

## ECO-RESOURCES MANAGEMENT AND THE CIRCULAR ECONOMY

Anca IUGA (BUTNARIU)

” Transilvania ”University of Brasov, Department of Engineering and Industrial  
Management, Braşov, România, ( [ancadezv@yahoo.com](mailto:ancadezv@yahoo.com))

DOI: 10.19062/2247-3173.2016.18.2.33

***Abstract:** Eco - Efficiency of resource use is to produce more value with fewer resources and change our consumption habits. This will limit the risk of shortages and maintain environmental impact in the planet's natural limits. It is a general principle that applies to all natural resources from food, timber and biodiversity to energy, metals, soil, water, minerals, air and earth. Increasing resource efficiency in Europe is a means by which the objectives of economic policy, social and environmental development can achieve easier, safer and more cost effectively.*

***Keywords:** eco-efficiency, eco-resources management, circular economy*

### 1. ECO-RESOURCES MANAGEMENT

Eco-management is a component of the general management system which includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining environmental policies. Resources management must pursue performance indicators, which must be fixed targets such as: quality of management, innovation, the attitude and decisions of managers, technological performance, motivation, profitability and public accountability.

There are several characteristics that emphasize the importance of natural resource management. First, the world is moving towards a situation of absolute scarcity of certain resources and capacities, and this scarcity can become an indirect constraint, which involves both difficulties and opportunities in terms of identification of integrated solutions. Second, resources are increasingly interdependent. Be resolved deficiencies of coordination between policies on water, energy and land to avoid the negative impacts of these interlinked. Third, although there are markets for pricing on traditional resources ( labor and capital), markets for pricing land and water - and prerequisites for clear property rights and data on conditions resources - are often inadequate, especially in countries in the developing world; or, if atmospheric carbon storage capacity, they are lacking. As the world is moving towards an absolute rarity of some of these resources, the poor people are the first to feel the pressure on their livelihoods.

### 2. NATURAL RESOURCES AND CIRCULAR ECONOMY

World natural resources are subject to new pressures due to increasing world population and economic growth globally.

It is estimated an increase of energy and water demand with 40% and with 50% of food by 2030 compared to current levels. In an interconnected world, these demand

pressures are exacerbated when solutions to resource constraints in one area creates additional difficulties in another area. It needs a new vision on the consumption of resources through inclusive and sustainable economic growth. Current economic system encompasses too many market failures to record positive results at all levels. Growing problems of climate change illustrates this clearly as possible difficulty. To face the challenges and to seize opportunities is appropriate to combine public and private actions. Three types of actors must tackle the difficult issues of resource consumption in order to achieve inclusive and sustainable growth. The public sector establishes the legislative framework and national regulation and, uses public expenditure and take coordination and facilitation actions.

The private sector can respond by enhancing inclusive and sustainable nature of its business models and investments for sustainable results. European Union can support poorer countries through internal policies on production and consumption, as an important trade partner and investor and through contributions to a global governance, and promoting greater coherence of development policies. All great actors must consider the full range of options in terms of managing the pressures acting on natural resources using circular economy principles. Because of the magnitude and urgency, it is needed transforming actions by combining four pillars: demand paradigms influencing to reflect scarcity values (sustainable consumption and production by reducing waste and changing lifestyles); qualitative and quantitative increase of supply ( partnerships on renewable energy, soils, water storage through appropriate financing, regulatory action and dissemination of knowledge); increasing efficiency ( technology transfer, national innovation systems); enhancing resilience to shocks and benefits for the poorest (benefit-sharing, social protection, Corporate Social Responsibility, inclusive land policy).

The ideal circular economy environment is composed of green companies and natural environment. Not all companies can adapt to circular economy new requirements. Some declare themselves as part of the green industry, but in reality belong to this business model. Businesses are within circular economy environment if implemented specific circular economy practices and have outstanding results in preventing pollution and restoring the environment. Opportunities and challenges in scientific research in the field of circular economy have no limits.

