performance audit mission conducted at the Ministry of the Environment of Romania. The case study had as objective the Audit of the performance of the use of public funds in waste management and the greening of areas affected by industrial activities. This part can be viewed as the experimental (applicative) part of the paper, including also results and discussions, in the light of considerations exposed in Section 1.

Against the backdrop of a deep economic crisis and of the intensification of long-term challenges, such as the already active actions and processes on globalization, the pressure on resource use, and the ageing of population, the European Union proposes, as a strategic option, to create conditions for a smart, sustainable economic growth and favourable to inclusion, by adopting, in the framework of the European Council of June 17-th 2010 The Europe 2020 Strategy, a ten-year program (2010-2020).

In the light of the specificities of each Member State, the Europe 2020 Strategy (hereafter, also referred to - in short - as the Strategy) is also pursuing a coherent reform agenda, with the overall aim of boosting Europe's competitiveness on the strengths coming from the single market, common currency and common policies. The Strategy also seeks to correct financial markets and ensure closer policy coordination in the euro area.

However, the developments in the fields of scientific research, technological development and innovation, the application and the exploitation of the results in optimizing the economic and societal systems or in the management of crises of different types, were inherently accompanied, as a manifestation of a universal entropic principle, of by undesired negative effects (direct or secondary),

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characterized even as *perverse* by some authors such as the acceleration of pollution, the emergence of new risks (generated by the economic subjects themselves as a result of daily activity, the society itself undergoing a process of transformation towards a *hybrid world* [1, 2].

As regards the practical effects, the occurrence and impact of pollutant emissions into the environment have been extensively addressed in the literature. Marked as the effects of massive industrialization at the beginning of the 20th century, they have evolved into *cascading* destructive effects in contemporary society (affecting the population and animal health and the natural environment). For an analysis of the situation in Romania [3, 4].

For these reasons, one of the three thematic priorities included in the Europe 2020 Strategy refers to sustainable economic growth based on the promotion of an economy more efficient from the point of view of the use of resources, greener and more competitive. From this general perspective, a short analysis of the profile of a *green consumer* (consumer who is mindful of environment related issues and obligations, and is supportive of environmental causes to the extent of switching allegiance from one product or supplier to another even if it entails a higher cost *http://www.businessdictionary.com/definition/ green-consumer.html*) is presented in [5].

It should be stressed, however, that success in achieving the objectives of the Europe 2020 Strategy depends on the implementation at national level of the necessary structural reforms to accelerate smart growth, sustainable and favorable to inclusion. In this respect, the National Reform Programmes constitute the main instrument for the Member States.

# **Development of the Sustainable Economy. Documentary study of New Concepts and Integrated Approaches** *The Eco-economy*

Creating a sustainable economy - which comply with the requirements of eco-systems that it depends on: fish farming, forests, water, agricultural land - must take into account the fact that the global economy is now increasingly governed by the synergy between *market forces* and the *principles of ecology*, which implies *the transformation of the economy guided by market forces into an economy organized on ecological principles*.

This has generated a new paradigm and an associated economic model, the *eco-economy*, which recognizes and respects the principle of ecology, and the evidence of the efficiency and effectiveness of on investments and tax policies.

Building an eco-economy is the result of the restructuring of the traditional economy, through a *systemic approach*, based on a *strategy of economic change* that leads to sustainable development by preventing destructive phenomena (pollution, soil erosion, flooding, carbon emissions, production residues, etc.), as well as by raising the standards of living (nutrition, consumption of materials and energy, physical mobility). In an ever more widely accepted vision, economic progress is the result of restructuring the economy, viewed as a system, with the aim of transforming it into an environmentally sustainable economy [6].

From this perspective, within the European context the *environment policy* and the *sustained economic development* are closely related (interconnected) and are inter-conditioning through economic and financial policies, and, at the same time, linked to Community environmental programs, with beneficial effects on intensifying activities aimed at reducing pollution [2, 7].

Appropriate allocation of funds for the various areas is very important for creating a balance (an equilibrium) within the macroeconomic model. The convergence between the *environmental objectives* and the specific *economic decisions* taken in response to the *market reactions* (which mostly rely on economists in developing national economic policies or corporate strategies) brings *benefits to society* or - referring to a broader framework – to *Humanity* [6].