Natural resources are often used globally in a way that is not sustainable, resulting in additional pressure on raw materials, environmental degradation and threats to ecosystems. This trend is likely to increase, causing changes in the global population and economic growth models. By preventing the loss of valuable material streams, it creates economic opportunities and competitive advantages on a sustainable basis. Linear economy, based solely on the extraction of resources is no longer a viable option. Using resources more efficiently will also bring new growth and job opportunities. With the transition to a circular economy, the manager focus moves to reuse, repair, refurbishment and recycling of materials and existing products.

All resources need to be managed more efficiently throughout their life cycle. A successful transition towards a circular economy requires action at all stages of the value chain: from extraction of raw materials to the design of materials and products, production, distribution and consumption of goods, systems repair, remanufacture and reuse until to waste and recycle management. Areas of interest in the industry from top global green are: wind, water, solar energy, fuel cells, efficient construction, pollution control, waste reduction, reduction of pesticides, green environment [1]

These areas, meaning investment in research and technology development and production of green products, are covering clean energy resources and control of the main polluting industries, investment in shares of listed companies and equipment investments

(fixed capital). The circular economy and environmental resources management is shown in the FIG.1.

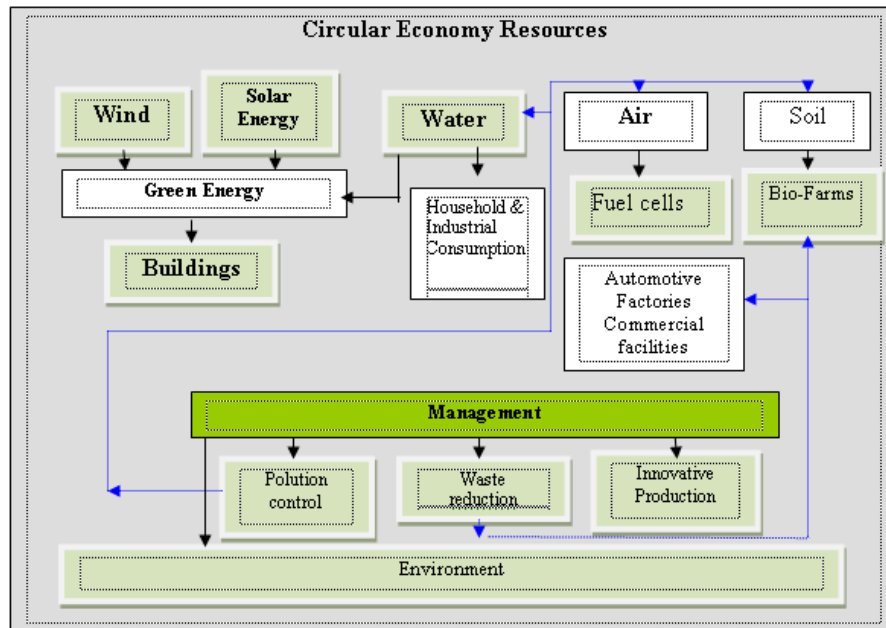


FIG.1 . Circular economy and environmental resources management (realized by the author)

### 3. ENVIRONMENTAL MANAGEMENT SYSTEMS (EMS)

Environmental Management System includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

EMS objectives are defined by: improving environmental performance; compliance with relevant legislation; informing the public of the action taken in the field of environmental protection; Continuously circular economy environmental performance improvement of organizations is achieved through: the organizations development and implementation of circular economy environmental management systems; the systematic, objective and periodic performance evaluation of these systems; providing information on circular economy environmental performance and maintain a dialogue with the public and other interested outside organizations; the active involvement of employees in their appropriate, initial and advanced environment training.

The steps implementation of the Circular Economy Environmental Management System are: identifying and prioritizing environmental issues; the organization should consider the direct and indirect environmental aspects of activities, products and services; identification of environmental aspects of circular economy factors: water discharges, air emissions, noise, leaking into the soil and groundwater, waste, energy and water use, dangerous substances and preparations, etc, ; setting circular economy environmental objectives and targets; implementation of an environmental management system; - Identify the circular economy legal requirements and other requirements; determining and ranking the competencies levels of all general management responsibilities within the organization; training and awareness of employees (Environment, Safety, Firefighting); internal and external communication.

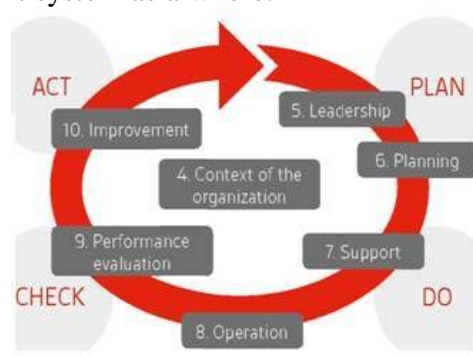
## MANAGEMENT

The relationship between the environment and socio-economic activities within the circular economy can be presented synthetically by assessing the activities environmental socio-economic impact and is performed on two main directions:

- One, with mandatory character for economic agents, to obtain approvals, agreements, operating licenses in relation to relevant institutions for environment protection. In this situation, the environmental impact assessment forms are regulated by national and E.U. environmental legislation.
- Other, with a voluntary nature for economic agents, stimulated by certain potential advantages, is committed to improve environmental performance.

The benefits of implementing a circular economy environmental management system are the next: improved circular economy environmental performance through the organization; easy integration into a quality management system; legal safety due to systemic observation of national circular economy environmental legislation; increase employee's engagement, motivation and commitment; cost savings through a systemic and proactive thinking and action; increased consumer confidence, government agencies and insurers; participate actively in minimizing pollution scourge.

With the new standard of Environmental Management Systems (ISO 14001), organizations will find it easier to incorporate their environmental management system into the core business processes and get more involvement from senior management. Figure 2 shows how the clauses of the new high level structure could also be applied the Plan-Do-Check-Act cycle. The PDCA cycle can be applied to all processes and to the environmental management system as a whole.



**FIG.2 .** The PDCA cycle can be applied to process and to the environmental management system as a whole.[7]

Figure 3 shows an integrated risk assessment of multiple factors including social responsibility, energy efficiency, carbon footprint or water usage. This risk assessment can be integrated with the aspects and impacts of risk assessment conducted in ISO 14001.



**FIG.3 .** Integrated risk assessment methodology for EMS including Energy, Social Responsibility (SR) and Sustainability . [7]

#### 4. ECO-EFFICIENCY, ECO-SUSTAINABILITY AND ECO-DESIGN CONCEPTS

Eco-efficiency is generally defined as the delivery of competitively priced goods and services that satisfy human needs while progressively reducing environmental impact and resource intensity of goods and services throughout their life cycle (WBCSD, 2000).

Within circular economy, eco-efficiency concept aims to combine ecological and economic efficiency so that firms are able to save money in the production and supply of goods and services, while reducing environmental impacts and resource intensity throughout the life cycle a product.

According with Vasile N. Popa, and Luminita I. Popa [6] eco-efficiency is a new concept in environmental management, which integrates environmental considerations with economic analysis to improve products and technologies and is a strategic tool and it is one of the key factors of it sustainable development. Eco-efficiency analysis allows finding the most effective solution taking into account circular economy aspects and environmental compatibility of products/technologies. The circular economy environmental impact should be as low as possible while the economic performance should be as high as possible. Eco-efficiency means reducing, slowing and delaying consumption of resources and generation of waste for a given output.

According with Vasile N. Popa, and Luminita I. Popa [6], eco-sustainability of electronics systems is an integration factor of eco-supportability, eco-maintainability, eco-reliability and eco-availability. By their opinion eco-sustainability of electronic products is a combined approach to balance environment with their sustainability. They have represented the role of eco-sustainability of electronics systems as an integration factor of eco-supportability, eco-maintainability, eco-reliability and eco-availability in the figure 4, below.