The development of *eco-economics* tax savings assumes changes on a long-range and of high amplitude, aimed at incorporating environmental costs into the prices and making some significant changes in individual or collective behavior. The aim of the restructuring fees is to reflect the reality about the extent of the ecological degradation and to produce positive results, even if - in the first instance - they may be modest.

The environmental policy of the European Union has foreseen, in recent years, the introduction of Environmental Tax Reforms (ETR) in Member States' legislation, making these levies an economic lever and environmental protection instruments.

In this regard, several countries (including Germany, England, Netherlands, Finland, Sweden) have introduced taxes on products and activities with destructive impact on the environment, along with the corresponding reduction of other taxes (tax shifting), which was conceived as a measure of restructuring of the tax system that contributes to the achievement of the environmental health goal.

Ruffing [8] highlights the importance of economic levers which are used to operate at the level of environmental policy, noting that environmental policy directions follow *direct environmental regulations* (environmental standards, emission standards, design standards, product standards, etc.) and *economic instruments* (environmental taxes and costs, as parts of environmental policy) designed to stimulate public financial support to foster environmentally friendly practices and environmental investment financing.

### The Circular Economy

The circular economy is an advanced model of the economy, oriented on the life cycle of products, which has the effect of reducing waste and protecting the environment. This model represents an integrated framework based on the redesign of technological (process) flows, of the manufacturing processes, and of the processes and ways of selling and disposal of products, thereby reducing the environmental impacts of resource use and valorizing waste through their transformation into products, through their transformation into valuable products, from the perspective of optimizing resource management and developing a sustainable and ecological business.



Fig. 1. Circular economy model Source:Ellen Mac Arthur Foundation (https:// www.ellenmacarthurfoundation.org)

Compared to the classical model - which involves the purchase (acquisition) of resources, the production, the use and the disposal of products or the throwing of damaged or unnecessary products - the transition to the new model involves restructuring of the market economy and increasing its competitiveness, by increasing the efficiency of resources usage and reducing the dependency on rare raw materials and conserving scarce and precious resources along with their intelligent capitalization.

Also, as observed in [9], from which we cite, the implications of the chemical industry in the economy can be seen in almost all the products we use in everyday life, through the chemical processing of natural raw materials from the soil, water, and air. The connection between the chemical industry and the economy can be seen by transforming natural raw materials from the soil, water and air in the products we use in our daily lives, such as food, clothing (fibres, dyes), health care products (medicines), cosmetics, computer technology, nonpolluting energy sources, transport fuels, plastics, fertilizers, and any other product of modern life that depends on the chemical sector of the economy.

This overall characterization is also confirmed from the point of view of the quantitative dimensions. As shown in [10], from which we cite, the chemical industry is one of the largest manufacturing sectors of the European economy, covering approximately 7% of the total industrial production. Consequently, it plays an important role in achieving European competitiveness, especially since a high degree of technology incorporation and innovation are specific to it.

We would also like to turn attention to an additional but otherwise of great interest issue: that the relationship between the economic (business) cycles and the new economic paradigms is an emergent research field, with no doubt interesting and important under its various facets. One of the governing principles (e.g., *https://courses. lumenlearning.com/zelixeco201v2/chapter/the-businesscycle/*) is that a sustainable prosperity and economic growth rely on discipline and patience - in the absence of a new technological invention, or the discovery of new supplies of natural resources, there is no magical way to increase the productivity of labor so that everyone can consume more *immediately and permanently*. This issue is not further detailed, as being out of the scope of the paper.

Recent reports on the effects of the circular economy on the competitiveness of the European Union, analyze the different facets in which these effects are converted: job creation at the local level, energy savings, avoidance of irreparable loss (depletion of resources through inadequate rates of consumption - higher than the rates of regeneration - and others), the activities of circular economy being globally ranked as a key EU priority. You can see, in this regard, report [11].

The key contribution to the EU to the development of a sustainable economy in Europe will be to preserve the value of products, materials, and resources in the economy for as long as possible and to minimise waste generation, by setting up an appropriate regulatory framework for the development of the circular economy into the single market and the establishment of long-term objectives in the field of waste as well as a set of concrete, far-reaching measures, to be achieved before 2020. These will materialize in: (a) boosting investment; (b) creating the conditions for fair competition; (c) removing the obstacles arising from European legislation or inappropriate application of the rules; (e) the development of the single

market, and (f) ensuring favourable conditions for innovation and involvement of all interested parties.