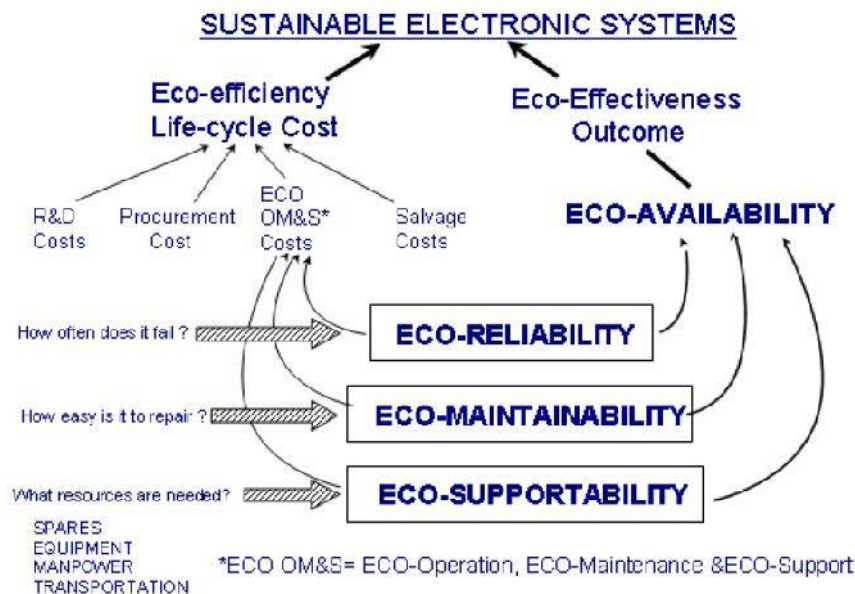


FIG.4 . Eco-sustainability of electronic systems[7]

#### 5. CONCLUSIONS

There are five golden rules for maximizing economic growth while reducing pressure on resources reserves:

1. Saving: we must seize opportunities to save resources whenever possible - some EU

## MANAGEMENT

economies are 16 times more effective than others;

2. Recycling: it is necessary to increase the level of recycling materials and reusing elements in the composition of products.
3. Substitution: we need to replace some key resources with alternatives that offer greater efficiency and which have a lower impact on the environment throughout their life cycle.
4. Reduction: it is necessary to change the way we meet people's needs, through new business models or goods and services that require an intake of less resources.
5. Evaluation: policy makers need to find ways to get properly consider the proper amount of natural resources in decision-making, thereby facilitating better management of natural resources reserves.

Learning to evaluate ecosystem services and natural resources and their right to determine the price, we will reduce pressure on the environment. Today, the companies within EU countries, as those who have business relationship or partnership with such organizations, are doing serious efforts to implement these eco- resources management systems by introducing these tools in new areas of activity and groups of products and services according with circular economy principles. It is necessary to use the earth's limited resources in a more sustainable way. Our society is based on metals, minerals, fuels, water, timber, fertile soil and clean air, which is equally vital to maintaining the functioning of our economy. We are using these limited resources much faster than they can recover, and if we do not change the approach, significant shortage may occur.

## REFERENCES

- [1] Top 10 Green Industries, June, 2009, Available at <http://www.investopedia.com/articles> in Green Investing, accessed on 15 Apr. 2016;
- [2] Circular Economy Package review phase. 08 June 2015 Economy, Available at <http://www.ecologic.rec.ro/articol/read/politici-economie/12053>, accessed on 15 Apr. 2016;
- [3] Moving towards a circular economy. Will the European Commission present year ambitious strategy circular economy in late 2015. Available at <http://ec.europa.eu/environment/circular-economy/>, accessed on 15 Apr. 2016;
- [4] European Commission, Commission Staff Working Document, Impact Assessment Summary, 02/07/2014. SWD (2014). Available at <http://eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=CELEX:52014SC0208&from=EN> ; accessed on 15 Apr. 2016;
- [5] European Commission, Environment Action Programmer "Living well, within the limits of our planet"(7thEAP),January2014 ;Available at <http://ec.europa.eu/environment/pubs/pdf/factsheets/7eap/en.pdf> , accessed on 15 Apr. 2016
- [6] Vasile N. Popa, and Luminta I. Popa, The role of ecoefficiency & ecoeffectiveness in electronics sustainability, Global Journal on Advances Pure and Applied Sciences [Online], vol. 1, no. 0,pp.760-766, 2013;
- [7] ISO 10001, 2015,Transition guide. Moving from ISO 14001:2004 to ISO 14001: The new international standard for environmental management systems . Bsi group, Available at <http://www.bsigroup.com/LocalFiles/en-MY/iso14001/revision/ISO-14001-transition-guide.pdf>, accessed on 15 Apr. 2016;