On a practical level, the Circular Economy Package [11] creates conditions for establishing a stable trajectory for better waste management in Europe through support actions that cover the entire lifecycle of products, which will help actors involved in such processes (national and local authorities, companies and consumers) to undertake this transformation: switching from the polluting industry to a green, efficient and competitive economy.

The EU Action Plan for the Ĉircular Economy focuses on EU-wide measures with high added value, their implementation requiring long-term involvement at all levels, from the Member States, regions and cities to businesses and citizens.

Although we have, in the above, referred to several aspects related to the situation and the programs within the EU, it must be emphasized that the requirement for the circular economy *to develop globally* is already manifesting, with programmatic documents of some international organizations of the highest representativeness already adopted and publicly available nowadays.

Indeed, as shown in [11]: the circular economy will also need to develop globally. Increased policy coherence in internal and external EU action in this field will be mutually reinforcing and essential for the implementation of global commitments taken by the Union and by the EU Member States, notably the UN 2030 Agenda for Sustainable Development and the G7 Alliance on Resource Efficiency. This action plan will be instrumental in reaching the Sustainable Development Goals (SDGs) by 2030, in particular, Goal 12 of ensuring sustainable consumption and production patterns.

The EU Action Plan also includes sectoral measures as well as quality standards for secondary raw materials and will play a key role in meeting the objectives of sustainable development by 2030, in particular, the objective 12 development of sustainable consumption and production models.

Among the main actions adopted in the Action Plan, we mention:

a)funding from the program Horizon 2020 (over euro 650 million) and structural funds euro 5.5 billion);

b) halving food waste by 2030, developing a common methodology for measuring and improving date stamping, as well as associated tools;

c) developing quality standards for secondary raw materials, in order to increase the operators' confidence in the single market;

d) promoting, within the framework of the *Working Plan* on *Ecodesign for the period 2015 2017*, of measures relating to the possibility of repair, the sustainability and the potential for recycling of products;

e) revising the *Fertilizer Regulation*, in order to facilitate the recognition, in the single market, of organic-based and waste-based fertilizers and to support the role of bio-nutrients;

f) developing the *Plastics Strategy in the Circular Economy*, including targets on recycling potential, biodegradability, the presence of hazardous substances in plastics, and the significant reduction target for marine waste, as set out in the *Sustainable Development Objectives* framework;

g)actions concerning the reuse of water, including a legislative proposal regarding the minimum requirements in terms of re-use of waste water.

The EU Action Plan also includes a simple and effective monitoring framework regarding the circular economy. It includes, at the same time, a series of revised legislative proposals on waste, that set clear targets for waste reduction, a long-term waste management, and recycling pathway, and concrete measures related to the objectives (listed hereafter).

The proposed targets are:

(a)municipal waste recycling - 65% by 2030;

(b)recycling of packaging waste -75 % by 2030;

(c)reduction of landfill deposits - up to 10% of all waste by 2030;

(d) prohibiting the storage of separately collected waste; (e) promoting economic instruments to discourage disposal in landfills;

(f) simplified and improved definitions, as well as methods for calculating recycling rates, harmonized at EU level;

(g) promote reuse and incentives (initiatives) to stimulate industrial symbiosis - turning a byproduct of an industry into the raw material of another industry;

(h)economic incentives for manufacturers to place more environmentally friendly products on the market and support recovery and recycling schemes (for packaging, batteries, electrical and electronic equipment, vehicles).

At the beginning of 2017, one year after adopting the circular economy package, the Commission presented a report on closing the loop in the circular economy (design, production, consumption, and waste management) to create a green and competitive Europe [12].

According to this report, a number of key actions have been undertaken and already delivered in the implementation of the EU Action Plan (since its adoption in December 2015), in areas such as food waste, ecodesign, organic fertilizers, guarantees for consumer goods, and innovation and investments. Circular economy principles have also – gradually – be integrated into industrial best practices, green public procurement, the use of cohesion policy funds, and through new initiatives in the construction and water sectors. The report also introduces key deliverables for 2017 [12].

The creation of a new *business model* and *innovative ways of financing* was supported by the adoption of additional measures by the Commission, which has set up, together with the European Investment Bank (EIB), a financial support platform for the circular economy, which brings together investors and innovators.

#### **Evaluation of sustainable economic systems. A case study** *The role of the audit*

For environmental projects to contribute to the development of a sustainable economy, it is necessary to assess them in terms of their generated effects regarding the environmental protection, along with the evaluation of economic issues, in order to harmonize environmental objectives with funding policies.

From the perspective of this requirement, the audit through the induced effects - is a way to increase performance in environmental governance as a result of using specific instruments for restructuring the economy: (a) *restructuring of the tax system*, that contributes to the achievement of the goal related to environmental health; (b) *change of composition of taxes*; (c) support for *fiscal restructuring*; (d) *eco-labeling*; (e) *permits for the marketing of products*; (f) *elimination of subsidies for environmentally destructive industries*, to discourage activities that cause environmental degradation, and (g) the *allocation of environmental subsidies*.

As the Government spending on developing and implementing environmental policies and obligations is becoming increasingly more significant, conducting environment-oriented audits, as well as assessing the risks that occur throughout the life-cycle of ecosystems are currently vital activities and priorities for a number of international reference organizations that have attributions in regulating the external audit of such systems (International Organization of Supreme Audit Institutions -INTOSAI, European Organization of Supreme Audit Institutions - EUROSAI, European Court of Auditors -ECA).

The conduct of environmental audit missions is completed through the formulation of conclusions and recommendations that typically address the following issues: (a) the performance of the implementation of the measures to be taken to ensure the sustainability and management of environmental projects, aiming at the efficiency, effectiveness and economy; (b) the degree of implementation of environmental strategies and policies; (c) creation of appropriate organizational structures for implementing environmental policies and establishing relationships with other areas; (d) assessment of environmental patrimony and obligations; (e) the performance of the use of funds allocated through environmental programs; (f) the environmental impact of other programs; (g) address cross-cutting environmental issues; (h) assessing the effectiveness of the reporting framework at governmental or organizational level, and (i) compliance with the environmental legislation and conventions (national and international).

In order to ensure the credibility, quality and professionalism of public sector environmental auditing, the INTOSAI Working Group for Environment Audit (WGEA) has developed essential standards and guiding elements specific to the environmental audit (ISSAI 5110 -

Guidance on Conducting Audit Activities with an Environmental Perspective [13] and ISSAI 5120 -

*Environmental Audit and Regularity Auditing* [14], endorsed at The XXII INCOSSAI Congress, Abu Dhabi, United Arab Emirates, 2016).

These documents promote *integrated approaches to the audits* carried out by the supreme audit institutions (financial audit, compliance audit, and performance audit) from an environmental perspective and are geared to the principles of eco-economy (covering both financial and environmental aspects).

In the same vein, the European Union has introduced an *Eco-Management Audit Scheme* (EMAS) [15], which requires companies and other organizations to have their own programs, policies, management, verification and reporting (sub)systems relating to the environment, all of which are verified by a third party.

The European Court of Auditors assessed whether European organizations, authorities, and institutions have policies to reduce the impact of their administrative activities on the environment and whether these policies are effectively implemented [16]. The audit found that only seven of the 15 European organizations have integrated into the EMAS scheme.

A number of organizations such as OECD [17], WHO [18], EEA [19] and ECETOC [20] are actively involved in the *modeling environmental risk assessment*, which provides a good source of data on environmental risk factors that arise from the use of some technologies and have a major impact on ecosystems, animals, and humans.

The *EUROSAI Working Group for Environment Audit* (WGEA) has promoted environmental audits by conducting pilot or collaborative environmental audit missions (with the participation of its members, the supreme audit institutions in Europe) as well as by organizing exchanges of experience and knowledge in the field.

### Audit of the performance of the use of public funds in waste management and the greening of areas affected by industrial activities. Case Study

The context and institutional framework applicable

The need to carry out audits of the performance of the use of public funds in the waste management activities and in the greening (cleanup) of areas affected by industrial activities stems from the need to reduce significantly the impact both on the environment and on the health of the population, as well as the pollution and the contamination of land and underground water.

The audit, briefly presented below, was conducted by the Romanian Court of Accounts at the Ministry of Environment and Climate Change (MMSC) [21], including subordinate or coordinated units holding relevant data for this area.

Currently, the national waste management policy is aligned to and consistent with the European policies on waste prevention and resource consumption, with the application of the *waste hierarchy* in practice.

Audit Objectives and Approach

The main objective of this audit, which targeted the period 2013 – 2014, was to assess the degree of harmonization of the national policy and legislation in the field with the European policies and legislation as well as the assessment of the institutional capacity and human resources available for the proper implementation of these environmental policies. The audit was carried out by the Ministry of Environment and Climate Change (MMSC), including the subordinated or coordinated units, respectively:

- National Agency for Environmental Protection (NAPP);

- National Environmental Guard (GNM);

- The Environmental Fund Administration (EFA).

To answer the audit questions, a *combined approach* has been adopted: *based on the results* and *based on problems*, depending on the specific objective under consideration.

The audit mission has set the following *specific objectives*, based on the review of existing national legislation, guides, regulations, and performance criteria, which apply to waste management and greening of areas affected by industrial activities:

- assess the degree of implementation of the European legislation in the field of waste management and the greening of areas affected by industrial activities, as well as how to comply with these legal provisions; evaluation of how national legislation covers potential environmental threats caused by the waste;

- assess the existence of the systems and of the economic and financial mechanisms for waste management and the extent to which the waste management and the greening of areas affected by industrial activities responsibilities are carried out and are met by the competent factors involved.

- the assessment of the degree of achievement of the objectives of the projects carried out in the field of waste management and whether the recorded levels were satisfactory during the analyzed period;

- evaluation of the number of Romanian research projects in the field, as well as of the number of researchers / working groups involved or engaged in this activity;

- evaluation of the degree of application of the results of Romanian research projects in the waste management activity. General Principles and Objectives of Waste Management

The National Strategy documents on waste management include two main components: (a) Waste management strategy - setting long-term waste management targets at national level; (b) National Waste Management Plan - in fact the plan to implement the strategy and which contains details of the actions to be taken to achieve the objectives of the Strategy, the way of the conduct of such operations, including timelines and concrete responsibilities.

Romania has a National Waste Management Strategy (SNGD) [22], developed by MMSC, revised in 2013 and approved by Government Decision 870/2013, which establishes the country's policy and strategic objectives for waste management for the period 2014 -2020.

The general principles and objectives of the waste management activity established for the period 2011-2013 (the subject of the audit) in the *National Strategy for Waste Management* were as follows:

- harmonization of policies (at national, sectoral and economic companies levels) with those existing at European level and increasing the efficiency in the implementation of waste management legislation;

- adaptation and development of the institutional and organizational framework in order to meet the European requirements transposed at the national level, ensuring adequate human resources (both in number and level of professional training);

- the creation and use of economic and financial systems and mechanisms for (a) waste management; (b) promoting a correct and complete information system; (c) awareness and motivation for all parties involved; (d) preventing excessive generation of waste; (e) collection, transport and recovery of waste, and (f) encouraging and supporting the Romanian research in the field of integrated waste management.

Integrated waste management

Actions in the field of greening the areas affected by industrial activities are aimed at implementing integrated waste management projects at the national and regional level, through hierarchical investment orientation according to established priorities: prevention, selective collection, recycling, recovery, treatment, and disposal. Integrated management programs will progressively expand into rural areas also by setting up collection services and eliminating uncontrolled landfills.

In order to address these issues, the *National Strategy* and the *National Plan for the Management of Contaminated Sites in Romania* [23] provide for the following main objectives:

- environmental objectives: reduction of the surface occupied by contaminated sites, improvement of the environmental factors of the location, and uniformity in the management of these issues;

- economic and social objectives: the subsequent promotion of the repaired sites through informing and participation of the population, and the use of these sites for the economic and social development of Romania;

- technical objectives: to develop institutional capacity for the management of contaminated sites, to develop the market of services in the field of investigation and remediation of contaminated sites, under the conditions of applying the best existing practices and not generating excessive costs for the identification and restoration of contaminated sites. In addition, the *Romania - European Union Accession Treaty* and the annexed Protocols contain concrete commitments by our country to implement the communities acquis as a whole, with the provision of timelines and deadlines for the implementation of environmental obligations.

EU policies in the field of waste management highlight the importance of an integrated approach to waste management, which includes the construction of waste disposal facilities together with measures for waste prevention and recycling in line with the hierarchy of principles: prevention of waste production and of its negative impact, recovery of waste by recycling, re-use and final safe disposal of waste where there is no possibility of recovery.

Romania has been granted *transition periods* to comply with EU Directives, as follows: (a) for municipal waste landfills until 2017; (b) the temporary storage of hazardous waste was allowed until 2009; (c) the storage of nonhazardous industrial waste was allowed until 2013. Thus, several warehouses would cease their activity, ensuring the gradual reduction of the quantities deposited in the non-compliant municipal warehouses.

Actions in the audited field aim at *implementing integrated waste management projects at national and regional level* through hierarchical investment orientation according to established priorities: prevention, selective collection, recycling, recovery, treatment, and disposal. Integrated management programs will progressively expand into rural areas by setting up collection services and eliminating uncontrolled landfills.

In this respect, the targets for 2015 are: the creation of 30 integrated waste management systems at regional / county level, the closure of 1500 small deposits located in rural areas and 150 old deposits in urban areas, the realization of 5 pilot projects for the rehabilitation of historically contaminated sites, improved sanitation services and waste management for an estimated 8 million inhabitants.

Regarding the *integrated waste management*, a gradual shift from waste storage to waste selective collection and recovery in a higher proportion of recyclable waste, including the transformation of organic waste into compost and the exclusive use of ecological landfills for urban deposits, is foreseen. Also, for rural areas, an increase in the implementation of integrated waste management systems is expected.

In 2013, the Romanian Government adopted a new decision (HG No. 870/2013), which launched a series of action lines, including:

- the priority of waste management efforts, in accordance and concomitant with the waste hierarchy;

- encouraging measures to prevent waste generation and re-use, promoting the sustainable use of waste;

- increasing the recycling rate and improving the quality of recycled materials;

- promoting the recovery of packaging waste;

- reducing the impact of waste-generated carbon;

- encouraging the generation of energy from waste that can not be recycled;

- organizing a national-level database and increasing the efficiency of the waste management monitoring process;

- iImproving services for the population by encouraging green investments, by rewarding those who reduce, reuse and recycle household waste;

- stepping up collaboration with the local public administration to increase the efficiency and the degree of waste collection and recycling.

#### Audit conclusions and findings General conclusions

Concerning the policy and legislative framework on waste management and greening of the industrially contaminated sites, most of the European waste management directives have been transposed into national law, but there are still a number of steps needed to improve the environment conditions in Romania.

Remediation of contaminated sites is one of the main components of sustainable community development, at every administrative level, but currently, there is no legislative framework in place in this respect in Romania.

Although in recent years environmental expenditures at the national level have shown a decreasing trend, the *waste management* sector was, however, the main beneficiary, this area being allocated the highest spending for. Expenditure on environmental protection at the national level was about LEI 52 billion (\$ 13 billion) for the period under review, which accounted for 3% of GDP for the same period. Out of the total, the largest share was spent on waste management - 57% i.e., 28 billion LEI (\$ 7 billion) respectively.

Financing of programs, projects, and investment objectives for the development of integrated waste management systems and the rehabilitation of historically polluted sites

Financing from the State budget - the legislative framework has been created, but the state funding rate for projects is still low, mainly due to the fact that at MMSC level there is no a well-defined operational procedure for the elaboration and substantiation of the annual requirements of funds for financing from the State budget the programs or subprograms and/or the investment objectives necessary to achieve the objectives of the approved multiannual programs.

The audit found that the MMSC did not adequately follow the way the beneficiaries fulfilled their obligations under the conventions concluded, did not secured the rhythmical financing of the projects according to the worksheets and has not pursued rigorously the implementation of the projects, which led to making non-economic expenses (consisting of the payment of damages for delays in the payment of bills or purchases made at values above those set out in the technical documentation of execution).

Financing of projects from the Environment Fund was insignificant during the period under review. Furthermore, due to lack of institutional capacity and inconsistent decision-making at MMSC level, the Financing Guide drafted in this respect could not be applied. Delays were also recorded in the case of the Environment Fund financing of tailings pond closure works in the mining sector, which led to the modification of the financing schedule and the setting of new start and completion deadlines, all after appropriate adaptation of the framework that governs the field.

The financing of waste management projects and the remediation of contaminated sites within the Sectoral Operational Program Environment (SOP ENV) was achieved with difficulty, the main cause being the reduced institutional capacity and the incoherence of decisionmaking among local beneficiaries - plus: the insufficient and interpretable normative framework governing public procurement, the lack of expertise of beneficiaries in the application of public procurement legislation, reduced institutional capacity and decision-making capabilities - which led to difficulties: delay in starting and in the execution of contracts for building new deposits and failing to approve the list of contaminated sites on time. However, solutions have been identified at the level of the Sectoral Operational Program for the Environment, which allowed to increase the degree of commitment of expenditures in 2014 at approx. 94% and the absorption rate at 24.13%.

Management of the greening of areas affected by industrial activities

There is a risk that the greening of the contaminated sites will be affected by the financial interests of the persons involved in the investigation work, as no instructions or methodological guide for the evaluation have been developed, which led to an under-identification of these sites.

- It is necessary to define clearly the concepts of *historically contaminated site* and of the *presently contaminated site* by the MMSC and to complete the appropriate legal framework as well as to establish criteria and procedures for the delimitation of the historical pollution from the current one. It must be taken into account that there exists the risk of challenging the validity of the documents related to the investigation, evaluation and remediation works of historically contaminated sites executed by some economic operators, which carried out investigations, evaluation, and remedial work at their expense through specialized firms.

- the MMSC should take steps to ensure that economic operators take all the necessary measures to prevent and/ or reduce as far as possible any adverse effects on the health of the population and on the environment as a result of waste management in the extractive industry, including the development of emergency plans in the event of environmental accidents. The MMSC database on potentially contaminated sites does not currently contain sufficient information on industrial or agricultural units that have been privatized with or without environmental obligations. The financial guarantee modes and the measures to develop the offer of financial instruments on environmental liability have not been established by the competent bodies

- addressing the remediation action of land affected by pollution and surrounding areas where pollution causes an unacceptable risk to the receptors, based on a national strategy and national action plan for the management of contaminated sites in Romania, which should be developed and approved.

- although the MMSC has monitoring, inspection and control functions, it was found that this authority does not have sufficient data on the fulfillment of the obligations by the landfill (waste deposits) operators, concerning the establishment of the *closure funds* and *post-closure tracking funds* for the landfills.

### Recommendations for improving the activity

As a result of this audit, a series of recommendations have been formulated to improve the MMSC activity, of which the most important are:

- MMSC should take the appropriate legal measures, and to undertake demarches on the drafting and approval with priority of the legal framework for the transposition of all relevant European directives in the national legislation and to comply with European legislation on the landfill and mining waste (will undertake steps to establish the legal framework concerning the need to carry out the investigation and evaluation of the geological environment, establishing the conditions for investigation and approval of the investigation programs for the contaminated sites, as well as for the development of specialized methodological guides);

- regarding the financing of the waste management activity, it was recommended *to develop a set of operational procedure* regarding the activity of substantiating the annual needs of funds, to undertake onthe-spot checks / inspections for the works carried out within the projects, to check the way the project purchases were carried out, and to verify how the ongoing projects are implemented;

- the MMSC will develop and approve *regulatory procedures* relating to: the content of the reports of investigation and preliminary or final evaluation, the elaboration of the risk assessment study, the substantiation of the remediation program, the content of the technical project for cleaning, remediation and/or ecological reconstruction, the completion report and others related;

- the MMSC will undertake *legal steps on contaminated sites*, that are required for preparing the approval - by common order of the central public authorities involved - of the list of all historical, orphaned, abandoned sites and the list of presently contaminated sites;

- MMSC will promote a *draft normative act to define forms of financial guarantee*, including insolvency, to enable economic operators to meet (to guarantee) their obligations;

- updating / completing the MMSC database on potentially contaminated sites with data and information on industrial and agricultural units that have been privatized with or without environmental obligations;

- taking the necessary measures by the MMSC to ensure that warehouse operators have provided and reserved the closure funds and post-closure funds, according to the legal provisions;

- organizing a system of *continuous professional training and instruction* for the personnel involved in the management of contaminated sites;

- updating the existing legislative framework, by modifying and completing it in order to effectively and uniformly address the stages involved in the remediation of contaminated sites.

# Conclusions

The aim of the paper is to present a brief *compte rendu* on recent, confirmed paradigm shifts in the economics: the sustainable economy and the new developments designated as eco-economy and circular economy.

A first point of interest of the paper is a concise but comprehensive enough presentation of concepts and definitions, on one side, accompanied, on the other side, by policy and strategic programmes (at both EU and national – Romania levels) in the field, promoted (and adopted) by both the political instances (governments) and by the international professional organizations of consolidated reputation.

The main contribution of the article consists of presenting the support that the external audit can bring to enhance the new evolutions in the economy and the implementation of the related projects thereof. In this respect, a specific audit mission with the Ministry of Environment of Romania is described as an applied case study. It includes the relevant specific issues as the audit approach and objectives, the relevant findings – and the causes thereof, the recommendations to align the current state to the new requirements and regulations.

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